JOINT WORK SESSION MEETING WITH STORMWATER COMMITTEE
AGENDA
CITY OF CREVE COEUR
CITY COUNCIL
300 NORTH NEW BALLAS RD
FEBRUARY 26, 2024
6:00 PM

CALL TO ORDER

ROLL CALL

DISCUSSION ITEMS

1. **Approval of February, 12, 2024 City Council Joint Work Session Minutes**

2. **Watershed Management Plan**
   Summary: Tim Dean, the project's lead from Intuition & Logic, will present the draft Watershed Management Plan. City Council members will have an opportunity to ask questions and offer comments about the plan, and members of the Stormwater Committee have been invited to participate as well.

ADJOURNMENT

Pursuant to Section 610.022 RSMo., the City Council could, at any time during the meeting, vote to close the public meeting and move to closed session to discuss matters relating to litigation, legal actions and/or communications from the City Attorney as provided under Section 610.021(1) RSMo. and/or personnel matters under Section 610.021(13) RSMo. And/or employee matters under Section 610.021(3) RSMo. and/or real estate matters under Section 610.021(2) or other matters as permitted by Chapter 610.

Posted by: _____

Date/Time posted: _____

If you need special accommodations to attend a meeting, services may be arranged by contacting the Office of the City Administrator in advance.

JOINT WORK SESSION MEETING WITH ECONOMIC DEVELOPMENT COMMITTEE MINUTES
CITY OF CREVE COEUR
CITY COUNCIL
300 NORTH NEW BALLAS RD
FEBRUARY 12, 2024
6:00 PM

CALL TO ORDER

A joint work session meeting of the City Council and Economic Development Committee of the City of Creve Coeur was called to order by Mayor Robert Hoffman at the City Council Chamber, 300 North New Ballas Rd, City of Creve Coeur Government Center, Creve Coeur, MO 63141 on Monday, February 12, 2024, 6:00 at PM.

ROLL CALL

Mayor Robert Hoffman
Council Member, Ward 1 Mark Manlin
Council Member, Ward 1 Heather Silverman
Council Member, Ward 2 Tim Carney
Council Member, Ward 2 Nicole Greer
Council Member, Ward 3 Sari Neudorf
Council Member, Ward 3 David Hoffman
Council Member, Ward 4 Joseph Martinich
Council Member, Ward 4 Dan Tierney

Staff Present: City Administrator Mark Perkins, City Attorney Carl Lumley, Director of Community Development Jason Jaggi, Director of Public Works Jim Heines, Assistant City Administrator Sharon Stott, Chief of Police Jeffrey Hartman, Public Information Officer and Management Analyst Melissa Bradford, and City Clerk Kellie Henke.

Economic Development Committee Members Present: Chair Ned Maniscalco, Warren Davis, Roger Levy, Ramaa Vissa, and Lon Zimmerman.

Others Present: Emily Lohse-Busch, Executive Director of 39 North AgTech Innovation District.

DISCUSSION ITEMS

1. 39 North AgTech Innovation District Update

Emily Lohse-Busch, Executive Director of 39 North AgTech Innovation District, provided the background of the 39 North Innovation District and the strategic pillars of developing the physical footprint of the 39 North community, supporting the start-up/scale-up of companies within 39 North, and cultivating the development/amplification of St. Louis's agri-food tech narrative. Ms. Lohse-Busch presented an overview of economic development activities that 39 North has implemented over the past 6-month period, including accomplishments towards key metrics for economic development marketing, business retention and expansion, business attraction, and strengthened relationships

with State and Regional Economic Development Organizations.

Ms. Lohse-Busch stated there are currently thirty-three AgTech companies located within the 39 North District and real estate is available for re-purposing. Ms. Lohse-Busch stated pre-construction planning is underway on three existing buildings within 39 North that have been identified as potential “graduation space” opportunities for agtech/agri-food tech companies. Ms. Lohse-Busch stated 39 North has been approved for grant funding that will be used towards an existing conditions analysis of the Innovation District, which will include a conditions assessment of land use policy and potential economic constraints that may exist in the area. Ms. Lohse- Busch stated 39 North will use the findings from the reports to create a full understanding of baseline conditions for real-estate development opportunities within 39 North.

Council Member Neudorf left the meeting at 6:28 pm and returned at 6:29 pm.

Ms. Lohse-Busch stated companies have indicated that one of the most significant values of 39 North is the proximity to and connection with peers and colleagues. Ms. Lohse-Busch stated 39 North is in final lease negotiations for a space in Creve Coeur that would be serve as the 39 North Collaboration Hub and be used to host community events for current and prospective tenants and investors. Ms. Lohse-Busch stated Washington University is conducting a study to identify the point in development that an AgTech company would decide to move and what they look for when relocating.

Ms. Lohse-Busch stated 39 North will be attending and serving on discussion panels for two major national agtech/agri-food tech conferences this year, South by Southwest (SXSW) and World AgriTech.

City Administrator Mark Perkins recognized Ms. Lohse-Busch for her many accomplishments thus far as executive director of 39 North.

ADJOURNMENT

The meeting adjourned at 6:50 pm.

Submitted by:

Kellie Henke
City Clerk

Dr. Robert Hoffman
Mayor

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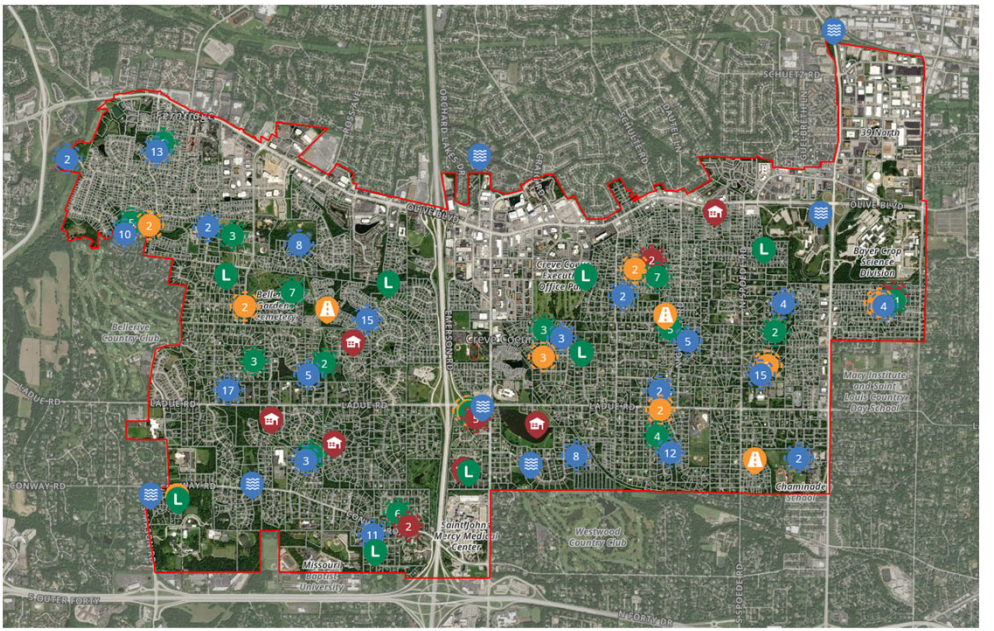
City of Creve Coeur Watershed Management Plan



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February 2024

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City of Creve Coeur Watershed Management Plan

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Timothy Patrick Dean
MO# E-2008019536

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Table of Contents

Executive Summary ES-1

Section 1 – Data Collection and Coordination

1.1 Watershed Inventory 1-1
1.2 Study Methodology 1-2
1.2.1 Public Involvement 1-3
1.2.2 Stormwater Issues & Site Investigations 1-3
1.2.3 Channel Condition Assessment 1-4

Section 2 – Public Involvement

2.1 Public Participation Process 2-1
2.1.1 Open House Events 2-1
2.1.2 Website and Newsletter 2-3
2.1.3 Online Survey 2-4
2.1.4 Social Media Posts 2-5
2.1.5 Community Outreach 2-7

Section 3 – Stormwater Problem Site Investigation

3.1 Introduction 3-1
3.2 Methodology 3-1
3.3 Summary 3-4
3.3.1 Overland Flow Issues 3-4
3.3.2 Channel Issues 3-5

Section 4 – Channel Condition Assessment

4.1 Introduction 4-1
4.2 Methodology 4-3
4.3 Channel Condition Results 4-10
4.3.1 Deer Creek Watershed 4-10
4.3.2 Creve Coeur Creek Watershed 4-12
4.4 Reach Summary Results 4-15
4.4.1 Deer Creek Watershed 4-15
4.4.2 Creve Coeur Creek Watershed 4-17
4.5 Stream Recommendations 4-20

Section 5 – Potential Projects

5.1 Introduction 5-1
5.2 Evaluation Approach 5-1
5.2.1 Typical Problem Solutions 5-2
5.3 Cost Development Approach 5-4

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5.4 Results 5-5
5.5 Private Issues 5-8

Section 6 – Prioritization Methodology

6.1 Introduction..... 6-1
6.2 Prioritization Approach..... 6-1
6.2.1 MSD Stormwater Project Prioritization System 6-1
6.2.2 Creve Coeur Prioritization Methodology 6-2
6.3 Results 6-3

Section 7 – Implementation

7.1 Introduction..... 7-1
7.2 Potential Project Implementation 7-1
7.3 Project Funding 7-2
7.4 Coordination Efforts 7-3
7.5 Stormwater Ordinance Review for Mitigation BMPs..... 7-3
7.5.1 Mitigation BMP Criteria Comparison 7-3
7.5.2 Mitigation BMP Modeling Approach 7-4
7.5.3 Mitigation BMP Modeling Results 7-5
7.5.4 Mitigation BMP Conclusions 7-6
7.5.5 Stormwater Ordinance Recommendations 7-6

Appendices

Appendix A - Glossary and References
Appendix B - Public Materials
Appendix C - Stormwater Problem Sites
Appendix D - Channel Condition Assessment Field Data
Appendix E - Potential Projects
Appendix F - Cost & Prioritization Summary
Appendix G - Cost & Prioritization Methodology
Appendix H - Meeting Notes

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Figures

ES-1 Channel PPs ES-2
ES-2 Stormwater PPs ES-3
1-1 Creve Coeur Study Reaches 1-4
2-1 Open House #1 2-1
2-2 Open House #1 2-1
2-3 Open House #2 2-2
2-4 Open House #3 2-2
2-5 Open House #4 2-2
2-6 City Newsletter 2-3
2-7 City Website Project Page 2-3
2-8 Online Survey Tool 2-4
2-9 Arbor Day Celebration 2-7
4-1 Channel Evolution Stages 4-2
4-2 Creve Coeur Study Reaches 4-4
4-3 Creve Coeur Study Reach Names 4-8
4-4 Straightened Channel 4-11
4-5 Bank Cutting Near Roadway 4-11
4-6 Mass Wasting Threatening Transmission Tower 4-13
4-7 Creve Coeur Channel Condition Scores 4-14
4-8 Creve Coeur Stream Channel Dominant Process 4-19
4-9 Rectangular Concrete Channel With Grade Control Drops 4-20
5-1 Rock Grade Control Structure Detail 5-2
5-2 Bank Stabilization Structure Detail 5-2
5-3 Rock Armor and Scour Protection Detail 5-3
5-4 Channel PPs 5-6
5-5 Stormwater PPs 5-7
5-6 Private Issues 5-8

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Tables

4.1 Stream Naming Convention....4-6
4.2 Average Field Score Per Channel Condition Rating Category 4-10
4.3 Number of GOOD, FAIR and POOR Field Scores 4-11
4.4 Average Field Score Per Channel Condition Rating Category 4-12
4.5 Number of GOOD, FAIR and POOR Field Scores 4-12
4.6 Deer Creek Watershed Reach Summary....4-15
4.7 Creve Coeur Creek Watershed Reach Summary....4-17
5.1 PP Results....5-5
6.1 PP Priority List....6-4
7.1 Flows for Drainage Area A6 That Contains the Single Lot Redevelopment Site..7-5
7.2 Watershed Redevelopment Flowrate Results for the 15-year Storm (cfs) 7-5

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Executive Summary

Introduction

The City of Creve Coeur (City) has updated its citywide Watershed Management Plan. Watershed Management Plans are one of the tools that the City Staff, the Stormwater Committee, and the City Council use as a guide for planning future stormwater projects and determining the direction of the Stormwater Program. This plan will help ensure that City funds are used effectively and wisely in delivering stormwater management benefits to residents across the City.

The City's first Watershed Management Plan was developed in 1999. The management plan was updated in 2012. This report represents the third update of the City's Watershed Management Plan. The purpose of the Watershed Management Plan is to identify needed Potential Projects (PPs) for flood reduction and stream stability.

The project team was led by the City. The City retained the consultant team of Intuition & Logic Engineering, Inc. (I&L), in association with EDM Incorporated and AMPM Consulting.

Public Participation

As part of the Watershed Management Plan development, a public participation process was used to solicit input from area residents and other interested parties. The public participation process included the following:

- Four open houses in March 2023, May 2023, September 2023, and January 2024.
- Project updates and information on the City's website and social media to post preliminary results and upcoming events
- Use of Social Pinpoint to collect data on stormwater issues from property owners

The public input and feedback received during this process was used by the project team to formulate and refine the watershed management plan recommendations. Section 2 provides further details regarding the public participation process.

Potential Projects

The results of the geomorphic, hydraulic, and hydrologic analyses formed the foundation for identifying problem areas in the watershed. Potential improvement projects addressing each problem area were evaluated based on design considerations, economic feasibility, and overall efficiency.

The Watershed Management Plan includes 102 total projects further divided into 20 structure/culvert projects, 48 bank stabilization projects, and 34 overland flooding projects. The general locations of the projects are shown in Figures ES-1 and ES-2. The total cost for all 102 projects is estimated to be approximately $33.9 million using 2023 material and construction costs. Funding for these Potential Projects may include, but not be limited to, the City's one half-cent capital improvement sales tax, one half-cent parks and stormwater sales tax, transfers from the City's general fund, and grants from local, state, and federal aid programs.

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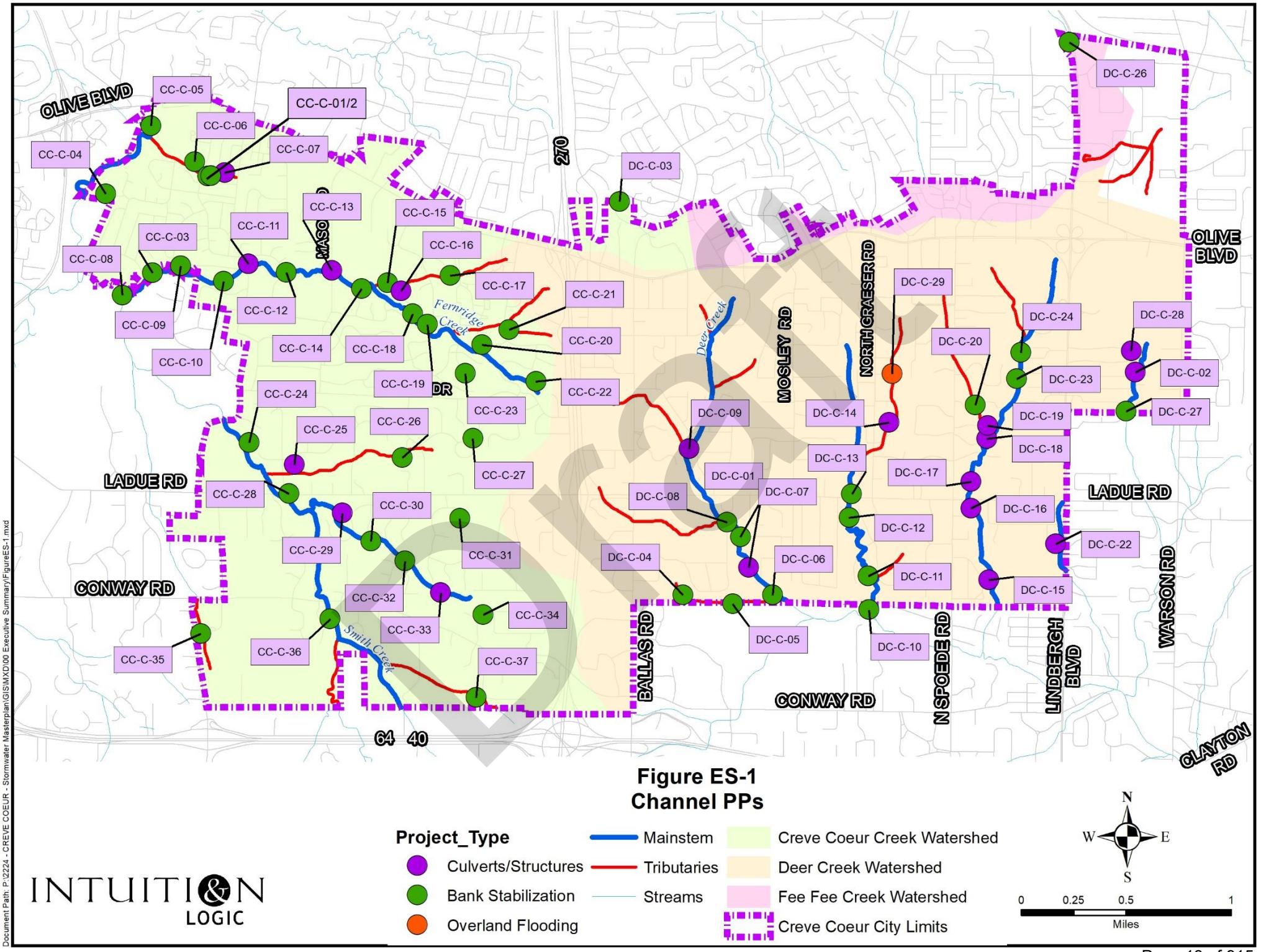
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CONWAY RD
WARSON RD
CLAYTON RD
LINDBERGH BLVD
N SPOEDE RD
BALLAS RD
MOSLEY RD
NORTH GRAESER RD
Fernridge Creek
Deer Creek
Smith Creek
Figure ES-1
Channel PPs
Project_Type
Culverts/Structures
Bank Stabilization
Overland Flooding
Mainstem
Tributaries
Streams
Creve Coeur Creek Watershed
Deer Creek Watershed
Fee Fee Creek Watershed
Creve Coeur City Limits
N
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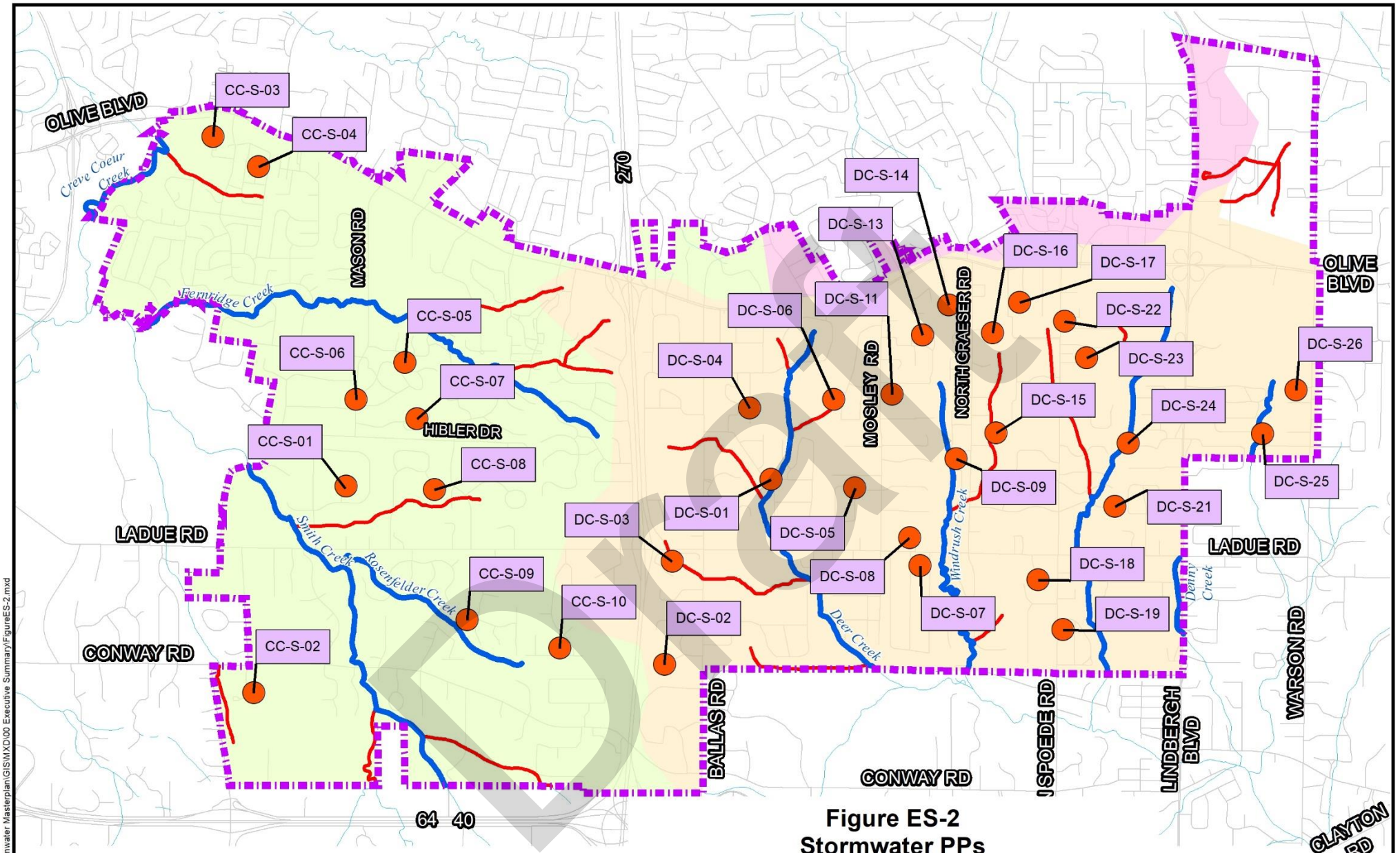

Figure ES-2
Stormwater PPs

Project_Type
- Overland Flooding
- Mainstem
- Tributaries
- Streams

- Creve Coeur Creek Watershed
- Deer Creek Watershed
- Fee Fee Creek Watershed
- Creve Coeur City Limits

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The City modified MSD's Prioritization Methodology to establish a consistent, defensible methodology for ranking Potential Projects for implementation. The Prioritization Methodology divides projects into problem solved and solution benefit categories. For each project, a ranking worksheet is used to assign points under each category, with the goal of developing an overall cost/benefit ratio. The projects with the higher ratios are considered a higher priority. A priority list and further detail on each project are found in Section 6.

Summary

The Watershed Management Plan provides the necessary planning tools and improvement projects to address potential stormwater issues in the City. By using the detailed study information and applying the Management Plan elements described above, multiple goals will be achieved including:

- An engineering-based tool to guide the City in choosing projects for the Stormwater program
- Maximized benefits to residents
- Reduction of risks to public safety, public health, and damage to public infrastructure and private property
- Allows the City to secure grant funding which will allow the City to complete more projects in a shorter period of time

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Section 1
Data Collection and Coordination

1.1 Watershed Inventory

The watershed inventory consisted of collecting, compiling, and evaluating existing data applicable to the development of both the Watershed Management Plan and new data sets. A data search was conducted to identify existing information that could be used by the project team throughout the development of the Watershed Management Plan. Below is a general list of existing data collected:

Geographic Information System (GIS) data files:

- Addresses
- Aerial imagery
- Basin boundaries
- Census blocks
- City limits
- Contours
- Federal Emergency Management Agency (FEMA) Data
- Fire districts
- Floodplain data
- Impervious areas
    - Bridges
    - Buildings
    - Driveways
    - In-ground pools
    - Parking
    - Patios
    - Recreation areas
    - Sheds
- Lakes, streams, and waterbodies
- Light Detection and Ranging (LiDAR)
- MO 2018 Public Land Survey System (PLSS)
- Metropolitan St. Louis Sewer District (MSD) data
    - Sanitary
    - Storm
- National Hydrography Dataset (NHD) Data
- Parcels
- Parking islands
- Parks
- Paved drainageways
- School districts
- St. Louis County GIS Data
- Subdivisions
- Transportation
    - Islands
    - Metrolink
    - Railroads
    - Roads
    - Sidewalks
        - Ramps
- Wards
- Watershed boundaries
- Zoning

Hydrology & Hydraulics (H&H) Models:

- Creve Coeur Creek FEMA
- Fernridge Creek FEMA
- Smith Creek FEMA
- Monsanto-Sunswept Creek FEMA
- Deer Creek FEMA

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- Westwood Creek FEMA

Reports:

- City of Creve Coeur 1999 Stormwater Evaluation Final Report
- City of Creve Coeur 2012 Stormwater Master Plan Update

Websites:

- City of Creve Coeur Stormwater Information
  - https://www.crevecoeurmo.gov/stormwater
- St. Louis County GIS Viewer
  - https://data-stlcogis.opendata.arcgis.com/apps/property-lookup/explore
- Deer Creek Watershed Alliance
  - https://www.deercreekalliance.org/
- East-West Gateway Council of Governments
  - https://www.ewgateway.org/

The above data and data sources may not be directly utilized or referenced in this Watershed Management Plan, but rather represent the body of data available for our reference and use as we developed the plan.

During the study, new data sets were developed using GIS technology including:

- Geomorphic and channel data
- Resident reports about stormwater issues on Social Pinpoint, the online map-based reporting tool
- Potential projects/areas of concern
- Other information obtained from the field investigation

New data generated consist of:

- GIS files
- The watershed report in PDF and Microsoft Word formats
- Images/photos
- Any subsequent supplemental data

1.2 Study Methodology

This Creve Coeur Watershed Management Plan includes:

- Public involvement
- Hydraulic and hydrology data summary
- Stormwater issues site investigations
- Channel condition assessments.

Each of these study components was then considered in the development of potential capital improvement projects. A summary of each component is provided below.

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1.2.1 Public Involvement

Public involvement consisted of newsletter and email notifications, an online, map-based stormwater questionnaire, four open house events, and a table at the City's Arbor Day Celebration.

The online questionnaire was used to identify the location and nature of stormwater issues throughout the City. The questionnaire link was posted on the City's website, promoted on the City's social media accounts, and in the City's newsletters. Responses from Creve Coeur residents were compiled into a database and engineering teams visited each site as part of the evaluation process.

Four public open house events were held to seek input from residents and to present findings from the Watershed Management Plan. The first public meeting served to:

- Present historically known issues
- Familiarize residents with the website and help residents use the online map-based reporting tool
- Solicit reporting of other flooding or erosion issues from the residents

The second public open house event served to present the data collection results to the residents.

At the third public meeting, residents learned about identified Potential Project (PP) approaches to the stormwater problems.

The fourth public meeting focused on the compiled and prioritized list of PPs by category and the implementation strategy. See Section 2 of this report for detailed information.

1.2.2 Stormwater Issues & Site Investigations

The analysis of stormwater concerns was conducted to identify flooding or erosion issues within the City. Under the plan, identified issues are evaluated and considered for the possibility of becoming a project in the City's future Capital Improvement Programs. The following methodology was used for site investigations:

- Coordinate with the City and MSD to identify and locate historical stormwater issues
- Evaluate stormwater questionnaire online survey results to locate additional stormwater concerns
- Review existing GIS data and previous reports containing information regarding the previously identified stormwater issues
- Develop GIS maps of the identified stormwater issues
- Perform site visits to determine the nature and scope of the problem, identify public and private infrastructure affected, and develop a potential solution with project extents

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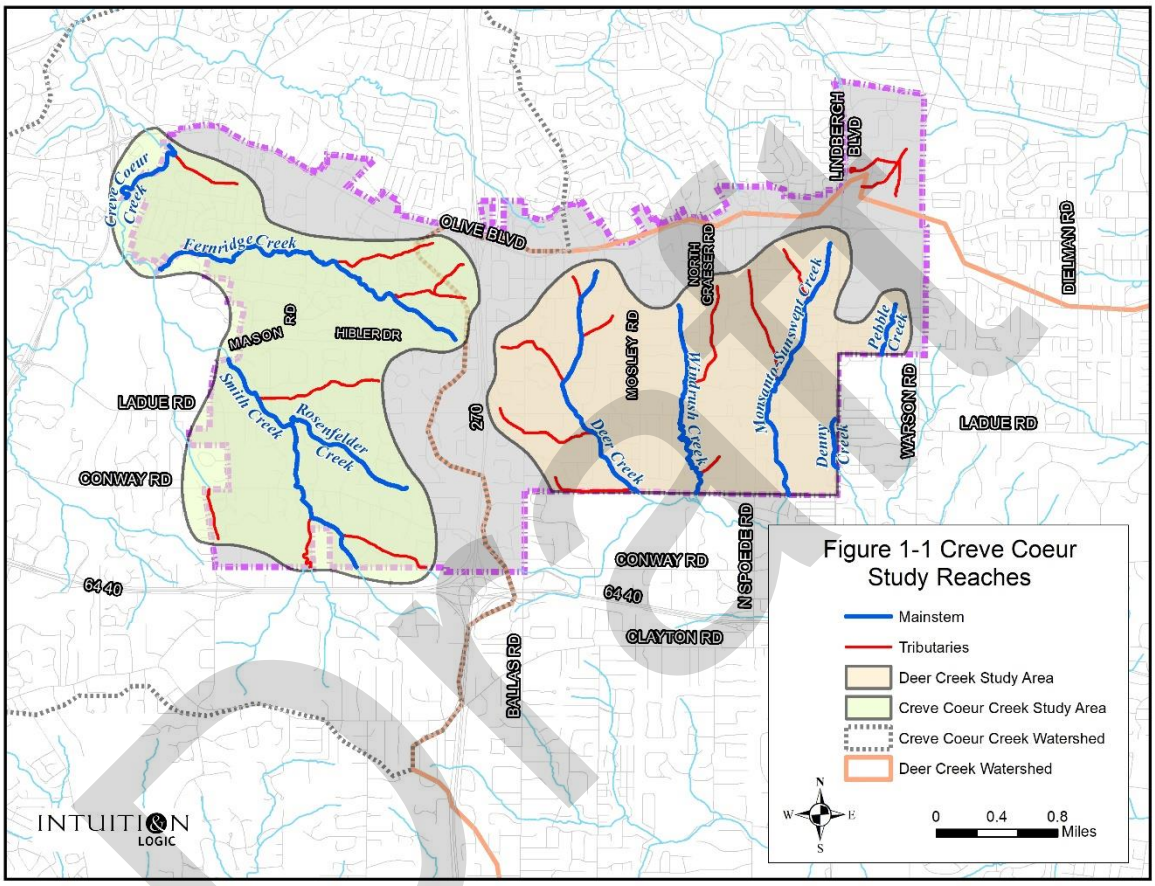
See Section 3 of this report for a detailed description of site investigations, evaluations, and results.

1.2.3 Channel Condition Assessment

The geomorphic evaluation is based on field reconnaissance of about 20 miles of channel as shown in Figure 1-1.



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The Creve Coeur Creek Watershed fieldwork limits included:

- Smith Creek
- Rosenfelder Creek
- Fernridge Creek
- Creve Coeur Creek
- And the above creeks' respective tributaries

The Deer Creek Watershed fieldwork limits included:

- Deer Creek
- Windrush Creek
- Monsanto-Sunswept Creek
- Denny Creek
- Pebble Creek
- And the above creeks' respective tributaries

A small tributary in the upper River Des Peres Watershed was also included in the study limits. The tributary fieldwork limits were developed by focusing on the higher stream order reaches (the larger channels). The tributary upstream fieldwork limits began where there was one mile or more of identified drainage way contributing to the tributary. Typically, the upstream stopping point was set to the nearest roadway or confluence. Some exceptions to the contributing stream length were made where the tributary was fed by a development or where known issues were present.

Along each reach, geomorphic data points were collected in GIS during the field investigation. This data enabled reconnaissance-level analysis of reach stability. Field data was collected using the following data categories:

1) Bank soil texture and coherence per Uniform Soil Classification using the visual-manual procedures (ASTM D 2488-00)
2) Average bank slope angle as measured where obvious breaks in slope create a top of bank and toe of slope
3) Average bank height as measured from the lowest point in the channel cross section to the top of bank
4) Vegetative bank protection
5) Bank cutting
6) Mass wasting (wedge or slide slope failure)
7) Bar development
8) Debris jam potential
9) Obstructions, flow deflectors, and sediment traps
10) Channel bed material consolidation and armoring
11) Percentage of channel cross section constriction
12) Sediment movement
13) Sinuosity
14) Opinion of dominant process

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For each data point, the data categories are weighted and scored to provide an overall indication of stability. The data points were then summarized to provide an overall reach score. Each reach is also given an opinion of dominant process that is based on field staff's observations.

Field data was also collected at potential project locations including:

- Project type (Bed stabilization and/or bank stabilization)
- Project length
- Brief problem description
- Brief recommended solution description
- Additional notes as needed

See Section 4 for a detailed description of the channel condition assessments and results of the geomorphic data points and indicators as listed above.

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Section 2
Public Involvement

2.1 Public Participation Process

Residents and stakeholders were offered a variety of ways to provide input to the study and to contribute to the development of alternative concepts and solutions. Each public involvement activity provided the project team with ideas for presenting and refining its recommendation. The following is a summary of the various components of the public participation process.

2.1.1 Open House Events

Four open house events for the Creve Coeur Watershed Management Plan were held during the study to solicit input, update the public on the status of the study, and to present preliminary results. The events were advertised by a direct mail newsletter, advertising through the City's social media, and advertising on the City's website. The open house events followed the same general format consisting of information stations at which the attendees could inquire more about the study and discuss their concerns with representatives from the project team. The open houses were held at the Creve Coeur Government Center, 300 N New Ballas Road on March 22, 2023, May 17, 2023, August 20, 2023, and January 17, 2024. A summary of the open house events is provided below.

Figure 2-1: Open House #1

Over 30 residents participated in the first open house held on March 22, 2023. The first open house was designed to present historically known issues, watershed management plan study components, resident comment tools, and to solicit reporting of flooding or erosion issues from the residents. Participants were encouraged to visit information stations set up around the room that provided specific information on the Channel Condition Assessment, Stormwater Problem Site Investigation, and Prioritization Ranking Methodology. Tablets were also provided for the residents to provide feedback through the City's online survey tool.

Figure 2-2: Open House #1

15 residents participated in the second open house held on May 17, 2023. The second open house was designed to be a continuation of the first open house. At the second open house, the residents were provided with an update on the watershed management plan process and

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Figure 2-3: Open House #2

an overview of the watershed management plan findings, including: channel condition assessment, stream dominant process, and identified flooding, stormwater, and erosion issues throughout the City. I&L gave a short presentation to highlight the findings to date and reviewed the next steps. Participants were then encouraged to visit information stations set up around the room that provided specific information on the various findings.

Figure 2-4: Open House #3

9 residents participated in the third open house held on September 20, 2023. The third open house was designed to be a continuation of the first two open houses. At the third open house, the draft Potential Projects to address the identified problems were presented to the residents along with the methodology for prioritization and implementation. This meeting was also used to give the residents a chance to review the project locations and present any additional sites or feedback on the project extents. Participants were encouraged to visit information stations set up around the room that provided specific information on the project approaches, prioritization, and implementation.

Figure 2-5: Open House #4

10 residents participated in the fourth open house held on January 17, 2024. The fourth open house was designed to be a continuation of the first three open houses. I&L gave a short presentation to run through the overall watershed management plan process, findings, and next steps. The residents were presented with the compiled and prioritized list of PPs. Participants were encouraged to visit information stations set up around the room that provided specific information on the PPs.

In addition to the Open Houses, presentations were made to City Council on June 26, 2023 and February 26, 2024. The first City Council meeting presented the Channel Condition Assessment, Stream Dominant Process, and identified flooding, stormwater, and erosion problems. The second City Council meeting presented the proposed Potential Projects, Implementation Program, and Watershed Management Plan Report.

2.1.2 Website and Newsletter

A series of monthly newsletters (City of Creve Coeur Newsletter) and a project website were used to supply information about the study process and Watershed Management Plan recommendations. Each newsletter edition provided an effective means of informing the public about key aspects of the project. The newsletters were sent to all residents of the City of Creve Coeur. See Appendix B for a copy of each Newsletter.

City of CREVE COEUR Newsletter
the heart of community & commerce
March 2023
Citizens to Vote on Proposition M on Tuesday, April 4
Fast Facts About Creve Coeur's Proposition M
This Issue
Residents Invited to Watershed Management Open House
Wednesday, March 22, 2023 • 6:30–8:00 p.m. • Creve Coeur Government Center

Figure 2-6: City Newsletter

The project website was another mechanism used to inform the public about the progress of the study. The website contains general background information, an online survey link, open house dates, preliminary study results, and handout materials that were distributed at the open houses. The website was regularly updated throughout the study process and was used to advertise upcoming events.

A copy of the public participation materials including newsletters, presentations, and exhibits are provided in Appendix B.

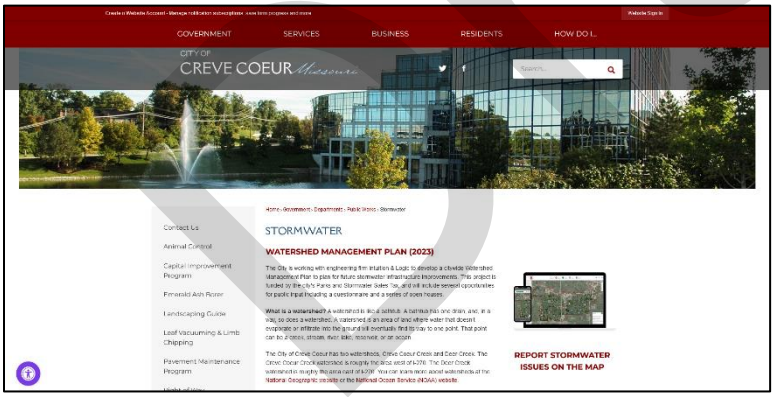

Figure 2-7: City Website Project Page

2.1.3 Online Survey

An online survey tool was used to collect resident feedback/stormwater issues. The online survey was advertised on the City's newsletters and a link was provided on the City's

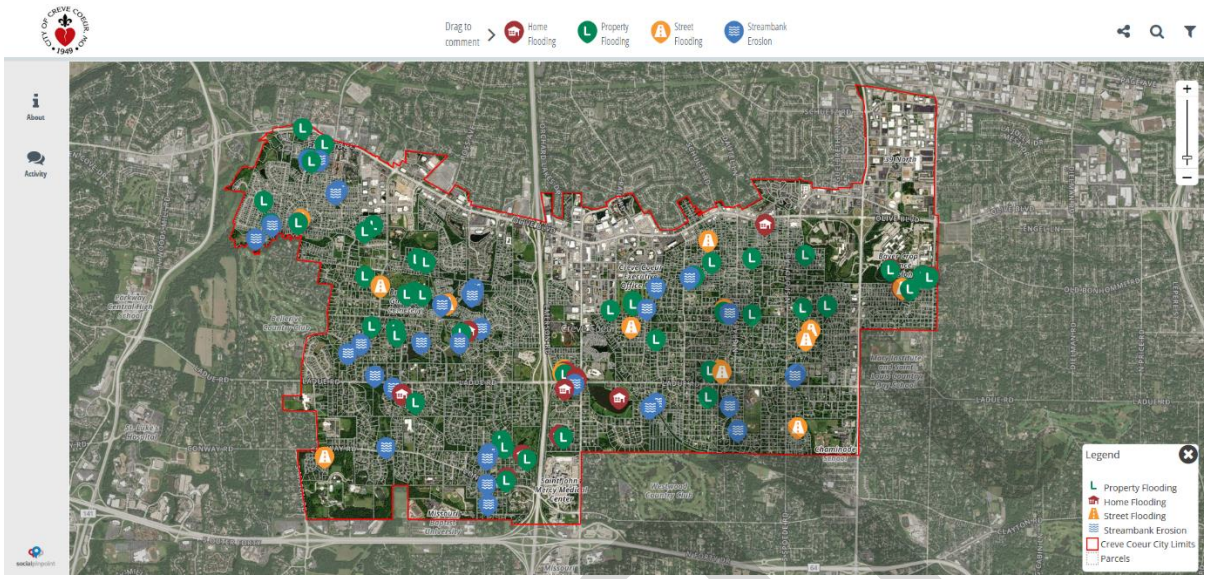

Figure 2-8: Online Survey Tool

website. Residents were able to drop points for stormwater issues such as home flooding, property flooding, street flooding, and streambank erosion. Further information could be provided such as a description of the problem, a photo of the problem, and survey questions related to the problem itself. Each stormwater issue was reviewed and followed up with a site visit to gather additional information and identify potential approaches to address the problem. Refer to Section 3 for more information on the site investigations.

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2.1.4. Social Media Posts

During Phase I, the online survey and Open House events were promoted on the City's social media accounts.

From Twitter:

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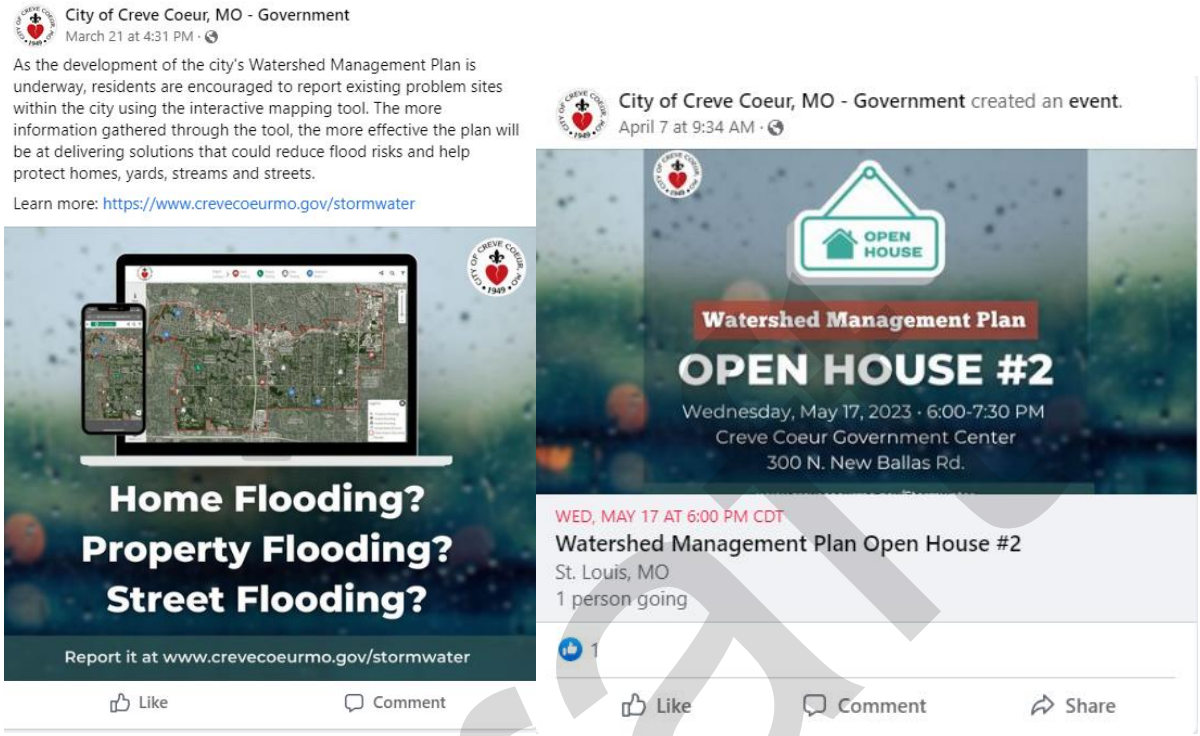
From Facebook:



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From Instagram:

2.1.5 Community Outreach

Stormwater Committee Members and City Staff met in-person with residents at the Creve Coeur Arbor Day Celebration & Art Contest on Sunday, April 30th, 2023. Approximately 25 residents learned about the Watershed Management Plan and were invited to report known stormwater issues to the online survey tool using an iPad. Residents were also encouraged to take and then share an informational flyer that had been also used at Open House events and is available at the City's Government Center and the Dielmann Recreation Center.

Figure 2-9: Arbor Day Celebration

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Section 3
Stormwater Problem Site Investigation

3.1 Introduction

The Stormwater Problem Site Investigation is a crucial component of the Watershed Management Plan. The investigation aims to review stormwater issues reported by residents within the City and determine if the issues meet the City's criteria for being addressed as a Potential Project. This section contains the review methodology, a summary of each problem area, and general recommendations or follow-up analysis needed to develop a project approach. The investigations use a systematic process to review and document each reported stormwater issue. The process involves review of available information, site visits, and discussions with the residents to identify the scope of the reported issue. A methodical investigation process ensures that each reported stormwater issue is understood and the public was heard.

3.2 Methodology

Stormwater site investigations followed a structured approach to review reported issues. Issues reviewed were reported by residents via the web on the Social Pinpoint Map (See Public Involvement Section), previously reported issues listed in the 2012 Stormwater Master Plan Update, or identified in the field as part of this study. The following steps were taken as part of the structured review approach:

A. Step 1: Consolidate Issues

   All identified issues were cataloged into a single map-based database. The database included the project location, contact information for the reporting party, issue type, and notes on the reported issue. It was not uncommon for residents who had reported issues to the City in the past to also post the issue on the Social Pinpoint Map. It is also not uncommon for the same issue to be reported on the Social Pinpoint Map multiple times either by the same person or by neighbors.

B. Step 2: Identify Project Areas

   The issues were laid out on a map, grouped into project areas, and given a project name and identification number. The project areas consist of two main types.

   1. Individual Issues

      Individual issues affect an isolated property. For individual issues, property addresses are used as the project name.

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2. Group Issues

   Group issues that are geographically clustered together or have a similar source were grouped as one project area. Group issues are typically located in a single subdivision or in a linear fashion along a channel or storm sewer line. For group issues, the project name is typically the name of a central property address.

C. Step 3: Categorize Issues

Issues were categorized as either Overland Flow or Channel. Overland Flow issues typically consist of yard erosion, yard ponding, structural flooding, or other issues of a similar nature. Channel issues typically consists of creek erosion or bank instability.

D. Step 4: Investigate Issues

The purpose of the investigation is to gather enough basic background information about each issue to determine if the issue meets the City's criteria to potentially become a public project.

1. Overland Flow

   The investigation of the overland flow issues begins as a desktop investigation using submitted descriptions of the problem, including photos and video data. Available background information is collected at each site to determine the scope of the problem. The desktop review included LiDAR DEM terrain data for the entire City, MSD basemap data of the storm sewer system and two-foot contours, and current aerial imagery. If needed, information was used including: historical aerial photos, MSD review plans (if available through the Accela online portal), and Google Street view. Lastly, some sites were visited to confirm the desktop review of the information. If additional information was still needed to adequately define the scope of the problem, a follow up was performed by phone or email if the homeowner's contact information was available.

   The LiDAR DEM terrain data is a one-meter by one-meter grid of elevation data. This data was processed using TauDEM (**T**errain **A**nalysis **U**sing **D**igital **E**levation **M**odels). TauDEM is a suite of Digital Elevation Model (DEM) tools for the extraction and analysis of hydrologic information from topography as represented by a DEM. The primary extracted hydrologic information was flowpaths and accumulated drainage areas. The DEM data was processed to fill in the low spots so that the entire contributing area drains and does not pond in localized low areas. Flow paths were then developed along with the accumulated drainage area. This allows for an estimated drainage area anywhere in the City. An estimated drainage area was identified for the majority of the problem areas (typically not needed for the channel erosion sites). These drainage area estimates are based on how the surface terrain drains without any storm sewers and without buildings.

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Ground surface slopes were also determined as part of the review for overland sites with yard erosion issues.

Flows were estimated for those areas where the storm sewer may be a contributing factor to flooding. Watersheds from the TauDEM were used along with MSD impervious areas to estimate the percent impervious of each watershed. Flows were calculated based on the MSD P.I. factors where P = .35 + .0042 x %IMP for the 20-min storms with I_{15} = 4.6 and I_{100} = 6.2.

2. Channel Investigations

Similiarly to the process for investigating overland flow, channel investigations began with a desktop review. Problem areas outside of the channel condition assessment reaches were followed up on with a site visit. As part of the desktop investigation, the FEMA Flood Insurance Study report, Flood Insurance Rate Map, and hydrologic/hydraulic models (where available) were reviewed for the channel sites.

E. Step 5: Potential Project Criteria Review

The City developed the following criteria to provide guidelines for a problem area to be considered for a Potential Project. Problem areas that do not meet the criteria may still be considered for the City's Stormwater Grant Program. If one or more of the following are applicable, then a publicly-funded solution might be considered.

- Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue? If yes, then a publicly-funded solution might be considered.
- Does the stormwater issue threaten public or private structures? If yes, then a publicly-funded solution might be considered.
- Does the stormwater issue threaten public or private roadways? If yes, then a publicly-funded solution might be considered.
- Does the stormwater issue threaten public infrastructure or publicly-funded improvements? If yes, then a publicly-funded solution might be considered.
- Is the issue caused by an undersized stormwater conveyance infrastructure? If yes, then a publicly-funded solution might be considered.
- Does the proposed project address regional or systematic channel instability? If yes, then a publicly-funded solution might be considered.
- Would a solution protect water quality or natural resources? If yes, then a publicly-funded solution might be considered.
- Was the issue caused by altered upstream conditions? If yes, then a publicly-funded solution might be considered.
- Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations? If yes, then a publicly-funded solution might be considered.

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- Was the issue caused by inadequate maintenance of a public system? If yes, then a publicly-funded solution might be considered.
- Will the project improve public safety? If yes, then a publicly-funded solution might be considered.
- Has the stormwater issue been identified as a monitor project? If yes, then a publicly-funded solution might be considered.
- Is the focus of the project utility work? If no, then a publicly-funded solution might be considered.
- Does the work focus on privately-owned infrastructure? If no, then a publicly-funded solution might be considered.

3.3 Summary

There were 406 issues in total that were reviewed, 93 previously reported to the City, 198 via the Social Pinpoint Map, and 115 field identified. The following results from Social Pinpoint were observed:

- 24 home flooding issues reported mainly consisting of basement flooding, sanitary sewer backups, garage flooding, and general home flooding.
    - Reported sewer backups were referred to MSD.
- 87 property flooding issues reported mainly consisting of general property flooding from overland flow issues, ponding in the yard, yard erosion, and inadequate capacity of the storm system.
- 60 streambank erosion issues reported mainly consisting of yard erosion, threatened structures or roads/trails, outfall erosion, and drainage way erosion.
- 26 street flooding issues reported mainly consisting of ponding, inadequate capacity of the storm system, and general overland flow flooding.

The 115 field identified issues mainly consisted of knickpoints, threatened structures or roads/trails, exposed utilities, scour holes, and failing grouted riprap/armament/grade controls.

The reported issues were grouped into 132 problem areas based on location and anticipated construction access. See Appendix C for further details of each problem area.

3.3.1. Overland Flow Issues

The Overland Flow issues can generally be grouped into one of the following sub-categories listed below. The list is in order from high to low severity on the spectrum of stormwater issues.

1. Structural Flooding

   Structural flooding is water entering a structure through doors or windows.

2. Street Flooding

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Street flooding happens when water exceeds the capacity of the curb or covers more than half a lane.

3. Yard Flooding

   Yard flooding has its own spectrum ranging from water that causes damage or enters a pool (most severe) to water spreading out from an overflowing swale or water that flows without a well-defined flow path (less severe).

4. Yard Erosion

   Yard erosion happens when water forms rills and gullys.

5. Street Ponding

   Street ponding is water that does not drain and remains standing on the street more than a day after a rain event.

6. Yard Ponding

   Yard ponding is water that does not drain and remains standing in the yard more than a day after a rain event.

7. Wet Yard

   A wet yard is a yard that remains wet or soggy, primarily due to groundwater, when adjacent areas are dry several days after a summer rain event.

3.3.2. Channel Issues

Channel issues can generally be classified by the effects of erosion. The following sub-categories are listed in order of high severity to low severity on the spectrum issues created by erosion.

1. Threatening structures
2. Threatening public roads
3. Threatening infrastructure (pipes, culverts, etc.)
4. Threatening private driveways
5. Bank erosion/yard erosion
6. Bank erosion in common ground
7. Gully erosion on the channel bank

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Section 4
Channel Condition Assessment

4.1 Introduction

The conditions of the channels in the watershed were assessed using fluvial geomorphology principles. Fluvial geomorphology is the science of how moving water shapes the land. It is the fundamental discipline of river science and provides a quantitative description of stream behavior now and reasonable predictions of future behavior under specified conditions. Fluvial geomorphology and the related disciplines of hydrology and hydraulic engineering, geology and soil science together provide the technical underpinnings for sound watershed management. A more thorough discussion of the basic principles of Fluvial Geomorphology is presented in Appendix D.

The purpose of the channel condition assessment is to determine the basic geomorphic conditions of the main stem and selected tributaries. Understanding the geomorphic conditions of these streams will help determine the locations and prioritizations of interventions for managing the main stem and tributaries. Following is a brief overview of geomorphic principles with an emphasis on their application to stream and watershed management.

Streams exist in a state of dynamic equilibrium in which the forces driving channel form are balanced by the resisting forces. The driving force is gravity, acting on a stream by determining the rate at which water and sediment move through the channel while the resisting forces are the strength of the channel boundary materials and friction expressed as the channel shape. When the driving forces exceed the resisting forces, the stress applied by water or sediment exceeds the channel strength. The stream channel responds by altering its shape in plan, profile, and cross-section to accommodate the change in flow volume and applied shear. Once disturbed, the processes by which streams respond are (in order):

1) Incision or degradation
2) Widening
3) Aggradation or deposition and
4) Plan form adjustments

Through these processes, disturbed streams eventually re-establish equilibrium. Determining which process is dominant and the likely progression of stream processes is one of the principal challenges of stream management. Schumm (1984) and Simon (2001) have described the process by which streams reacquire equilibrium after a disturbance in the watershed. Simon separates changes in channel morphology into six stages:

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Stage I Pre-disturbance

- Bed and bank materials balanced with erosive forces
- Permanent woody vegetation near the water line
- Two-stage channel shape evident at about 1.8 year return interval

Stage II Disturbance

- Channel altered, hydrology or sediment inputs modified
- Removal of permanent woody vegetation near the water line
- Two-stage channel shape eliminated or no longer supported by flow conditions

Stage III Incision

- Downcutting liberates sediment
- Lost or perched bankfull floodplains
- "U" shaped channel
- Woody vegetation high on bank with many "surfer" trees

Stage IV Channel Widening

- Widespread bank failures as banks exceed critical height or were undercut by toe scour
- Channel adjusts to new flow regime
- Significant sediment loads generated; most significant erosion hazard in this phase

Stage V Deposition

- Deposition begins from liberated sediment
- Vegetation establishes near water line

Stage VI Recovery and Reconstruction

- Bankfull floodplains may be reconstructed from liberated sediment
- Woody vegetation establishes near water line
- Stability re-established

Each of these phases is depicted on Figure 4-1.

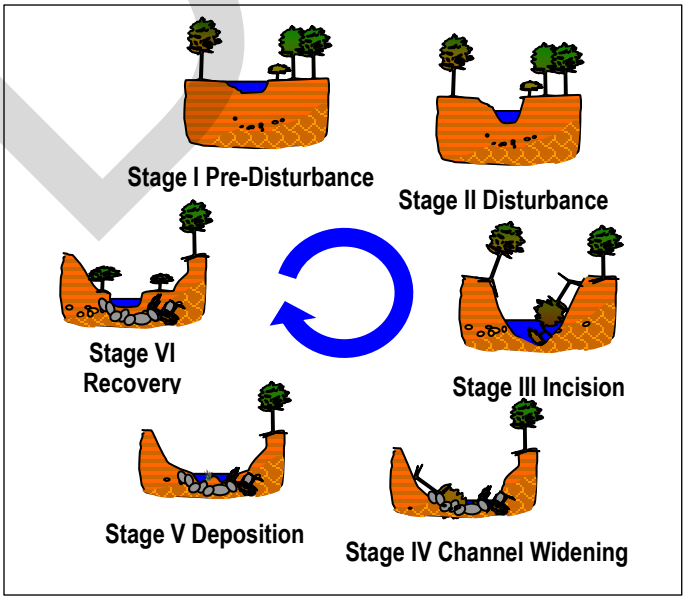

Figure 4-1: Channel Evolution Stages

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4.2 Methodology

During March and April 2023, geomorphic field reconnaissance was conducted on about 22 miles of main stem and tributaries in the Creve Coeur Creek and Deer Creek Watershed Study Areas. A Rapid Reconnaissance Geomorphic Data Collection Method was used to determine the basic geomorphic conditions of the channels. This method was adapted from the Johnson, Gleason and Hey white paper "Rapid Assessment of Channel Stability in Vicinity of Road Crossing" published in the Journal of Hydraulic Engineering, June 1999 and evaluates the primary geomorphic parameters to determine the base health of the channel.

The field reconnaissance was completed by highly experienced Engineers/ Geomorphologists. The experience of the field team allowed the reconnaissance data to be further supplemented with the field engineer's opinion of dominant process based on the field observations at each channel condition data point. The field data was collected on Samsung Galaxy 10.4" Tab S6 Lite 64GB tablets with integrated GPS and ESRI ArcGIS Field Maps software containing the City's latest GIS data.

The Creve Coeur Creek Watershed fieldwork limits included Smith Creek, Rosenfelder Creek, Fernridge Creek, Creve Coeur Creek, and their respective tributaries. The Deer Creek Watershed fieldwork limit included Deer Creek, Windrush Creek, Monsanto-Sunswept Creek, Denny Creek, Pebble Creek, and their respective tributaries. A small tributary in the upper River Des Peres Watershed was also included in the study limits. The tributary fieldwork limits were developed by focusing on the higher stream order reaches (the larger channels). The MSD stormwater basemap layers were used to identify the upstream fieldwork limits from where the drainage network becomes fully enclosed. In some areas, the open channel continues on the upstream side of the enclosed drainage network. In these situations, the fieldwork continued upstream to where there was one mile or more of identified drainage way contributing to the tributary. Typically, the upstream stopping point was set to the nearest roadway, confluence, or where the channel became a shallow managed swale. Some exceptions to the contributing stream length were made where the tributary was fed by a development or where known issues were present. Figure 4-2 illustrates the Fieldwork Limits. Fieldwork evaluation generally progressed from downstream to upstream.

Field data was collected for three data categories:

1. Channel Condition Data
2. Reach Summary Data
3. Potential Project Data

The following pages describe the methods and approach for each of the data categories.

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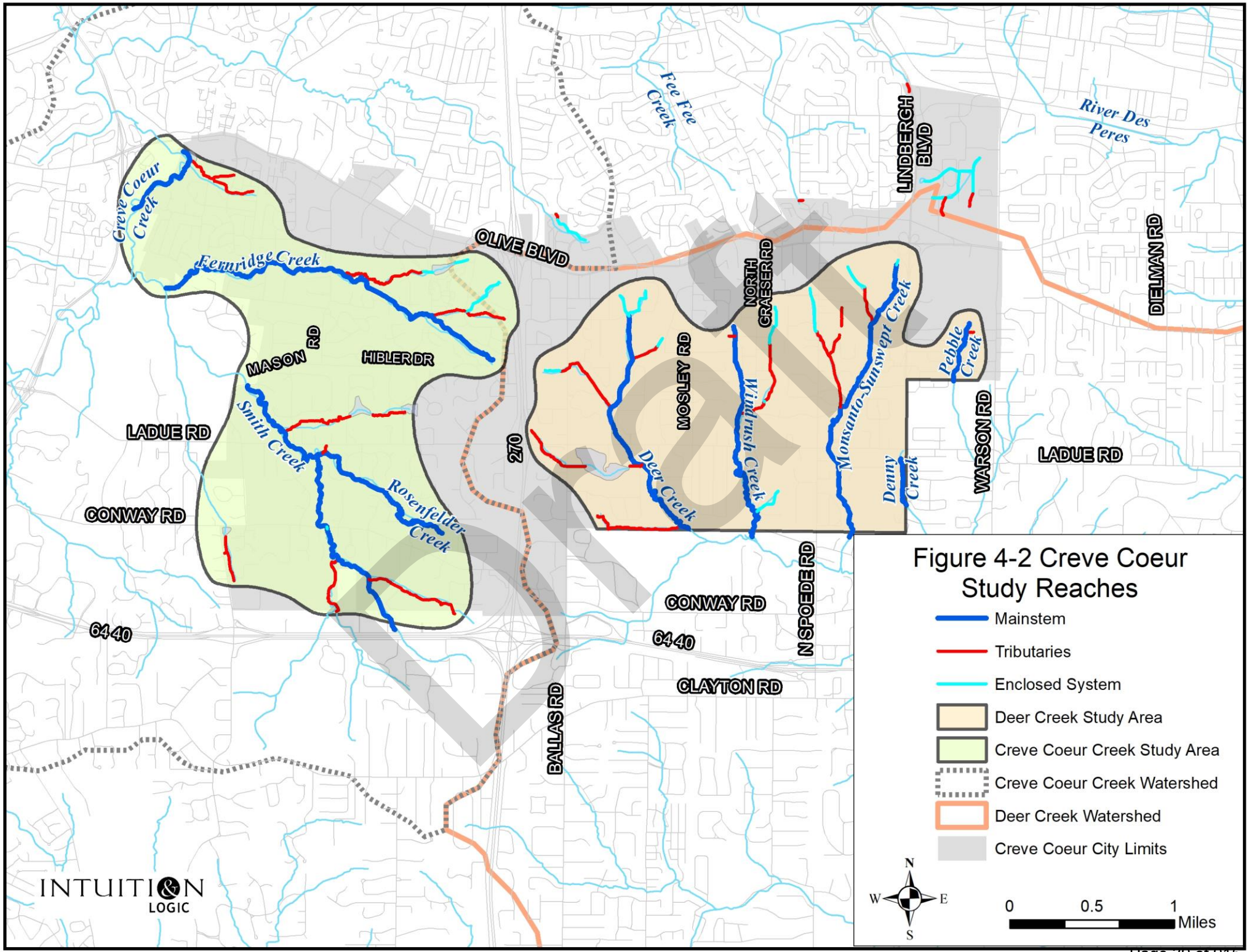
Creve Coeur Creek
Fernridge Creek
Fee Fee Creek
River Des Peres
OLIVE BLVD
LINDBERGH BLVD
DIELMAN RD
NORTH GRAESER RD
MOSLEY RD
Windrush Creek
Monsanto-Sunswepr Creek
Pebble Creek
Denny Creek
WARSON RD
LADUE RD
MASON RD
HIBLER DR
Smith Creek
Rosenfelder Creek
Deer Creek
270
CONWAY RD
6440
N SPOEDE RD
CLAYTON RD
BALLAS RD
Figure 4-2 Creve Coeur Study Reaches
Mainstem
Tributaries
Enclosed System
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
N
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1
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INTUITION & LOGIC

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Channel Condition Data

Channel Condition Data points were taken at regular intervals throughout the watershed. The following 13 rating categories were evaluated at each channel condition data point:

1) Bank soil texture and coherence
2) Average bank slope angle
3) Average bank height
4) Vegetative bank protection
5) Bank cutting
6) Mass wasting (wedge or slide slope failure)
7) Bar development
8) Debris jam potential
9) Obstructions, flow deflectors and sediment traps
10) Channel bed material consolidation and armoring
11) Percentage of channel cross section constriction
12) Sediment movement
13) Sinuosity (ratio of the channel length to valley length). This data was developed in the office, not in the field.

Each of the above 13 rating categories at each channel condition data point were assigned a score of 1 for good, 2 for fair or 3 for poor. The criteria used to determine a good, fair or poor rating for each of the rating is provided in Appendix D.

159 channel condition data points were taken during the rapid reconnaissance.

The Channel Condition Scores provide an indication of the lateral, vertical and overall stability of the channel at the channel condition point location as follows:

- GOOD – The channel is managing channel flows and sediment without significant erosion and the channel material, vegetation and shape in plan, profile and section are indicative of a state of dynamic equilibrium.

- FAIR – The channel is experiencing erosion and/or lateral/vertical migration and possesses channel material, vegetation and/or channel shape features that are indicative of active erosion that has not progressed to critical bank failures.

- POOR – The channel is actively eroding and/or moving laterally/vertically and many of the channel materials, vegetation and shape features indicate current and severe instability.

The field investigators also recorded the observer's opinion of dominant process at each of the channel condition points. Multiple dominant processes were recorded in the channel condition points if the observer noticed strong indications of multiple processes. The channel condition point locations are illustrated in Figure 4-7.

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Reach Summary Data

The 22 miles of main stem and selected tributaries were sub-divided into 114 reaches (not including enclosed reaches) based on road crossings, confluence locations and other natural and/or manmade features. The reach limits were adjusted in the field to correspond with observed physical features or changes in process.

The reaches along the main stem were given a unique alphanumeric name with the format ZZRXXX. "ZZ" is the two-letter code for the named stream. "RXXX" is a three-digit reach number. Generally the reach numbers were assigned in increments of five to allow for future subdivision (e.g., DCR005, DCR010).

Table 4.1 Stream Naming Convention

Stream Name	Stream Code	Tributary Code
Creve Coeur Creek	CC	CC005
Fernridge Creek	FC	FC005
Smith Creek	SC	SC005
Rosenfelder Creek	RC	RC005
Deer Creek	DC	DC005
Windrush Creek	WC	WC005
Monsanto-Sunswept Creek	MS	MS005
Denny Creek	DY	DY005
Pebble Creek	PC	PC005
Fee Fee Creek	FF	FF005
River Des Peres	RD	RD005

The tributary reaches were also given a unique alphanumeric name with the format ZZYYYRXXX. "ZZ" is the two-letter code for the named stream. "YYY" is a three-digit tributary number. Tributary numbers were assigned in increments of five. Generally, the hundredths placeholder was used to identify branches along the tributary. "RXXX" is a three-digit reach number. Generally, the reach numbers were assigned in increments of five. An incremental assignment was used to allow for future subdivision or addition of tributaries. Figure 4-3 illustrates the general reach naming convention. Refer to Appendix D for a detailed breakdown of the reach limits and naming codes.

Reach summary data was prepared in the field at the end of each reach walked. The reach summary data includes the observer's opinion of dominant process for the reach based on key indicators of dominant process observed in the field. The field engineer recorded his observations by entering "TRUE" for each of the following 42 key indicators that were observed to be present in the reach:

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Indicators of Dynamic Equilibrium –

- No persistent scour or erosion features
- Bankfull shelf along one or both banks
- Gradually sloping banks
- Herbaceous vegetation growing at or near the water surface
- Well established woody vegetation on healed failure surfaces
- Vegetated, consolidated bars
- Consolidated bed material
- Imbricated rock bed material
- De facto grade controls reinforcing knickpoints
- Healthy riparian corridor and canopy cover

Indicators of Incision –

- "V" or "U"-shaped channel cross-section
- Persistent scouring on both banks toe to mid slope
- Wedge failures along both banks
- Steep, near vertical banks
- Perched bankfull floodplain or abandoned terraces
- Knickpoints and knickzones occurring in channel profile
- Steep bed slope
- Scoured bed material
- Consolidated bed material
- Frequent, large woody debris jams
- Lower limit of woody vegetation high with exposed roots
- Undercut or perched infrastructure

Indicators of Widening –

- Wide, "U"-shaped channel cross-section
- Increase in cross sectional area
- Increase in channel width and decrease in bank height from upstream to downstream
- Scouring or bank failures along both banks
- Persistent scouring on both banks mid to upper slope
- Residual failure material at bank toes
- Unconsolidated, depositional bed material
- Depositional center bars
- Unconsolidated, depositional sediment bars
- Reinforced knickpoints and knickzones
- Large woody debris jams
- Lower limit of woody vegetation high with exposed roots
- Numerous surfing or overhanging trees

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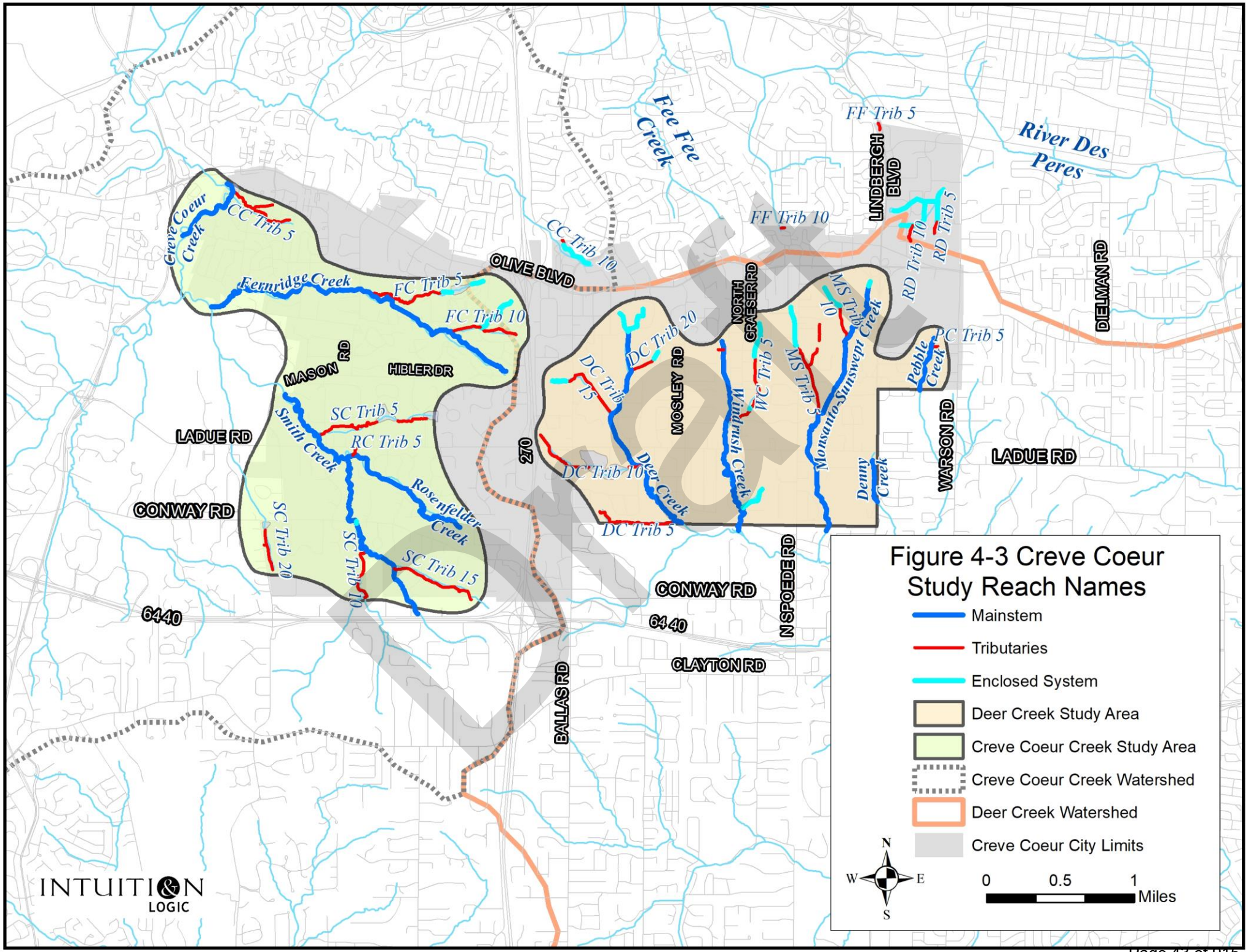
Fee Fee Creek
River Des Peres
FF Trib 5
FF Trib 10
LINDBERGH BLVD
RD Trib 10
RD Trib 5
DIELMAN RD
CC Trib 10
OLIVE BLVD
NORTH GRAESER RD
MS Trib 10
MS Trib 5
Monsanto-Sunswept Creek
PC Trib 5
Pebble Creek
Creve Coeur Creek
CC Trib 5
Fernridge Creek
FC Trib 5
FC Trib 10
MASON RD
HIBLER DR
DC Trib 20
DC Trib 15
MOSLEY RD
WC Trib 5
Wildrush Creek
Denny Creek
WARSON RD
LADUE RD
SC Trib 5
RC Trib 5
Smith Creek
LADUE RD
270
DC Trib 10
Deer Creek
CONWAY RD
Rosenfelder Creek
SC Trib 20
SC Trib 10
SC Trib 15
DC Trib 5
CONWAY RD
N SPOEDE RD
64 40
64 40
CLAYTON RD
BALLAS RD
Figure 4-3 Creve Coeur Study Reach Names
Mainstem
Tributaries
Enclosed System
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
N
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0.5
1
Miles
INTUITION & LOGIC

Indicators of Planform Adjustment (meander advance and lateral migration)

- Cutbanks with active scour lines opposite of advancing bar formations
- Circular failures along alternating banks or at the outside of bends
- Alternating pattern of scour and deposition
- Bar formations are consolidated, with an unconsolidated leading edge
- Bar material unsorted with fines downstream
- Bar is irregularly shaped and more than 1/3 across the channel
- Poorly sorted bed material

The reach summary data is provided in Appendix D.

Potential Project Data

In addition to the Channel Condition Data and the Reach Summary Data, potential projects were investigated and/or identified in the field. Utilities near or crossing the channel and structures near the top of bank were located in GIS prior to field work and each location was evaluated in the field as potential projects. Reported channel issues from residents were also evaluated in the field as potential projects. If a potential project was identified, potential solutions were identified and project data was recorded in the field. Project data included the potential project location point, project notes, grade control locations, bank stabilization limits and more as appropriate for each potential project. The project identification process, associated data and the identified projects are discussed in further detail in Section 5.

At the conclusion of the field work, the following data is available:

1. Channel Condition Point Data – erosion features identified and scored producing a channel condition score at each channel condition data point in addition to the observer's opinion of dominant processes for each channel condition point.
2. Reach Summary Data – the observer's opinion of dominant process for each reach and a list of indicators observed throughout the reach which resulted in the dominant process opinion.
3. Potential Projects identified

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4.3 Channel Condition Results

Each of the 13 previously mentioned rating categories were evaluated at each of the 159 channel condition data point locations and assigned a score of 1 for good, 2 for fair or 3 for poor. In the Deer Creek Watershed, 77 channel condition data points were taken. In the Creve Coeur Creek Watershed, 82 channel condition data points were taken. The results for each watershed are broken down in the following sections.

4.3.1. Deer Creek Watershed

The following table presents the average assigned values recorded for each of the 13 channel condition rating categories of the 77 field scores in the Deer Creek Watershed:

Table 4.2 Average Field Score Per Channel Condition Rating Category

Table 4.2 **Channel Condition Rating Category**	**Average Field Score**	**Average Rating**
Bank soil texture and coherence	1.0	Good
Average bank slope angle	2.3	Fair - Poor
Average bank height	1.6	Good – Fair
Vegetative bank protection	2.1	Fair
Bank cutting	2.0	Fair
Mass wasting (wedge or slide slope failure)	1.7	Good – Fair
Bar development	1.5	Good – Fair
Debris jam potential	1.7	Good – Fair
Obstructions, flow deflectors and sediment traps	1.2	Good
Channel bed material consolidation and armoring	1.2	Good
Percentage of channel cross section constriction	1.5	Good – Fair
Sediment movement	1.8	Fair
Channel Sinuosity	2.3	Fair - Poor

The scores for each of the above 13 categories were weighted according to Johnson et. al and the weighted scores summed to produce an overall channel condition score for each field channel condition data point. The weighting factors for each data category are presented in Appendix D. The weighted Channel Condition Score for each data point ranges between 10.2 and 19.0. The resulting weighted channel condition score and rating for each data point are as follows:

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Table 4.3 Number of GOOD, FAIR and POOR Field Scores

Table 4.3 Weighted Channel Condition Score Range	Number of Channel Condition Points in the Range	Percent of Channel Condition Points in the Range
GOOD – score of 8 – 10.9	4	5%
FAIR – score of 11 to 16.9	63	82%
POOR – score of 17 or greater	10	13%

Overall the Deer Creek Watershed channels walked are rated fair with an average channel condition score of 14.1. The overall score of 14.1 for the assessed Deer Creek Watershed channels should not be taken as a true average condition for the entirety of the study area. This score does not include all headwater reaches which were managed swales or in early stages of incision. The overall score of fair instead represents a general condition of the major channels located within the watershed study area.

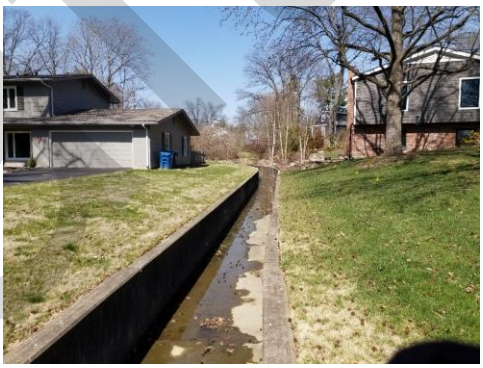

Figure 4-4: Straightened Channel

The major drivers of the fair channel scores were significant portions of enclosed and managed channels. The Deer Creek watershed contains significant residential and commercial development, with the watershed nearing full buildout, as shown in Figure 4-4. Many channels are enclosed, constricted or straightened to fit the surrounding developments, which led to the generally poor sinuosity scores. Vegetative bank protection is limited in urban areas where yards are frequently adjacent to the channels with no riparian buffer. The watershed generally had low debris jam potential (good) and low obstructions which can be attributed to the ongoing maintenance of the managed channels. In addition, debris jams are often reported by residents and removed by the Metropolitan St. Louis Sewer District (MSD) crews.

Figure 4-5: Bank Cutting Near Roadway

The widespread managed channel reaches and numerous roadway crossings acting as de facto grade controls geomorphically isolate the natural channel reaches within the watershed and limit the channel's ability to respond. This is observed in the fair to poor ratings for the bank slopes, height, cutting, and sediment movement, but good to fair ratings for mass wasting, bar development, and channel constriction. Within each reach, the channel's response is limited by the amount is can down cut (halted by de factor grade controls) or migrate (halted by bank armament). There is little to no loose sediment in the watershed for bar building because the reaches tend to be steep

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and any loosened sediment is transported downstream. Bank cutting leading to steep bank slopes and overhanging vegetation with extensive root exposure were common throughout the main stem and lower tributaries. Figure 4-7 illustrates the Channel Condition Scores.

4.3.2. Creve Coeur Creek Watershed

The following table presents the average assigned values recorded for each of the 13 channel condition rating categories of the 82 field scores in the Creve Coeur Creek Watershed:

Table 4.4 Average Field Score Per Channel Condition Rating Category

Table 4.4 **Channel Condition Rating Category**	**Average Field Score**	**Average Rating**
Bank soil texture and coherence	1.0	Good
Average bank slope angle	2.4	Fair – Poor
Average bank height	1.8	Fair
Vegetative bank protection	2.0	Fair
Bank cutting	2.4	Fair – Poor
Mass wasting (wedge or slide slope failure)	2.1	Fair
Bar development	2.0	Fair
Debris jam potential	2.0	Fair
Obstructions, flow deflectors and sediment traps	1.6	Good – Fair
Channel bed material consolidation and armoring	1.6	Good – Fair
Percentage of channel cross section constriction	1.7	Good – Fair
Sediment movement	2.3	Fair - Poor
Channel Sinuosity	1.7	Good - Fair

The scores for each of the above 13 categories were weighted according to Johnson et. al and the weighted scores summed to produce an overall channel condition score for each field channel condition data point. The weighting factors for each data category are presented in Appendix D. The weighted Channel Condition Score for each data point ranges between 11.0 and 19.8. The resulting weighted channel condition score and rating for each data point are as follows:

Table 4.5 Number of GOOD, FAIR and POOR Field Scores

Table 4.5 **Weighted Channel Condition Score Range**	**Number of Channel Condition Points in the Range**	**Percent of Channel Condition Points in the Range**
GOOD – score of 8 – 10.9	0	0%
FAIR – score of 11 to 16.9	59	72%
POOR – score of 17 or greater	23	28%

Overall the Creve Coeur Creek Watershed channels walked are rated fair with an average

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channel condition score of 15.5. The overall score of 15.5 for the assessed Creve Coeur Creek Watershed channels should not be taken as a true average condition for the entirety of the study area. This score does not include all headwater reaches which were managed swales or in early stages of incision. The overall score of fair instead represents a general condition of the major channels located within the watershed study area.

The major drivers of the fair channel scores were the limited vegetative bank protection, mass wasting and sediment movement along the main stem and tributaries. Similar to the Deer Creek watershed, the Creve Coeur Creek watershed contains significant residential and commercial development within the watershed. However, the Creve Coeur Creek watershed has significantly less managed channel reaches, providing more opportunity for the channel to respond. In this watershed, the bank cutting, mass wasting, bar development, debris jam, and sediment movement are fair to poor, however, the channel sinuosity is good to fair. This is indicative of the channel progressing along the channel evolution process in a less impeded manner.

Vegetative bank protection is limited in urban areas where yards are frequently adjacent to the channels with no riparian buffer. Cut banks up to 12 feet high were common with steep bank slopes and overhanging vegetation with extensive root exposure. Mass wasting was observed to be frequent and extensive on the main stem and tributary reaches as shown in Figure 4-6. Loose sediment, scour, and deposition was frequently observed throughout the reaches. Figure 4-7 illustrates the Channel Condition Scores.

Figure 4-6: Mass Wasting Threatening Transmission Tower

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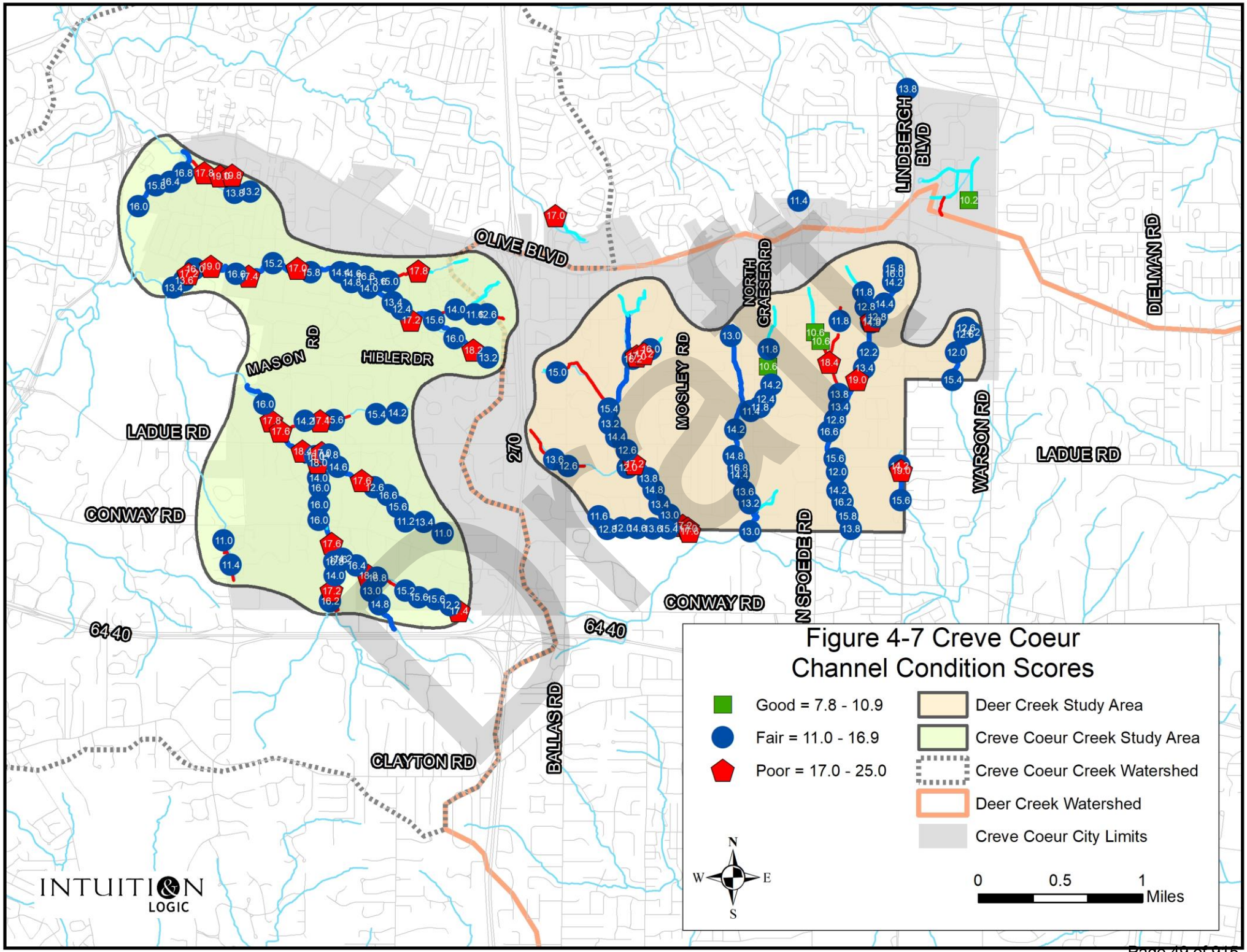
OLIVE BLVD
LINDBERGH BLVD
DIELMAN RD
NORTH GRAESER RD
MOSLEY RD
WARSON RD
LADUE RD
MASON RD
HIBLER DR
CONWAY RD
N SPOEDE RD
270
64 40
BALLAS RD
CLAYTON RD
Figure 4-7 Creve Coeur
Channel Condition Scores
Good = 7.8 - 10.9
Fair = 11.0 - 16.9
Poor = 17.0 - 25.0
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
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4.4 Reach Summary Results

42 key indicators of dominant process were evaluated and recorded for each of the 110 Deer Creek and Creve Coeur Creek Watershed reaches walked (not including enclosed reaches). The Deer Creek Watershed consists of 29 mainstem reaches and 32 tributary reaches. The Creve Coeur Creek Watershed consists of 24 mainstem reaches and 25 tributary reaches. 2 tributaries in the Fee Fee Creek Watershed and 2 tributaries in the River Des Peres Watershed were also walked. The results for each watershed are broken down in the following sections. Appendix D contains a detailed breakdown of each reach and the dominant process indicators observed.

4.4.1 Deer Creek Watershed

In general, for all of the Deer Creek Watershed streams, there is a similar pattern of planform adjustment at the downstream limits, widening in the middle, and a combination of managed or enclosed in the upper reaches. Table 4.6 summarizes the number of reaches found within each of the dominant process categories within the Deer Creek watershed.

Table 4.6 Deer Creek Watershed Reach Summary

Stream Channel Dominant Process	Number of Reaches
Enclosed System	26
Managed	18
Dynamic Equilibrium	3
Early Stage Incision	7
Incision	10
Widening	14
Planform Adjustment	9

The following discussion breaks down the observed dominant process by each of the 5 named reaches within the City limits.

Deer Creek mainstem is undergoing planform adjustment in the lower reaches and widening in the middle reach. A segment of rectangular concrete channel in good condition separates these reaches. The lower reach has incised to bedrock and the channel is no longer able to down cut. Upward migration of incision is arrested at de facto grade control culvert crossings. The widening middle reach has multiple rock grade controls holding 1 foot tall drops in the channel bed. The east bank is armored with a gabion wall. These combined result in a widening reaction on the west bank. The upper reaches of Deer Creek are enclosed or managed.

- Tributary 5 on Deer Creek is incising with the incision having started at the lowered mainstem and is progressing up the tributary.
- Tributary 10 is controlled by Carlyle Lake at the lower end and is mostly enclosed or managed upstream of this large lake. Incision starting at the mainstem is progressing to the lake outfall structure. Upstream of the lake, there is one reach that is incising,

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however, it is geomorphically isolated by enclosed systems at the upstream and downstream limits.

- Tributary 15 is primarily an enclosed system with small segments of managed channel and early stage incision. These are controlled by the enclosed system segments.
- Tributary 20 along the south edge of the golf course has a number of geomorphically isolated reaches controlled by culvert crossings and runs the gamut of dominant processes from planform adjustment up through early stage incision.

Windrush Creek mainstem is undergoing planform adjustment in the lower reaches and widening in the middle reach. A short segment of enclosed system is located in the middle of the widening reaches. The upper reaches of Windrush Creek are enclosed or managed. Knickpoints were found in the lower and middle reaches and are generally arrested at roadway culvert crossings or exposed bedrock.

- Tributary 5 is primarily a managed concrete trapezoidal or rectangular channel, with a short segment of incising natural channel in the lower portion of this tributary. The upper limits of this reach are enclosed.

Monsanto-Sunswept Creek mainstem is undergoing planform adjustment in the lower reaches and widening in the middle reach. Near the confluence with Tributary 5 the reach is geomorphically isolated by a culvert crossing and a section of reinforced concrete channel. This isolated reach is a previous bank stabilization project that is in dynamic equilibrium. Where the stabilization stops, the channel is in planform adjustment to the roadway culvert. Upstream of the reinforced concrete channel, the mainstem is widening with the historical incision halted by bedrock in the channel. The upper reaches are primarily incising or an enclosed system.

- Tributary 5 is widening through much of the tributary. The upper limit is an enclosed system. An offshoot tributary in the headwater is in early stage incision and dynamic equilibrium above that.
- Tributary 10 is in early stage incision. Near the confluence this tributary and the mainstem are in planform adjustment due to the bedrock outcroppings preventing further downcutting of the channel.

Denny Creek is widening with much of this reach paralleling S. Lindbergh Blvd. The widening is threatening the roadway in several locations. Historical incision on this reach has migrated through the reach and is arrested at the existing culvert crossings.

Pebble Creek is partially enclosed or managed, with a short segment of dynamic equilibrium upstream of the managed channel. The managed channel consists of a previous stabilization effort using a concrete toe and vegetated rock armor on the banks. The upstream limits are widening due to bedrock outcroppings in the channel bed. The unwalked headwater reach north of the Tealwood Drive service road around the Bayer complex consists of a managed detention pond.

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Two tributaries to River Des Peres were investigated in the northeast corner of the City limits. This headwater tributary is primarily enclosed system with one short reach each of dynamic equilibrium and early stage incision.

Two tributaries to Fee Fee Creek were investigated in the northeast section of the City limits. Tributary 5 runs along Lindbergh Boulevard and is in early stage incision. Tributary 10 is a managed pond which outlets to an enclosed system.

Figure 4-8 illustrates the dominant process by reach.

4.4.2 Creve Coeur Creek Watershed

In general, for all of the Creve Coeur Creek Watershed streams, there is a similar pattern of widening at the downstream limits, continuing through the middle, and a mix of other processes in the upper reaches. The watershed is noticeably different from the Deer Creek Wateshed in that there are significantly less managed or enclosed system reaches. Table 4.7 summarizes the number of reaches found within each of the dominant process categories within the Creve Coeur Creek watershed.

Table 4.7 Creve Coeur Creek Watershed Reach Summary

Stream Channel Dominant Process	Number of Reaches
Enclosed System	17
Managed	7
Dynamic Equilibrium	2
Early Stage Incision	2
Incision	16
Widening	17
Planform Adjustment	5

The following discussion breaks down the observed dominant process by each of the 4 named reaches within the City limits.

Creve Coeur Creek mainstem within the City limits is widening. There are two constructed grade control crossings that are holding up approximately 2 feet of channel profile grade. They are in serviceable shape but are beginning to be flanked. Cutoff oxbows were found on the abandoned terraces of the floodplain.

- Tributary 5 is widening in the lower reach and the upper reach is mostly enclosed with a few interspersed incising reaches. The incision is arrested at the perched outfalls of the enclosed systems. A subtributary along this reach has deeply incised to a perched outfall at Fernview Drive.

Fernridge Creek mainstem is widening from the lower to the middle reaches. It transitions to planform adjustment upstream of N Mason Road. The road crossing is perched and holding

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up the upstream reach. A segment of rectangular concrete channel isolates the upstream reaches. The lower segment of the upstream reach is widening, transitioning to incision near Tributary 10. The upper segment is isolated by a reach of enclosed system that opens up to a managed grass swale through a subdivision common ground dry detention basin. At the upstream limits of the basin, the channel enters a wooded corridor where the channel has incised to hardpan which has prevented further downcutting and has shifted the channel to planform adjustment.

- Tributary 5 is widening from the confluence to the middle of the reach where it becomes an enclosed system. The upper reach is incising from the enclosed system to the wet pond outfall underneath Tempo Drive.
- Tributary 10 is primarily enclosed with a short segment near the middle that has progressed to planform adjustment between the enclosed system and the perched trapezoidal concrete channel running up to Country Manor Lane. Upstream of the road, the channel is incising up to the pipe outfall for a detention basin adjacent to Lake School Park. The reach through the detention basin is a managed segment.

Smith Creek mainstem is alternating between widening and subsequent rounds of incision moving through the watershed. The processes are interrupted at road crossings acting as de facto grade controls. Near the confluence with Tributary 15, the mainstem has progressed to planform adjustment in part due to the partial gabion and reno mat armament of the right descending bank and the high cobble bedload from the incising upstream reaches. The channel incised below the reno mat which turned the reno mat into a bankfull shelf albeit now the channel is over widened and cannot move the cobble bedload, thereby moving the channel to planform adjustment to rebuild the necessary transport shape. At the confluence with Tributary 15, the mainstem switches back to incision to the City limits.

- Tributary 5 is widening between the two subdivision lakes and their respective outfall piping and short reaches of managed channel. One section of early stage incision was found between Falaise Drive and Chamonix Court where the constructed retaining walls are beginning to fail allowing incision to resume.
- Tributary 10 is widening from the confluence to the City limits.
- Tributary 15 is incising from the confluence to the City limits.
- Tributary 20 is in a state of dynamic equilibrium in the lower reach immediately upstream of a small subdivision pond. The reach transitions to incision and early-stage incision as it moves upstream through the front lot of the St. Louis Priory School.

Rosenfelder Creek mainstem is widening with a short segment of rectangular concrete channel near the middle of the stream. The upper reach has incised to bedrock. The channel has responded by shifting to planform adjustment. There is a concrete trapezoidal channel behind the homes on Hewlett Court that is holding up several feet of grade drop. The reach upstream of the managed section is in dynamic equilibrium with some early-stage incision beginning to form. There is one location of bank erosion behind homes on Cabin Grove Ln.

Figure 4-8 illustrates the dominant process by reach.

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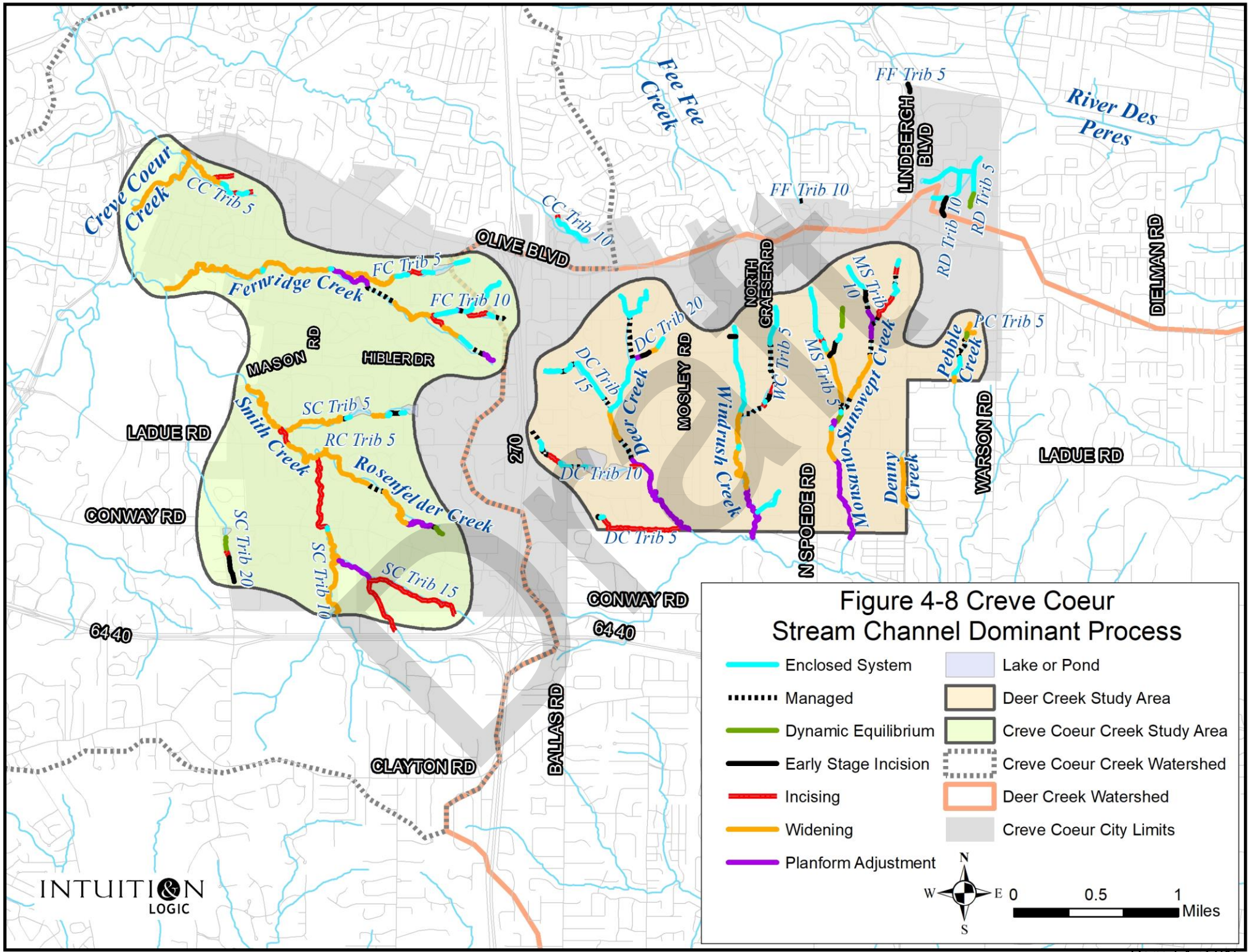
Creve Coeur Creek
CC Trib 5
Fee Fee Creek
FF Trib 5
River Des Peres
LINDBERGH BLVD
FF Trib 10
RD Trib 10
RD Trib 5
CC Trib 10
OLIVE BLVD
DIELMAN RD
Fernridge Creek
FC Trib 5
FC Trib 10
NORTH GRAESER RD
MS Trib 10
PC Trib 5
Pebble Creek
MASON RD
HIBLER DR
DC Trib 20
DC Trib 15
Deer Creek
MOSLEY RD
WC Trib 5
MS Trib 5
Monsanto-Sunswept Creek
SC Trib 5
Smith Creek
RC Trib 5
Rosenfelder Creek
LADUE RD
270
Windrush Creek
Denny Creek
WARSON RD
N SPOEDE RD
CONWAY RD
SC Trib 20
SC Trib 10
SC Trib 15
DC Trib 10
DC Trib 5
64 40
BALLAS RD
CLAYTON RD
Figure 4-8 Creve Coeur
Stream Channel Dominant Process
Enclosed System
Managed
Dynamic Equilibrium
Early Stage Incision
Incising
Widening
Planform Adjustment
Lake or Pond
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
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4.5 Stream Recommendations

In general, the recommended approach to stabilizing both watersheds is to stop the process of widening, planform adjustment and incision. Each of these processes is attempting to reduce energy in the system by increasing channel section and lower the stream slope in response to changes in the watershed. At several locations on the main stem, active widening and planform adjustment are creating substantial bank failures. At many locations on the tributaries, active incision is threatening upstream tributaries or infrastructure that is in relatively good shape. Channel management is proving successful in stabilizing tributary reaches in several locations.

Grade controlling the channel will arrest the downward migration of the channel bed and will allow the reaches to adjust to a stable planform. Grade controls are recommended at existing knickpoints and at locations where projects are necessary to protect infrastructure from the channel erosion. Bank stabilization is recommended in conjunction with grade controls at locations where steep bank slopes and mass wasting are threatening infrastructure.

The Channel Condition score was used during Potential Project development and Prioritization, please refer to Section 5 and 6, respectively. The condition of the channel was considered during project identification with grade control or bank stabilization projects located to protect reaches of channel that are in good condition. Reaches in poor condition were also evaluated for potential projects, or consideration given to projects identified within those reaches, to add measures to address systemic issues within the reach. A project's priority may be increased to preserve natural resources where a reach in poor condition is progressing into a reach in good or fair condition.

Figure 4-9: Rectangular Concrete Channel With Grade Control Drops

As part of the historical development, several reaches in the watershed were enclosed or hard armored (managed channels), with materials such as rectangular concrete channels, gabion wall banks with reno mat inverts, grouted riprap, concrete filled geoweb reinforced slopes, and other hard armament techniques. While many of these were observed to be in serviceable condition, they should be monitored regularly and replacement plans prepared when they reach the end of their service life. The hard armament reaches often act to geomorphically isolate reaches of the channel and can interrupt the channel evolution process while the armament remains structurally sound. As the modifications start to fail, they release subsequent rounds of incision into the channel response. Some of the managed segments are starting to fail, others are threatened, and some are still in serviceable condition. Segments that were found in serviceable condition were identified as Monitor projects in the Potential Projects section, refer to Section 5.

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Section 5
Potential Projects

5.1 Introduction

The results of the public involvement, hydraulic and hydrology data summary, stormwater problem site investigation, and channel condition assessment discussed in the previous sections of this report formed the foundation for identifying problem areas in the study area. The Potential Projects (PP) addressing each problem area were evaluated based on design, economic feasibility, and overall efficiency of addressing problems within the study area. Each PP was then prioritized according to the City's Priority Ranking System presented in Section 6.

The PP identification and development process is detailed in the following subsections. The PP writeups, cost estimate worksheets, and prioritization worksheets are found in Appendix E.

5.2 Evaluation Approach

Each stormwater issue was evaluated based on the PP criteria presented in Section 3. A checklist was filled out for each reported issue which was used to sort each problem area into either a private issue or an issue that may be solved with a publicly-funded project (PPs). Within the 132 problem areas, a total of 155 issues were identified. Of those 155 issues, 53 were categorized as private issues and 102 were categorized as potential projects.

The recommended PPs were further categorized into three project types:

1) Structures/Culverts
   a) Projects addressing erosion or flooding threats to structures or culverts.
2) Bank Stabilization
   a) Projects addressing streambank erosion issues that do not directly threaten a structure or culvert.
3) Overland Flooding
   a) Projects addressing overland flooding issues.

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5.2.1. Typical Problem Solutions

Typical problem solutions for stormwater issues are as follows:

Grade Control Projects - construct grade controls along the main stem and tributaries at select locations to stop incision at these locations. The grade controls will eliminate incision and limit the propagation and depth of incision upstream of each grade control project. Grade control projects also include any localized bank stabilization necessary to construct a stable grade control. The bank stabilization should incorporate the use of native riparian vegetation. The grade control should be placed at grade on the channel bottom and formed in a manner to mimic the elevation and stable slopes of the existing channel banks. Where stabilizing a knickpoint, a ramp slope of 20H: 1V maximum should be used. The grade control should extend to the top of each bank or the 25 year flow depth, whichever is greater. Consideration should be given to soil erodibility, piping and shear stresses along the grade control and at the edges.

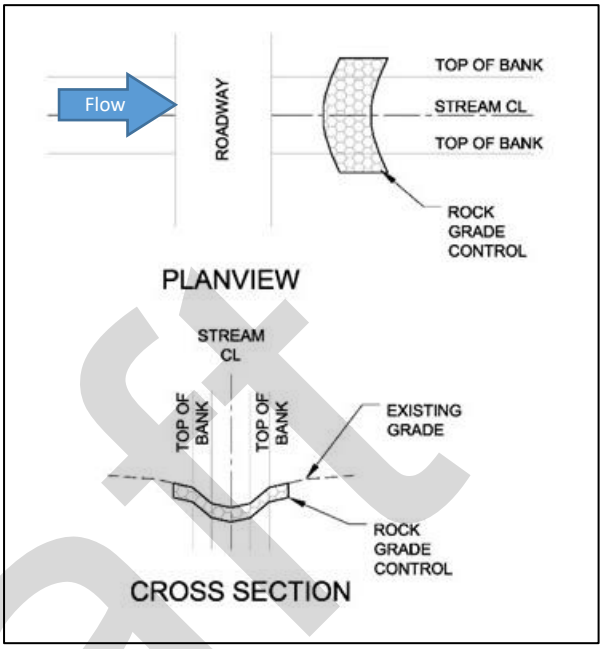

Figure 5-1: Rock Grade Control Structure Detail

Bank Stabilization Projects - construct engineered bank stabilization to protect identified infrastructure or structures from continuing bank erosion threatening the structure. The bank stabilization measures vary in size based on flow parameters, bank height, bank slope, site-conditions and other parameters. Bank stabilization should extend through the entire bend, beginning and ending at a riffle. To the greatest extent practical, bank stabilization shall be bio-engineered, incorporating the use of native riparian vegetation. Each bank stabilization project includes grade controls at the project limits to protect the stabilized bank from potential future incision and add to the systemic stability of the watershed study area.

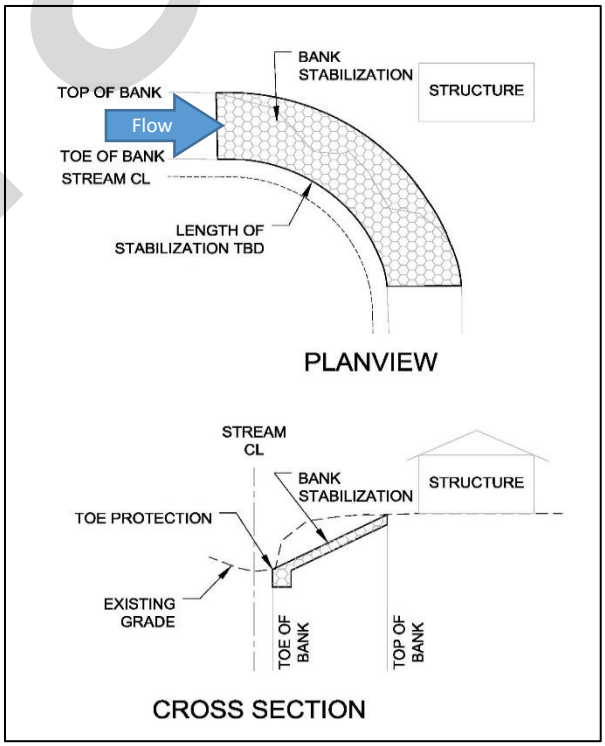

Figure 5-2: Bank Stabilization Structure Detail

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Rock Armor and Scour Protection – construct a stilling basin or scour protection at the pipe or culvert outfall to protect the pipe from erosion and undermining due to outfall scour. The limits of protection should extend to the top of each bank or the 25 year flow depth, whichever is greater. Consideration should be given to soil erodibility, piping and shear stresses through the scour protection and at the edges. When using a stilling basin, consideration should be given to the depth of scour anticipated in the plunge pool for a variety of flow events. Due to tailwater influences, the greatest potential for scour may not occur at the largest flowrate.

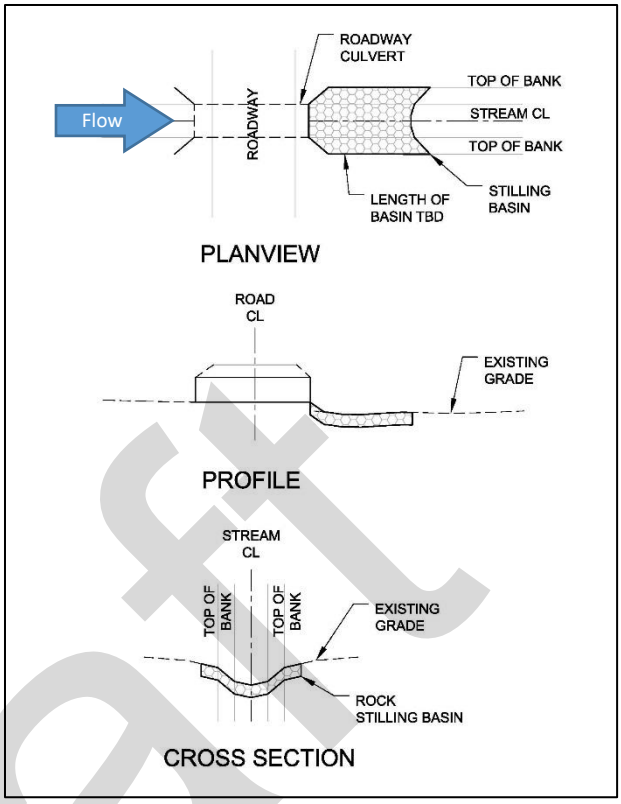

Figure 5-3: Rock Armor and Scour Protection Detail

Swales and Berms – grade swales and/or berms to shift overland drainage away from houses and through yards. Swales should be rock lined or reinforced with Instaturf ShearForce.

Mill and Overlay – mill and overlay the street to adjust the pavement slopes and allow water to drain across the pavement and prevent ponding.

Storm System – install additional area inlets, curb inlets, yard drains, and storm sewers to collect and guide drainage into the existing stormwater systems. Area inlets, curb inlets, and storm sewers shall conform to the Metropolitan St. Louis Sewer District (MSD) standards. Yard drains shall be dome grated to minimize clogging.

Water Quality Alternatives – Several water quality alternatives can be incorporated across the projects to benefit the watersheds. For bank stabilization projects, the stabilization can be extended to eliminate sediment and pollution from erosion. For overland flow projects, the addition of rain gardens or bioretention can be considered to help aid localized detention before discharging into existing stormwater systems. The addition of vegetated buffer strips can aid in slowing down stormwater runoff and capturing sediment and pollutants.

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5.3 Cost Development Approach

The cost development approach focuses on establishing a defensible project budget that will be robust enough to cover the design and construction costs and allow the City to reliably budget and plan for implementation. There are two components to the cost development: the quantity takeoff, and the unit cost database. These combine to form the cost estimate for the project.

Quantity Takeoff – At each problem area a conceptual approach to solve the problem was developed using GIS basemap information and available LiDAR data. The LiDAR data aids in the conceptual layout by providing topographic information to help establish project limits, extents, access, and staging locations. From the layout information, conceptual level quantities are developed for key construction components such as: rock grade controls; rock toe protection; bank stabilization area; length of culverts or pipes; number of inlets or manholes; retaining walls; potential utility relocations; and access & staging restoration. A standard unit of measure is assigned to each key construction component for consistency throughout the project development. Refer to Appendix G – Cost & Prioritization Methodology for the detailed template worksheet used for each cost estimate takeoff.

Cost Development – For each of the key construction components, a unit cost is developed and applied to all projects. Unit costs were developed from local bid tab databases such as MSD, St. Louis County, MoDOT, as well as other recently bid projects as available to the City and the design team. The various sources were reviewed, and representative unit costs were selected from each.

Engineering Cost Development – Survey, geotechnical exploration, engineering design, and construction document costs were developed for each project site. Survey limits were developed from the conceptual project layout and access route as well as the estimated number of easements that will be needed. Geotechnical exploration was developed based on the length of the project, including the length of both banks at channel projects. Typically, one boring per 100 linear feet of project was used to estimate the exploration needs. The boring depth was estimated based on the LiDAR survey of the bank height or the estimated depth of a storm sewer system. Additional borings were identified for structural features such as bridge abutments or retaining walls.

Engineering budget estimates were developed based on the conceptual project layout, construction elements involved, and considered things such as flood study needs for projects in the floodplain; length of the project to determine the USACE 404 and MoDNR 401 permitting requirements; and MSD minimum plan requirements for plan review and approval.

Future Escalation Recommendations – The unit costs used to develop the cost estimates presented herein are a snapshot in time. It is recommended that an annual escalation be applied to the project budgets beginning the year following adoption of this plan and

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progressing at a rate matching the annual inflation rate developed by the US Bureau of Labor Statistics, available at https://www.bls.gov/data/

5.4 Results

The amount of PPs in each project type as well as the overall cost is shown in Table 5.1. Individual project costs ranged from $1,788,700 to $61,900.

Table 5.1 – PP Results

PROJECT TYPE	QUANTITY	COST (IN MILLIONS)
1. Structures/Culverts	20	$12.6
2. Bank Stabilization	48	$16.7
3. Overland Flooding	34	$4.6
PROGRAM TOTALS	**102**	**$33.9**

PPs were assigned names based on the watershed and the type of issue with the format XX-Y-ZZ. "XX" is the two-letter code for the watershed (DC for Deer Creek and CC for Creve Coeur Creek). "Y" is the issue type identified (C for channel projects, S for stormwater/overland flow projects). "ZZ" is a two-digit project number generally increasing from the downstream end to the upstream end of the watershed or stream. Overview maps of the PPs can be seen in Figures 5-4 and 5-5.

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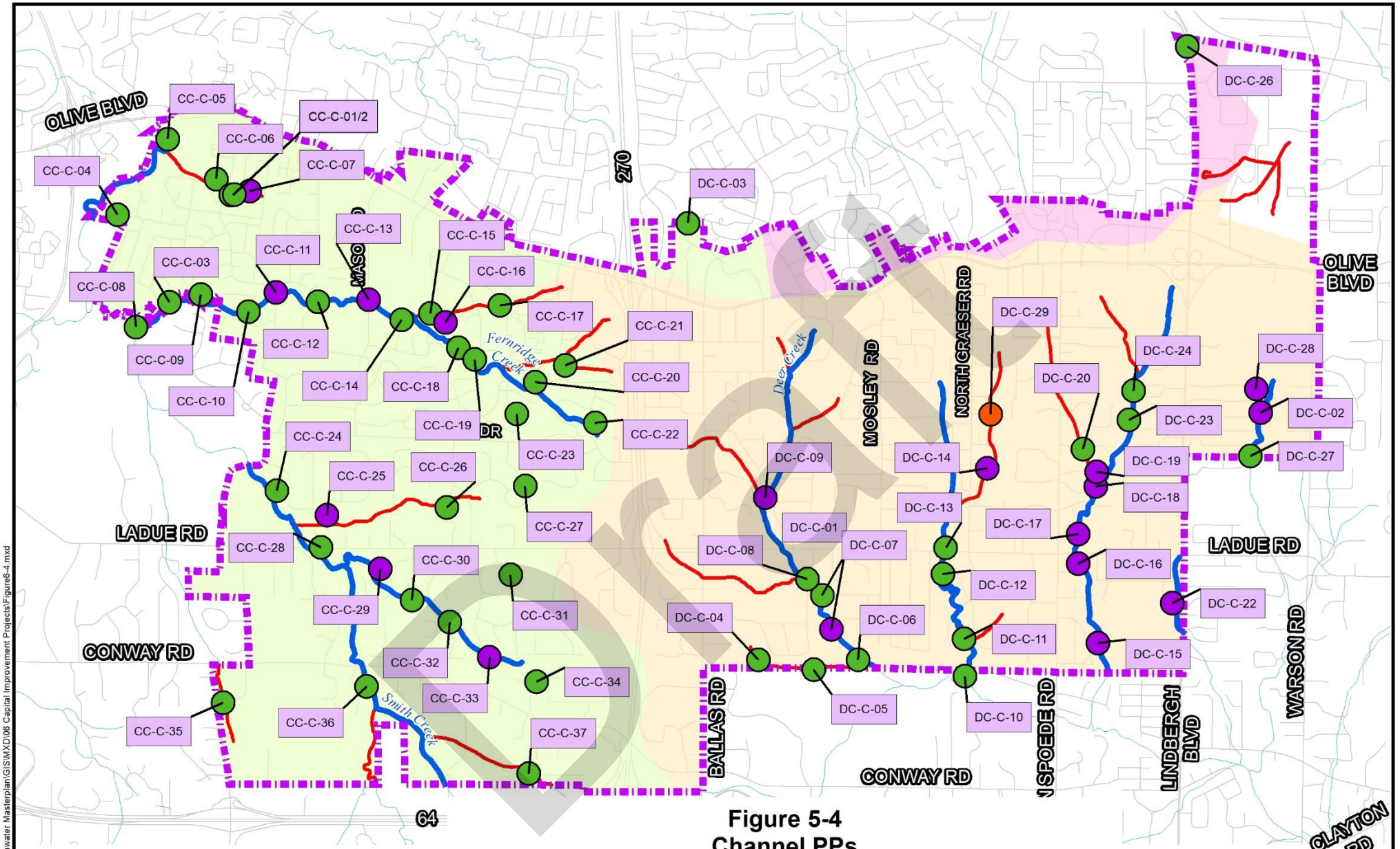

Figure 5-4
Channel PPs

PP

Project_Type
- Culverts/Structures
- Bank Stabilization
- Overland Flooding

- Mainstem
- Tributaries
- Streams

- Creve Coeur Creek Watershed
- Deer Creek Watershed
- Fee Fee Creek Watershed
- Creve Coeur City Limits

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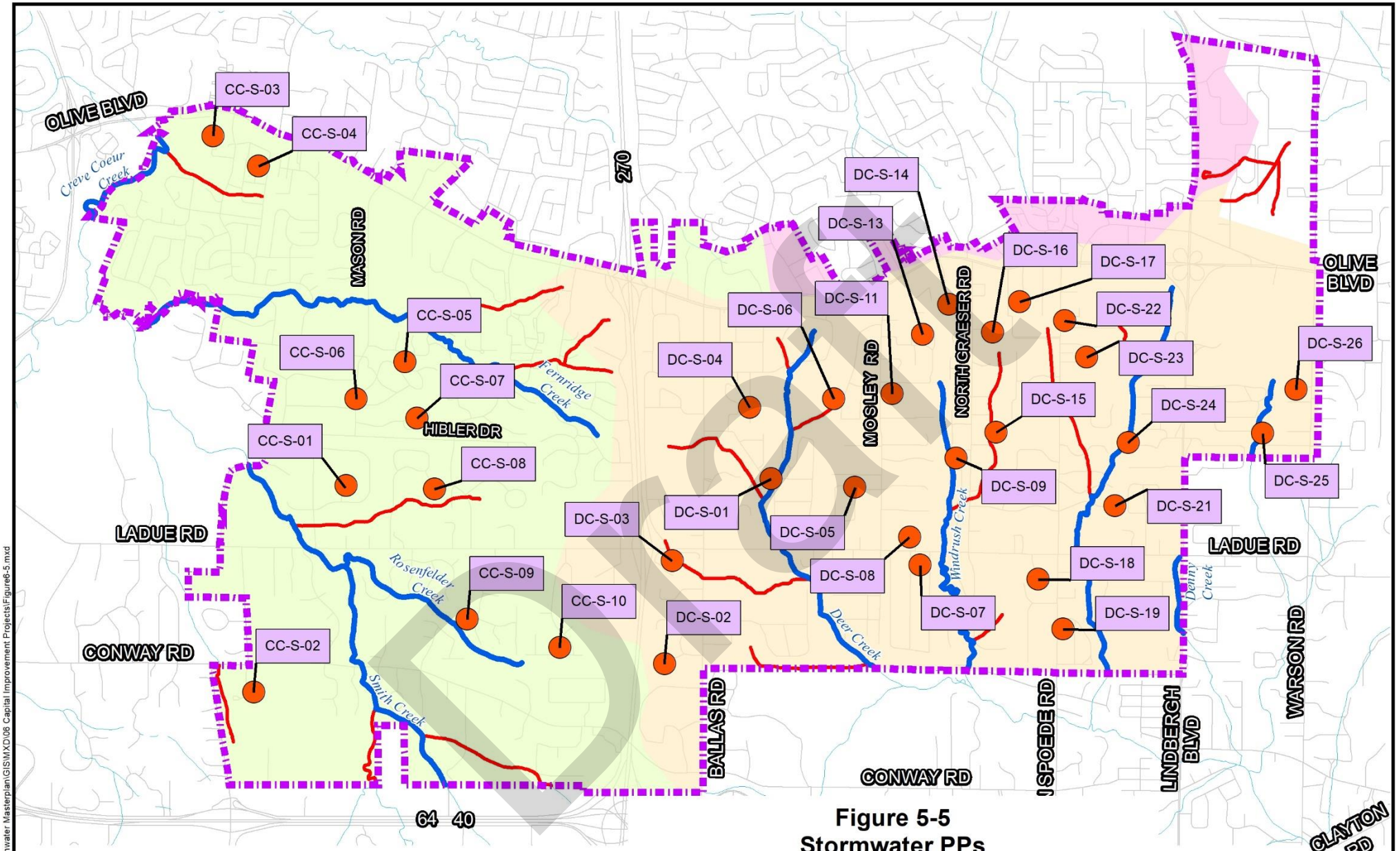

Figure 5-5
Stormwater PPs

Project_Type
- Overland Flooding
- Mainstem
- Tributaries
- Streams

- Creve Coeur Creek Watershed
- Deer Creek Watershed
- Fee Fee Creek Watershed
- Creve Coeur City Limits

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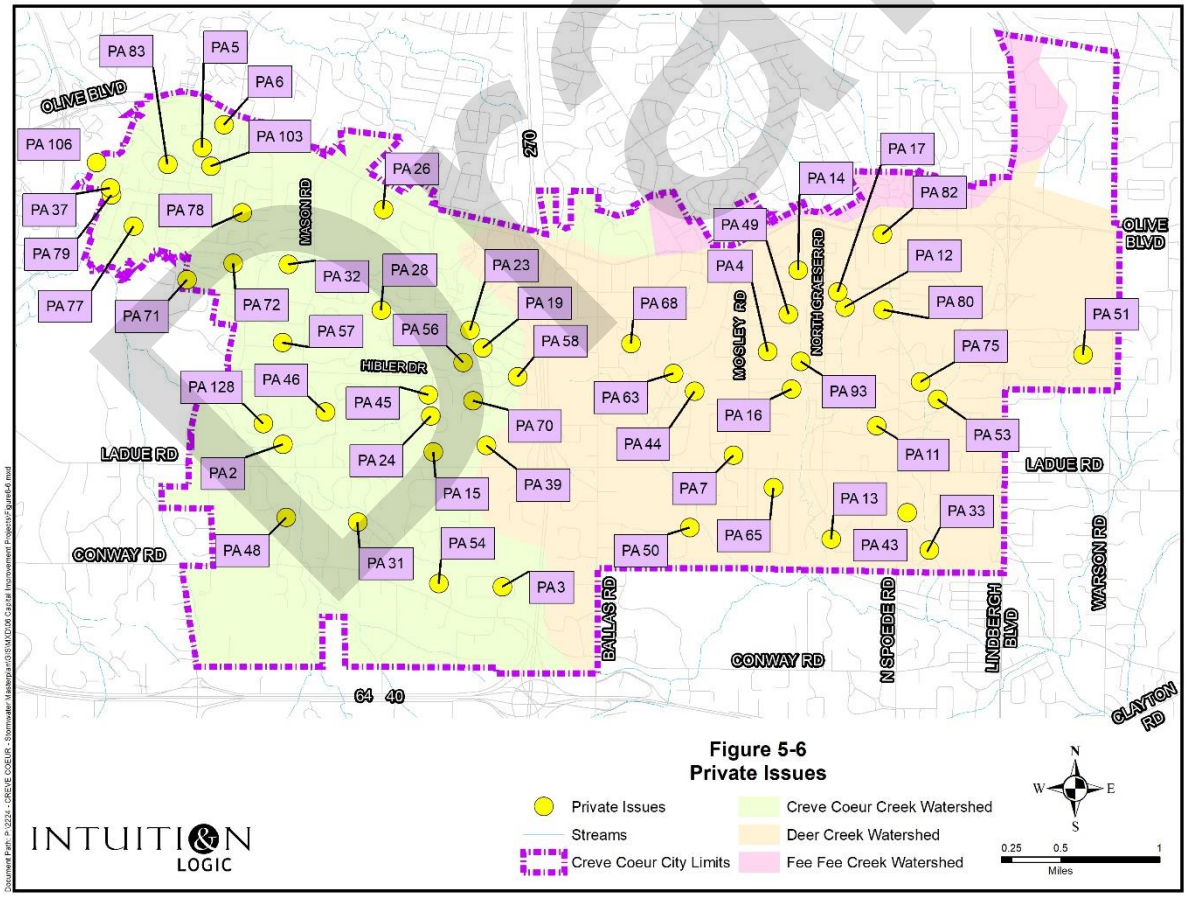
5.5 Private Issues

While the process for identifying problem areas was primarily focused on identifying and evaluating potential PPs, it inevitably identified other projects which are not eligible for consideration as a PP given the detailed criteria in Section 3.

Residents who want to solve their private stormwater issues may receive funding assistance from the City's new Stormwater Management Cost-Share Program. This program was developed to help homeowner associations and individual homeowners solve stormwater issues that are unlikely to be addressed by a City funded project or receive funding from existing programs. An overview of the program, requirements, application, review, scoring, reimbursement, and responsibilities is available on the City's website at https://www.crevecoeurmo.gov/1203/Stormwater-Cost-Share-Program. This is a pilot implementation of the Cost-Share Program. Depending on the interest level and resident feedback, the City may adjust the funding levels. The Deer Creek Watershed Alliance and MSD also have grant opportunities for individual homeowners.

A map of private issues can be seen in Figure 5-6. A list of the private issues and their descriptions can be found in Appendix C.



Section 6
Prioritization Methodology

6.1 Introduction

As part of this Management Plan, a Prioritization Methodology was developed for the City of Creve Coeur to establish a consistent, defensible methodology for ranking Potential Projects (PPs) for implementation. The implementation order is based on the prioritization score providing the highest and best use of taxpayer dollars, regardless of the timing or order of identification of a PP. This establishes a system for the City to set priorities and implement the Capital Improvement Program each year. Subsequently identified PPs will be ranked with the Prioritization Methodology and inserted into the implementation list based on the prioritization score.

6.2 Prioritization Approach

The Prioritization Methodology was developed based on the Metropolitan St. Louis Sewer District's (MSD's) Stormwater Projects Prioritization System (SPPS). This methodology calculates a prioritization score based on the benefit cost ratio for each PP.

6.2.1 MSD Stormwater Project Prioritization System

MSD's Stormwater Project Prioritization System (SPPS) divides projects into problem solved and solution benefit categories. Within the problem solved category, there are stream and storm sewer/overland flow sub-categories. These are further divided by flooding and erosion. Severity classifications are used to assign points for each sub-category. Within the solution benefit category, there are regional, environmental/water quality, and miscellaneous sub-categories. The following presents an overview of the problem solved and solution benefit categories:

- Problem Solved Categories
    - Stream: This category identifies the impacts of stream flooding and erosion on structures, roadways, yards, and natural resources. The stream erosion threat may be identified through visual observation, not strictly fluvial geomorphic assessment. The flooding impacts are further divided according to the frequency of flooding, number of structures impacted, and roadway flooding obstructions. The erosion impacts are further divided by number of structures impacted, and type of roadway being threatened.
    - Storm Sewer/Overland Flow: This category identifies the impacts of storm sewers/overland flow flooding and erosion on structures, roadways, and yards as well as the age of the existing stormwater collection system. The flooding and erosion potential can be identified through hydrologic and hydraulic analysis, study of topographic maps, field investigation, or recorded historical problems. The

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flooding impacts are further divided according to the frequency of flooding, number of structures impacted, and roadway flooding obstructions. The erosion impacts are further divided by risk to structures and yard erosion.

- Solution Benefit Categories
    - Regional: This category identifies benefits of reducing the flowrate leaving the site or combining smaller projects into a regional solution.
    - Environmental/Water Quality: This category identifies the benefits of addressing pollutants, eliminating combined sewers, and eliminating inflow into the sanitary system.
    - Miscellaneous: This category identifies the benefits from ease of implementation and the recreational/educational benefits of the project.

Appendix H provides the MSD template ranking worksheet and scoring guidance document.

6.2.2 Creve Coeur Prioritization Methodology

The Creve Coeur Prioritization Methodology follows the MSD methodology structure and scoring closely with the same category breakdowns and severity classification for point allocation. However, the MSD methodology was modified by changing or adding sub-categories to accommodate the City's unique needs. The following modifications were made to the MSD SPPS:

- Problem Solved Category Modifications
    - The Stream Erosion category was modified as follows:
        - Category 1.2.3 Threatening Roadway was changed to allow more points to be allotted for critical road sections as well as adding a point adjustment factor to account for undermined/failing bridges or culverts.
        - Category 1.2.4 Threatening Natural Resources was added to account for stream erosion threats to parks, wetlands, wooded areas, etc. based on the buffer width.
    - The Storm Sewer/Overland Flow category was modified as follows:
        - Category 2.4 Age of Existing System was renamed Condition of Existing System to allocate points based on the percentage of design life instead of the age. If the condition is unknown, the age of the system can still be used.
- Solution Benefit Category Modifications
    - The Environmental/Water Quality category was modified as follows:
        - Category 4.4 Preserves Natural Resource Areas was added to allocate points for projects that are preserving lakes, wetlands, natural corridors, etc.

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- Category 4.5 Conservation Easements was added to allocate points for each conservation easement being obtained as part of the project.

- The Miscellaneous category was modified as follows:
  - Category 5.1 Ease of Implementation was modified to add a category for projects that require no easements.

This ranking system was specifically developed for Potential Projects proposed as part of the on-going stormwater master planning efforts. For each PP identified a ranking worksheet was prepared to add points under each category, with the goal of developing an overall score. A scoring guidance document was developed to provide additional information and understanding of the scoring worksheet. Projects with higher point scores are considered a higher priority. Appendix H provides a template ranking worksheet, a scoring guidance document, and a copy of each ranking worksheet developed for the identified PPs in this Management Plan.

6.3 Results

Table 6.1 lists the cost, project type, and cost/benefit ratio for the Potential Projects within the City of Creve Coeur. These are presented in order of highest cost/benefit ratio and project type. The project costs are based on 2023 material and construction costs.

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Table 6.1 – PP Priority List

Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-C-16	Villa Hill Lane	12495 Villa Hill Lane, Creve Coeur, MO 63141	Bank stabilization to address erosion threatening structures along an outside bend of Fernridge Creek.	1	$104,000.00	2.28
DC-C-01a	Deer Creek in Malcolm Terrace Park	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at bridge with associated grade controls. City design plans were advanced to an 80% level prior to putting on hold due to funding.	1	$491,700.00	1.60
DC-C-18	Alden Lane	9 Alden Lane, Creve Coeur, MO 63141	Bank stabilization, grade control, and swale to address erosion threatening structures in Monsanto Sunswept Creek and one of its tributaries as well as overland flow issues.	1	$212,300.00	1.47
DC-C-02	Beaver Drive Crossing	48 Beaver Drive, Creve Coeur, MO 63141	Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues.	1	$518,500.00	1.41
CC-C-29	Royal Manor Drive	12553 Royal Manor Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek as well as an area inlet and swales to convey overland flow.	1	$942,400.00	1.35

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-C-28	Tealwood Drive	47 Tealwood Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basin, new culvert, wing wall replacement, overland swales, and a new inlet to address erosion and overland flow issues in Pebble Creek and along Tealwood Dr.	1	$473,900.00	1.34
CC-C-07	Ferngate Lane	954 Ferngate Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basin, wing walls, and toe walls to address erosion threatening structures along a tributary to Creve Coeur Creek.	1	$191,200.00	1.09
DC-C-17	10675 Ladue Road	10675 Ladue Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.	1	$621,700.00	1.07
DC-C-01	Deer Creek in Malcolm Terrace Park	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.	1	$1,116,900.00	1.01
CC-C-13	North Mason Road	900 North Mason Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion and knickpoints threatening structures in Fernridge Creek.	1	$619,500.00	1.00
DC-C-16	Ladue and South Spoede Road	10656 Ladue Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a culvert replacement to address erosion in Monsanto-Sunswept Creek.	1	$533,400.00	0.98
DC-C-22	Denny Creek	403 South Lindbergh Boulevard, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Denny Creek.	1	$1,760,500.00	0.87

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-C-01 ALT	Deer Creek in Malcolm Terrace Park Alternative	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.	1	$1,468,800.00	0.82
DC-C-15	Chaminade Drive	14 Chaminade Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a pedestrian bridge replacement to address erosion along Monsanto-Sunswept Creek as well as an inlet capacity review to address overland flow issues. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.	1	$781,000.00	0.77
CC-C-25	Chasselle and Chamblee Lane	700 Chamblee Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek.	1	$1,030,300.00	0.75
CC-C-33	Bellington Lane	296 Bellington Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, a stilling basin, and replacing bridge abutments to address erosion in Rosenfelder Creek.	1	$556,100.00	0.65
CC-C-11	Fernridge Creek at Bellerive Estates Drive	12918 Bellerive Estates Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion along threatening structures Fernridge Creek.	1	$360,400.00	0.63

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-C-19	Middlebrook Lane	5 Middlebrook Lane, Creve Coeur, MO 63141	Bank stabilization and bridge abutment replacement to address erosion in Monsanto-Sunswept Creek and one of its tributaries.	1	$174,400.00	0.37
DC-C-14	East Windrush Creek	1 East Windrush Creek, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a culvert replacement to address erosion threatening structures in a tributary to Windrush Creek.	1	$394,000.00	0.37
DC-C-09	281 Magna Carta Drive	281 Magna Carta Drive, Creve Coeur, MO 63141	Step grade control and stilling basin to protect outfall and replace failing grouted riprap structure in Deer Creek.	1	$233,800.00	0.32
DC-C-24	Sunswept Drive	15 Sunswept Drive, Creve Coeur, MO 63141	Bank stabilization and gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.	2	$477,800.00	1.67
CC-C-23	Oak Hollow Drive	12346 Oak Hollow Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion threatening structures along an upper tributary to Fernridge Creek.	2	$323,400.00	1.55
DC-C-03	996 East Rue De La Banque Street	996 East Rue De La Banque Street, Creve Coeur, MO 63141	Bank Stabilization and a stilling basin to address knickpoints threatening structures in an upper tributary.	2	$195,800.00	1.52
CC-C-12	680 Bellerive Estates Drive	680 Bellerive Estates Drive, Creve Coeur, MO 63141	Bank stabilization to address erosion threatening structures along Fernridge Creek. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.	2	$167,000.00	1.45

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-C-26	Chamonix Court	227 Chamonix Court, Creve Coeur, MO 63141	Bank stabilization, grade controls, rock armoring, stilling basin, and a retaining wall to address erosion and knickpoints threatening structures along a tributary to Smith Creek. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.	2	$631,800.00	1.43
DC-C-08	New Salem Drive and Camfield Square Drive	201 New Salem Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion threatening structures in Deer Creek and one of its tributaries.	2	$383,900.00	1.33
DC-C-23	10620 Country View Drive	10620 Country View Drive, Creve Coeur, MO 63141	Bank stabilization, grade control, and pipe replacement to address erosion threatening structures along Monsanto-Sunswept Creek in Dr. Phillip Venable Memorial Park. Bridge work will be combined with the planned Venerable Park project.	2	$263,800.00	1.13
CC-C-28	2 Chasselle Lane	2 Chasselle Lane, Creve Coeur, MO 63141	Grade control and rock armoring to address bank cutting along Ladue Rd. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.	2	$106,200.00	1.05
CC-C-01	Ferntop Lane Bank Stabilization	12970 Ferntop Lane, Creve Coeur, MO 63141	Rock armoring to address erosion and grade control at outfall knickpoint.	2	$114,700.00	1.05

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-C-04	11572 New London Drive	11572 New London Drive, Creve Coeur, MO 63141	Bank stabilization to address erosion in an unnamed tributary.	2	$181,900.00	1.04
CC-C-34	Williamsburg Road	14 Williamsburg Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and rock armoring to address knickpoints and erosion threatening structures along Rosenfelder Creek.	2	$285,100.00	0.98
DC-C-11	Brooktrail Court South	257 Brooktrail Court, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address erosion threatening structures in Windrush Creek.	2	$574,400.00	0.98
DC-C-06	Malcolm Terrace Park	Malcolm Terrace Park, 11370 St Paul Street, Creve Coeur, MO 63141	Bank stabilization to address bank erosion in Deer Creek.	2	$148,000.00	0.95
CC-C-06	1009 Fernview Drive	1009 Fernview Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basins, and rock armoring to address erosion threatening structures along a tributary to Creve Coeur Creek.	2	$490,900.00	0.95
CC-C-02	Ferntop Lane Outfall Repair	12970 Ferntop Lane, Creve Coeur, MO 63141	Headwall, rock armor, and grade control at existing outfall.	2	$96,100.00	0.94
CC-C-09	Ambois Drive	13010 Ambois Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address knickpoints and erosion threatening structures along Fernridge Creek.	2	$474,400.00	0.94
DC-C-12	Brooktrail Court North	123 Brooktrail Court, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion in Windrush Creek as well as swales to address overland flow issues.	2	$404,200.00	0.93

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-C-37	Balcon Estates	24 Balcon Estates, Creve Coeur, MO 63141	Bank stabilization and grade control to address erosion threatening structures along an unnamed tributary to Smith Creek.	2	$143,400.00	0.91
DC-C-26	Lindbergh Boulevard	8 Millstone Campus Drive, St. Louis, MO 63146	Bank stabilization, grade control, rock armoring, and a stilling basin to address erosion in an unnamed tributary along Lindbergh Blvd.	2	$326,600.00	0.91
DC-C-10	Villa Coublay Drive	44 Villa Coublay Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to repair erosion in Windrush Creek. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.	2	$228,900.00	0.85
CC-C-20	Falaise Drive	571 Falaise Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address knickpoints in Fernridge Creek.	2	$345,100.00	0.82
CC-C-14	840 Angleterre Drive	840 Angleterre Drive, Creve Coeur, MO 63141	Grade controls with associated bank stabilization to address knickpoints in a tributary to Fernridge Creek.	2	$156,000.00	0.79
CC-C-01 ALT	Ferntop Lane Bank Stabilization Alternative	12970 Ferntop Lane, Creve Coeur, MO 63141	Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.	2	$181,300.00	0.77
CC-C-18	12426 Stratford Ridge Court	12426 Stratford Ridge Court, Creve Coeur, MO 63141	Grade control and stilling basin to address failing grouted riprap in Fernridge Creek.	2	$132,100.00	0.74

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-C-27	22 South Tealbrook Drive	22 South Tealbrook Drive, Creve Coeur, MO 63141	Bank stabilization, grade control, and rock armoring to address erosion threatening structures in Pebble Creek. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.	2	$249,700.00	0.72
CC-C-30	151 Royal Gate Drive	151 Royal Gate Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Rosenfelder Creek.	2	$365,500.00	0.71
CC-C-35	12 Broadview Farm Road	12 Broadview Farm Road, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion in a tributary to Smith Creek.	2	$343,200.00	0.69
CC-C-04	Autumn Trails Court	13241 Autumn Trails Court, Creve Coeur, MO 63141	Grade control to address a knickpoint in a tributary to Creve Coeur Creek.	2	$148,500.00	0.62
CC-C-15	Millenium Park	Millenium Park, 2 Barnes West Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion along a tributary to Fernridge Creek in Millenium Park. This project will be combined with future project Millenium Park Phase 2.	2	$805,400.00	0.59
CC-C-32	Conway Downs Drive	12567 Conway Downs Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion in Rosenfelder Creek.	2	$319,600.00	0.58
CC-C-10	Lampadaire Drive	12961 Lampadaire Drive, Creve Coeur, MO 63141	Grade controls to stabilize knickpoints in Fernridge Creek.	2	$190,200.00	0.57

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-C-08	Bellerive Country Club	Bellerive Country Club, 12925 Ladue Road, St. Louis, MO 63141	A series of grade controls where Fernridge Creek confluences with Smith Creek.	2	$400,500.00	0.56
CC-C-05	Olive Boulevard	13150 Olive Boulevard, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion threatening structures along Creve Coeur Creek and one of its tributaries.	2	$894,000.00	0.55
DC-C-21	10694 Country View Drive	10694 Country View Drive, Creve Coeur, MO 63141	Grade control with associated bank stabilization to address erosion along Monsanto-Sunswept Creek.	2	$168,600.00	0.55
DC-C-20	Sherwyn Lane	7 Sherwyn Lane, Creve Coeur, MO 63141	Bank stabilization to address erosion threatening structures in a tributary to Monsanto-Sunswept Creek.	2	$153,800.00	0.52
DC-C-13	Executive Estates Drive	109 Executive Estates Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address erosion in Windrush Creek as well as a swale to address overland flow issues.	2	$580,900.00	0.48
CC-C-31	Boothbay Court	12318 Boothbay Court, Creve Coeur, MO 63141	Grade control with associated bank stabilization to address pipe outfall erosion threatening structures.	2	$108,000.00	0.46
DC-C-01b	Deer Creek in Malcolm Terrace Park	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.	2	$588,700.00	0.46
DC-C-05	Westwood Country Club	Westwood Country Club, 11801 Conway Road, St. Louis, MO 63131	Grade controls and bank stabilization to address bank erosion and knickpoints in Deer Creek and one of its tributaries.	2	$1,788,700.00	0.44

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-C-19	Questover Lane	665 Questover Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address erosion in Fernridge Creek.	2	$614,500.00	0.35
CC-C-03	13105 D'Artagnan Court	13105 D`Artagnan Court, Creve Coeur, MO 63141	Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.	2	$541,000.00	0.35
CC-C-27	Montsouris Drive	12365 Montsouris Drive, Creve Coeur, MO 63141	Bank stabilization to address erosion along an unnamed tributary near Montsouris Drive.	2	$167,000.00	0.23
CC-C-17	12344 Mulberry Tree Court	12344 Mulberry Tree Court, Creve Coeur, MO 63141	Grade control and stilling basin to address perched outfalls and a scour hole in a tributary to Fernridge Creek.	2	$180,500.00	0.22
CC-C-36	438 Twin Creek Road	438 Twin Creek Road, Creve Coeur, MO 63141	Bank stabilization to address erosion along Smith Creek.	2	$132,400.00	0.22
CC-C-21	Blackheath Court and Country Manor Lane	12230 Blackheath Court, Creve Coeur, MO 63141	Bank stabilization and rock armoring to address erosion in an upper tributary to Fernridge Creek.	2	$140,700.00	0.22
CC-C-24	17 Chamblee Lane	17 Chamblee Lane, Creve Coeur, MO 63141	Bank stabilization and fill to address sloughing and sinkholes along Smith Creek.	2	$108,900.00	0.20
DC-C-07	New Salem Drive	234 New Salem Drive, Creve Coeur, MO 63141	Bank stabilization to address bank erosion in Deer Creek.	2	$623,200.00	0.17
CC-C-22	Royal Valley Drive	12182 Royal Valley Drive, Creve Coeur, MO 63141	Grade controls and stilling basins to address knickpoints in Fernridge Creek.	2	$239,300.00	0.14
DC-S-03	Woodbridge Manor Road	8 Woodbridge Manor Road, Creve Coeur, MO 63141	Swales and inlet modifications to address street and structural flooding.	3	$62,200.00	6.83

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-S-07	Mason Forest Drive	12574 Mason Forest Drive, Creve Coeur, MO 63141	Swale, slotted manhole, and inlet modifications to address yard, street, and structural flooding.	3	$73,400.00	4.69
DC-S-02	18 Sackston Woods Lane	18 Sackston Woods Lane, Creve Coeur, MO 63141	Storm sewer, inlets, and rock swale to address yard flooding.	3	$158,600.00	2.08
CC-S-04	Fernpark Drive	1032 Fernpark Drive, Creve Coeur, MO 63141	Swale, yard drain, storm sewer, and curb inlet to address yard and basement flooding.	3	$115,700.00	2.07
DC-S-17	Sona Lane	14 Sona Lane, Creve Coeur, MO 63141	Berm, swale, inlets, and storm sewer to address structural flooding and yard erosion.	3	$562,700.00	2.00
CC-S-09	252 Bellington Lane	252 Bellington Lane, Creve Coeur, MO 63141	Berm, swale, and inlet modifications to address yard and basement flooding.	3	$61,900.00	1.29
DC-S-26	Warington Square	9820 Warington Square, Creve Coeur, MO 63141	Berm, swales, inlets, and storm sewer to address yard and structural flooding.	3	$340,500.00	1.29
DC-S-19	308 South Spoede Road	308 South Spoede Road, Creve Coeur, MO 63141	Swale, catch basin, storm sewer, and curb to address structural flooding.	3	$103,600.00	1.21
DC-S-22	North Spoede Road & Mission Hills Court	800 North Spoede Road, Creve Coeur, MO 63141	Inlets and storm sewer to address street flooding.	3	$71,200.00	1.19
CC-S-05	740 North Mason Road	740 North Mason Road, St. Louis, MO 63141	Reconstructed berm and swale to contain overland flow in the cemetery.	3	$138,600.00	1.06
DC-S-09	Pine Manor Drive	8 Pine Manor Drive, Creve Coeur, MO 63141	Trench drain, inlets, inlet modifications, berm, and swales to address street and yard flooding.	3	$80,200.00	1.05
DC-S-13	Morwood Lane	53 Morwood Lane, Creve Coeur, MO 63141	Mill asphalt, inlets, berm, manhole, and grading to address seepage and yard flooding.	3	$148,800.00	0.94

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-S-11	554 North Mosley Road	554 North Mosley Road, Creve Coeur, MO 63141	Swale to address yard gully and drainage issues.	3	$73,200.00	0.82
DC-S-05	Ladue Meadows	16 Ladue Meadows, Creve Coeur, MO 63141	Inlets and storm sewers to address yard flooding.	3	$132,600.00	0.72
CC-S-01	Cuiseaux Court	208 Cuiseaux Court, Creve Coeur, MO 63141	New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.	3	$135,600.00	0.70
DC-S-16	Wedgewood Lane	6 Wedgewood Lane, Creve Coeur, MO 63141	Inlets, storm sewer, and swale to address yard ponding.	3	$111,500.00	0.63
DC-S-01	Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive	11577 Templar Drive, Creve Coeur, MO 63141	New inlets and regrading pavement to address ponding issues along Magna Carta Drive.	3	$169,600.00	0.62
DC-C-29	The Knolls Lane	7 The Knolls Lane, Creve Coeur, MO 63141	Broken curb/drainageway replacement.	3	$74,500.00	0.62
DC-S-15	Fourwynd Drive	438 Fourwynd Drive, Creve Coeur, MO 63141	Berm, swales, and a culvert replacement to address yard flooding and overland flow erosion.	3	$213,900.00	0.61
CC-S-10	12229 Ladue Woods Drive	12229 Ladue Woods Drive, Creve Coeur, MO 63141	Berm to address yard flooding.	3	$69,200.00	0.55
CC-S-02	Broadview Farms Subdivision	19 Broadview Farm Road, Creve Coeur, MO 63141	Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.	3	$107,400.00	0.52

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
DC-S-07	East Ladue Estates Drive	57 East Ladue Estates Drive, Creve Coeur, MO 63141	Swale, berm, and underdrain field to address yard ponding.	3	$78,200.00	0.51
DC-S-23	6 Spoede Ridge Lane	6 Spoede Ridge Lane, Creve Coeur, MO 63141	Rock channel to address yard flooding.	3	$73,800.00	0.49
DC-S-14	Mary Meadows Lane	808 Mary Meadows Lane, Creve Coeur, MO 63141	Berm, swales, inlets, and storm sewer to address flooding and overland flow erosion.	3	$166,200.00	0.48
DC-S-25	Haven View Drive	19 Haven View Drive, Creve Coeur, MO 63141	Gutters, inlets and storm sewer to address yard flooding.	3	$125,100.00	0.48
DC-S-06	Fairways Circle	541 Fairways Circle, Creve Coeur, MO 63141	Storm sewer, inlets, berm, and swales to address yard flooding.	3	$262,300.00	0.48
DC-S-18	3 Oak Park Court	3 Oak Park Court, Creve Coeur, MO 63141	Inlets and storm sewer to address yard erosion.	3	$107,000.00	0.47
DC-S-24	7 Quailways Drive	7 Quailways Drive, Creve Coeur, MO 63141	Pipe repairs and retaining wall replacement to address erosion and sinkholes.	3	$107,200.00	0.47
CC-S-06	Auburndale Drive	39 Auburndale Drive, Creve Coeur, MO 63141	Shoulder and swale along N Mason Rd to address street flooding.	3	$187,800.00	0.43
DC-S-21	Chilton Lane	8 Chilton Lane, Creve Coeur, MO 63141	Erosion control, berms, and swales to address erosion.	3	$98,100.00	0.41
DC-S-04	561 Sarah Lane	561 Sarah Lane, Creve Coeur, MO 63141	Profile and mill asphalt to address street ponding.	3	$65,800.00	0.38
DC-S-08	121 Mystic Meadows Lane	121 Mystic Meadows Lane, Creve Coeur, MO 63141	Storm sewer extension and inlet to address overland flow erosion.	3	$137,300.00	0.33
CC-S-08	228 Falling Leaves Court	228 Falling Leaves Court, Creve Coeur, MO 63141	Drains, curb inlet, and storm sewer to address yard ponding.	3	$168,200.00	0.27

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Project Number	Project Name	Project Location	Project Description	Project Type	Total Project Cost	Cost/Benefit Ratio
CC-S-03	Ferntrails Lane	13096 Ferntrails Lane, Creve Coeur, MO 63141	Berm and swale to shift overland flow away from houses.	3	$78,300.00	0.26

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Section 7
Implementation

7.1 Introduction

The Watershed Management Plan (WMP) is intended to be used as a planning tool. It is understood that the recommendations included within the WMP carry significant costs and impacts to the community, and the plan will be implemented over decades. The needs and limitations of the City will inevitably change over that time. By creating a decision-making framework with a consistent project scoring and ranking system, the WMP will guide City Councils so that stormwater control efforts will be wisely chosen and well-coordinated for years to come.

The core of the WMP is the development of a prioritized list of possible projects. The projects listed in the WMP are by definition considered "concept" projects. Over the next few months, the City anticipates programming stormwater concept projects into the City's five-year Capital Improvement Program (CIP). City staff along with the Stormwater Committee will work together to develop the list of stormwater management concept projects for the CIP, and then the CIP will ultimately be reviewed and approved by the City Council. Many factors will be used in choosing concept projects for the five-year CIP with the overarching goal of having an optimal mix of projects that will solve significant stormwater issues within the given budget.

Typically each April, the City Council approves the CIP for the following fiscal year. The City's fiscal year starts on July 1st and ends June 30th the following year. After the CIP is approved by the City Council, typically the next step is the development of a detailed engineering study and then a plan set. After design work is complete, projects will be reviewed by City staff to ensure that they are economically feasible and likely to successfully solve a serious stormwater issue. Viable projects will then typically be publicly bid for construction.

7.2 Potential Project Implementation

The Potential Projects (PPs) outlined in Section 5 of this report were categorized using the Prioritization Ranking System presented in Section 6. The Prioritization Ranking System is one planning tool that gives City staff, the Stormwater Committee, and the City Council a way to consistently compare and rank possible projects based on the cost-to-benefit ratio. The intent of this scoring system is to help identify projects that are likely to deliver the most public good. The scores are a starting point – not the only or final determining factor in stormwater project programming. It's important to note:

- The ranked list of projects is dynamic and subject to adjustments as conditions change and new stormwater issues arise. As new possible projects are added, the order of projects on the list may adjust.

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- Potential projects that are already on the list will only be re-scored if physical conditions significantly change the nature or severity of the stormwater issue.
- Projects with a cost-to-benefit ratio greater than 1.0 are the most likely to be addressed within the next five-year CIP planning window.
- High scores are not a guarantee that a project will be included in the CIP.
- Remaining CIP budget, staffing levels, and possible grant funding will be considered when scheduling projects.
- Grant funding options will likely be explored and pursued before committing City funds for some projects – particularly for streambank restoration and other watercourse projects.
- Construction-related timing constraints will be considered when scheduling projects.
    - Tree removal for creek stabilization projects can only be done November through March.
    - Live stakes and other types of vegetation have limited installation windows.
    - Concrete and asphalt can only be installed when temperatures exceed minimum thresholds.
- Projects involving a City asset (such as a roadway) may be scheduled before projects that solve issues solely on private property.
    - Replacing a failing roadway culvert may be prioritized over projects that involve only private assets. The reason? Culvert replacement can be considered both a roadway project and a stormwater project.
    - The City has an obligation to protect the public's safety by maintaining public roadways.
- Stormwater projects may be scheduled to coordinate with a planned roadway or park projects.
- Projects that do not require easements may be programed before projects that require one or more easements.
- Some projects may not be able to be constructed without the cooperation and support of other government entities such as the Missouri Department of Transportation, Saint Louis Country, or neighboring municipalities.

If the location of the work is within a floodplain or floodway, the Stormwater Committee and the City Council may choose not to fund the project.

7.3 Project Funding

Funding for these Potential Projects may include, but not be limited to, the City's one half-cent capital improvement sales tax, one half-cent parks and stormwater sales tax, transfers from the City's general fund, and grants from local, state, and federal aid programs such as 319 grants. Funding assistance for private issues can be obtained through the City's new Stormwater Management Cost-Share Program.

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7.4 Coordination Efforts

A coordinated effort between the City, MSD, St. Louis County, MoDOT, and neighboring municipalities will be needed to guide the implementation of the Watershed Management Plan. When applicable, the City shall perform the initial outreach with appropriate agencies to discuss coordination efforts prior to moving forward with design on the PPs and verify agency concurrence.

7.5 Stormwater Ordinance Review for Mitigation BMPs

This report compared the regulatory requirements and performance of two neighboring municipalities. The goal of this analysis was to quantitatively show how the stormwater management benefits that Creve Coeur's current requirements provide compare to the regulatory stormwater management benefits achieved by neighboring municipalities.

While the City follows MSD criteria for stormwater design, it also has stormwater mitigation requirements for sites that disturb 2,000 square feet or more. The requirements provide mitigation for the incremental development that occurs as lots are redeveloped or additions are added. These small increases in runoff aggregate over the watershed and transform into larger impacts on channel erosion, enclosed system capacity, and downstream flooding. The mitigation requirements help prevent damage on adjoining parcels and downstream neighbors. The review will evaluate if improvements to the current ordinances would yield better protection for the City's residents.

7.5.1 Mitigation BMP Criteria Comparison

For this comparison reference is made to the *Olivette Stormwater System* Analysis dated January 30, 2024 and prepared by EDM Incorporated. While the report was prepared for the City of Olivette, the study methodology and results are directly applicable to the City of Creve Coeur. The study compared the stormwater mitigation approaches used by three cities for sites disturbing less than 1 acre and the resulting effects on peak stormwater discharges. The comparison evaluated the stormwater mitigation BMP criteria of Olivette, Frontenac, and Creve Coeur. The following nomenclature will be used for the discussion: "City Name" BMP, i.e. a BMP sized following Olivette's criteria will be referenced in the discussion as an "Olivette BMP".

Olivette Criteria - For new homes, the Olivette BMP (detention) is sized based on the roof area of the new house. Olivette does not consider the additional impervious area by other lot coverages for new construction. The City also requires detention of lot coverage for a residential addition, reconstruction, and/or improvement that increases lot coverage by one thousand two hundred (1,200) square feet or more. The 15-year, 20-minute storm is used to size the BMP, and the total roof area runoff (new construction) or increased impervious area (reconstruction) must be directed to the BMP.

Frontenac Criteria - A Frontenac BMP is sized based on the total increased impervious area over 1,000 square feet. If that area increases by more than 2,000 square feet, 20% of the

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existing impervious area must be added to the increased impervious area. The Frontenac BMP is based on a 2.5-inch rain over the increased impervious area. This is equivalent to the rainfall of a 1-year, 24-hour storm with no losses assumed. A restrictive orifice is required to meter out flow.

Creve Coeur Criteria – In Creve Coeur, stormwater mitigation is required for all new homes, swimming pools, and detached garages. Mitigation is also required for any site improvement or building addition that disturbs more than 2,000 square feet. The 15-year, 20-minute storm is the design storm. The differential stormwater runoff shall be contained on-site if the subdivision's detention cannot handle the increase. The difference between the existing and proposed runoff rates is used to calculate the size of the detention.

A fourth BMP scenario was also considered that used the Olivette Criteria and added a restrictive outflow orifice as typically required in Frontenac. This scenario is referred to as Olivette BMP w/ Orifice.

7.5.2 Mitigation BMP Modeling Approach

EDM used the following modeling software: "Personal Computer Storm Water Management Model" (PCSWMM), a dynamic hydrologic and hydraulic program, to model two scenarios: a typical residential lot improvement and a larger scale, multi-lot redevelopment scenario in a 60-acre watershed in an Olivette residential neighborhood. For each scenario, stormwater BMP(s) were sized based on each municipality's criteria. A combined 1D-2D model was used to model the watershed. The enclosed system was modeled and linked to a 2D model of the surface. This was done to evaluate overland flow and flooding when the enclosed system is surcharged. To consider the effects of the detention, a 15-Year 24-Hour SCS Type II event was evaluated. Please note, this is different from the MSD 15-year, 20-minute peak flowrate calculation which does not generate a runoff hydrograph.

For consistency on the comparison, the detention BMP selected was an underground rock storage basin with an infiltration trench and overflow discharge. The analysis variable is the sizing of the BMP based on each municipality's criteria.

Single Lot Scenario – New home construction on an existing lot near the middle of the 60 acre watershed. The new home had an area of 4,229 square feet plus driveway and other lot coverages. The new home footprint approximately doubled the impervious area on the lot.

Multi-Lot Redevelopment – This scenario considered redevelopment of 50% of the homes in a 60-acre watershed to simulate redevelopment over time under the various criteria. The scenario assumed that 61 of the smallest homes in the watershed were redeveloped to a footprint similar to the single lot scenario (~4,200 square feet). Approximately half of the sites increased the impervious area more than 2,000 square feet (Frontenac criteria threshold). It was also assumed that 31 pools (about 25% of lots) would be added to the

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watershed at an increase of 1,200 square feet of impervious area. The watershed was subdivided into 13 subbasins based on the enclosed system and the redevelopment improvements were proportionally distributed throughout the subbasins.

An existing conditions scenario and a development with No BMP were also developed as a basis for comparison.

7.5.3 Mitigation BMP Modeling Results

The peak flowrates from the watersheds were reviewed to evaluate the detention BMP impacts. The flowrates discussed are in units of cubic feet per second (cfs).

Single Lot Scenario – The runoff results for the drainage area with the single redevelopment lot are listed in Table 7.1. They showed that the biggest positive effect, reducing peak flow, was seen for the Olivette BMP w/ Orifice and the Frontenac BMP. The Olivette BMP was next and Creve Coeur BMP was least effective for the 15-Year 24-Hour SCS Type II event.

Table 7.1 Flows for Drainage Area A6 That Contains the Single Lot Redevelopment Site

Model 15 Yr Storm	Existing Condition	Add. Imp. Area No BMP	Olivette BMP	Olivette BMP w/ Orifice	Frontenac BMP	Creve Coeur BMP
A6 Runoff (cfs)	11.99	12.32	11.91	11.83	11.83	12.11

Multi-Lot Redevelopment – The runoff results for the watershed redevelopment are listed in Table 7.2. The 15-Year, 24-Hour SCS Type II event runoff results for this scenario were similar to those for the single redevelopment site. The scenarios with the biggest positive effect, reducing peak flow, varied between the Olivette BMP w/ Orifice and the Frontenac BMP for the 13 drainage areas. These scenarios also reduced peak flows from the existing condition scenario. The Olivette BMP peak flows were sometimes lower and sometimes higher than the existing condition scenario. The Creve Coeur BMP was least effective, overall. All scenarios did reduce the peak flows for the developed 15-Year, 24-Hour SCS Type II event. Table 3 also lists the enclosed storm sewer system outflows for each BMP application. It was noted that smaller reductions were observed in these flows because the piped system was surcharging and losing flow to overland bypass routes.

Table 7.2 Watershed Redevelopment Flowrate Results for the 15-year Storm (cfs)

Drainage Area	Existing Condition	Add. Imp. Area No BMP	Olivette BMP	Olivette BMP w/ Orifice	Frontenac BMP	Creve Coeur BMP
A1	26.75	29.95	25	24.34	24.8	26.78
A2	14.04	16.05	14.09	13.69	13.32	14.69
A3	16.84	18.57	16.86	16.22	16.35	17.54
A4	9.79	10.51	9.91	9.73	9.38	10.16

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Drainage Area	Existing Condition	Add. Imp. Area No BMP	Olivette BMP	Olivette BMP w/ Orifice	Frontenac BMP	Creve Coeur BMP
A5	10	10.71	10.12	9.95	9.58	10.38
A6	11.99	13.59	12.22	11.89	11.46	12.65
A7	21.05	24.28	20.32	19.77	20	21.7
A8	16.93	19.28	16.65	16.13	16.03	17.62
A9	16.91	19.31	16.61	16.12	16.04	17.62
A10	17.51	19.68	16.92	16.44	16.41	17.94
A11	9.914	10.55	10	9.84	9.42	10.25
A12	15.94	17.64	15.92	15.29	15.41	16.61
A13	9.81	10.6	10.03	9.87	9.45	10.43
Total	**197.47**	**220.72**	**194.65**	**189.28**	**187.65**	**204.37**
Storm Sewer Max Outflow (cfs)	**143.3**	**147.1**	**144.9**	**143.9**	**142.3**	**145.3**

7.5.4 Mitigation BMP Conclusions

The City of Creve Coeur's criteria is effective at reducing the peak discharge for the 15-year, 20-minute flowrate, but could be more effective at controlling the cumulative runoff volumes. The detention sizing requirements could be increased similar to the Frontenac criteria that sizes the detention based on metering out 2.5 inches of rainfall (1 year storm) for the increased impervious area. In addition to mitigating the 15-year, 20-minute storm and improving conveyance system capacity, this would also help address cumulative increases to the stream forming flowrate and prevent increased erosion on the receiving channels.

7.5.5 Stormwater Ordinance Recommendations

It is recommended that the City strengthen the existing stormwater ordinances to require stronger detention requirements for any increase in impervious area on each lot. The Watershed Management Plan has identified more than $30 million in possible projects. Improving the effectiveness of stormwater management ordinances by requiring that more stormwater stays where it falls or remain longer where it falls will protect the City's current and future investments in stormwater infrastructure and streambank stabilization projects.

It is also recommended that the City evaluate the stormwater mitigation requirements periodically to assess potential improvements. The nature of storms has changed and will likely continue to change. Rainfalls are having higher intensity and shorter durations. This means more rainfall occurs in shorter timeframes. Adapting the regulations to the changing climate will ensure the residents receive the same levels of protection and stormwater management benefits in the future as they do today.

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Appendix A
Glossary of Terms and References

Content:

- A.1 Glossary of Terms
- A.2 References

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A.1 Glossary of Terms

The following terms and acronyms are used throughout the report.

- 2-year design storm - A rainfall event with a probability of occurrence of 50 percent in any given year

- 5-year design storm - A rainfall event with a probability of occurrence of 20 percent in any given year.

- 10-year design storm - A rainfall event with a probability of occurrence of 10 percent in any given year.

- 25-year design storm - A rainfall event with a probability of occurrence of 4 percent in any given year.

- 50-year design storm - A rainfall event with a probability of occurrence of 2 percent in any given year.

- 100-year design storm - A rainfall event with a probability of occurrence of 1 percent in any given year.

- 500-year design storm - A rainfall event with a probability of occurrence of 0.2 percent in any given year.

- Bank angle - The angle measured from the horizontal between the base of the slope and the top of bank. For complex cross sections, it is the series of angles measured from the horizontal at each change in slope.

- Bankfull elevation - In classical terms, the elevation in the channel where water surface reaches the top of the streambanks, also referred to as “top-of-bank” elevation. When the water surface rises above the bankfull elevation, it crests the banks and spills over onto the bankfull floodplain. In urban streams, the bankfull elevation generally coincides with the dominant discharge elevation. This elevation corresponds to the stream forming flow, which creates bankfull floodplains.

- Bankfull floodplain - The bankfull floodplain is a low, vegetated terrace, formed by, and an indicator of, the bankfull discharge. In incised streams, bankfull floodplains form as internal shelves within the main channel. While not an absolute diagnostic, functioning bankfull floodplains indicate stable reaches. Bankfull floodplains fulfill the important function of reducing stress on the streambanks. When the flow crests the internal floodplain, the velocity and thereby the shear stress is reduced as the flow spreads across the internal shelf.

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- Base flow - In a perennial stream, the low flow discharge attributable to groundwater flow.

- BFE - Base flood elevation.

- Bioengineering (also called biostabilization) - A scientific and ancient method of restoring the landscape of ecosystems using the physical properties of plants, such as their sheer resistance, tensile strength, and flexibility, to rebuild the terrestrial or aquatic foundation in a manner that is both physically and ecologically stable (see streambank stabilization, synonymous with bioengineering).

- BMP - Best management practice, a structural or nonstructural device designed to treat runoff in order to mitigate flooding, reduce pollution, and provide other amenities.

- cfs - Cubic feet per second, a unit of measurement for labeling flow of water.

- Channel bar - A streambed deposit of silt, clay, sand, or gravel, often exposed during low-water periods. An alluvial deposit composed of silt, clay, sand, gravel, or other material that obstructs flow and induces deposition or transport.

- Channel evolution - The progression of channel form (usually expressed as cross section) over time as a response to a disturbance. The model describes the progression of channel shapes as the stream accommodates the disturbance and eventually reacquires equilibrium. The stages of channel evolution in the most commonly used model are equilibrium, channel disturbance, incision, widening, deposition, and recovery.

- CMP - Corrugated metal pipe.

- Composite revetment - A bank strengthening method in which rock, geogrid, and plants form a composite material and increase resistance to scour and near-surface mass wasting. The revetment is built in layers comprised of durable rock interlaid with woody bare root plants. The thickness of the rock is controlled by geogrid layers wrapping the rock on three sides. The channel-facing side remains open. On steep slopes, a structural geogrid may also be used to increase slope stability.

- Contours - Lines of equal elevation that represent the land surface.

- Conveyance system - Natural channels and manmade structures that convey stormwater downstream.

- Cross section - A two-dimensional line that is drawn perpendicular to the contours to represent the open channel flow conveyance at that location.

- Detention basin - A stormwater facility that collects and temporarily stores runoff to reduce peak flow rates and alleviate downstream flooding and erosion problems.

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- DFIRM - Digital Flood Insurance Rate Map

- Dominant discharge - The dominant stream-forming flow or recurring flow responsible for the majority of work and channel maintenance in a stream. It is the flow that over time has the greatest influence on stream form. The recurrence interval for the dominant discharge of most streams is roughly 1.5 years, as determined by flood frequency analysis. In urban areas with highly altered hydrology, this return interval may be much more frequent. The dominant discharge is sometimes referred to as the bankfull or stream-forming discharge.

- Extended dry detention basin: An extended dry detention basin provides flood control and water quality treatment and is a dry storage facility. The term "extended" means the entire WQCV is treated by slowly releasing the runoff over a specified period of time until the facility completely drains. The primary pollutant removal mechanism is sedimentation, which is achieved through an appropriate detention time.

- Extended wet detention basin: An extended wet detention basin provides flood control and water quality treatment and contains a permanent pool. The term "extended" means the entire WQCV is treated above the permanent pool by slowly releasing it over a specified period of time. The permanent pool provides a medium for the settling of solids between storms and, with longer retention times and aquatic vegetation, nutrients and dissolved pollutants can be removed. Section 8.3.4.2 of the Drainage Criteria Manual refers to these basins as "Retention (Wet) Ponds."

- FEMA - Federal Emergency Management Agency.

- FIRM - Flood Insurance Rate Map

- FIS - Flood Insurance Study.

- Flood bench - A technique used in stormwater control, when horizontal space is available, that removes earth from one or both streambanks such that the result is a visible bench when the stream is viewed in cross section, and done to reduce water velocity, shear stresses, and water surface elevation.

- Floodplain - The area of land that is inundated with water during a given storm event.

- Floodway – The channel of a river or watercourse and the adjacent areas that must be reserved in order to discharge the 100-yr flood without cumulatively increasing the water surface elevation more than one foot.

- Floodprone area – term used to refer to the 100-year floodplain identified as part of a new study and not yet shown on the FEMA floodplain maps.

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- Fluvial geomorphology - The scientific discipline concerned with the study of how moving water shapes landforms.

- Freeboard - Defined as the distance between the maximum water surface elevation anticipated in design and the top of retaining banks or structures, and provided to prevent overtopping due to unforeseen conditions.

- ft/sec - Feet per second, a unit of measurement for labeling velocity of water.

- ft^2 – Square foot or square feet, a unit of measurement for labeling area.

- Geomorphology - The study of surface land forms and the processes that develop those forms. Geomorphic processes are the primary mechanisms that produce these land forms, including drainage patterns, streams, floodplains, and other watershed features (see also fluvial geomorphology).

- GIS - Geographical information system.

- GPS - Global positioning system.

- Gully - A channel or miniature valley cut by concentrated runoff through which water commonly flows only during and immediately after heavy rains and is sufficiently deep that it would not be obliterated by normal tillage operations.

- HEC - Hydrologic Engineering Center of the U. S. Army Corps of Engineers.

- HEC-HMS - A computer model developed by the U. S. Army Corps of Engineers to simulate the hydrologic conditions of a drainage area.

- HEC-RAS - A computer model developed by the U. S. Army Corps of Engineers to simulate the hydraulic conditions of a conveyance system through a drainage area.

- Hydraulic analysis - The study of stormwater flow through the conveyance system that includes underground pipelines, culverts, improved open channels, and natural creeks.

- Hydraulic Profile - A plot of the water surface elevation along the flow line of a stream or pipe.

- Hydrograph - A plot of surface runoff or excess precipitation versus time.

- Hydrology analysis - The study of the occurrence, distribution, movement, and properties of waters of the earth and their environmental relations.

- Hyetograph - A plot of rainfall depth or intensity versus time.

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- Illicit connections - The illegal and/or unauthorized connections that result in untreated wastewater discharges into storm drainage systems and receiving waters.

- Illicit discharge - Any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater, except for discharges allowed under an NPDES permit or waters used for certain emergency situations.

- Imbrication - Imbrication refers to the pattern of bed load deposition. Larger particles such as cobbles, concrete slabs, or shale plates deposit on the streambed in a "fish scale" pattern. The stream power necessary to move these larger particles generally results from mid-intensity storms (10- to 25-year events). Imbrication armors streambeds from the major storms and is one indicator of competent bedload transport.

- Impervious - The characteristic of a material that prevents the infiltration or passage of liquid through it. This may apply to roads, streets, parking lots, rooftops, and sidewalks.

- Incision - Vertical channel adjustment, or channel downcutting, generally in response to an alteration upstream or downstream of the incising reach. Incision occurs when sediment or transport material is more easily removed from the channel bed than it is from the streambanks. Bed material is liberated to "heal" a temporary disturbance in sediment transport equilibrium or channel shape.

- Knickpoint - An abrupt discontinuity in bed slope indicating the upward limit of channel incision. A knickpoint usually occurs at a resistant hard point in the channel bed, such as a geologic control, debris jams, de facto grade control, or manmade structure.

- Knickzone - Typically observed in loess or alluvial streams, a knickzone is an area of slope discontinuity similar to a knickpoint, but less pronounced and occurring over a greater length of channel. In bedrock streams, knickzones occur as a series of smaller knickpoints.

- Left (and right) descending bank - Refers to the either side of the channel in relation to the downstream flow of water. For example, left descending bank refers to the lefthand side of an in-channel observer facing downstream. This designation is the convention in river science and engineering.

- Length-to-width ratio - Increasing the length-to-width ratio of the water quality basin increases the water quality treatment potential by providing additional detention time for settling, infiltration, and possibly biological uptake. As a result, a 3:1 length-to-width ratio or greater is generally recommended. Basins should be wedge-shaped, narrowest at the inlet and widest at the outlet. Greater flow lengths can be accommodated by relocating the basin inlet or outlet where possible, or by installing berms or baffles within the basin to the full depth of the WQCV to avoid short circuiting and increase travel time to the outlet.

- lf – Linear foot or linear feet, a unit of measurement for labeling length.

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- Littoral zone - An aquatic and safety bench around the perimeter of a pond or detention/retention basin is called the littoral zone.

- Longitudinal profile - A profile survey down the thalweg of a stream. A thalweg profile is not a channel centerline profile and the two are not interchangeable. Longitudinal profiles are used both for diagnosis of dominant process and for design guidance. Longitudinal profiles are particularly helpful in identifying knickpoints and knickzones and for evaluating pool riffle sequences.

- Manning's formula - A formula used to predict the velocity of water flow in an open channel or pipeline: V = 1.486/n* R2/3 *S1/2, where V is the mean velocity of flow in feet per second, R is the hydraulic radius, S is the slope of the channel, in feet per foot, and n is the roughness coefficient of the channel lining.

- Mass wasting - Landslide, a mass downward movement of material caused by gravity in contrast to surficial erosion, which is the movement of individual soil particles.

- Meander advance - The natural process by which the meander waveform migrates downstream. The movement is a consequence of the secondary flows occurring perpendicular to the primary downstream flow. These secondary flows alternately scour and deposit channel materials. The greatest stress and the greatest scour occur just downstream of the apex of a curve on the outside of the bend. Similarly, the peak deposition occurs just downstream of the apex on the inside of a bend. Over time, this pattern moves the waveform downstream.

- Meander amplitude - The linear distance between the apex of one meander and the apex of the next meander.

- Meander wavelength - The length of one complete waveform. Wavelength can be measured as the linear distance between two analogous points on a waveform.

- Micropool - The micropool is an optional feature for extended dry detention basins, a relatively shallow impoundment intended to concentrate sediment and reduce the potential for resuspension during runoff events. Vegetation in the micropool can help stabilize the trapped sediment. A micropool also helps prevent clogging of the outlet.

- Normal depth - Depth of flow in an open conduit during uniform flow for the given conditions (see Manning's equation).

- NPDES - The National Pollutant Discharge Elimination System, established by Section 402 of the Clean Water Act, is a federally mandated system used for regulating point source and stormwater discharges.

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- Open channels - Also known as swales, grass channels, streams, and biofilters. These systems are used for the conveyance, retention, infiltration, and filtration of stormwater runoff.

- Outfall - The point where water flows from a conduit, stream, or drain.

- Perennial stream - A stream channel that has running water throughout the year.

- Permanent pool – The permanent pool is the designed water surface, water area and volume of water in a pond or retention basin where water is permanently stored. The permanent pool provides a holding volume between runoff events for continued settling of particulate contaminants and nutrient uptake by aquatic plants. As discussed in Section 6.11.2 of the City's Drainage Criteria Manual, water budget calculations are required for all permanent pool stormwater facilities to demonstrate that a permanent pool will be achieved given the average annual site hydrologic conditions. If the permanent pool cannot be maintained under normal conditions, infiltration losses in the permanent pool can be minimized using various methods, including compaction, incorporating clay into the base materials, and installing an impermeable liner.

- Permanent pool volume - There are a variety of methods for determining the design volume of the permanent pool. Sizing criteria have been developed based on solids settling and nutrient removal mechanisms. Due to limited empirical evidence to support these designs, a simplified method of one to two times the WQCV is suggested (Table 7-1). The permanent pool depth should be between 5 to 10 feet, which is consistent with City's Drainage Criteria Manual guidance.

- Plan form analysis - Evaluation of the horizontal geometry of the shape and size of the stream channels. Plan form analysis provides insight on whether and how parts of the basin differ from one another and if the geometric relationships of meanders are within the expected norms.

- Pollution prevention plan - A requirement for some land uses or activities (e.g., industrial sites) that outlines techniques to prevent pollutants from being washed off in stormwater runoff (e.g., spill response, material handling, employee training, etc.)

- Pool-riffle sequences - In a streambed, the combination of topographical lows (pools) produced by scour and the topographical high areas (riffles) created by the accumulation of relatively coarse-grained sediment. A sequence is defined as the beginning point of one riffle to the beginning of the next.

- RCB - Reinforced concrete box.

- RCP - Reinforced concrete pipe.

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- Rill - Erosion of lesser depth than a gully and would be smoothed by ordinary farm tillage (see gully).

- Riparian - Woody vegetation that is characteristic of an area bordering a stream or river.

- Riprap - A loose assemblage of broken stones built along streams or beaches for erosion protection.

- Runoff - The portion of precipitation that is discharged from a drainage area.

- Sediment forebay - A sediment forebay is a pretreatment feature that can increase the pollutant removal efficiency of the facility by trapping sediment and trash at all basin inlets. Generally it is recommended that the forebay represent at least 10 percent of the WQCV to be effective. The forebay can also facilitate maintenance by concentrating sediment in an accessible location. The forebay consists of a separate cell, formed by an acceptable barrier such as a vegetated earthen weir.

- Sediment transport - The movement of dislodged particles through a stream system. It is one of the driving forces (along with flow) of channel adjustment.

- Sediment transport competence - The condition in which the stream maintains sufficient stream power to transport the sediment supplied to it continuously through the system.

- Sedimentation - Soil particles suspended in stormwater that can settle in streambeds and disrupt the natural flow of the stream.

- Scour line elevation - The distance above a known datum (top of ground) to a persistent near-horizontal erosion feature at the peak depth of any given flow.

- Side slopes - The slope of the sides of a channel, dam or embankment, where customary naming is the horizontal distance first, as 1.5 to 1, or frequently, 1½:1, meaning a horizontal distance of 1.5 feet to 1 foot vertical.

- Sinuosity - The ratio of channel length to valley length. For example, a river 2,000 feet long, winding through a river valley that is 1,000 feet long has a sinuosity of 2.

- Slope - Defined by change in vertical elevation divided by horizontal distance and typically expressed as a percentage.

- Stabilization - Providing adequate measures, vegetative and/or structural that will prevent erosion from occurring.

- Streambank stabilization - The use of the structural properties of live plants to rebuild washed out streambanks and flood terraces, including live slope fascines, hedge brush layers, and live willow brush mattresses.

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- Structural BMPs - Constructed facilities designed to remove pollutants and slow down the runoff from smaller rainstorms to preserve water quality and provide long-term stream stability. These facilities can be installed as development progresses (sitespecific) or to address multiple developments (regional).

- Subarea - A portion of a watershed that drains and concentrates at point, typically at a catch basin, within a system of drainage pipes, or along a stream.

- Surcharge - A condition of a stormwater system, where the water surface exceeds the freeboard and overflows.

- Swale - An open drainage channel or depression explicitly designed to detain and promote the filtration of stormwater runoff.

- Tail water - Water, in a river or channel, immediately downstream from a structure.

- Thalweg - The deepest part of a channel cross section. The dominant thread of stream flow creates the thalweg.

- Time of concentration - Time required for water to flow from the most remote point of a watershed, in a hydraulic sense, to a point of concentration described within a subarea.

- Toe (of slope) - Where the slope stops or levels out. Bottom of the slope.

- TR-55 - Technical Release 55, a report compiled by the Natural Resources Conservation Service that presents procedures for stormwater calculations.

- Watershed - A region of land that drains to a river, creek, or body of water.

- Wing wall - Side wall extensions of a structure, typically at the head or tail end of a system of stormwater pipes or a culvert, which is used to prevent sloughing of banks or channels and to direct runoff.

- WQCV - Water quality control volume.

- WSE - Water surface elevation.

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Appendix C
Stormwater Problem Sites

Content:

- Stormwater Problem Site Project Areas
- Criteria for Public Projects
- Public or Private Checklist
- List of Private Projects

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Stormwater Problem Site Project Areas

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Introduction

The following problem areas (PA) were developed by grouping the reported issues. The PA numbers were assigned for initial tracking of the reported issues. The Potential Project number that this area is addressed under is listed in parentheses in the title. Some problem areas were also classified as private issues.

PA-1 – Woodbridge Manor Road (Overland) (DC-S-03)

Stormwater issues in Woodbridge Manor Road include flooding in basements, garages, and on streets and yards during heavy rain events. The main cause of the basement flooding is stormwater back-up in the sanitary sewer, which is an MSD issue. During heavy rainfall events 8 Woodbridge Manor has had up to 15 inches of water on the garage door and water inside the garage. Analysis is needed to determine the intensity of rainfall that leads to the flooding to make sure the storm sewer system is properly sized. The 15-year flowrate is 380 cubic feet per second and 100-year flowrate is 513 cubic feet per second. The MSD basemap does not have invert elevations for the 72-inch outfall into the detention basin. It is estimated that the pipe is adequately sized for the 15-year but the 100-year would likely surcharge on to Woodbridge Manor. Based on the two-foot contours, the overland flow path maybe constricted leading to the garage flooding. Additional analysis should include the detention basin and outfall structure to ensure these structures do not contribute to the flooding and that drainage from I-270 is properly accounted for.

PA-2 – Chasselle and Chamblee Lane (Channel) (CC-C-25)

Five streambank erosion issues were reported either to the City or on Social Pinpoint affecting the following properties:

3 Chasselle Lane
5 Chasselle Lane
6 Chasselle Lane
10 Chamblee Lane
606 Chamblee Lane
622 Chamblee Lane

These issues are located along a tributary to Smith Creek which runs under Chasselle Lane and south of Chamblee Lane. Reported issues include an undermining headwall, a sinkhole caused by a possible pipe failure, creek erosion, streambank erosion, and flooding of a pool area and home.

The City has reported the sinkhole and pipe failure issue to MSD. I&L identified active incision along this reach as well as undermined pedestrian bridge abutments and erosion threatening a retaining wall. Erosion on both sides of the Chasselle Lane culvert was also identified in the field.

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PA-3 – Williamsburg Road (Overland/Channel) (CC-C-34)

The Williamsburg subdivision project area has several different issues.

10 Williamsburg Road –	Streambank erosion is located at the upstream end of Rosenfelder Creek which runs between Cabin Grove Lane and Williamsburg Road. Reported issues include gully erosion where overland drainage enters the channel and outfall erosion and undermining of an 18-inch pipe on the north side of the property.
14 Williamsburg Road –	Inlet maintenance and capacity analysis are both recommended.
20 Williamsburg Road –	Yard flooding from 69-acre drainage area (DA). Analysis is needed to determine the intensity of rainfall that leads to the flooding to make sure the storm sewer system is properly sized and an overland flow path is provided. The estimated flows in the 48-inch reinforced concrete pipe are 15-year flowrate is 146 cubic feet per second and 100-year flowrate is 197 cubic feet per second. The MSD basemaps show that the 48-inch pipe downstream of this property has a 6% slope and thus adequate capacity for these flows. Additional analysis is needed to determine if there is bypass flows upstream and that drainage from I-270 is properly accounted for in pipe-sizing calculations.
21 Williamsburg Road –	Yard erosion on a graded hillside was reported.
38 Williamsburg Road –	Yard ponding was reported.
40 Williamsburg Road –	Yard ponding was reported.
43 Williamsburg Road –	Structural flooding results from the front yard sloping towards the house. There exists the potential for flow from the street at the gap in the curb at the sidewalk and off the driveway to the west.

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PA-4 – Mosley Acres (Overland/Channel) (Private)

Overtopping of the dam causes erosion and damage to the dam. The primary outfall pipe is likely undersized and prone to blockage. The emergency overflow is also likely undersized. There is little freeboard between the primary outfall on the top of the dam. At 16 Mosley Acres Drive, yard erosion behind the curb was reported. Asphalt has reduced the capacity of the curb. The yard at 16 Mosley Acres Drive does not have turf grass. Other nearby yards with turf grass did not exhibit erosion.

PA-5 – Fernview Drive (Overland) (Private)

Yard erosion was reported at 1020 & 1028 Fernview Drive. The drainage area for 1028 Fernview Drive is about 0.75 acres and there is a 8:1 slope from 1020 Fernview Drive.

PA-6 – Fernpark Drive (Overland) (CC-S-04)

Different issues were reported at the following addresses:

1032 Fernpark Drive –	Yard flooding is evident on the side yard from about a 0.4-acre DA with about a 2.4% slope along the house. Owners have added a French drain to prevent water from coming into basement windows.
12921 Fernway Lane –	Yard erosion is evident.
12921 Fernway Lane –	Yard ponding is evident.

PA-7 – Ladue Meadows (Overland) (DC-S-05)

Various stormwater issues were reported at the following addresses:

104 Ladue Meadows Lane –	Yard erosion is happening near an inlet. This is a maintenance-related issue.
16 Ladue Meadows Lane –	The yard is flooding from 45-acre DA. A debris line of mulch just inside the yard near the driveway entrance was evident on 4-20-23. Based on the LiDAR flow paths and areas, the storm sewer is capturing a drainage area of 32.87 acres. Based on estimated flows, the storm sewer should have adequate capacity. Additional inlets are likely warranted to capture the drainage area downhill of the existing inlets. An analysis is also likely needed to determine if an adequate overland flow path is provided.

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PA-8 – Brooktrail Court North (Overland/Channel) (DC-C-12)

Reported issue of water in the street after and during heavy rains. Sod on both sides of the road is above the pavement. Possible bypass of inlets up the hill may also contribute to the amount of water on the roadway. The capacity of the 72-inch reinforced concrete pipe (RCP) should be reviewed for the level of service for the 467-acre DA.

I&L identified a channel erosion issue in need of systemic repair consisting of failing grouted riprap, knickpoints, and a scour pool in Windrush Creek from South Graeser Road to Ladue Road. This reach crosses between two common ground lots.

PA-9 – 10671 Country View Drive (Overland) (Private)

The existing swale was disturbed by development and no longer functions properly. Without a functioning swale, the back yard floods

PA-10 – Ladue Road and South Spoede Road (Channel) (DC-C-16)

Three streambank erosion issues were reported either to the City or on Social Pinpoint. The issues affect the following properties:

10656 Ladue Road
10677 Spoede View Court

Streambank erosion issues were reported along Monsanto Sunswept Creek just south of the Ladue Road crossing. As surface flows drain to the creek, the runoff causes gully erosion in yards.

In this location, I&L also identified a channel erosion issue in need of systemic repair consisting of knickpoints, bank erosion, culvert undermining, and roadside swale erosion. I&L also noted that the Ladue Road culvert wall was bulging and cracking, and active seepage was flowing from the cracks.

PA-11 – 10835 Rondelay Drive (Overland) (Private)

Yard erosion in the front due to flow overtopping the curb. The curb has reduced capacity due to an asphalt overlay. Yard erosion is evident in the back yard near an inlet. This issue can likely be resolved with MSD maintenance activities.

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PA-12 – Chalet Court (Overland) (Private)

This project area includes:

531 Chalet Court – The owner reports spending $60,000 trying to resolve stormwater issues. Drainage area to the backyard is about 0.44 acre.

10921 Chalet Court – Reported issue of yard flooding during heavy rain. A 42-inch sewer traverses the property with inlets near both property lines. The yard slopes towards the downhill inlet but is uneven. The drainage area between the inlets is about 3.2 acres.

PA-13 – Brooktrail Court South (Channel) (DC-C-11)

Two streambank erosion issues were reported on Social Pinpoint affecting the following common ground lots between South Graeser Road and Brooktrail Court and along Windrush Creek between Villa Coublay Drive and South Graeser Road:

252 South Graeser Road
10954 Brooktrail Court

Reported issues include erosion at the Graeser Road crossing, yard erosion, ponding in the common area, and streambank erosion.

I&L also identified channel erosion issues in need of systemic repair including failing grouted riprap, knickpoints, and bank erosion.

PA-14 – 11076 Graeser Lane (Overland) (Private)

Yard flooding from flow onto driveway from Graeser Lane. The drainage area is about 0.5 acre.

PA-15 – 111 Worthington Oaks Drive (Overland) (Private)

A sinkhole has formed on the backside of the street inlet and this is an MSD maintenance issue.

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PA-16 – 11205 Tureen Drive (Overland) (Private)

A sinkhole is in front of an area inlet near the eastern property line. Ponding occurs at end of private drain pipe. A 30-inch reinforced concrete pipe runs through the backyard. Unrelated water was observed seeping onto the street from 11218 Tureen Drive.

PA-17 – Wedgewood Lane (Overland) (DC-S-16)

Yard erosion and yard ponding were reported at the following addresses:

6 & 7 Wedgewood Lane –	Yard ponding is likely due to poor grading between houses.
12 Wedgewood Lane –	Yard erosion was reported.

PA-18 – 121 Mystic Meadows Lane (Overland) (DC-S-08)

Residents report yard erosion along the driveway which slopes about 6.7%. The drainage area at the top of the driveway is about 4.5 acres, and the drainage area at the bottom of the driveway is about 5 acres.

PA-19 – Creve Coeur Place (Royal Valley) (Overland) (Private)

Yard erosion was reported at 12121 & 12135 Royal Valley Drive. The Home Owner Association (HOA) has concerns about the dry detention basin and long-term maintenance of the basin due to silt and other debris collecting in the basin. The basin's drainage area is more than 50 acres and includes portions of I-270.

PA-20 – 12229 Ladue Woods Drive (Overland) (CC-S-10)

Yard ponding with about a 0.9 acre DA. A pool is likely constricting flow path.

PA-21 – Blackheath Court and Country Manor Lane (Channel) (CC-C-21)

Streambank erosion issues were reported at the following addresses:

12242 Blackheath Court
689 Country Manor Lane
12295 Country Manor Lane

The erosion issues are found along a tributary to Fernridge Creek between Country Manor Lane and Coeur De Ville Drive. Reported issues include the creek rising near the property and outfall erosion undermining a 12-inch pipe.

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PA-22 – Boothbay Court (Channel) (CC-C-31)

Two streambank erosion issues were reported to the City affecting the following properties:

12310 Boothbay Court
12318 Boothbay Court

These issues are located along an unnamed creek between Boothbay Court and Bellington Lane which drains into an enclosed system. Reported issues include outfall erosion undermining an 18-inch pipe and creek bank erosion threatening yards.

PA-23 – 12318 Halsgame Lane (Overland) (Private)

Yard erosion. This property doesn't have a significant DA but does have steep slopes.

PA-24 – Montsouris Drive (Overland/Channel) (CC-C-27)

This project area consists of different issues at the following addresses:

12335 Gaillard Drive –	The owner reports that channel erosion started after the Belle Maison subdivision was constructed. MSD shows as-builts dated November 2014.
12365 Montsouris Drive –	Water leaks into the basement through the walls or floor. During heavy rain events, water also leaks through the garage floor. The owner reports that the yard ponds during every rain event. Trees are threatened due to channel erosion. The owner suspects underground springs may be present.
12372 Montsouris Drive –	The owners report yard flooding from the lake.
12450 Montsouris Drive –	Residents report shore erosion that the subdivision has taken steps to prevent by recently placing rock to protect the bank. Sediment is being transported into the lake.

Three streambank erosion issues were reported on Social Pinpoint affecting the following properties:

12335 Gaillard Drive
12365 Montsouris Drive
12450 Montsouris Drive

These issues are located along an unnamed creek which drains to a lake at the upstream end of a tributary to Smith Creek and the lake itself. The lake is directly west of Montsouris Drive. Reported issues include streambank erosion nearing a retaining wall, backyard erosion, and erosion along the lake shoreline.

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PA-25 – Oak Hollow Drive (Channel) (CC-C-23)

Four streambank erosion issues were reported on Social Pinpoint affecting the following properties:

12345 Woodline Drive
12351 Woodline Drive
524 Falaise Drive
12340 Oak Hollow Drive
12346 Oak Hollow Drive

These issues are located along an unnamed creek between Woodline Drive and Oak Hollow Drive which eventually drains to Fernridge Creek. Reported issues include drainageways to the creek deepening and widening causing yard erosion plus sinkholes. Reported channel bank erosion is causing trees to fall and loss of yard.

PA-26 – Questover Crossing (Overland) (Private)

Residents report standing water and minor erosion within the condo complex.

PA-27 – Villa Hill Lane (Channel) (CC-C-16)

Two streambank erosion issues were reported either to the City or on Social Pinpoint. These issues are located along a tributary to Fernridge Creek and along Fernridge Creek and affect the following properties:

12517 Villa Hill Lane
12495 Villa Hill Lane

Reported issues include erosion in backyards and bank erosion threatening a residential fence and wall.

PA-28 – 740 North Mason Road (Overland) (CC-S-05)

Multiple properties report wet yards and yard ponding on Villa Hill Lane, which sits north of the Bellerive Garden Cemetery. These properties sit downhill from the cemetery and are graded into the hillside. Residents suggest that perhaps the pond on the cemetery is contributing to stormwater issues.

PA-29 – Royal Manor Drive (Overland/Channel) (CC-C-29)

Overland flow was reported at the following addresses:

12568 Royal Manor Drive – Reports of basement flooding. LiDAR and two-foot contours indicate yard is graded towards the house. Re-grading the yard near the back of the property could solve the issue.

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Four streambank erosion issues were also reported either to the City or on Social Pinpoint affecting approximately two lots.

12554 Royal Manor Drive
12650 Royal Manor Drive

These issues are located along a tributary to Smith Creek which crosses Royal Manor Drive. Reported issues include creek erosion; home flooding; and streambank erosion that is threatening a pedestrian bridge, trees, a community walking path, and a culvert.

I&L identified a channel erosion issue in need of systemic repair consisting of knickpoints along this reach as well as erosion threatening a pedestrian bridge, undermining a retaining wall, threatening a trail, and causing a pedestrian bridge's wing walls to fail.

PA-30 – Mason Forest Drive (Overland) (CC-S-07)

Yard flooding and ponding issues at multiple properties. Residents at 12602 Mason Forest Drive report structural flooding and flooding of their pool. A 36-inch pipe is shown on the MSD basemaps with a 31-acre DA. The pool is located in the overland flow path. The 15-year flowrate is 63 cubic feet per second and 100-year flowrate is 84 cubic feet per second. The MSD basemap shows a pipe slope of 1.1% for the 36-inch pipe. It is estimated that the pipe is adequately sized for the 15-year and the 100-year flows. Analysis is needed to determine if an adequate overland flow path is provided while taking into account the potential for bypass flows at the inlets in the system.

PA-31 – 12643 Conway Downs Drive (Overland) (Private)

Yard ponding in a low spot in the yard with a 2.25-acre DA. Potential to include in PA-29.

PA-32 – Creekside at Mason (Overland) (Private)

Two issues are reported. The first issue is flooding in the common ground on the north side of the subdivision. The second issue is flow from a lake south of the subdivision. The common ground is in a FEMA floodplain with a 600-acre DA. MSD has an approved floodplain study for a new subdivision to the north. The flow from the lake overwhelms the area inlet and dislodges riprap.

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PA-33 – Chaminade (Overland/Channel) (DC-C-15)

This project area consists of different issues at the following addresses:

16 Chaminade Drive –	Street runoff is causing yard erosion due to possible inadequate inlet capacity at low point in street and flow to leave street at the driveway.
13 & 14 Chaminade Drive –	Streambank erosion caused the retaining wall to collapse.

One streambank erosion issue was reported to the City, and this erosion issue affects the following properties:

13 Chaminade Drive
14 Chaminade Drive
425 S Lindbergh Boulevard

These issues are located along Monsanto Sunswept Creek between Chaminade Drive and Chaminade College Preparatory School. Reported issues include retaining wall failure and creek erosion.

I&L identified a channel erosion issue in need of systemic repair consisting of knickpoints, undermined retaining wall, a failed bridge, and bank erosion along this reach.

PA-34 – 13 Sona Lane (Overland) (DC-S-17)

Reported structural flooding of home that sits at the bottom of a cut slope with a 0.44-acre DA similar to neighboring properties.

PA-35 – Ambois Drive (Channel) (CC-C-09)

Three streambank erosion issues were reported on Social Pinpoint affecting the following properties:

13006 Ambois Drive
13010 Ambois Drive
12996 Ambois Drive

These issues are located along Fernridge Creek south of Ambois Drive. Reported issues include property flooding, street flooding, and creek bank widening.

In this location, I&L identified a channel erosion issue in need of systemic repair consisting of erosion threatening residential fence, knickpoints, yard erosion, fence failure, and a scour hole.

PA-36 – Ferntrails Lane (Overland) (CC-S-03)

Yard ponding in an area that is known to be a sinkhole. Residents have concerns about structural flooding during large, infrequent rain events. Based on the LiDAR information, the

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sinkhole drains 7.6 acres; however, curbs and other infrastructure may impact the area that drains to the sinkhole. The estimated 100-year flowrate is 23.2 cubic feet per second and it appears that the overland flow path may not be adequate to pass this flow. Additional analysis is needed to determine the amount of freeboard that is provided.

PA-37 – Autumn Trails Court (Overland/Channel) (CC-C-04)

Yard erosion was reported at 13210 Autumn Trails Court. Contours show 6% grade that steepens in the woods with a 0.56-acre DA.

Along a tributary to Creve Coeur Creek just west of Autumn Trails Court, I&L identified a channel erosion issue in need of systemic repair consisting of a knickpoint and failing grade control.

PA-38 – Alden Lane (Overland) (DC-C-18)

Street flooding happens in the flat area between the two channels that lack curbs. Area to the east up the hill has curbs. In this area with curbs, flows bypass the channel, which significantly adds to the flow between channels. The east box culvert and the street from the box culvert to the cul-de-sac was replaced in 2017. Sod is high along street preventing local water from draining off the street. A gully is forming on the south side of the street near 6 Alden Lane.

Along Monsanto-Sunswept Creek and a tributary to Monsanto-Sunswept Creek just north of the Alden Lane crossings, I&L identified a channel erosion issue in need of systemic repair consisting of failing grouted riprap and failing railroad tie wall.

PA-39 – 174 Belle Maison Court(Overland) (Private)

Water flows through the backyard to the north onto 178 Belle Maison Court. Improvements at 178 Belle Maison Court have blocked the flow path. At the time of the initial report, the flow path was completely blocked. 178 Belle Maison Court has partially remediated the issue, but the flow path is still partially blocked. The drainage area leaving 174 Belle Maison Court is about 0.88 acre.

PA-40 – 18 Sackston Woods Lane (Overland) (DC-S-02)

Residents report structural flooding and flooding of the pool. The flow path is through the pool, and the estimated drainage area is 6 acres.

PA-41 – Balcon Estates (Channel) (CC-C-37)

Five streambank erosion issues were reported either to the City or on Social Pinpoint affecting the following properties:

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7 Balcon Estates
19 Balcon Estates
24 Balcon Estates
26 Balcon Estates
27 Balcon Estates
30 Balcon Estates
32 Balcon Estates

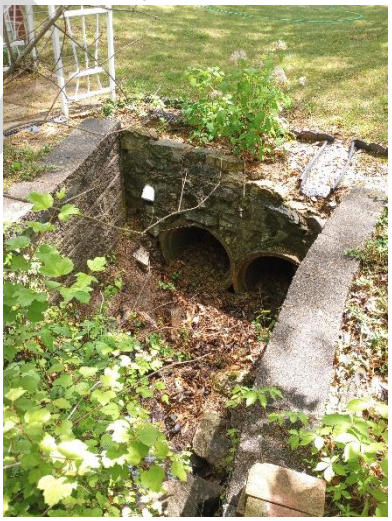
These issues are located in the Balcon Estates subdivision where a tributary to Smith Creek runs on the southwest side and an unnamed sub-tributary runs through the middle of the subdivision. Reported issues include property flooding, home flooding, streambank erosion, threatened pool decks, and a threatened driveway bridge.

I&L identified a channel erosion issue in need of systemic repair consisting of scour threatening the driveway at 25 Balcon Estates.

PA-42 – Tealwood Drive (Overland/Channel) (DC-C-28)

This project area consists of different issues at the following addresses:

19 Tealwood Drive – A 29.6-acre DA flows into a culvert with estimated 15-year flowrate of 59 cubic feet per second and 100-year flowrate of 80 cubic feet per second. The MSD basemaps do not show the culvert. An analysis is needed to determine the intensity of rainfall that could lead to structural flooding and if the overflow path is adequate. In addition to potential structural and problematic flooding, flow comes across the street, down the driveway, and around the backside of the culvert headwall. Across the street, driveway culverts that had been constructed to maintain flow and connect to an inlet are no longer visible.



51 Tealwood Drive – A 23.5-acre DA flows into a culvert with an estimated 15-year flowrate of 47 cubic feet per second and 100-year flowrate of 64 cubic feet per second. The MSD basemaps do not show the culvert. An analysis is needed to determine the intensity of rainfall that could lead to

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	structural flooding and if there is an adequate overflow path. Two-foot contours indicate that there is less than two feet from house and a low point in road. A potential location for a detention basin is on the Bayer campus. A basin in this location could control approximately 19 acres.
53 Tealwood Drive –	Residents report structural flooding in the basement and water leaking through the basement walls and floor. The house sits south of the Bayer campus and at the bottom of hill. The drainage area that flows towards the house is about 1.35 acres.

Two streambank erosion issues were reported to the City affecting 47 North Tealwood Drive. These issues are located along Pebble Creek directly east of Tealwood Drive. Reported issues include erosion at culvert headwall, outlet, and along banks.

Along this reach, I&L identified channel erosion issues in need of systemic repair consisting of undermined and failing wingwalls, sinkholes, a failing driveway, knickpoints, failing gabion baskets, and yard erosion.

PA-43 – 2 Spoede Acres (Overland) (Private)

Yard ponding and erosion issues were reported. A 36-inch RCP traverses the property with an inlet near the uphill property line. A manhole is located near the downhill property line, and an inlet is nearby on the neighboring property. There is about a two-acre DA downhill from the inlet on the property. The two-foot contours indicate potential for ponding.

PA-44 – Runnymede Drive (Overland) (DC-S-01)

This project area consists of different issues at the following addresses:

201 Runnymede Drive –	Residents reported concerns about runoff from 237 Runnymede Drive; however, LiDAR does not indicate that flow goes onto property from 237 Runnymede Drive. Any flow from 237 Runnymede would be minor.
434 Runnymede Drive –	Yard erosion. Yard slopes 10% with a drainage area of 0.4 acre.
424 Magna Carta Drive –	Yard ponding. The home sits at the bottom of a cut slope with a 0.6 acre DA similar to neighboring properties.

PA-45 – 219 Hibler Oaks Drive (Overland) (Private)

Yard erosion. Yard slopes 10% with a drainage area of 3.4 acres. An MSD inlet is located downhill about 30 feet with a 15-inch pipe.

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PA-46 – Clion Lane & Ladue Lake Drive (Overland) (Private)

General report of gully erosion and ponding in multiple yards. There is no storm sewer system for this area that drains nearly 12 acres. Particular issues reported at:

220 Clion Lane –	Yard flooding with a 4.2 acre DA.
230 Clion Lane –	Concerned about street drainage. Single inlets on each side of street at what may be a low spot in the road with 1.55 acre DA.
225 Ladue Lake Drive –	Yard flooding. Drainage from the two subdivisions is split and flows along the back property lines and combine here with a total drainage area of 9 acres.

PA-47 – Falling Leaves Court (Channel) (CC-C-26)

Silt depositing into the lake and erosion along the edge of the lake was reported on Social Pinpoint affecting the following properties:

215 Falling Leaves Court
221 Falling Leaves Court

The erosion issues are found along the lake bordered by Ladue Lake Drive and Falling Leaves Court. The lake drains into a tributary to Smith Creek.

Along the tributary between the lake and Falaise Drive, I&L identified a channel erosion issue in need of systemic repair consisting of exposed manholes, knickpoints, threatened utility pole, bank erosion, failing retaining walls, and a scour hole.

PA-48 – 240 Laduemont Drive (Channel) (Private)

One streambank erosion issue was reported to the City affecting 240 Laduemont Drive. This issue is located along an unnamed tributary to Smith Creek that flows between Laduemont Drive and Royal Manor Drive. Yard erosion was reported at the north section of the backyard where a storm pipe discharges.

PA-49 – Morwood Lane (Overland) (DC-S-13)

This project area consists of various issues at the following addresses:

25 Morwood Lane –	Yard flooding on south side and ponding on north side. MSD basemaps show that a flared end section should be located near the southwest corner of lot with 6.4-acre DA. An inlet is near the northwest corner of the lot with 0.26-acre DA. During the field visit, neither the flared end section nor the pipe could be seen or located, and it appears unlikely that these stormwater conveyance features exist. The neighbor to the north of 25 Morwood

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	Lane stated that the inlet had been blocked for years until the middle of April 2023.
50 Morwood Lane –	For an extended period after a rain event, water seeps from a pop-up to the street.
55 Morwood Lane –	Street ponding likely due to asphalt in the rolled curb. The street has a 2% slope.

PA-50 – New Salem Drive (Channel) (DC-C-07)

Streambank erosion was reported on Social Pinpoint affecting 258 New Salem Drive. This issue is located along Deer Creek just east of New Salem Drive.

Along this reach, I&L identified a channel erosion issue in need of systemic repair consisting of an outfall with a rusted invert, undercut bank, perched outfall, exposed manhole, and a leaning utility pole.

PA-51 – Beaver Drive (Overland) (DC-C-02)

This project area consists of various issues at the following addresses:

27 Beaver Drive –	Structural flooding was reported going into the garage. Approximately 2.2-acre DA flows onto the property. Flow continues down the driveway onto the street and into the yard across the street at 41 Beaver Drive.
41 Beaver Drive –	Yard erosion behind the house and along the street.
49 Beaver Drive –	Yard ponding reported in front yard but field visit did not confirm potential for ponding.

PA-52 – 3 Oak Park Court (Overland) (DC-S-18)

A resident reported property flooding from an undersized stormwater inlet. The MSD basemaps do not show an inlet at this location. The LiDAR data indicates potential flow onto the driveway with a 0.33-acre DA. There is a small grated inlet at the end of the street on the left side that was observed to be covered. Overflow from this inlet is causing erosion. Flows from the right side of the street go into an old asphalt swale that was installed along the hillside.

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PA-53 – Middlebrook Lane (Channel) (DC-C-19)

Along a tributary to Monsanto Sunswept Creek where the tributary crosses Middlebrook Lane, residents report bank erosion upstream and downstream of a culvert. The issue affects the following properties:

3 Middlebrook Lane
4 Middlebrook Lane
5 Middlebrook Lane
6 Middlebrook Lane

Along this reach, I&L identified a channel erosion issue in need of systemic repair consisting of a failing bridge abutment and erosion threatening a shed.

PA-54 – 307 Cabin Grove (Overland) (Private)

Residents report multiple issues. The primary issue is yard erosion due to water from the uphill properties. LiDAR data indicates about a third of an acre drains onto the property for the area that drains to the west. The affected area is shaded and lacks good ground cover. The lack of ground cover makes the area susceptible to erosion. An area east of the property line located upgrade of an inlet shows signs of erosion. This area has a 0.4-acre DA and a slope of about 10%. In the backyard, water ponds on the flat top of the hill. Another issue reported was on the neighboring property next to Windsor Oak Drive and standing water. An older private inlet with what appears to be an 8-inch pipe collects water from a two-acre DA.

PA-55 – 308 South Spoede Road (Overland) (DC-S-19)

Resident reports concerns about runoff from neighboring property located uphill and to the north. LiDAR shows distributed drainage from the property to the north. The largest indicated drainage area is 0.07 acres.

PA-56 – 359 Country Glen Lane (Channel) (Private)

Backyard streambank erosion at 359 Country Glen Lane was reported to the City. The erosion is found along an unnamed creek that runs from Country Glen Lane to Falaise Drive and eventually drains to Fernridge Creek.

PA-57 – Auburndale Drive (Overland) (CC-S-06)

Residents report water ponds in the street after and during heavy rains. Sod on both sides of the road is higher than the pavement. LiDAR indicates 25.8-acre DA to the intersection with Mason Road, which is a low point along Mason Road. The MSD Basemap shows 36-inch Storm pipe leaving the intersection. Google Street View historical photos of the south entrance to

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Bellerive Gardens show a driveway culvert pipe. This pipe is now buried, and the swale downhill is not as well defined.

The estimated flows in the MSD 36-inch RCP are 15-year flowrate of 50 cubic feet per second and 100-year flowrate of 67 cubic feet per second with 15-year flowrate of 38 cubic feet per second and 100-year flowrate of 51 cubic feet per second in a 30-inch pipe. It appears that the storm sewer is adequately sized; therefore, it appears that the issue is inadequate drainage off the street due to the sod being higher than the pavement and/or an inadequate number of inlets.

Yard flooding was also reported due to flow not being captured by inlet near 33 Auburndale Drive. The back property line has a berm and swale; however, flow may not be contained or captured by the inlet.

PA-58 – 373 Hibler Court (Channel) (Private)

The City received a report of yard erosion at 373 Hibler Court. This issue is located along an undersized concrete channel that outlets into Fernridge Creek.

PA-59 – 4 Benwood Lane (Overland) (Private)

Residents report street ponding. Asphalt was laid in curb, which blocks flow causing ponding at the driveway.

PA-60 – 438 Twin Creek Road (Channel) (CC-C-36)

One streambank erosion issue, yard erosion along the creek, was reported to the City affecting 438 Twin Creek Road. This issue is located along Smith Creek directly east of Twin Creek Road.

PA-61 – Fourwynd Drive (Overland) (DC-S-15)

This project area consists of various issues at the following addresses:

451 Fourwynd Drive –	Residents report sheet flow from uphill onto property runs towards the house. The DA is 0.5 acre.
7 Pine Manor Drive –	Residents report street flooding which flows into the yard. MSD basemap shows 84-inch pipe with a 198 acre DA. The 15-year flowrate is 451 cubic feet per second and 100-year flowrate is 608 cubic feet per second. The MSD basemap invert elevations for the pipes in this area are inconsistent. It is estimated that the 84-inch pipe is adequately sized. Analysis is needed to determine if an adequate overland flow path is provided while taking into account the potential for bypass flows at inlets in the system.
8 Pine Manor Drive –	Yard erosion was reported. The backyard has a 10% grade with a 1.25-acre DA.

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PA-62 – Villa Coublay Drive (Channel) (DC-C-10)

Four streambank erosion issues were reported to the City affecting the following properties:

44 Villa Coublay Drive
47 Villa Coublay Drive
50 Villa Coublay Drive
60 Villa Coublay Drive

These issues are located along Windrush Creek from the confluence with Deer Creek to the Villa Coublay Drive crossing. Reported issues include erosion along the Villa Coublay bridge and yard erosion.

Along this reach, I&L identified a channel erosion issue in need of systemic repair consisting of knickpoints and cracking bridge abutments.

PA-63 – Runnymede North (Overland) (Private)

This project area consists of various issues at the following addresses:

477 Manford Drive–	Yard ponding was reported in the southwest corner of the property. The two-foot contours show a depression in this location.
482 Staines Court –	Residents report yard flooding. A 90-inch RCP traverses the property with a 187- acre DA. Another 3.9 acres drains through the yard. The resident reports that all the water runs above ground. The pipe should be inspected for a potential blockage.

PA-64 – Chilton Lane (Overland) (DC-S-21)

Residents reported that a sinkhole is forming over the culvert; however, a sinkhole was not evident during a field visit. There was erosion where water runs off the road to the channel on the south side of the road.

8 Chilton Lane –	Residents reported concerns about stormwater runoff from a recently developed site on Country Fair Lane. Aerial photos show the new house to east and uphill is larger than the home that had been replaced and the new home extends further back on the lot. The estimated drainage area from the redeveloped lots onto this property is about 0.16 acres.

PA-65 – East Ladue Estates Drive (Overland) (DC-S-07)

This project area consists of various issues at the following addresses:

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5 Ladue Estates Drive – Yard erosion was reported at this address. The rear yard drops off to South Mosley Road.

55 East Ladue Estates Drive – Water pools and runs over the retaining wall onto sidewalk that runs alongside Ladue Road. LiDAR shows two flow paths over the retaining wall with drainage areas of 1.2 acres and 0.1 acres.

59 East Ladue Estate Drive – Residents report yard erosion and wet yard. There is sheet flow from the west and concentrated flow from the north with 1.15- acre DA near the low end of the back yard. The property sits lower than the property to the west by about 12 feet.

65 East Ladue Estates Drive – Yard ponding was reported in low spots in southwest corner of property. The DA is 1.5 acres.

71 & 73 East Ladue Estates Drive– Yard ponding was reported. LiDAR indicates less than 1% slope with a drainage area of 0.42 acre to 1.44 acres across the two properties.

PA-66 – Fairways Circle (Overland/Channel) (DC-S-06)

This project area consists of various issues. Overland flow issues affect the following addresses:

541 Fairways Circle – Yard flooding was reportedly caused by runoff from golf course and house to the north. LiDAR indicates that the drainage area at the south or low end of the yard is 2.8 acres, and the drainage area at the north property line is 1.64 acres.

Three streambank erosion issues were reported either to the City or on Social Pinpoint affecting the following properties:

519 Fairways Circle
527 Fairways Circle
631 Fairways Circle
647 Fairways Circle

Reported issues including creek erosion threatening fence, erosion at the pipe outfall, backyard erosion, and ponding along the creek are found along a tributary to Deer Creek between the Creve Coeur Golf Course and Fairways Circle.

I&L identified a channel erosion issue in need of systemic repair consisting of headwall erosion and a threatened maintenance bridge.

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PA-67 – 554 North Mosley Road (Overland) (DC-S-11)

Resident reports yard ponding and erosion forming a channel. Resident felt that flow has increased since new subdivision to the south was built. The as-built plans show depressed inlets and a berm that routes runoff from the subdivision to a BMP that discharges to the east. Flow from North Mosley Road discharges onto the property with about a 1.25 acres DA. Erosion on the south side of the house is threatening a deck.

PA-68 – 561 Sarah Lane (Overland) (DC-S-04)

Residents report ponding on Sarah Lane and in front of the garage doors of the two condominium buildings. Google Street view shows ponding on the street uphill from the south driveway entrance. There are trench drains in front of each garage at the bottom of the driveway, but the trench drains have small outlet pipes that may be undersized and/or need to be cleaned.

PA-69 – 6 Spoede Ridge Lane (Overland) (DC-S-23)

Resident reports yard flooding. The property sits at the upper end of a valley and a 21-inch pipe outlets onto the property near the rear property line shared with the subdivision to the north. An inlet appears to not capture much flow, and as a result stormwater enters the yard to the west of the outfall. LiDAR indicates a DA of 4.75 acres with 0.55 acre of the DA bypassing the inlet.

PA-70 – 12228 Winrock Drive (Channel) (Private)

Two streambank erosion issues were reported on Social Pinpoint affecting 12228 Winrock Drive. Creek widening, fallen trees, bank erosion, and standing water can be found along an unnamed channel between Winrock Drive and Prince Towne Drive.

PA-71 – Maison Manor (Overland) (Private)

This project area consists of various issues at the following addresses:

607 Lampadaire Drive –	Resident reports clogged drains downstream based on neighbor's investigation of system with Town & Country. Refer to MSD as maintenance issue.
625 Lampadaire Drive –	Yard erosion reported at this address. Contours show steep valley with 4:1 slope and DA of 1.67 acres.

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PA-72 – 667 Rue De Fleur Drive (Channel) (Private)

One streambank erosion issue was reported to the City affecting 667 Rue De Fleur Drive. Ponding in the common area near the creek is seen along Fernridge Creek just west of the Ambois Drive crossing.

PA-73 – 69 Notre Dame Drive (Overland) (Private)

Resident reports a constant stream of water in front of the home which is eroding the cement driveway. The DA is about 0.9 acre, and the street curb has deteriorated. The issue was referred to the Missouri American Water Company for a potential water leak, and the roadway has been added to the City's Pavement Maintenance Program

PA-74 – 7 Quailways Drive (Overland) (DC-S-24)

A possible sinkhole was reported to be over a private storm sewer. Yard erosion is seen along and behind the backyard fence that runs parallel to the creek. Retaining wall blocks have washed away, and some have fallen into the creek. The yard serves as the overland flow path to the creek if the MSD double inlet at the end of the cul-de-sac is overwhelmed.

PA-75 – Sherwyn Lane (Overland/Channel) (DC-C-20)

Overland flow is reported to be causing erosion at 7 Sherwyn Lane. Runoff from the neighboring house flows in a swale along the north property line, and the homeowner reports erosion in the swale.

A concrete channel runs through 7 Sherwyn Lane. This channel is part of a tributary to Monsanto Sunswept Creek and crosses Sherwyn Lane at this location.

Along this reach, I&L identified a channel erosion issue in need of systemic repair consisting of erosion threatening a fence and driveway.

PA-76 – Bellerive Estates (Overland) (Private)

Residents report issues of runoff from properties on Nimes Drive. Residents at 741 & 749 Beauvais Court report flooding and backyard erosion. The properties sit about six feet lower than the quarter-acre lots on Nimes Drive.

PA-77 – 741 Gascogne Drive (Overland) (Private)

Residents report yard erosion and ponding. Gullies have formed near the stormwater sewer that collects water but doesn't fully drain. LiDAR indicates about 0.29 acre DA, and the yard slopes about 1.5%.

PA-78 – 753 Timber Run Drive (Channel) (Private)

Three streambank erosion issues including a collapsed corrugated metal pipe causing bank and yard erosion were reported on Social Pinpoint. These issues affect 753 Timber Run Drive and

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are located along a pond between Somerton Ridge Drive, Nimes Drive, Timber Run Drive, and Haverton Drive.

PA-79 – 761 Turrentine Trail (Overland) (Private)

Resident inquiry about the design of the storm water conveyance through their yard. The stormwater is creating about a four-foot wide stream as it passes through the yard. The drainage area is about 0.73 acre at the lower end of the lot and drains three other properties.

PA-80 – 77 Colonial Hills (Overland) (Private)

Resident reports yard erosion. There are two areas of concern, one has a 5.8 acre DA with a 5-6% slope and the other has a 2.3 acre DA and an 8% slope.

PA-81 – 808 Mary Meadows (Overland) (DC-S-14)

Residents reported structural flooding of the house during the July 2022 storm event. A new larger house to the east was built in 2022. The property sits about eight feet lower than the lot with the newer home. About 0.8 acre drains onto the yard which slopes about 2.5% to the south. Contours show a low spot near the northeast corner of the house.

PA-82 – 859 Larkin Avenue (Overland) (Private)

Homeowners report yard ponding. Contours show a low spot in the front yard.

PA-83 – 920 Bellerive Manor (Overland) (Private)

Report of failing french drain and improperly directed downspouts from the City's list; however, ownership changed March 2022.

PA-84 – Warington Square (Overland) (DC-S-26)

One resident reported yard and structural flooding of the houses on the south side of Warington Square. The homes sit about ten feet lower than the homes to the south on Sundown Square. In general, the ground slopes towards the southeast corner of each house. Resident reports flow from Warson Road which has a vertical curb and an inlet near the southeast corner of 9800 Warington Square with a drainage area of 4.1 acre. Another 2.8 acre drains towards the houses west of Warson Road. Yard erosion and soggy turf was also observed during a field visit during a dry period at 9800 Warington Square. The storm system runs along the back property line but is up the hill.

PA-85 – Hibler Road (Overland) (Private)

Residents report street flooding. This issue will be resolved with the City's Hibler Road Drainage Improvements project. Construction for this project is expected to begin in the early spring of 2024.

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PA-86 – Millenium Park (Channel) (CC-C-15)

Along tributary to Fernridge Creek south of Millenium Park. I&L identified channel erosion issues in need of systemic repair consisting of a potentially threatened sculpture, threatened trail, knickpoints, threatened fence, and threatened wall.

PA-87 – Westwood Country Club (Channel) (DC-C-05)

Along Deer Creek and a tributary to Deer Creek north of the Westwood Country Club, I&L identified channel erosion issues in need of systemic repair consisting of a threatened golf course path (erosion is ten feet from the path), sanitary crossing, knickpoints, potentially threatened utility manhole, bank erosion, and threatened abutments.

PA-88 – 11572 New London Drive (Channel) (DC-C-04)

In a tributary to Deer Creek southwest of New London Drive, I&L identified channel erosion issues in need of systemic repair consisting of a failing concrete grade control and asphalt debris.

PA-89 – Malcolm Terrace Park (Channel) (DC-C-06)

Along Deer Creek in the southeast portion of Malcolm Terrace Park, I&L identified channel erosion issues in need of systemic repair consisting of bank erosion threatening a trail

PA-90 – New Salem Drive and Camfield Square Drive (Channel) (DC-C-08)

Along Deer Creek and a tributary to Deer Creek between New Salem Drive and Camfield Square Drive, I&L identified channel erosion issues in need of systemic repair including a failing concrete apron, exposed sanitary crossing turning flow, tributary erosion nearing house, failing grouted riprap, failing bank armament, and scour along outside bend of creek.

PA-91 – 281 Magna Carta Drive (Channel) (DC-C-09)

I&L identified channel erosion issues in need of systemic repair along Deer Creek west of 281 Magna Carta Drive. These issues consist of failing grouted riprap and a potentially threatened gabion wall.

PA-92 – Executive Estates Drive (Channel) (DC-C-13)

I&L identified channel erosion issues in need of systemic repair along Windrush Creek west of Executive Estates Drive. These issues consist of bank erosion upstream of the Ladue crossing, knickpoints, and a scour hole.

PA-93 – Mosley Acres & Ridgecorde (Overland) (Private)

Field identified issue of inlet being covered at 455 Ridgecorde Place and a sinkhole near the inlet at 9 Mosley Acres Drive. Refer to MSD for inlet maintenance.

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PA-94 – East Windrush Creek (Overland/Channel) (DC-C-14)

The 42” CMP is rusted out per the owner and is not properly designed to handle the flow from the north. The drainage area is about 90 acres into the pipe and another 8 acres is added before flowing of the property.

I&L identified a channel erosion issue in need of systemic repair consisting of failing grouted riprap, knickpoints, bank erosion, failing driveway, and failing concrete slabs along a tributary to Windrush Creek between Graeser Road and Wyndtop Lane.

PA-95 – The Knolls Lane (Channel) (DC-C-29)

I&L identified channel erosion issues in need of systemic repair consisting of a broken curb where the road drainage enters the tributary to Windrush Creek.

PA-96 – 10675 Ladue Road (Channel) (DC-C-17)

I&L identified channel erosion issues in need of systemic repair consisting of perched pipe and bank cutting, failing gabion walls, erosion threatening fence at top of slope, knickpoints, two utility poles with bases rotting out and one pole failing along Monsanto-Sunswept Creek between Ladue Road and Chilton Lane.

PA-97 – 10694 Country View Drive (Channel) (DC-C-21)

I&L identified channel erosion issues in need of systemic repair consisting of failing grouted riprap and bank erosion downstream of the Country View Drive culvert along a tributary to Monsanto-Sunswept Creek.

PA-98 – 10620 Country View Drive (Channel) (DC-C-23)

I&L identified channel erosion issues in need of systemic repair consisting of failing gabions, failing retaining wall, knickpoints, failing pipe, and failing honeycomb material that stabilizes the channel along Monsanto-Sunswept Creek east of Dr. H. Phillip Venable Memorial Park.

PA-99 – Sunswept Drive (Channel) (DC-C-24)

I&L identified channel erosion issues in need of systemic repair consisting of an undermined pipe outfall in culvert, undermined grouted riprap around outfall, and failed gabion wall along Monsanto-Sunswept Creek where it crosses Sunswept Drive.

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PA-100 – 10300 Olive Boulevard (Channel) (Private)

Along Monsanto-Sunswept Creek and a tributary to Monsanto-Sunswept Creek on the former Bayer property (10300 Olive Blvd), I&L identified channel erosion issues in need of systemic repair consisting of failing wire face geogrid reinforced slope, exposed pipe with the end section detached, a sinkhole, failed bank armament sliding into channel, bank erosion between parking lots, an undermined culvert, failing grouted riprap, a scour hole, an undermined swale, and an undermined outfall.

PA-101 – Denny Creek (Channel) (DC-C-22)

Along Denny Creek, I&L identified channel erosion issues in need of systemic repair consisting of erosion and knickpoints threatening Lindbergh Road, nearby properties, and culverts.

PA-102 – 22 South Tealbrook Drive (Channel) (DC-C-27)

Along Pebble Creek in the rear lot of 22 South Tealbrook Drive, I&L identified channel erosion issues in need of systemic repair consisting of outfall and swale erosion.

PA-103 – Ferngate Lane (Channel) (CC-C-07)

One streambank erosion issue was reported on Social Pinpoint affecting 946 Ferngate Lane. This issue is located along a tributary to Creve Coeur Creek between Ferngate Lane and Fernway Lane. Reported issues include creek erosion and standing water in the backyard.

In this reach, I&L identified a channel erosion issue in need of systemic repair consisting of perched outfalls, failing residential fence, failed grouted riprap, knickpoint, and threatened wing walls.

PA-104 – 1009 Fernview Drive (Channel) (CC-C-06)

Gully erosion was reported to the City. The issue is at 1009 Fernview Drive, which is along a tributary to Creve Coeur Creek between Ferntrails Lane and Bellerive Farm Drive.

Along this reach, I&L identified a channel erosion issue in need of systemic repair consisting of a scour hole, knickpoints, an incising tributary, six -foot tall drop at a pipe outfall, an undermined sanitary crossing, and bank erosion.

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PA-105 – Olive Boulevard (Channel) (CC-C-05)

I&L identified channel erosion issues in need of systemic repair consisting of bank erosion, knickpoints, bank erosion threatening a driveway, failing grade controls, and bank erosion threatening a high tower. I&L also observed a failed grade control that is turning flow into the bank along Creve Coeur Creek and a tributary to Creve Coeur Creek along Village Du Lac Lane.

PA-106 – 1070 Toreador Drive (Channel) (Private)

I&L identified a potential combined sewer outfall along Creve Coeur Creek south of Toreador Drive.

PA-107 – Bellerive County Club (Channel) (CC-C-08)

Along Smith Creek and the downstream reach of Fernridge Creek, I&L identified channel erosion issues in need of systemic repair consisting of a fully exposed sanitary line, failed riprap on banks, and knickpoints.

PA-108 – Lampadaire Drive (Channel) (CC-C-10)

I&L identified channel erosion issues in need of systemic repair including knickpoints along Fernridge Creek north of Lampadaire Drive.

PA-109 – Fernridge Creek at Bellerive Estates Drive (Channel) (CC-C-11)

One streambank erosion issue was reported to the City, and this issue affects the following properties:

12912 Bellerive Estates Drive
12918 Bellerive Estates Drive
12824 Bellerive Estates Drive
12832 Belerive Estates Drive

This issue is located along Fernridge Creek between Ambois Drive and Bellerive Estates Drive. Reported issues include erosion and flooding.

Along this reach, I&L identified a channel erosion issue in need of systemic repair consisting of knickpoints, failing grouted riprap, as well as erosion threatening fences, utility pole, and yards.

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PA-110 – 680 Bellerive Estates Drive (Channel) (CC-C-12)

Along Fernridge Creek east of Bellerive Estates Drive, I&L identified channel erosion issues in need of systemic repair consisting of bank erosion and an undercut shed.

PA-111 – North Mason Road (Channel) (CC-C-13)

Along Fernridge Creek where the watercourse crosses North Mason Road near 858 North Mason Road, I&L identified channel erosion issues in need of systemic repair consisting of a threatened old structure, exposed utility pipe, knickpoints, exposed sanitary line, threatened abutment, and bank erosion. These erosion issues are threatening the Hope Educational & Research Center's sports court.

PA-112 – 840 Angleterre Drive (Channel) (CC-C-14)

Along Fernridge Creek north of Angleterre Drive, I&L identified channel erosion issues in need of systemic repair including an exposed utility pipe and knickpoints.

PA-113 – 12426 Stratford Ridge Court (Channel) (CC-C-18)

Along Fernridge Creek southwest of Stratford Ridge Court, I&L identified channel erosion issues in need of systemic repair including a knickpoint, failing reno mat, and failing grouted riprap.

PA-114 – Questover Lane (Channel) (CC-C-19)

Along Fernridge Creek south of Questover Lane, I&L identified channel erosion issues in need of systemic repair consisting of knickpoints, five-foot high aerial sanitary crossing, failing grouted riprap, a threatened bridge abutment, undermining of a private driveway bridge, exposed pipes and manhole on bank, failing/undermined concrete encasement, and an exposed telephone pedestal.

PA-115 – Falaise Drive (Channel) (CC-C-20)

Along Fernridge Creek between Falaise Drive and Royal Valley Drive, I&L identified channel erosion issues in need of systemic repair including knickpoints, threatened culvert outfall wing walls, a scour hole, exposed utility pipe along the channel toe, and an exposed sanitary line encasement.

PA-116 – Royal Valley Drive (Channel) (CC-C-22)

Along Fernridge Creek between Royal Valley Drive and Hibler Drive, I&L identified channel erosion issues in need of systemic repair consisting of knickpoints, a failed pipe segment, a perched outfall, rusted corrugated metal pipe, a threatened fence, pipe section failure, a scour hole, and failed grouted riprap.

PA-117 – 12344 Mulberry Tree Court (Channel) (CC-C-17)

Along a tributary to Fernridge Creek between Tempo Drive and Questover Lane, I&L identified channel erosion issues in need of systemic repair that includes two perched outfalls and a large flanking hole next to box culvert.

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PA-118 – 17 Chamblee Lane (Channel) (CC-C-24)

Along a Smith Creek west of 17 Chamblee Lane, I&L identified channel erosion issues in need of systemic repair consisting of sinkholes, bank slotting, and potentially threatened manhole.

PA-119 – 2 Chasselle Lane (Channel) (CC-C-28)

On the north side of Ladue Road between Chasselle Lane and Wexler Manor Court, I&L identified channel erosion issues in need of systemic repair that includes bank cutting in the roadside swale that is threatening the roadway and a knickpoint along a roadside swale.

PA-120 – 151 Royal Gate Drive (Channel) (CC-C-30)

Along Rosenfelder Creek south of Royal Gate Drive, I&L identified channel erosion issues in need of systemic repair consisting of knickpoints, an exposed sanitary line along toe of slope, and a perched pipe.

PA-121 – Conway Downs Drive (Channel) (CC-C-32)

Along Rosenfelder Creek northeast of Conway Downs Drive, I&L identified channel erosion issues in need of systemic repair consisting of knickpoints, a scour hole, threatened bridge abutments, an exposed utility line, and two perched outfalls.

PA-122 – Bellington Lane (Channel) (CC-C-33)

Along Rosenfelder Creek between Conway Holmes Circle and Hewlett Court, I&L identified channel erosion issues in need of systemic repair consisting of two fallen pipe segments, knickpoints, a failing fence along outside bend, a scour hole, a failing abutment, and outfall erosion.

PA-123 – 12 Broadview Farm Road (Channel) (CC-C-35)

Along a tributary to Smith Creek between Broadview Farm Road and Mason Road, I&L identified channel erosion issues in need of systemic repair consisting of knickpoints, tributary erosion, and bank mass wasting.

PA-124 – 996 East Rue De La Banque Street (Channel) (DC-C-03)

Along a tributary to Creve Coeur Creek between West Rue De La Banque Street and Charter Oak Parkway, I&L identified channel erosion issues in need of systemic repair consisting of outfall erosion, knickpoints, a scour hole, an exposed sanitary line, and an exposed MSD manhole (035S).

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PA-125 – Lindbergh Boulevard (Channel) (DC-C-26)

Along a tributary to Fee Fee Creek west of Lindbergh Boulevard, north of Schuetz Road, I&L identified channel erosion issues in need of systemic repair consisting of bank erosion, a failing asphalt swale from Lindbergh which is being bypassed, knickpoints, and a scour hole.

PA-126 – Haven View (Overland) (DC-S-25)

The street has been overlaid which has decreased the capacity of the rolled curb. Flow from the roadway carries mulch and dirt onto the driveway and yard at 19 Haven View Drive. MSD basemaps shows a 72-inch x 72-inch box culvert on the west side of the house, which is also near the low point on the street. Three inlets are on the north side of the street spanning from the low point to the cul-de-sac to near the top of the hill. No inlets have been installed on the south side of the street.

PA-127 – 252 Bellington Lane (Overland) (CC-S-09)

Resident reports basement, basement stairwell and yard flooding during heavy rains. LiDAR indicates about 1.2-acres DA towards the house which sits four to six feet lower than the adjacent houses.

PA-128 – 215 Chasselle Lane (Channel) (Private)

Bad tasting drinking water after storms reported on Social Pinpoint affecting 125 Chasselle Lane. This issue was referred to the utility owner.

PA-129 – 228 Falling Leaves Court (Overland) (CC-S-08)

Resident reported yard ponding in the back yard and along south side of the house plus erosion on south side of house. The back yard slopes about 2.4 %, and the side yard slopes about 1.4% with a DA of about 0.76 acre.

PA-130 – 203 Townsend Street (Overland) (Private)

Resident reported property flooding and streambank erosion in Malcolm Terrace Park. Reported issues include constant flooding in the park and a ravine that has been formed by erosion.

PA-131 – North Spoede Road & Mission Hills Court (Overland) (DC-S-22)

Resident reported street flooding due to inadequate capacity of the existing stormwater system.

PA-132 – Pine Manor Drive (Overland) (DC-S-09)

Residents reported street flooding and property flooding along Pine Manor Drive. Reported issues include inadequate capacity of the existing stormwater system causing cul-de-sac and property flooding.

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Criteria for Public Projects

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Determination of Public or Private Stormwater Projects
May 2023

Other municipalities have used the criteria below to determine if a potential project should be eligible for public funding or if the project should be a private effort. If one or more of the following conditions applies to the site or issue, then the municipality determines that the solution may possibly become a publicly-funded solution.

The City's goal is to develop and approve criteria that can be applied consistently to stormwater issues identified under the Watershed Management Plan. The list below can be used as a base for the City and the Stormwater Committee in choosing the criteria that Creve Coeur will use in evaluating possible projects.

	Possible public project	**Private owner's responsibility**
Can the solution be reasonably completed by the homeowner?	Does the solution require the homeowner to work with other agencies or parties outside of the individual homeowner's control such as MSD, Missouri DNR, Army Corps of Engineers, or other homeowners? If so, the project may be a candidate for a publicly-funded solution.	Projects that can be reasonably constructed by the homeowner would unlikely be eligible for public funds.
Does the stormwater issue threaten public or private structures? ● Qualifying structures require a building permit to construct. ● Structures would likely not include sheds (unless the shed had a permit) and other non-habitable structures that lack a foundation. ● What about pools?	If the stormwater issue threatens a qualifying structure, then a publicly-funded solution may be considered.	If the issue threatens a non-qualifying structure and if none of the other considerations for public funding apply, then a publicly-funded solution is unlikely.
Does the stormwater issue threaten public or private roadways?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	

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Is the issue caused by an undersized stormwater conveyance infrastructure?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Would the proposed project address regional or systematic channel instability?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Would a solution protect water quality or natural resources? Protected elements would need to be in good existing condition to be eligible for public funding.	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Was the issue caused by altered upstream conditions?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Was the issue caused by inadequate maintenance of a public system?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Will the project improve public safety?	If yes, then it is possible a solution will be publicly funded depending on the prioritization ranking.	
Is the focus of the project utility work?	If yes, then a publicly-funded solution is unlikely unless the utility work is part of an eligible project.	The project is likely to be the utility owner's responsibility if the infrastructure is owned and operated by other Public Agencies with the possible exception of some MSD assets or assets that will be dedicated to MSD after construction.
Does the work focus on privately-owned infrastructure?		If yes, then the solution is likely the owner's responsibility.
Has the stormwater issue been identified as a monitor project?	Some projects are identified as not urgent and are recommended to be monitored over time for consideration to be included in future CIPs.	

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Public or Private Checklist

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Is a stormwater issue public or private?

If one or more boxes are checked, then a publicly-funded solution might be considered	
Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue?	☐ Check for yes
Does the stormwater issue threaten public or private structures?	☐ Check for yes
Does the stormwater issue threaten public or private roadways?	☑ Check for yes
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	☐ Check for yes
Is the issue caused by an undersized stormwater conveyance infrastructure?	☐ Check for yes
Does the proposed project address regional or systematic channel instability?	☐ Check for yes
Would a solution protect water quality or natural resources?	☐ Check for yes
Was the issue caused by altered upstream conditions?	☐ Check for yes
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	☐ Check for yes
Was the issue caused by inadequate maintenance of a public system?	☐ Check for yes
Will the project improve public safety?	☐ Check for yes
Has the stormwater issue been identified as a monitor project?	☐ Check for yes
Is the focus of the project utility work?	☐ Check for no
Does the work focus on privately-owned infrastructure?	☐ Check for no

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List of Private Projects

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Project Number	Address	Reported Issue	Notes	Public/Private	Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue? (Y/N)	Does the stormwater issue threaten public or private structures? (Y/N)	Does the stormwater issue threaten public or private roadways? (Y/N)	Does the stormwater issue threaten public infrastructure or publicly-funded improvements? (Y/N)	Is the issue caused by an undersized stormwater conveyance infrastructure? (Y/N)	Does the proposed project address regional or systematic channel instability? (Y/N)	Would a solution protect water quality or natural resources? (Y/N)	Was the issue caused by altered upstream conditions? (Y/N)	Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations? (Y/N)	Was the issue caused by inadequate maintenance of a public system? (Y/N)	Will the project improve public safety? (Y/N)	Has the stormwater issue been identified as a monitor project? (Y/N)	Is the focus of the project utility work? (Y/N)	Does the work focus on privately-owned infrastructure? (Y/N)
2	116 WEXLER MANOR CT	Property Flooding	We are concerned about the run-off from ladue lake. In a hard rain it floods chasselle and at least four yards - including ours.	Private	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
3	20 WILLIAMSBURG RD	Property Flooding	Area between this home and the home to the east floods during heavy rains. Stormwater sewer between the homes is not able to move it away. Water comes down the hill from the area above the home to the east.	Private	N	N	N	N	?	N	N	N	?	N	N	N	N	N
	21 WILLIAMSBURG RD	Property Flooding	The run off from the rain water in the backyard has become a deeper chasm (1ft depth). The neighbor that backs up to the property has tried to create a leaf barrier to provide ground cover.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	38 Williamsburg Rd	Standing water between the homeowner's and the neighbor's home.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	40 WILLIAMSBURG RD	Property Flooding	Ponding in yard from neighbor yard	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	43 WILLIAMSBURG RD	Property Flooding	When rains, water floods the property and floods basement as a result	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	43 WILLIAMSBURG RD	Home Flooding	House floods when bad rains / storms															
4	16+ Mosley Acres Dr	Asphalt overlay of concrete street has reduced gutter capacity and resulted in erosion behind the curb		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5	1020 & 1028 Fernview Dr	Yard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
6	12921 Fernway Ln	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
7	104 Ladue Meadows Ln	Erosion in yard and near street inlet	Needs Site Visit (KLE)	Private & MSD	N - for yard erosion	N	N	N	N	N	N	N	N	N	N	N	N	N

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11	10835 Rondelay Dr	Channel erosion upstream of inlet in backyard, asphalt overlay has reduced the gutter capacity causing creek erosion		Private & MSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
12	10921 CHALET CT	Property Flooding	Backyard flooding in heavy rain.	Private - Cost Share	N - If problem can be solved with grading the yard. Y - If solution is to add an MSD inlet in the yard or redirect flow uphill to existing inlets.	N	N	N	N?	N	N	N	N	N	N	N	N	N
	531 Chalet Ct	The homeowner reports spending approximately $60,000 trying to solve stormwater issues.	Any remaining issues result of deficent design or improperly installed system. Proper grading and installation of system could solve issue.	Private	n	?house?	n	n	N?	N	N	N	N	N	N	N	N	y
	10921 Chalet Ct		Sinkhole near area inlet	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
13	248 Brooktrail Ct		Sinkholes around inlet structure	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
14	11076 Graeser Ln	Yard flooding from runoff from Graser Ln		Monitor	N - If viable solution is grading yard and adding a speed bump to driveway. Y - If solution needed is street inlet upstream of driveway.	N	N	N	N	N	N	N	N	N	N	N	N	N
15	111 Worthington Oaks	Failing MSD structure on a neighboring site		MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
16	11205 Tureen Dr	Yard erosion		Private	N	N	N	N	N	N	N	N	N	Y - For issue at inlet.	N	N	N	N
17	12 Wedgewood	Erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N

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19	12121 & 12135 Royal Valley Dr	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	12234 Royal Valley Dr	Dry detention maintenance. The HOA also asked what, if anything, could be done to reduce flows coming from other subdivisions and 270.		Private	N - May need professional advice	N	N	N	N	N	Y?	N	N	N	N	N	N	Y
	12234 ROYAL VALLEY DR	Streambank Erosion	Erosion near the MSD stand pipe and the drain channel has been an issue for many years. HOA maintenance has only fixed erosion for a few short years.	Private	N	N	N	N	N	N	N	N		N	N	N	N	N
	12233 Royal Valley Dr		Sinkholes around curb inlet across the street	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
23	12318 Halsgame Ln	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
24	12365 MONTSOURIS DR	Home Flooding	Ponding occurs in the yard every time it rains. In addition, every time it rains the basement leaks/flood depending on the amount of rain that occurs. MSD was contacted and they said the sewer system near the residence cannot handle more than 3 in of rain, however, the house leaks/floods and the yard ponds every time it rains. There is also a creek in the behind the house.	Private	N	N	N	N	N?	N	N	N	N	N	N	N	N	N
	12372 MONTSOURIS DR	Property Flooding	Drainage area between the two ponds/lakes overflows during heavy rains into the surrounding yards. Also causes excessive rise in receiving pond/lake.	Private - Cost Share	Y - However HOA maybe responsible for lake outfall	N	N	N	N	N	N	N	N	N	N	N	N	N
26	12503 Questover Lane	Concerns about standing water and minor erosion within the condo complex.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
28	12502 TRAMMELL CT	Property Flooding	Water typically pools heavily during storms through this area. Ground remains moist for long periods after storms have ceased.	Private														
31	12643 CONWAY DOWNS DR	Property Flooding	Whenever it rains, a pool of water forms in the far corner of my property. There is a creek on the other side of our fence. I am concerned about the mosquitoes breeding in this standing water.	Private	n	N	N	N	N	N	N	N	N	N	N	N	N	N

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32	12721 CREEKSIDE VIEW DR	Property Flooding	The area behind our home floods during heavy rains. The water comes up from a drain pipe or overflow from Fernridge Creek. In addition, a new subdivision (Duever Estates) is being built to the north and we are concerned that this will make the flooding worse. https://crevecoeurmo.portal.civicclerk.com/event/7234/overview	Natural Floodplain Area														
	12739 CREEKSIDE VIEW DR	Property Flooding	The common ground north of our home floods during heavy rains. Some of this comes from Fernridge Creek via a 12" rain pipe or from the creek overflowing its banks. A sub division (Duever Estates) is planned on the North side of Fernridge Creek and we are concerned that this will make the flooding worse.https://civicclerk.blob.core.windows.net/stream/CREVECOEURMO/604f5ec7-9be7-45de-9a05-a30753403b2c.pdf?sv=2021-10-04&st=2023-03-23T00%3A36%3A07Z&se=2024-03-23T00%3A41%3A07Z&sr=b&sp=r&sig=WKJlBRjA															
	801 N MASON RD	Property Flooding	During heavy rains the four 4-way drains are unable to handle the storm water running off our neighbors ponds and property. It has dislodged the rip-rap several times in the last 3 years. The board believes it would be helpful if our neighbor (Steven Leiber) would take measures to slow down the water before it leaves his property.	Private - Cost Share	N - Alternatives to the rock are available that the HOA could install from the property line to the inlets.	N	N	N	N	N	N	N	N	N	N	N	N	N
33	16 Chaminade	Street runoff causing erosion on his property.		Private	N	N	N		N	N	N	N	N	N	N	N	N	N
37	13210 Autumn Trails	Erosion in backyard		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
39	174 Belle Maison Ct	Stormwater flows from 178 Belle Maison Ct		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
43	2 Spoede Acres St	Runoff from surrounding area causes ponding and erosion	Install berm along west property line so inlet intercepts water, regrade yard for ponding issues and potentially have MSD swap out solid manhole cover for slotted cover and lower the frame if needed.	Private	n	N	N	N	N	N	N	N	N	N	N	N	N	N

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44	201 & 434 Runnymede Dr	Resident is concerned about runoff created by 237 Runnymede addition project		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	434 Runnymede Dr	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	450 RUNNYMEDE DR	Streambank Erosion	Lac du bois subdivision and others which have retaining basins: In several of these subdivisions the shoreline of these water retention "ponds" is eroding badly. These subdivisions need both management and perhaps financial assistance in order to avoid retention dike failure and damage to roadways	Private	N	N	N	N	N	N	Y	N		N	N	N	N	Y
45	219 Hibler Oaks	Backyard erosion		Private - Cost Share	N - If solution is permanent erosion control Y - If solution is extension of storm sewer	N	N	N	N	N	N	N	N	N	N	N	N	N
46	220 CLION LN	Property Flooding	heavy streams in the back yard with rains;	Monitor	Y - Regional solution needed if warranted.	N	N	N	N	N	N	N	N	N	N	N	N	N
	230 Clion Ln	Concerns about roadside drainage		Monitor	Y	N	Y	N	?	N	N	N	?	N	N	N	N	N
	Clion Lane & Ladue Lake Dr	Gully erosion and ponding in multiple back yards.		Private - Cost Share	Y - Regional solution needed if warranted.	N	N	N	N	N	N	N	N	N	N	N	N	N
	225 LADUE LAKE DR	Property Flooding	Extensive flooding on west side of lot coming from the north with moderate to heavy rain.	Private - Cost Share	Y - Regional solution needed if warranted.	N	N	N	N	N	N	N	N	N	N	N	N	N
48	240 Laduemount Dr	Creek erosion		Private	N	N	N	N	N	N	N	N		N	N	N	N	N
49	25 MORWOOD LN	Property Flooding	Yard floods during almost every rain event. Excessive water flowing on south side of yard. North side water ponds, City wanted to install an inlet in the 1990s or 1980s between 23 and 25 in the back, but the previous owner of 23 would not allow the work to proceed.	Monitor	Y - If pipe is a solution would likely cross property lines	N	N	N	N	N	N	N	N	N	N	N	N	N
50	258 NEW SALEM DR	Streambank Erosion	Resident report to the City: Streambank erosion	Private	n-Currently working with contractor to fix	N	N	N	N	Y	Y	N	N	N	N	N	N	Y
51	49 Beaver Dr	The homeowner is concerned about water ponding in the front yard.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
53	7 Middlebrook Ln		Erosion threatening shed (relocate shed)	Private	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y

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54	307 Cabin Grove	Sheet flows from an uphill neighbor causing erosion		Private	N - Erosion control with shade tolerant ground cover and proper grading of yard.	N	N	N	N	N	N	N	N	N	N	N	N	N
	307 CABIN GROVE LN	Property Flooding	storm water runs from the property located on Windsor Oaks Drive and accumulates in the backyard of the property.	Monitor	Y - Issue not on complaintants property	N	N	N	N	N	N	N	N	N	N	N	N	N
56	359 Country Glen	Concerns about creekside backyard erosion.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
57	36 AUBURNDALE DR	Property Flooding	Property flooding due to rain not flowing to storm drain east to west but down through yards southern direction	Private	N - grading can solve issue on the property	N	N	N	N	N	N	N	N	N	N	N	N	N
58	373 Hibler Ct	Existing concrete cannel is undersized		Private	Y	N	N	N	Y	N	N	N	N	N	N	N	N	N
63	477 MARFORD DR	Property Flooding	During and after rain, water pools up in this back corner of the yard	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	482 STAINES CT	Property Flooding	Our backyard turns into a river during heavy rain. We live where the creek was supposedly buried many years ago, but now all the water just runs above ground where the creek should have been.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
65	5 Ladue Estates	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	55 E LADUE ESTATES DR	Property Flooding	Water pools & runs over wall onto sidewalk.	Private	Y - If wall is public or issue is water on the sidewalk N - If wall is private	N	N	N	N	N	N	N	N	N	Y	N	N	N
68	561 Sarah Ln	Ponding on Sarah Ln and in front of garage doors. Garages are downgrade from road.		Public/Private	N - for onsite issues Y - for street ponding	Y	N	N	N	N	N	N	N	N	N	N	N	Y - For on-site issues
70	12228 WINROCK DR	Streambank Erosion	Resident reports that the conveyance channel to the detention basin has been receiving more flows than it did in the past. As a result, the channel has widened, trees have fallen, and the sides of the channel have eroded.	Private	Y	N	N	N	N	N	Y	N	N	N	N	N	N	N
	12228 WINROCK DR	Streambank Erosion	A culvert conveying street stormwater daylights here with open surface draining towards as MSD stand pipe, however there is standing water.	Private	Y	N	N	N	N	N	Y	N	N	N	N	N	N	N

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Project Number	Address	Reported Issue	Notes	Public/Private	Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue? (Y/N)	Does the stormwater issue threaten public or private structures? (Y/N)	Does the stormwater issue threaten public or private roadways? (Y/N)	Does the stormwater issue threaten public infrastructure or publicly-funded improvements? (Y/N)	Is the issue caused by an undersized stormwater conveyance infrastructure? (Y/N)	Does the proposed project address regional or systematic channel instability? (Y/N)	Would a solution protect water quality or natural resources? (Y/N)	Was the issue caused by altered upstream conditions? (Y/N)	Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations? (Y/N)	Was the issue caused by inadequate maintenance of a public system? (Y/N)	Will the project improve public safety? (Y/N)	Has the stormwater issue been identified as a monitor project? (Y/N)	Is the focus of the project utility work? (Y/N)	Does the work focus on privately-owned infrastructure? (Y/N)
71	625 Lampadaire Dr	Yard erosion		Private - Cost Share	N- If permanent erosion control is a viable option	N	N	N	N	N	N	N	N	N	N	N	N	N
72	667 Rue De Fleur Dr	Ponding in common area near the creek		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
75	7 SHERWYN LN	Property Flooding	The resident reports flows from neighbor's driveway entering a swale near the property line. Flows from the swale enter the creek on this property, and erosion is seen on the path from the swale to the creek.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
77	741 GASCOGNE DR	Property Flooding	Gullies have developed near the sewer that was installed (approx 15 years ago) that water collects in and doesn't fully drain. Ground needs to be regraded for better drainage.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
78	753 TIMBER RUN DR	Streambank Erosion	CMP is collapsed and causing bank/yard erosion and erosion of the pond banks. Pipe may be collapsed causing surcharge of manhole, runs into pond and causes erosion Erosion is contaminating waters with mud too. Ground is eroding through the trees to the sewer. That's water runoff from the backyards up the street.	MSD	Y	N	N	N	Y	N	Y	N	N	Y	N	N	Y	N
79	761 Turrentine Trail	Stormwater creating an approximate four-foot wide stream as it passes through the homeowner's yard. Homeowner wants to know if this is how the yards were designed to convey water.		Monitor	N	N	N	N	N	N	N	N	N	N	N	N	N	N
80	77 Colonial Hills Dr	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
82	859 Larkin Ave	Yard ponding		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
83	920 Bellerive Manor Dr	Failing French drain and improperly directed downspouts.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N

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Project Number	Address	Reported Issue	Notes	Public/Private	Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue? (Y/N)	Does the stormwater issue threaten public or private structures? (Y/N)	Does the stormwater issue threaten public or private roadways? (Y/N)	Does the stormwater issue threaten public infrastructure or publicly-funded improvements? (Y/N)	Is the issue caused by an undersized stormwater conveyance infrastructure? (Y/N)	Does the proposed project address regional or systematic channel instability? (Y/N)	Would a solution protect water quality or natural resources? (Y/N)	Was the issue caused by altered upstream conditions? (Y/N)	Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations? (Y/N)	Was the issue caused by inadequate maintenance of a public system? (Y/N)	Will the project improve public safety? (Y/N)	Has the stormwater issue been identified as a monitor project? (Y/N)	Is the focus of the project utility work? (Y/N)	Does the work focus on privately-owned infrastructure? (Y/N)
93	455 Ridgecorde Pl		Inlet in rear yard completely covered and property owner mentioned that it gets bypassed during storms	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
	9 Mosley Acres Dr		Sinkholes near/around area inlet															
103	946 FERNGATE LN	Property Flooding	Standing water in backyard in heavy rain	Private	N	N	N	N	N	N	N	N		N	N	N	N	Y
106	1070 Toreador Dr		Potential cso, has active flow	Private	Y	N	N	Y	N	N	Y	N		N	Y	N	Y	N
128	215 CHASSELLE LN	Streambank Erosion	Im not sure if this is considered stream bank erosion but after storms our drinking water tastes very bad. Undrinkable. We go weeks experiencing a bad smell/taste from the water. We have to resort to drinking bottled water during these times. We have contacted the water company a few times regarding this issue. They even sent someone out to test the water at one point. They never found undesirable levels, but the issue still persists after the storms.	Private	N	N	N	N	N	N	N	N	N	N	N	N	Y	N

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Appendix D
Channel Condition Assessment Field Data

Content:

- An Introduction to Fluvial Geomorphic Principles
- Channel Condition Scoring Matrix
- Channel Condition Scores Map
- Channel Condition Data Tables
- Study Reach Names Map
- Reach Data

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An Introduction to Fluvial Geomorphic Principles

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D.1 The Science of Fluvial Geomorphology

Fluvial geomorphology is the science studying the processes by which moving water shapes the land. It focuses on changes in the independent variables of discharge, sediment load supplied to reach, and valley slope, which give rise to adjustments in the dependent variables of sediment load, particle size, hydraulic characteristics, and morphologies, all of which interact with each other. It is a fundamental discipline of river science allowing for both the quantitative description of stream behavior in the present, as well as for the ability to make reasonable predictions of future behavior under specified conditions.

Fluvial geomorphology and the related disciplines of hydrology and hydraulic engineering, geology, landscape and aquatic ecology and soil science together provide the technical underpinnings for sound watershed management. A brief overview of basic principles of fluvial geomorphology, with an emphasis on their application to stream and watershed management is presented below.

D.1.1 Major Models

Streams exist in a state of dynamic equilibrium in which, the erosive forces of channel formation are counter-balanced by the resisting forces of the geological, ecological and soil strata the channel forms within. The driving force; gravity, acts on a stream as the rate at which water and sediment move through the channel. While the resisting force; the channels shape and roughness, is determined by the strength or cohesiveness of the channel boundary materials and the friction they exert on the water moving through the channel.

When the driving forces exceed the resisting forces, the stress applied by water or sediment (applied shear) exceeds channel strength. The stream channel subsequently responds by altering its geometry in plan, profile and cross-section form to accommodate the changes in flow volume and applied shear. Once disturbed, the processes by which streams respond are: 1) incision or degradation, 2) widening, 3) aggradation or deposition and 4) plan form adjustments. Through these processes, streams eventually re-establish equilibrium. Determining which process is dominant and the likely progression of the stream processes is one of the principle challenges of stream management.

While gravity and friction are the primary drivers of channel form, at the most fundamental level, stream manager's grapple with their many manifestations including sediment source, size and abundance, changing hydrologic conditions, shifting ecological influences of vegetative community disturbance and succession and a broad range of geological influences. In disturbed systems, the chosen approach evaluates each channel process separately then develops an integrated assessment using energy relationships derived from the following mathematical model. Given the large number of independent variables and the complex relationships between the many dependent variables that drive the patterns we see in natural systems such as streams, it is necessary to seek mathematical and process based models that organize the variables into easily observed and measured patterns.

Although there are three commonly recognized approaches to stream design, each with advantages and limitations (Skidmore et al. 2001), the two simplest approaches, often called analog and empirical methods, explicitly assume equilibrium conditions regarding hydrology and sediment transport. Because the watershed is not in an equilibrium condition, as discussed in more detail in the Geomorphic Section, the analytical approach is used.

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D.1.1.1 Lane's Relationship

In 1955, E.W. Lane expressed the relationships between the driving and resisting forces for channel change in the following simple proportionality. The expression is also illustrated in Figure D-1.

$Q_S D_{50} \propto S Q_W$

Where Q_S ≡ Rate of sediment flow
D_{50} ≡ Median size of mobile particles
S ≡ Slope of the channel bed
Q_W ≡ Rate of water flow

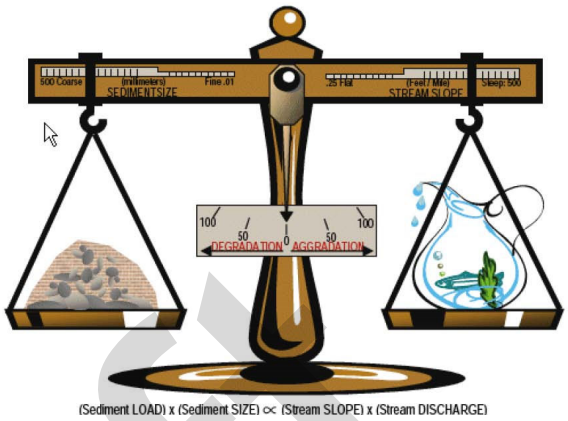

Figure D-1 Lane's Stable Channel Balance

Here the D_{50} stands as proxy for boundary strength and S for channel shape. From this relationship, it is clear that a change in any of these parameters will, once a threshold is exceeded, induce a change in one or more of the others. The familiar increase in Q_w associated with urban development illustrates this point well. The response to this increase is some combination of the following: a decrease in channel bed slope (incision), an increase in sediment load (increased erosion) and an increase in the median size of mobile particles.

When considering all four parameters, these responses often occur in sequence. The following examples illustrate:

- Initial change: $Q_W \uparrow$; response: $Q_S \uparrow$. Often the bed slope remains relatively unchanged at first, so to maintain the proportionality, Q_s increases. The increase in sediment load is generated by down cutting of the channel bed (incision), scour of the stream banks or both. The incision locally steepens the channel slope, compounding the driving force for more erosion. This local steepening of bed slope is called a knickpoint. Knickpoints migrate upstream liberating sediment as they progress. When the stream banks exceed their critical height, mass failure ensues. This reconfiguring of the channel geometry continues until the equilibrium described by Lane is re-established.

- Initial change: $Q_W \uparrow$; response: $D_{50} \uparrow$. This condition occurs when there is little sediment initially available in the bed or banks. So, to maintain Lane's proportionality, the size of the median mobile particles increases. Under this condition, rock armor that previously protected a structure becomes mobile as the D_{50} increases. Subsequently, the service life of the infrastructure declines. Moreover, the natural bed armoring aggregate, previously mobile only during less frequent floods, becomes mobile during more frequent events and the underlying, more erosion-prone bed and bank materials are exposed to greater and more frequent erosive force.

- Initial change: $Q_W \uparrow$; response: $S \downarrow$. If the channel bed is relatively resistant to incision, the stream may respond to increased flows by decreasing its slope. The stream accomplishes this decrease in slope by meandering or increasing the channel length over the same change in elevation. The downstream progression of point bars (crescent-shaped sediment deposited on the inside bank of stream bends) opposite the downstream progression of eroding and failing cut banks (steeper outside banks of stream bends) are classic signs of meandering.

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- Initial change: S ↑; response: Q_S ↑. Increasing channel slope is often accomplished through channel straightening to achieve greater flood conveyance or to optimize land development. This increase in slope causes an increase in sediment load, in mobile D_{50} size or both. Bed and banks erode to generate the sediment that deposits downstream where channel slopes are flatter. The effective change in water surface slope may extend upstream well beyond the actual channel straightening, extending the accelerated erosion. The sediment eroded from upstream of the channelization and deposited downstream counteracts the effect of the channelization and improvements in flood conveyance are often less than anticipated.

Lane's Relationship is useful for broad conceptual understanding of stream behavior. It is also valuable for testing hypotheses concerning stream behavior in various scenarios. The following models more specifically address stream processes.

D.1.1.2 Channel Evolution Model – Evaluating Channel Changes in Cross-Section

When considering streams from a management perspective, it is especially helpful to note that streams trend toward the equilibrium condition. Schumm (1984) and most recently Simon (2001) have described process by which streams reacquire equilibrium after a disturbance in the watershed. Simon separates changes in channel morphology into six stages: I) Pre-disturbance, II) Disturbance, III) Incision, IV) Widening, V) Deposition, and VI) Recovery and Reconstruction. Determining the phase of channel evolution in the various project reaches was an important part of the analysis.

At Stage I, the channel is stable and transports the water and sediment delivered to it without significant adjustment. Although not a universal feature, internal floodplains are common in stable streams including those in the Central Midwest. Bankfull floodplains occur at the elevation corresponding to the dominant discharge. The dominant discharge is the flow that, over time, accomplishes the most work on the stream channel. In undisturbed streams, the dominant discharge typically occurs every 1.5 to 2 years. The bankfull floodplain performs a valuable function by lowering the bank shear during higher flows and effectively managing the stream energy.

Stage I Pre-disturbance

- Bed and bank materials balanced with erosive forces
- Permanent woody vegetation near the water line
- Two-stage channel shape evident at about 1.8 year return interval

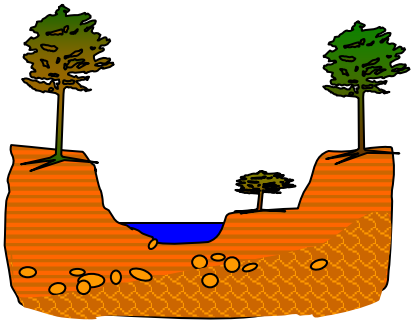

Figure D-2 Stage I Pre-disturbance

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During Stage II, natural or manmade events disturb the channel. In disturbed systems, the dominant discharge often occurs far more frequently and may not support the development of internal floodplains. Common forms of manipulation include increases in the rate, volume or timing of flow or direct alteration of channel dimensions or alignment.

Stage II Disturbance

- Channel altered, hydrology or sediment inputs modified
- Removal of permanent woody vegetation near the water line
- Two-stage channel shape eliminated or no longer supported by flow conditions

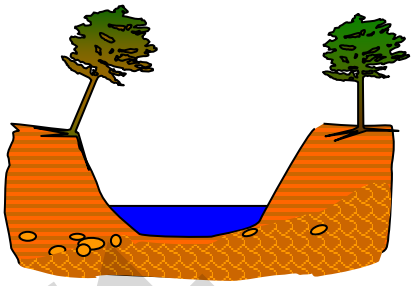

Figure D-3 Stage II Disturbance

In Stage III, the stream cuts downward, lowering its channel slope to redistribute energy. This incision process migrates upstream. The migrating face of an incision front is referred to as a knickpoint or knickzone. The typical shape of these channels is V- shaped or narrow U-shaped. In soils such as loess, incision may proceed rapidly; migration rates exceeding 1000 feet/year occur in the Central Midwest. Incision proceeds until the channel has reached a stable slope, the incision reaches a more resistant layer or the stream banks begin failing because of mass wasting.

Stage III Incision

- Downcutting liberates sediment
- Lost or perched bankfull floodplains
- "U" shaped channel
- Woody vegetation high on bank with many "surfer" trees

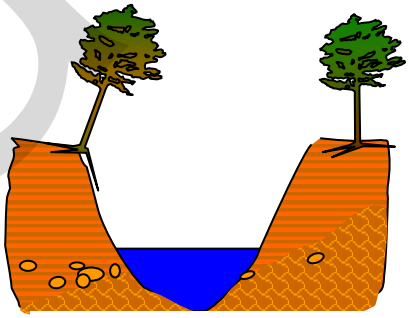

Figure D-4 Stage III Incision

Channel widening through mass wasting of the stream banks, Stage IV, follows incision. There are two common mechanisms of bank failure. Fluvial action erodes soil away from the toe of the slope resulting in a cantilevered bank, which eventually fails through toppling. Alternatively, the incision cuts deeply enough into the bed that the stream banks exceed their critical height and fail. Both mechanisms are operational in a stream.

Stage IV Channel Widening

- Widespread bank failures as banks exceed critical height or were undercut by toe scour
- Channel adjusts to new flow regime
- Significant sediment loads generated; most significant erosion hazard in this phase
- Bank armoring generally ineffective

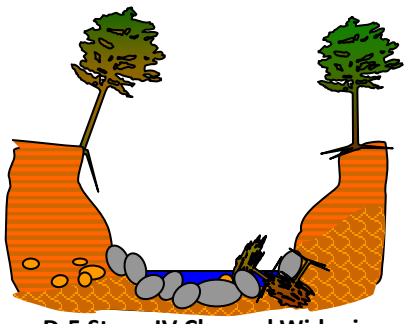

Figure D-5 Stage IV Channel Widening

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The next phase of channel evolution is Stage V when the channel has sufficiently widened and begun depositing sediment eroded from upstream reaches in the bed. The deposits occur as channel bars and occasionally as internal floodplains.

Stage V Deposition

- Deposition begins from liberated sediment
- Vegetation establishes near water line

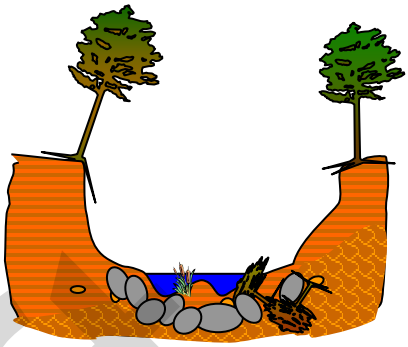

Figure D-6 Stage V Deposition

In Stage VI, the channel regains the equilibrium condition and efficiently transports both water and sediment. If a substantial increase in Q_w precipitated the adjustment, final dimensions of the channel (in cross section) will probably be larger than the pre-disturbance condition.

Stage VI Recovery and Reconstruction

- Bankfull floodplains may be reconstructed from liberated sediments
- Woody vegetation establishes near water line
- Stability re-established

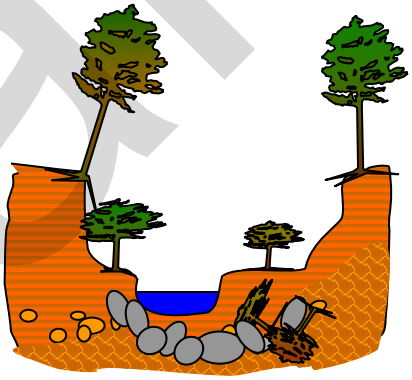

Figure D-7 Stage VI Recovery and Reconstruction

D.1.1.3 Meander Formation and Migration – Evaluating Channel Changes in Plan Form

Adjustments in plan form are common and have an important influence on the sustainability of a storm water system as well as on the safety and service life of near-stream infrastructure. Some plan form adjustments can liberate significant sediment and present major erosion hazards. The management requirements of plan form adjustment differ from those of an incising or widening stream. Consequently, distinguishing between these processes is an important part of any investigation and analysis into the stability of a watershed. Straight stream channels are rare, requiring a narrow set of circumstances to maintain dynamic equilibrium in a natural setting. Like all other open systems, streams adjust their form to minimize the expenditure of energy. The formation of pool-riffle patterns and meanders are consistent with this trend towards maintaining an equilibrium condition. Meanders are complex in both formation and behavior. Meander formation graphically demonstrates the principle of cause and effect in stream mechanics. The cause in this instance is the force applied by moving water and sediment while the effect is the shape of the stream channel.

To describe the basic process of meander formation, the distinction between the meander flow or discharge centerline and the channel centerline is important. As illustrated in Figure D-8, the channel

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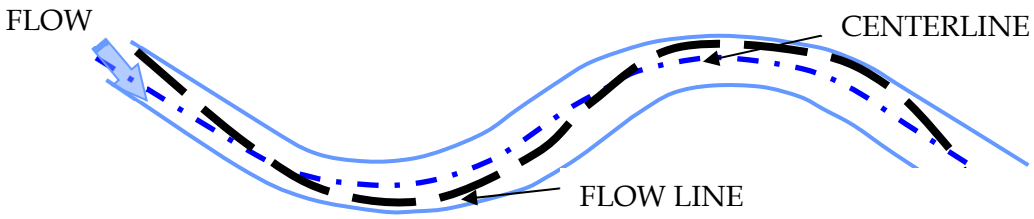

Figure D-8 Meander Formation and Migration

centerline (effect) lags the discharge flowline or the channel thalweg (cause). This is a result of the resistive forces of friction being unevenly applied to the water moving through the channel, recall that these resistive forces are expressed as the shape of the channel (in cross-section and plan form) and the channel paving materials. Consequently the flow in a stream channel is slower at the margins or boundaries of the channel. This is due to the higher levels of friction in these zones, which causes the flow in a stream to not progress in straight lines parallel to the stream channel. Therefore faster moving water from the interior of the channel is always spilling out into the space not occupied by the slower moving water at the margins of the channel.

Therefore, flow in a stream is comprised of a primary flow oriented downstream with secondary transverse flows oriented perpendicular to the primary flow. As illustrated in Figure D-9, along the channel thalweg, these inward and outward transverse flows are balanced in terms of the quantity of water which is being discharged. However, along the channel centerline, there is considerable asymmetry. Because of the variable turbulence and secondary flow patterns, the flow velocity, sediment transport and boundary shear stress are resultantly non-uniform across the channel. These areas of turbulence produce alternating pulses of sediment scour and deposition.

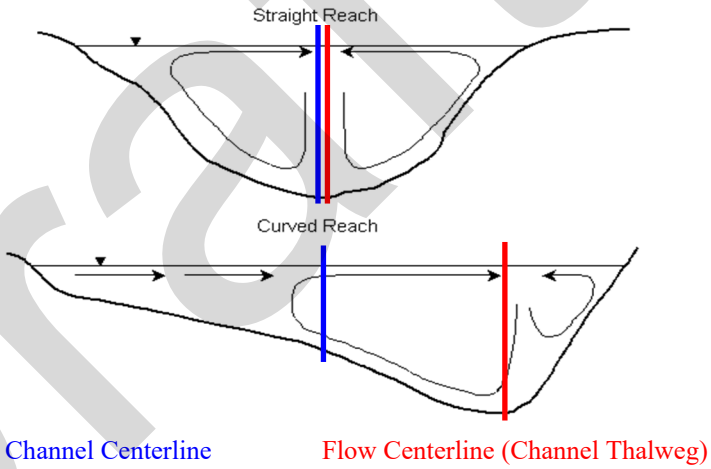

Figure D-9 Secondary Stream Flow

The resulting areas of scour and deposition alternate along the axis of discharge flow producing a pool along the outer bend and a corresponding point bar on the inner bend. As the pattern of scour and deposition alternates from one side of the channel to the other, the thalweg (deepest portion of the channel cross section) and maximum flow velocity cross over the center of the channel. Theses cross over points become the riffles. This alternating pattern of bar building and bank scour causes straight streams to evolve into meandering ones with a sinuous pattern. Specifically, this is how channelized reaches eventually reacquire a sinuous shape.

Although the process of creating riffles and pools encompasses highly variable processes, the riffles and pools occur at generally predictable intervals. The spacing of these riffles or pools along the thalweg relates closely to the width of the stream at the elevation of dominant discharge. The figure below illustrates riffle geometry in plan form. Further, the spacing of the pools, which are near the outside bend

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and slightly downstream of the maximum curvature of the meander, have essentially the same relationship to channel width as the riffles.

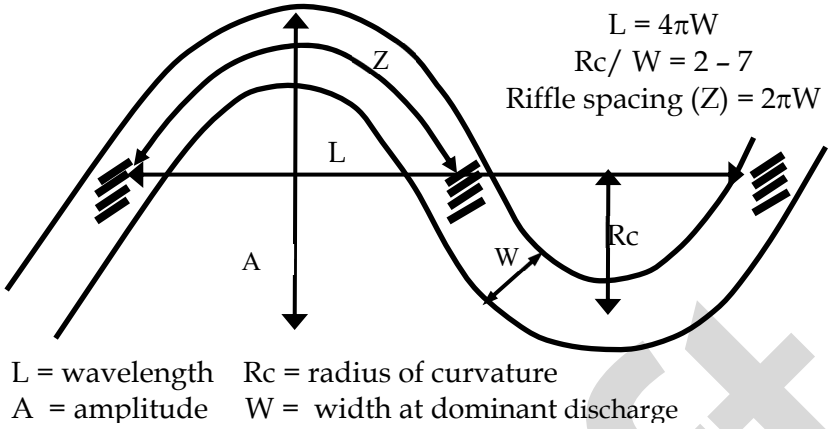

Figure D-10 Meander Geometry

In alluvial streams of homogeneous material, meanders take the form of sine-generated curves. Leopold and Langbein (1969) demonstrated that this shape is the most hydraulically efficient form for turning water. Further, Chang (1998) presents a more analytical assessment of this meander plan geometry. These relationships between stream width, riffle spacing, meander wavelength and radius of curvature are remarkably consistent for streams and rivers throughout the world.

Most stable relationships in channel geometry include the channel width at the elevation corresponding to the dominant discharge. Riffle spacing (Z) generally occurs every 6.3 bank widths (W) where W is the width at the dominant discharge., this spacing is essentially 2πW. Meander wavelength is approximately 12 bank widths, which approaches 4πW.

The radius of curvature is also related to the channel width at dominant discharge elevation. The ratio of meander radius of curvature (R_c) to channel width (W) generally ranges between 2 and 7. Bagnold's (from Thorne et al, 1997) investigation of energy losses at bends confirmed the empirical observations by determining that flow energy losses are minimized through this shape. A tighter radius causes a flow separation and severe energy losses, a hydraulic inefficiency that is not persistent. In natural rivers, channel bends erode to a R_c/W ratio of 2-5 and then maintain that form, which indicates that the hydraulic efficiency is optimized by this form.

In streams containing heterogeneous media and in confined channels, the meander pattern is interrupted by variations in bank structure, infrastructure, confluences, geologic features and channel manipulation. Streams out of equilibrium also display distortions in meander pattern and growth. Nevertheless, the fundamental relationships describing these patterns remain broadly applicable.

Consistent with the location of peak stress downstream of each bend apex, meander waveforms migrate downstream. In stable streams, the meander migration generally occurs at a rate that does not affect infrastructure. However, accelerated migration may pose a substantial risk. A rapid increase in sediment load delivered from an incising or widening reach upstream is the most likely trigger for accelerated migration in urbanizing watersheds.

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D.1.1.4 Profile Analysis

The measurement of the effect of gravity on a channel is often understood through an analysis of the channels longitudinal profile or gradient. In this manner, the dominant bed-slope of the channel is quantified. Channels with steeper bed-slopes, as determined by the difference in elevation between the crest of one riffle and the crest of an upstream or downstream riffle, have a higher level of hydraulic energy which must be dissipated by the channels shape and roughness. Abrupt changes in the overall pattern of channel profile indicate areas where incision is occurring now or where the degradation is arrested by manmade or natural structures. The advancing front of incision is known as a knickpoint or where slope changes are slightly less abrupt, knickzone. It is especially important to identify and manage incision because it usually precedes processes that are more destructive.

D.1.1.5 Energy Relationships

Other fundamental relationships used to understand stream mechanics are energy, continuity and loss relationships. Remembering that energy can neither be created nor destroyed, that mass is conserved and that all dynamic systems have losses, we can calculate flood elevations and erosive stresses.

First, the total energy in a system can be expressed as:

$E = w + v^2/(2g) + z - L$

Where: E ≡ energy (ft-lb/lb)
w ≡ work per unit mass
$v^2/(2g)$ ≡ kinetic energy
z ≡ potential energy
L ≡ losses

The total energy at any point is equal to the total energy at any other point and is expressed as:

$w_1 + v_1^2/(2g) + z_1 = w_2 + v_2^2/(2g) + z_2 - L$

Additional equations such as continuity[1] and Manning's loss equation[2] allow the designer to calculate the depth and velocity at any point in the system. Energy, continuity and Manning's equations are the bases for programs such as HEC-RAS.

Bringing these concepts together in the context of stream mechanics, work is the movement of sediment by water, kinetic energy is the movement of water, potential energy is the depth of the water and losses are friction and sound. HEC-RAS does not include a separate calculation of work. The energy exchange of work moving sediment is included by default in losses and kinetic energy.

Some designers consider sediment transport competency for major projects by establishing a sediment budget to analyze sediment movement through the designed intervention. More sophisticated techniques include computer based analyses. For small projects, it is usually difficult to justify a

[1]For modeling purposes, the continuity relationship expresses the concept that the quantity of water in any one point in a system is the same as the quantity of water at another point or changes only gradually. At each confluence, hydraulic models are partitioned into discrete reaches.

[2] Manning's loss equation is commonly expressed as $Q = 1.49(R^{2/3}S^{1/2})A/n$

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sophisticated model. The designer, however, can achieve a basic understanding of sediment transport competency and erosion hazard from data and analyses used to determine water surface elevations. The designer estimates area of erosion and deposition from the continuity of the stream power or boundary shear stress. Routines in the HEC-RAS model calculate stream power and boundary shear stress. The values of either stream power or boundary shear stress are plotted against the longitudinal profile. The designer compares the zones of highest and lowest values to his field observations of size and distribution of bed material and the location of scour and erosion. The designer then establishes threshold values from these observations. Improved sediment transport competency results from using these threshold values in design. Boundary shear stress is the product of density, depth and slope. The designer predicts areas of scour and erosion by comparing the boundary shear stress to the shear resistance of the bed or bank toe materials. The shear resistance for granular materials is calculated using empirical relationships. The shear resistance for cohesive materials is usually compared to measured or tabulated values.

Lane's proportionality allows the designer to understand and predict the effect of forces on a stream. Energy and continuity equations allow the designer to predict the depth and average velocity at any point. The energy and continuity equations are the bases for understanding the exchange of energy modes. Perhaps the simplest useful way to apply these principles is to think of energy as either kinetic or potential. For the purposes of stormwater, flooding occurs when potential energy is higher than we can accept and accelerated erosion occurs when kinetic energy is higher than we accept.

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D.1.2 Temporal and Spatial Implications

The dominant process in a stream reach is influenced by its location in the watershed. As shown on the following figures, the profile of the channel slope becomes flatter progressing downstream. In the most general sense, incision dominates the steep, upper watershed and plan form adjustments dominate the relatively flat lower watershed.

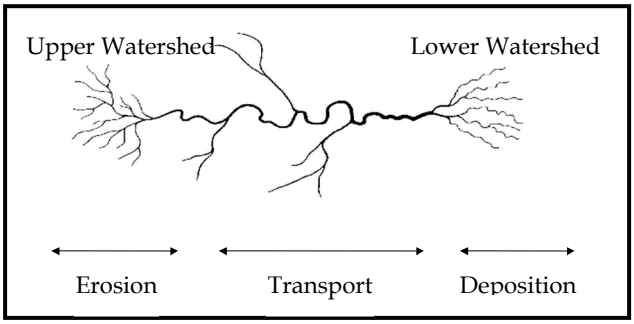

Figure D-11 Stages of a River System (adapted from Rienick and Singh, 1980)

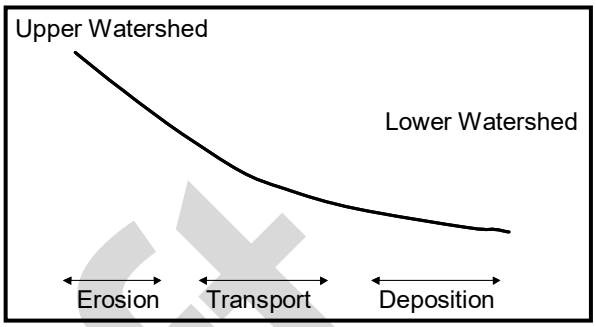

Figure D-12 General Channel Profile of a Watershed

In disturbed watersheds, this pattern may be reset by infrastructure. For example, a dammed stream can act as the end of a watershed, where sediment and water is deposited in the receiving lake.

Here the outfall behaves like a spring beginning the next watershed. Stream crossings such as bridges and culverts can also reset river formation, as shown on Figure D-14. In developing areas, the characteristic profile shape of natural watersheds may be repeated after each hard crossing that materially effects transport of water and sediment. These obstructions may geomorphically isolate the reach.

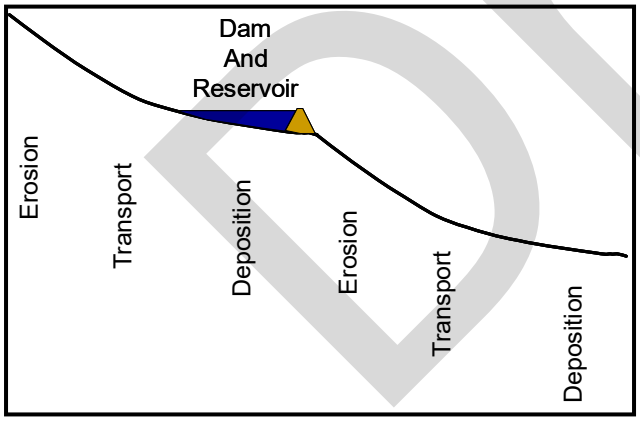

Figure D-13 Effect of a dam resetting the stream formation sequence

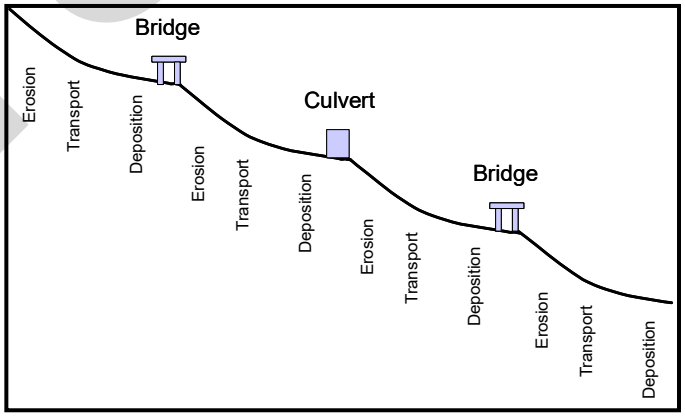

Figure D-14 Effect of stream crossings resetting the stream formation sequence

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D.1.3 Sediment Transport

Natural channels transport both water and sediment through the watershed. Sediment and water movement play parallel roles in flood and erosion control and in the performance of bridges and culverts. For this discussion, sediment includes large woody debris, man-introduced materials and other debris that comes to rest on the streambed. A stream in dynamic equilibrium maintains the movement of water and sediment without sudden and wholesale areas of erosion and deposition. Flow rate governs both the initiation of sediment movement and its deposition, moving material when the system has sufficient kinetic energy and depositing it when the kinetic energy is depleted. As described earlier, gravity, expressed here as hydraulic slope, is the driving force acting on the system. The movement of water transfers that force to dislodge and keep particles moving. Figure D-15 is a generic hydrograph and sedigraph relating the rate of flow to time. Note that there is a lag between the flow of water and the movement of sediment ($t_{s\,i}$). The lag represents the flow necessary to exceed the critical shear stress. At the peak water flow there is often a decrease in the transport of sediment as the hydraulic slope decreases. The falling leg of the hygrograph may coincide with the peak of the sedigraph with the particles already mobile and an increase in hydraulic slope.

As the flow recedes and kinetic energy declines, the stream deposits particles of decreasing particle size. This process forms the riffles between pools. Generally, this is most apparent where the woody debris jams morphologically behave as riffles.

Issues of sediment transport are particularly relevant to stream managers at infrastructure crossings. Bridge, culvert and pipeline crossings may interrupt the hydraulic slope with predictable, adverse consequences. A crossing backwatered under high flow conditions decreases the hydraulic slope and may induce deposition that reduces flow capacity. Over-widened or excessively smooth crossings increase hydraulic slope and induce scour. The scour may occur immediately downstream and undermine the structure or may, as the result of an upstream drawdown curve, induced incision. This incision migrates upstream until the stream reaches a stable bed slope.

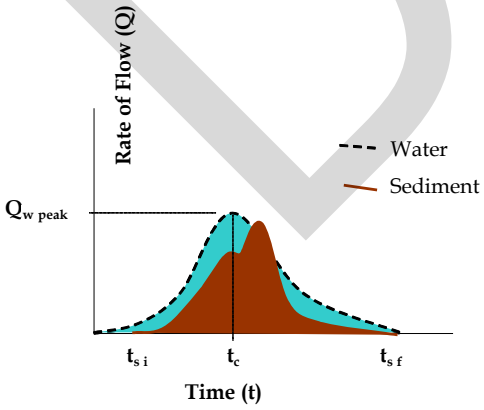

Figure D-15 Hydrograph and Sedigraph

Management activities that remove or add material to the stream also interrupt equilibrium sediment transport and may have similarly adverse consequences. Snagging, straightening and widening a channel all disrupt the sediment balance. These and similar activities induce upstream erosion and eventual deposition at the site of disturbance. Un-designed bank armor such as dumped riprap or waste concrete disrupts sediment transport when it migrates into the bed. These large, rough particles induce deposition where they enter the bed but induce scour downstream. Dumping materials on the bed can also reset the pool and riffle sequence if the dumped material becomes the hardest point in the reach.

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Channel Condition Scoring Matrix

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Channel Condition Scoring Matrix
(Adapted from Johnson et al 1999)

	Stability Indicator	Good (1)	Fair (2)	Poor (3)
1	Bank soil texture and coherence per Uniform Soil Classification using the visual-manual procedures (ASTM D 2488-00)	Cohesive materials, clay (CL), silty clay (CL-ML), massive limestone, continuous concrete, clay loam (ML-CL), silty clay loam (ML-CL), thinly bed limestone	Sandy clay (SC), sandy loam (SM), fractured thinly bedded limestone	Non-cohesive materials, shale in bank, (SM), (SP), (SW), (GC), (GM), (GP), (GW)
2	Average bank slope angle as measured where obvious breaks in slope create a top of bank and toe of slope	Slopes ≤ 2H:1V on one or occasionally both banks	Slopes from 2H:1V to1.7H:1V common on one or both banks	Slopes steeper than to1.7H:1V on one or both banks
3	Average bank height as measured from the lowest point in the channel cross section to the top of bank	Less than 6 feet	Greater than 6 and less than 12 feet	Greater than 12 feet
4	Vegetative bank protection	Wide to medium band (≥ the width of the riparian buffer) of woody vegetation with 70-90% plant density and cover. Majority are hardwood, deciduous trees with well-developed understory layer, minimal root exposure	Narrow band (>20 feet up to the buffer width) of woody vegetation, poor species diversity, 50-70% plant density, most vegetation on top of bank and not extending onto bank slope, some trees leaning over bank, root exposure common	Thin or no band (20 feet or less) of woody vegetation, poor health, monoculture, many trees leaning over bank, extensive root exposure, turf grass to edge of bank
5	Bank cutting	Little to some evident along channel bends and at prominent constrictions, some raw banks up to 4 foot	Significant and frequent. Cut banks 4 feet high. Root mat overhangs common.	Almost continuous cut banks, some over 4 feet high. Undercut trees with sod-rootmat overhangs common. Bank failures frequent
6	Mass wasting (wedge or slide slope failure)	Little to some evidence of slight or infrequent mass wasting, past events healed over with vegetation. Channel width relatively uniform with only slight scalloping	Evidence of frequent and significant mass wasting events. Indications that higher flows aggravated undercutting and bank wasting. Channel width irregular with bank scalloping evident	Frequent and extensive mass wasting evident. Tension cracks, massive undercutting and bank slumping are considerable. Highly irregular channel width.
7	Bar development	Bar width is less than ¼ of the channel width at low flow, well-consolidated, vegetated and composed of coarse bed material to slight recent growth of bar as indicated by absence of vegetation on part of bar	Bar widths ¼ to ½ of channel width at low flow with freshly deposited sand to small cobbles with sparse vegetation	Bar widths greater than ½ the channel width at low flow. Bars are composed of extensive deposits of finer bed material with little vegetation
8	Debris jam potential	Slight – small amounts of debris in channel. Small jams could form	Moderate – noticeable debris of all sizes present	Significant – moderate to heavy accumulations of debris apparent
9	Obstructions, flow deflectors and sediment traps	Negligible to few or small obstructions present causing secondary currents and minor bank and bottom erosion but no major influence on meander bend	Moderately frequent and occasionally unstable obstructions, noticeable erosion of channel. Considerable sediment accumulation behind obstructions	Frequent and unstable causing continual shift of sediment and flow
10	Channel bed material consolidation and armoring	Massive competent to thinly bed limestone, continuous concrete, hard clay, moderately consolidated with some overlapping. Assorted sizes of particles, tightly packed and overlapped, possibly imbricated. Small % of particles < 4mm	Shale in bed, soft silty clay, little consolidation of particles, no apparent overlap, moderate % of particles < 4mm	Silt, weathered, thinly bedded, fractured shale, high slaking potential, very poorly consolidated, high % of material < 4mm
11	Percentage of channel cross section constriction	< 25% of average cross section area	26-50% of average cross section area	> 50% of average cross section area
12	Sediment movement	Little to no loose sediment	Scour and/or deposition, some loose sediment	Near continuous scour and/or deposition and/or loose sediment
13	Sinuosity (ratio of the channel length to valley length) channel length = longitudinal profile survey length	1.2 ≤ Sinuosity ≤ 1.4	1.1<Sinuosity <1.2	Sinuosity <1.1 or >1.4

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Channel Condition Scores Map

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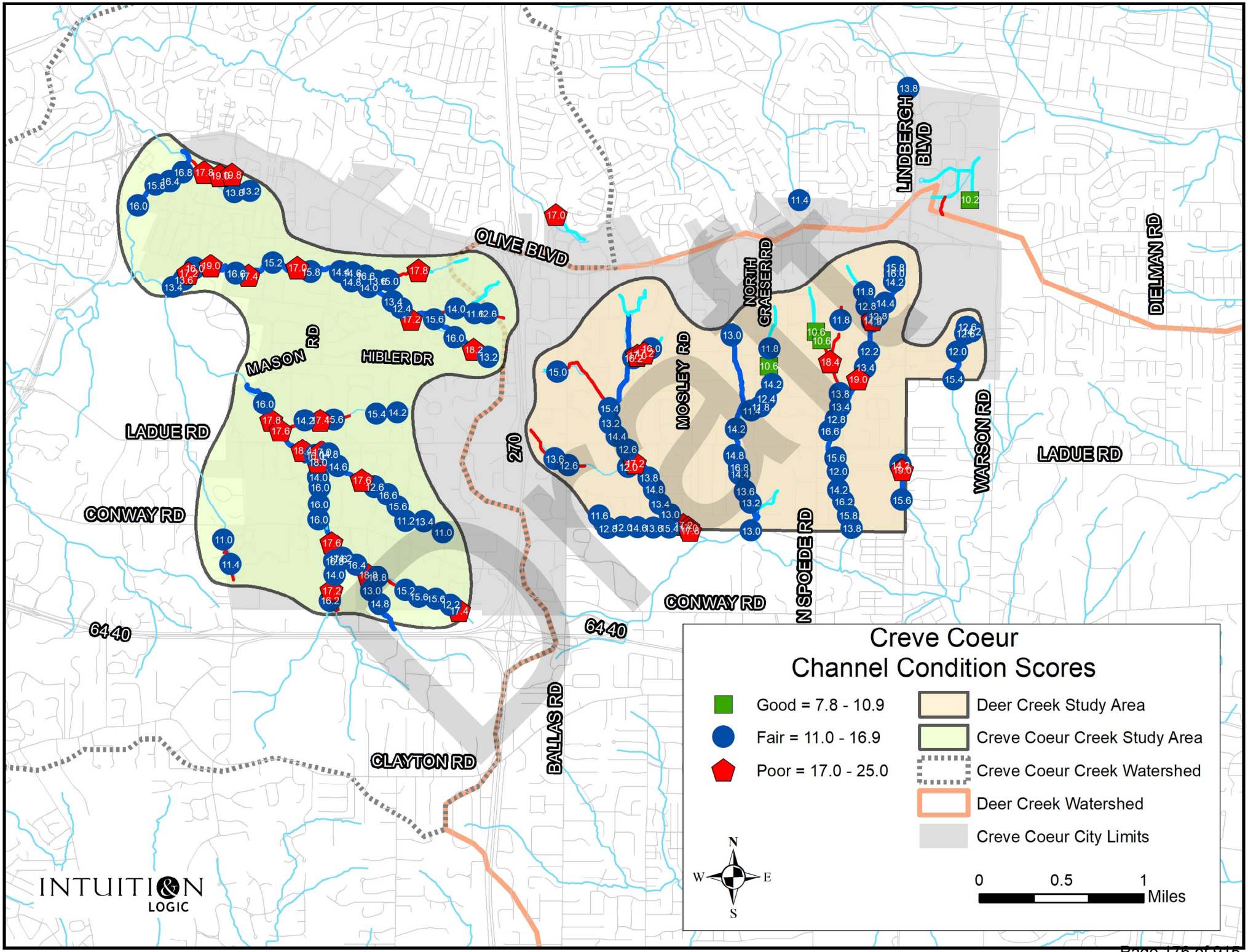
OLIVE BLVD
LINDBERGH BLVD
DIELMAN RD
NORTH GRAESER RD
MOSLEY RD
WARSON RD
LADUE RD
MASON RD
HIBLER DR
CONWAY RD
270
N SPOEDE RD
BALLAS RD
CLAYTON RD
64 40
Creve Coeur
Channel Condition Scores
Good = 7.8 - 10.9
Fair = 11.0 - 16.9
Poor = 17.0 - 25.0
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
N
W
E
S
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0.5
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Channel Condition Data Tables

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	Channel Condition Point	1	2	3	4	5	6	7	8	9	10
Field Observation and Field Data Input	Bank Soil Texture	1	2	1	1	1	1	1	1	1	1
	Average Bank Slope	2	3	3	3	2	2	2	2	2	2
	Average Bank Height	2	2	3	2	2	2	2	3	2	2
	Vegetative Bank Protection	2	2	2	3	3	1	2	1	2	1
	Bank Cutting	3	3	3	1	2	2	2	3	2	3
	Mass Wasting	3	3	3	1	2	1	1	3	3	3
	Bar Development	3	3	1	1	1	1	1	1	1	2
	Debris Jam Potential	2	2	3	1	1	2	1	1	1	3
	Channel Obstructions	2	2	2	1	1	1	1	1	1	1
	Channel Bed Material	2	2	1	1	1	1	1	3	3	3
	Channel Constrictions	2	2	2	1	1	1	1	1	2	2
	Sediment Movement	3	2	3	3	2	3	1	3	3	3
	Channel Sinuosity	1	2	1	1	3	2	2	1	1	2
	Dominant Process	Planform Adjustment, Widening	Planform Adjustment	Early Stage Incision	Managed Swale	Incision, Widening, Planform Adjustment	Incising	Incising	Widening	Widening	Widening, Planform Adjustment
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.2	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
	Average Bank Height (Weighted)	1.6	1.6	2.4	1.6	1.6	1.6	1.6	2.4	1.6	1.6
	Vegetative Bank Protection (Weighted)	1.6	1.6	1.6	2.4	2.4	0.8	1.6	0.8	1.6	0.8
	Bank Cutting (Weighted)	1.2	1.2	1.2	0.4	0.8	0.8	0.8	1.2	0.8	1.2
	Mass Wasting (Weighted)	2.4	2.4	2.4	0.8	1.6	0.8	0.8	2.4	2.4	2.4
	Bar Development (Weighted)	1.8	1.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.2
	Debris Jam Potential (Weighted)	0.4	0.4	0.6	0.2	0.2	0.4	0.2	0.2	0.2	0.6
	Channel Obstructions (Weighted)	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Channel Bed Material (Weighted)	1.6	1.6	0.8	0.8	0.8	0.8	0.8	2.4	2.4	2.4
	Channel Constrictions (Weighted)	1.6	1.6	1.6	0.8	0.8	0.8	0.8	0.8	1.6	1.6
	Sediment Movement (Weighted)	2.4	1.6	2.4	2.4	1.6	2.4	0.8	2.4	2.4	2.4
	Channel Sinuosity (Weighted)	0.8	1.6	0.8	0.8	2.4	1.6	1.6	0.8	0.8	1.6
	Weighted Channel Score	17.6	18.8	17.2	13.4	14.8	12.6	11.6	16.0	16.4	17.8
	Channel Condition	Poor	Poor	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Fair

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	Channel Condition Point	11	12	13	14	15	16	17	18	19	20
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	3	3	2	3	3	2	2	3
	Average Bank Height	2	2	2	2	2	2	2	2	2	2
	Vegetative Bank Protection	1	2	3	3	2	2	2	2	2	2
	Bank Cutting	3	3	3	3	3	3	3	3	3	3
	Mass Wasting	3	2	2	3	3	3	3	3	3	3
	Bar Development	2	1	1	1	1	3	3	1	1	1
	Debris Jam Potential	1	1	1	3	1	3	3	1	3	3
	Channel Obstructions	1	1	1	1	1	1	1	1	3	2
	Channel Bed Material	1	1	1	1	1	1	1	1	1	3
	Channel Constrictions	2	1	1	1	2	2	1	2	2	1
	Sediment Movement	1	3	3	3	3	3	3	1	3	3
	Channel Sinuosity	2	2	2	2	1	1	1	1	1	1
	Dominant Process	Widening, Planform Adjustment	Widening	Widening, Planform Adjustment, Incising	Widening, Incising	Widening	Widening, Planform Adjustment	Widening, Planform Adjustment	Widening, Incising	Widening, Incising	Widening
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	1.8	1.8	1.2	1.8	1.8	1.2	1.2	1.8
	Average Bank Height (Weighted)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Vegetative Bank Protection (Weighted)	0.8	1.6	2.4	2.4	1.6	1.6	1.6	1.6	1.6	1.6
	Bank Cutting (Weighted)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Mass Wasting (Weighted)	2.4	1.6	1.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Bar Development (Weighted)	1.2	0.6	0.6	0.6	0.6	1.8	1.8	0.6	0.6	0.6
	Debris Jam Potential (Weighted)	0.2	0.2	0.2	0.6	0.2	0.6	0.6	0.2	0.6	0.6
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.4
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	2.4
	Channel Constrictions (Weighted)	1.6	0.8	0.8	0.8	1.6	1.6	0.8	1.6	1.6	0.8
	Sediment Movement (Weighted)	0.8	2.4	2.4	2.4	2.4	2.4	2.4	0.8	2.4	2.4
	Channel Sinuosity (Weighted)	1.6	1.6	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.8
	Weighted Channel Score	14.8	14.4	15.8	17.0	15.2	17.4	16.6	13.6	16.0	17.2
	Channel Condition	Poor	Fair	Fair	Fair	Poor	Fair	Poor	Fair	Fair	Fair

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	Channel Condition Point	21	22	23	24	25	26	27	28	29	30
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	2	2	3	2	3	3	3	3
	Average Bank Height	2	2	2	1	3	2	2	2	2	1
	Vegetative Bank Protection	2	3	1	3	2	2	3	3	2	1
	Bank Cutting	3	2	3	1	3	1	1	1	3	3
	Mass Wasting	3	2	2	1	2	1	1	1	1	2
	Bar Development	1	1	2	1	3	1	1	2	3	3
	Debris Jam Potential	1	2	2	2	1	3	1	1	3	2
	Channel Obstructions	1	1	1	2	2	1	1	1	2	1
	Channel Bed Material	1	1	1	1	1	1	1	1	1	1
	Channel Constrictions	1	2	1	2	2	2	1	1	2	2
	Sediment Movement	1	3	3	1	3	2	1	1	1	3
	Channel Sinuosity	1	1	1	3	1	1	3	3	3	2
	Dominant Process	Incising	Widening, Planform Adjustment	Widening, Planform Adjustment	Incising	Planform Adjustment	Incising, Managed Swale	Managed Swale	Managed Swale	Planform Adjustment, Incising	Incising
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	1.2	1.2	1.8	1.2	1.8	1.8	1.8	1.8
	Average Bank Height (Weighted)	1.6	1.6	1.6	0.8	2.4	1.6	1.6	1.6	1.6	0.8
	Vegetative Bank Protection (Weighted)	1.6	2.4	0.8	2.4	1.6	1.6	2.4	2.4	1.6	0.8
	Bank Cutting (Weighted)	1.2	0.8	1.2	0.4	1.2	0.4	0.4	0.4	1.2	1.2
	Mass Wasting (Weighted)	2.4	1.6	1.6	0.8	1.6	0.8	0.8	0.8	0.8	1.6
	Bar Development (Weighted)	0.6	0.6	1.2	0.6	1.8	0.6	0.6	1.2	1.8	1.8
	Debris Jam Potential (Weighted)	0.2	0.4	0.4	0.4	0.2	0.6	0.2	0.2	0.6	0.4
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.4	0.4	0.2	0.2	0.2	0.4	0.2
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Channel Constrictions (Weighted)	0.8	1.6	0.8	1.6	1.6	1.6	0.8	0.8	1.6	1.6
	Sediment Movement (Weighted)	0.8	2.4	2.4	0.8	2.4	1.6	0.8	0.8	0.8	2.4
	Channel Sinuosity (Weighted)	0.8	0.8	0.8	2.4	0.8	0.8	2.4	2.4	2.4	1.6
	Weighted Channel Score	13.4	15.0	13.6	13.2	17.2	12.4	13.4	14.0	16.0	15.6
	Channel Condition	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair

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	Channel Condition Point	31	32	33	34	35	36	37	38	39	40
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	2	3	2	3	3	2	3	3
	Average Bank Height	2	2	2	2	1	1	1	1	1	1
	Vegetative Bank Protection	3	3	2	3	1	1	2	2	3	1
	Bank Cutting	3	3	3	3	2	2	2	2	1	2
	Mass Wasting	2	3	3	3	2	1	3	2	1	1
	Bar Development	1	2	3	2	3	1	3	3	1	1
	Debris Jam Potential	3	2	2	2	3	3	3	3	1	3
	Channel Obstructions	2	2	2	2	2	2	2	2	1	1
	Channel Bed Material	1	2	2	2	1	1	1	2	1	1
	Channel Constrictions	2	2	1	1	2	2	2	3	1	1
	Sediment Movement	2	3	3	3	2	1	2	3	1	1
	Channel Sinuosity	1	1	3	1	1	1	1	1	3	2
	Dominant Process	Widening, Planform Adjustment	Widening	Planform Adjustment	Widening, Planform Adjustment	Planform Adjustment	Widening	Widening, Incising	Planform Adjustment	Managed Swale	Widening
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	1.2	1.8	1.2	1.8	1.8	1.2	1.8	1.8
	Average Bank Height (Weighted)	1.6	1.6	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.8
	Vegetative Bank Protection (Weighted)	2.4	2.4	1.6	2.4	0.8	0.8	1.6	1.6	2.4	0.8
	Bank Cutting (Weighted)	1.2	1.2	1.2	1.2	0.8	0.8	0.8	0.8	0.4	0.8
	Mass Wasting (Weighted)	1.6	2.4	2.4	2.4	1.6	0.8	2.4	1.6	0.8	0.8
	Bar Development (Weighted)	0.6	1.2	1.8	1.2	1.8	0.6	1.8	1.8	0.6	0.6
	Debris Jam Potential (Weighted)	0.6	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.2	0.6
	Channel Obstructions (Weighted)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.2
	Channel Bed Material (Weighted)	0.8	1.6	1.6	1.6	0.8	0.8	0.8	1.6	0.8	0.8
	Channel Constrictions (Weighted)	1.6	1.6	0.8	0.8	1.6	1.6	1.6	2.4	0.8	0.8
	Sediment Movement (Weighted)	1.6	2.4	2.4	2.4	1.6	0.8	1.6	2.4	0.8	0.8
	Channel Sinuosity (Weighted)	0.8	0.8	2.4	0.8	0.8	0.8	0.8	0.8	2.4	1.6
	Weighted Channel Score	15.6	17.8	18.4	17.6	13.4	11.2	15.6	16.6	12.6	11.0
	Channel Condition	Fair	Fair	Poor	Poor	Poor	Fair	Fair	Fair	Fair	Fair

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	Channel Condition Point	41	42	43	44	45	46	47	48	49	50
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	2	2	1	1
	Average Bank Slope	2	2	2	2	2	3	2	3	2	2
	Average Bank Height	2	2	2	2	2	2	2	2	2	2
	Vegetative Bank Protection	3	2	2	2	2	2	2	2	2	2
	Bank Cutting	3	3	3	3	3	3	2	3	2	3
	Mass Wasting	2	2	2	2	2	3	2	2	2	3
	Bar Development	3	3	3	3	3	3	3	3	3	3
	Debris Jam Potential	2	2	2	2	1	2	2	2	2	2
	Channel Obstructions	2	2	2	2	1	1	2	2	2	2
	Channel Bed Material	2	2	2	2	1	2	2	2	1	2
	Channel Constrictions	2	2	2	2	1	2	2	2	1	2
	Sediment Movement	3	2	2	2	2	3	2	2	2	2
	Channel Sinuosity	1	1	1	1	1	1	1	1	1	1
	Dominant Process	Planform Adjustment	Incising	Widening, Incising	Incising	NO	Planform Adjustment	Planform Adjustment	Planform Adjustment	Incising	Planform Adjustment
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	1.2	1.2	0.6	0.6
	Average Bank Slope (Weighted)	1.2	1.2	1.2	1.2	1.2	1.8	1.2	1.8	1.2	1.2
	Average Bank Height (Weighted)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Vegetative Bank Protection (Weighted)	2.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Bank Cutting (Weighted)	1.2	1.2	1.2	1.2	1.2	1.2	0.8	1.2	0.8	1.2
	Mass Wasting (Weighted)	1.6	1.6	1.6	1.6	1.6	2.4	1.6	1.6	1.6	2.4
	Bar Development (Weighted)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	Debris Jam Potential (Weighted)	0.4	0.4	0.4	0.4	0.2	0.4	0.4	0.4	0.4	0.4
	Channel Obstructions (Weighted)	0.4	0.4	0.4	0.4	0.2	0.2	0.4	0.4	0.4	0.4
	Channel Bed Material (Weighted)	1.6	1.6	1.6	1.6	0.8	1.6	1.6	1.6	0.8	1.6
	Channel Constrictions (Weighted)	1.6	1.6	1.6	1.6	0.8	1.6	1.6	1.6	0.8	1.6
	Sediment Movement (Weighted)	2.4	1.6	1.6	1.6	1.6	2.4	1.6	1.6	1.6	1.6
	Channel Sinuosity (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Weighted Channel Score	17.6	16.0	16.0	16.0	14.0	18.0	16.2	17.2	14.0	16.8
	Channel Condition	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Poor	Fair

Draft

	Channel Condition Point	51	52	53	54	55	56	57	58	59	60
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	2	1	1
	Average Bank Slope	2	1	3	1	2	2	2	3	2	1
	Average Bank Height	2	1	2	1	1	1	1	2	1	1
	Vegetative Bank Protection	2	2	3	3	3	2	2	2	2	2
	Bank Cutting	2	2	3	1	2	2	2	2	2	1
	Mass Wasting	2	2	2	1	2	2	2	2	1	1
	Bar Development	3	3	3	1	3	3	3	3	3	3
	Debris Jam Potential	2	2	2	1	2	2	3	2	2	2
	Channel Obstructions	2	2	2	1	2	2	3	2	2	2
	Channel Bed Material	2	1	1	1	1	2	1	1	2	1
	Channel Constrictions	2	2	2	2	2	2	2	2	2	2
	Sediment Movement	2	2	2	2	2	2	2	2	2	2
	Channel Sinuosity	2	2	2	2	2	2	2	2	2	2
	Dominant Process	Planform Adjustment	Widening	Incising	Incising, Managed Swale	Incising, Planform Adjustment	Incising	Incising, Planform Adjustment	Planform Adjustment	Incising	Planform Adjustment
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.2	0.6	0.6
	Average Bank Slope (Weighted)	1.2	0.6	1.8	0.6	1.2	1.2	1.2	1.8	1.2	0.6
	Average Bank Height (Weighted)	1.6	0.8	1.6	0.8	0.8	0.8	0.8	1.6	0.8	0.8
	Vegetative Bank Protection (Weighted)	1.6	1.6	2.4	2.4	2.4	1.6	1.6	1.6	1.6	1.6
	Bank Cutting (Weighted)	0.8	0.8	1.2	0.4	0.8	0.8	0.8	0.8	0.8	0.4
	Mass Wasting (Weighted)	1.6	1.6	1.6	0.8	1.6	1.6	1.6	1.6	0.8	0.8
	Bar Development (Weighted)	1.8	1.8	1.8	0.6	1.8	1.8	1.8	1.8	1.8	1.8
	Debris Jam Potential (Weighted)	0.4	0.4	0.4	0.2	0.4	0.4	0.6	0.4	0.4	0.4
	Channel Obstructions (Weighted)	0.4	0.4	0.4	0.2	0.4	0.4	0.6	0.4	0.4	0.4
	Channel Bed Material (Weighted)	1.6	0.8	0.8	0.8	0.8	1.6	0.8	0.8	1.6	0.8
	Channel Constrictions (Weighted)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Sediment Movement (Weighted)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Channel Sinuosity (Weighted)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Weighted Channel Score	16.4	14.2	17.4	12.2	15.6	15.6	15.2	16.8	14.8	13.0
	Channel Condition	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair

Draft

	Channel Condition Point	61	62	63	64	65	66	67	68	69	70
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	2	1	3	2	3	2	2	3	3	2
	Average Bank Height	2	3	1	2	2	2	2	2	2	2
	Vegetative Bank Protection	2	1	2	2	2	1	1	1	1	2
	Bank Cutting	2	2	3	3	3	2	3	2	1	2
	Mass Wasting	2	1	3	3	3	3	1	2	1	2
	Bar Development	1	1	1	1	3	2	3	3	3	2
	Debris Jam Potential	3	2	3	1	1	1	1	1	1	1
	Channel Obstructions	1	1	1	1	1	1	1	1	1	1
	Channel Bed Material	1	1	1	1	2	1	3	1	1	1
	Channel Constrictions	1	2	2	1	1	1	1	1	1	2
	Sediment Movement	1	1	1	1	3	3	3	2	3	1
	Channel Sinuosity	2	2	2	2	1	1	1	1	1	1
	Dominant Process	Incising	Widening	Widening	Widening	Widening	Planform Adjustment, Widening	Planform Adjustment	Planform Adjustment	Planform Adjustment	Planform Adjustment, Widening
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.2	0.6	1.8	1.2	1.8	1.2	1.2	1.8	1.8	1.2
	Average Bank Height (Weighted)	1.6	2.4	0.8	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Vegetative Bank Protection (Weighted)	1.6	0.8	1.6	1.6	1.6	0.8	0.8	0.8	0.8	1.6
	Bank Cutting (Weighted)	0.8	0.8	1.2	1.2	1.2	0.8	1.2	0.8	0.4	0.8
	Mass Wasting (Weighted)	1.6	0.8	2.4	2.4	2.4	2.4	0.8	1.6	0.8	1.6
	Bar Development (Weighted)	0.6	0.6	0.6	0.6	1.8	1.2	1.8	1.8	1.8	1.2
	Debris Jam Potential (Weighted)	0.6	0.4	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	1.6	0.8	2.4	0.8	0.8	0.8
	Channel Constrictions (Weighted)	0.8	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.8	1.6
	Sediment Movement (Weighted)	0.8	0.8	0.8	0.8	2.4	2.4	2.4	1.6	2.4	0.8
	Channel Sinuosity (Weighted)	1.6	1.6	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.8
	Weighted Channel Score	12.8	12.0	14.6	13.6	17.0	13.8	14.8	13.4	13.0	13.0
	Channel Condition	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair

Draft

	Channel Condition Point	71	72	73	74	75	76	77	78	79	80
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	2	3	2	3	1	1	3	3	2	3
	Average Bank Height	2	2	2	3	1	1	1	1	2	2
	Vegetative Bank Protection	1	2	2	3	2	2	3	2	2	1
	Bank Cutting	3	1	2	3	1	3	3	3	1	2
	Mass Wasting	2	1	2	3	1	1	1	1	1	2
	Bar Development	1	2	3	2	1	2	1	1	3	1
	Debris Jam Potential	1	1	1	1	3	3	3	1	3	3
	Channel Obstructions	1	1	1	1	1	3	1	1	1	2
	Channel Bed Material	1	1	1	1	3	1	1	1	3	1
	Channel Constrictions	1	1	1	2	2	3	3	2	3	3
	Sediment Movement	1	1	1	1	3	3	2	2	3	2
	Channel Sinuosity	2	3	3	2	3	3	3	3	1	1
	Dominant Process	Incising	Early Stage Incision, Managed Swale	Planform Adjustment	Planform Adjustment	Early Stage Incision	Widening	Incising	Widening	Widening, Planform Adjustment	Widening
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.2	1.8	1.2	1.8	0.6	0.6	1.8	1.8	1.2	1.8
	Average Bank Height (Weighted)	1.6	1.6	1.6	2.4	0.8	0.8	0.8	0.8	1.6	1.6
	Vegetative Bank Protection (Weighted)	0.8	1.6	1.6	2.4	1.6	1.6	2.4	1.6	1.6	0.8
	Bank Cutting (Weighted)	1.2	0.4	0.8	1.2	0.4	1.2	1.2	1.2	0.4	0.8
	Mass Wasting (Weighted)	1.6	0.8	1.6	2.4	0.8	0.8	0.8	0.8	0.8	1.6
	Bar Development (Weighted)	0.6	1.2	1.8	1.2	0.6	1.2	0.6	0.6	1.8	0.6
	Debris Jam Potential (Weighted)	0.2	0.2	0.2	0.2	0.6	0.6	0.6	0.2	0.6	0.6
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.2	0.6	0.2	0.2	0.2	0.4
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	2.4	0.8	0.8	0.8	2.4	0.8
	Channel Constrictions (Weighted)	0.8	0.8	0.8	1.6	1.6	2.4	2.4	1.6	2.4	2.4
	Sediment Movement (Weighted)	0.8	0.8	0.8	0.8	2.4	2.4	1.6	1.6	2.4	1.6
	Channel Sinuosity (Weighted)	1.6	2.4	2.4	1.6	2.4	2.4	2.4	2.4	0.8	0.8
	Weighted Channel Score	12.0	13.2	14.4	17.2	15.0	16.0	16.2	14.2	16.8	14.4
	Channel Condition	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair

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	Channel Condition Point	81	82	83	84	85	86	87	88	89	90
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	1	3	2	3	2	3	2	1
	Average Bank Height	2	1	1	2	1	2	2	2	1	2
	Vegetative Bank Protection	1	1	2	2	2	2	3	2	2	2
	Bank Cutting	3	3	1	2	1	3	2	2	2	1
	Mass Wasting	3	2	1	2	2	2	3	2	1	1
	Bar Development	1	2	2	2	1	1	3	3	3	1
	Debris Jam Potential	2	3	1	1	1	1	1	1	1	1
	Channel Obstructions	1	2	1	3	1	1	2	1	2	1
	Channel Bed Material	1	1	1	1	1	1	1	1	1	1
	Channel Constrictions	1	2	2	2	1	1	1	1	1	1
	Sediment Movement	2	2	2	2	2	2	2	3	3	2
	Channel Sinuosity	1	1	3	2	2	2	2	2	2	3
	Dominant Process	Planform Adjustment, Widening	Planform Adjustment	Dynamic Equilibrium	Widening	Widening, Incising	Widening, Planform Adjustment	Widening	Widening, Incising	Planform Adjustment	Managed Swale, Widening
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	0.6	1.8	1.2	1.8	1.2	1.8	1.2	0.6
	Average Bank Height (Weighted)	1.6	0.8	0.8	1.6	0.8	1.6	1.6	1.6	0.8	1.6
	Vegetative Bank Protection (Weighted)	0.8	0.8	1.6	1.6	1.6	1.6	2.4	1.6	1.6	1.6
	Bank Cutting (Weighted)	1.2	1.2	0.4	0.8	0.4	1.2	0.8	0.8	0.8	0.4
	Mass Wasting (Weighted)	2.4	1.6	0.8	1.6	1.6	1.6	2.4	1.6	0.8	0.8
	Bar Development (Weighted)	0.6	1.2	1.2	1.2	0.6	0.6	1.8	1.8	1.8	0.6
	Debris Jam Potential (Weighted)	0.4	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Channel Obstructions (Weighted)	0.2	0.4	0.2	0.6	0.2	0.2	0.4	0.2	0.4	0.2
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Channel Constrictions (Weighted)	0.8	1.6	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.8
	Sediment Movement (Weighted)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	2.4	2.4	1.6
	Channel Sinuosity (Weighted)	0.8	0.8	2.4	1.6	1.6	1.6	1.6	1.6	1.6	2.4
	Weighted Channel Score	13.6	13.2	12.8	15.6	12.0	14.2	16.2	15.8	13.8	12.2
	Channel Condition	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair

Draft

	Channel Condition Point	91	92	93	94	95	96	97	98	99	100
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	1	2	2	3	2	3	3	1	1
	Average Bank Height	2	1	2	2	1	1	2	1	1	1
	Vegetative Bank Protection	2	1	3	2	2	3	2	2	1	3
	Bank Cutting	3	3	1	2	3	1	2	1	1	1
	Mass Wasting	2	1	1	2	1	1	2	2	1	1
	Bar Development	1	1	1	3	1	1	1	1	1	1
	Debris Jam Potential	1	3	1	2	2	1	1	1	3	1
	Channel Obstructions	1	1	1	1	1	1	1	1	1	1
	Channel Bed Material	1	1	1	1	1	1	1	1	1	1
	Channel Constrictions	1	1	1	3	2	1	2	1	1	1
	Sediment Movement	1	2	2	3	2	2	2	1	1	1
	Channel Sinuosity	2	3	2	2	3	3	3	3	3	3
	Dominant Process	Widening	Early Stage Incision	Managed Swale	Planform Adjustment	Incising	Managed Swale	Widening	Widening	Dynamic Equilibrium	Managed Swale
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	0.6	1.2	1.2	1.8	1.2	1.8	1.8	0.6	0.6
	Average Bank Height (Weighted)	1.6	0.8	1.6	1.6	0.8	0.8	1.6	0.8	0.8	0.8
	Vegetative Bank Protection (Weighted)	1.6	0.8	2.4	1.6	1.6	2.4	1.6	1.6	0.8	2.4
	Bank Cutting (Weighted)	1.2	1.2	0.4	0.8	1.2	0.4	0.8	0.4	0.4	0.4
	Mass Wasting (Weighted)	1.6	0.8	0.8	1.6	0.8	0.8	1.6	1.6	0.8	0.8
	Bar Development (Weighted)	0.6	0.6	0.6	1.8	0.6	0.6	0.6	0.6	0.6	0.6
	Debris Jam Potential (Weighted)	0.2	0.6	0.2	0.4	0.4	0.2	0.2	0.2	0.6	0.2
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	Channel Constrictions (Weighted)	0.8	0.8	0.8	2.4	1.6	0.8	1.6	0.8	0.8	0.8
	Sediment Movement (Weighted)	0.8	1.6	1.6	2.4	1.6	1.6	1.6	0.8	0.8	0.8
	Channel Sinuosity (Weighted)	1.6	2.4	1.6	1.6	2.4	2.4	2.4	2.4	2.4	2.4
	Weighted Channel Score	13.4	11.8	12.8	17.0	14.4	12.8	15.4	12.6	10.2	11.4
	Channel Condition	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Good

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	Channel Condition Point	101	102	103	104	105	106	107	108	109	110
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	1	2	3	3	2	3	2	3	3	3
	Average Bank Height	1	2	2	2	1	1	1	2	2	2
	Vegetative Bank Protection	3	3	2	2	1	3	3	2	2	2
	Bank Cutting	1	2	3	3	3	1	3	1	3	3
	Mass Wasting	1	2	3	3	1	1	1	1	3	3
	Bar Development	1	1	3	1	1	1	1	1	1	1
	Debris Jam Potential	1	3	1	3	3	1	1	1	2	3
	Channel Obstructions	1	1	1	1	1	1	1	1	2	3
	Channel Bed Material	1	3	3	1	2	1	1	1	1	3
	Channel Constrictions	1	2	1	2	1	1	2	1	1	3
	Sediment Movement	1	3	3	1	1	1	1	1	1	3
	Channel Sinuosity	2	3	1	2	2	3	3	3	3	1
	Dominant Process	Managed Swale	Widening	Incising	Incising	Early Stage Incision	Managed Swale	Widening, Incising	Managed Swale	Widening	Widening, Planform Adjustment
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	0.6	1.2	1.8	1.8	1.2	1.8	1.2	1.8	1.8	1.8
	Average Bank Height (Weighted)	0.8	1.6	1.6	1.6	0.8	0.8	0.8	1.6	1.6	1.6
	Vegetative Bank Protection (Weighted)	2.4	2.4	1.6	1.6	0.8	2.4	2.4	1.6	1.6	1.6
	Bank Cutting (Weighted)	0.4	0.8	1.2	1.2	1.2	0.4	1.2	0.4	1.2	1.2
	Mass Wasting (Weighted)	0.8	1.6	2.4	2.4	0.8	0.8	0.8	0.8	2.4	2.4
	Bar Development (Weighted)	0.6	0.6	1.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Debris Jam Potential (Weighted)	0.2	0.6	0.2	0.6	0.6	0.2	0.2	0.2	0.4	0.6
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6
	Channel Bed Material (Weighted)	0.8	2.4	2.4	0.8	1.6	0.8	0.8	0.8	0.8	2.4
	Channel Constrictions (Weighted)	0.8	1.6	0.8	1.6	0.8	0.8	1.6	0.8	0.8	2.4
	Sediment Movement (Weighted)	0.8	2.4	2.4	0.8	0.8	0.8	0.8	0.8	0.8	2.4
	Channel Sinuosity (Weighted)	1.6	2.4	0.8	1.6	1.6	2.4	2.4	2.4	2.4	0.8
	Weighted Channel Score	10.6	18.4	17.8	15.4	11.6	12.6	13.6	12.6	15.4	19.0
	Channel Condition	Fair	Good	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Fair

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	Channel Condition Point	111	112	113	114	115	116	117	118	119	120
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	2	3	3	3	2	1	2	2
	Average Bank Height	1	2	2	2	2	2	2	1	2	2
	Vegetative Bank Protection	3	1	2	1	1	1	2	3	3	2
	Bank Cutting	3	2	2	2	3	2	2	2	3	3
	Mass Wasting	1	2	1	2	3	2	2	2	3	3
	Bar Development	1	3	2	3	2	2	3	2	1	3
	Debris Jam Potential	1	3	2	3	2	2	2	1	1	2
	Channel Obstructions	1	1	1	1	1	1	1	1	1	2
	Channel Bed Material	3	1	1	3	3	1	1	2	2	2
	Channel Constrictions	3	1	2	3	1	2	2	3	1	1
	Sediment Movement	3	2	2	2	3	3	3	3	3	2
	Channel Sinuosity	3	1	2	2	1	1	3	3	1	1
	Dominant Process	Managed Swale, Incising	Planform Adjustment	Planform Adjustment, Widening	Incising	Widening	Widening, Planform Adjustment	Planform Adjustment, Widening	Incising	Widening	Planform Adjustment
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	1.2	1.8	1.8	1.8	1.2	0.6	1.2	1.2
	Average Bank Height (Weighted)	0.8	1.6	1.6	1.6	1.6	1.6	1.6	0.8	1.6	1.6
	Vegetative Bank Protection (Weighted)	2.4	0.8	1.6	0.8	0.8	0.8	1.6	2.4	2.4	1.6
	Bank Cutting (Weighted)	1.2	0.8	0.8	0.8	1.2	0.8	0.8	0.8	1.2	1.2
	Mass Wasting (Weighted)	0.8	1.6	0.8	1.6	2.4	1.6	1.6	1.6	2.4	2.4
	Bar Development (Weighted)	0.6	1.8	1.2	1.8	1.2	1.2	1.8	1.2	0.6	1.8
	Debris Jam Potential (Weighted)	0.2	0.6	0.4	0.6	0.4	0.4	0.4	0.2	0.2	0.4
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4
	Channel Bed Material (Weighted)	2.4	0.8	0.8	2.4	2.4	0.8	0.8	1.6	1.6	1.6
	Channel Constrictions (Weighted)	2.4	0.8	1.6	2.4	0.8	1.6	1.6	2.4	0.8	0.8
	Sediment Movement (Weighted)	2.4	1.6	1.6	1.6	2.4	2.4	2.4	2.4	2.4	1.6
	Channel Sinuosity (Weighted)	2.4	0.8	1.6	1.6	0.8	0.8	2.4	2.4	0.8	0.8
	Weighted Channel Score	18.2	13.2	14.0	17.8	16.6	14.6	17.0	17.2	16.0	16.0
	Channel Condition	Poor	Poor	Fair	Fair	Poor	Fair	Fair	Poor	Poor	Fair

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	Channel Condition Point	121	122	123	124	125	126	127	128	129	130
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	3	1	3	3	3	1	1	3	2
	Average Bank Height	2	2	2	2	2	1	1	1	2	1
	Vegetative Bank Protection	3	3	3	2	2	1	1	3	2	3
	Bank Cutting	3	3	1	3	3	2	1	1	2	1
	Mass Wasting	3	3	1	3	3	2	1	1	2	1
	Bar Development	1	3	3	1	1	1	1	1	1	1
	Debris Jam Potential	1	2	1	2	1	3	3	1	2	2
	Channel Obstructions	1	2	1	1	1	1	1	1	1	1
	Channel Bed Material	1	1	1	1	1	1	1	1	2	1
	Channel Constrictions	2	2	1	1	1	2	1	1	2	1
	Sediment Movement	2	3	2	2	2	2	2	1	2	1
	Channel Sinuosity	2	2	3	3	3	3	3	3	1	2
	Dominant Process	Widening, Planform Adjustment	Planform Adjustment	Managed Swale	Incising	Widening, Planform Adjustment	Widening	NO	Early Stage Incision	Widening	Managed Swale
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.8	0.6	1.8	1.8	1.8	0.6	0.6	1.8	1.2
	Average Bank Height (Weighted)	1.6	1.6	1.6	1.6	1.6	0.8	0.8	0.8	1.6	0.8
	Vegetative Bank Protection (Weighted)	2.4	2.4	2.4	1.6	1.6	0.8	0.8	2.4	1.6	2.4
	Bank Cutting (Weighted)	1.2	1.2	0.4	1.2	1.2	0.8	0.4	0.4	0.8	0.4
	Mass Wasting (Weighted)	2.4	2.4	0.8	2.4	2.4	1.6	0.8	0.8	1.6	0.8
	Bar Development (Weighted)	0.6	1.8	1.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Debris Jam Potential (Weighted)	0.2	0.4	0.2	0.4	0.2	0.6	0.6	0.2	0.4	0.4
	Channel Obstructions (Weighted)	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.6	0.8
	Channel Constrictions (Weighted)	1.6	1.6	0.8	0.8	0.8	1.6	0.8	0.8	1.6	0.8
	Sediment Movement (Weighted)	1.6	2.4	1.6	1.6	1.6	1.6	1.6	0.8	1.6	0.8
	Channel Sinuosity (Weighted)	1.6	1.6	2.4	2.4	2.4	2.4	2.4	2.4	0.8	1.6
	Weighted Channel Score	16.6	19.0	14.2	16.0	15.8	14.2	11.0	11.4	14.8	11.4
	Channel Condition	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair

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	Channel Condition Point	131	132	133	134	135	136	137	138	139	140
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	3	3	2	2	3	3	3	3
	Average Bank Height	1	1	1	1	1	1	1	2	2	2
	Vegetative Bank Protection	3	3	3	3	1	2	2	2	3	1
	Bank Cutting	1	2	2	1	2	1	2	3	2	3
	Mass Wasting	1	1	1	1	1	2	2	3	2	3
	Bar Development	1	1	1	1	1	2	1	2	1	3
	Debris Jam Potential	1	1	3	1	3	1	1	2	3	1
	Channel Obstructions	1	1	1	1	2	1	1	1	1	1
	Channel Bed Material	1	1	1	1	1	1	3	2	1	2
	Channel Constrictions	1	1	2	1	2	2	1	2	1	1
	Sediment Movement	1	1	2	1	2	2	3	3	2	3
	Channel Sinuosity	2	3	2	2	3	3	2	1	1	2
	Dominant Process	Managed Swale	Early Stage Incision	Incising	Managed Swale	Early Stage Incision	Early Stage Incision, Widening	Widening	Widening, Planform Adjustment	Widening	Widening, Planform Adjustment
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	1.8	1.8	1.2	1.2	1.8	1.8	1.8	1.8
	Average Bank Height (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.6	1.6	1.6
	Vegetative Bank Protection (Weighted)	2.4	2.4	2.4	2.4	0.8	1.6	1.6	1.6	2.4	0.8
	Bank Cutting (Weighted)	0.4	0.8	0.8	0.4	0.8	0.4	0.8	1.2	0.8	1.2
	Mass Wasting (Weighted)	0.8	0.8	0.8	0.8	0.8	1.6	1.6	2.4	1.6	2.4
	Bar Development (Weighted)	0.6	0.6	0.6	0.6	0.6	1.2	0.6	1.2	0.6	1.8
	Debris Jam Potential (Weighted)	0.2	0.2	0.6	0.2	0.6	0.2	0.2	0.4	0.6	0.2
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2
	Channel Bed Material (Weighted)	0.8	0.8	0.8	0.8	0.8	0.8	2.4	1.6	0.8	1.6
	Channel Constrictions (Weighted)	0.8	0.8	1.6	0.8	1.6	1.6	0.8	1.6	0.8	0.8
	Sediment Movement (Weighted)	0.8	0.8	1.6	0.8	1.6	1.6	2.4	2.4	1.6	2.4
	Channel Sinuosity (Weighted)	1.6	2.4	1.6	1.6	2.4	2.4	1.6	0.8	0.8	1.6
	Weighted Channel Score	11.8	12.4	14.2	11.8	13.0	14.2	15.4	17.4	14.2	17.0
	Channel Condition	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair

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	Channel Condition Point	141	142	143	144	145	146	147	148	149	150
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	3	3	3	3	3	2	3	3	3
	Average Bank Height	2	1	2	1	2	2	2	2	2	3
	Vegetative Bank Protection	1	2	2	3	2	3	2	1	3	2
	Bank Cutting	2	2	2	2	3	3	3	3	2	3
	Mass Wasting	2	1	2	1	2	3	3	3	2	3
	Bar Development	1	1	2	1	1	1	1	1	1	1
	Debris Jam Potential	2	3	3	1	3	3	1	1	1	3
	Channel Obstructions	1	3	3	1	3	3	1	1	2	3
	Channel Bed Material	2	1	2	1	3	3	3	3	1	1
	Channel Constrictions	1	2	2	2	2	2	2	1	1	3
	Sediment Movement	3	3	3	1	3	2	3	3	2	2
	Channel Sinuosity	2	2	2	3	3	3	1	1	3	3
	Dominant Process	Widening	Widening, Planform Adjustment	Widening	Incising	Widening, Planform Adjustment	Incising	Widening	Widening	Widening	Widening
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.8	1.8	1.8	1.8	1.8	1.2	1.8	1.8	1.8
	Average Bank Height (Weighted)	1.6	0.8	1.6	0.8	1.6	1.6	1.6	1.6	1.6	2.4
	Vegetative Bank Protection (Weighted)	0.8	1.6	1.6	2.4	1.6	2.4	1.6	0.8	2.4	1.6
	Bank Cutting (Weighted)	0.8	0.8	0.8	0.8	1.2	1.2	1.2	1.2	0.8	1.2
	Mass Wasting (Weighted)	1.6	0.8	1.6	0.8	1.6	2.4	2.4	2.4	1.6	2.4
	Bar Development (Weighted)	0.6	0.6	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Debris Jam Potential (Weighted)	0.4	0.6	0.6	0.2	0.6	0.6	0.2	0.2	0.2	0.6
	Channel Obstructions (Weighted)	0.2	0.6	0.6	0.2	0.6	0.6	0.2	0.2	0.4	0.6
	Channel Bed Material (Weighted)	1.6	0.8	1.6	0.8	2.4	2.4	2.4	2.4	0.8	0.8
	Channel Constrictions (Weighted)	0.8	1.6	1.6	1.6	1.6	1.6	1.6	0.8	0.8	2.4
	Sediment Movement (Weighted)	2.4	2.4	2.4	0.8	2.4	1.6	2.4	2.4	1.6	1.6
	Channel Sinuosity (Weighted)	1.6	1.6	1.6	2.4	2.4	2.4	0.8	0.8	2.4	2.4
	Weighted Channel Score	14.8	14.6	17.6	13.8	19.0	19.8	16.8	15.8	15.6	19.0
	Channel Condition	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Fair

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	Channel Condition Point	151	152	153	154	155	156	157	158	159
Field Observation and Field Data Input	Bank Soil Texture	1	1	1	1	1	1	1	1	1
	Average Bank Slope	3	2	1	1	3	1	2	2	1
	Average Bank Height	2	1	2	2	2	1	1	2	1
	Vegetative Bank Protection	2	3	3	2	2	3	3	2	1
	Bank Cutting	1	1	1	2	2	1	1	2	1
	Mass Wasting	2	1	1	2	2	1	1	1	1
	Bar Development	1	2	2	1	1	1	1	1	1
	Debris Jam Potential	1	1	1	3	3	1	1	3	3
	Channel Obstructions	1	1	1	1	3	1	2	2	1
	Channel Bed Material	2	1	1	1	2	1	1	1	2
	Channel Constrictions	1	1	1	2	3	1	1	2	1
	Sediment Movement	1	1	1	1	2	1	1	1	2
	Channel Sinuosity	3	3	2	3	2	2	1	3	3
	Dominant Process	Widening	Dynamic Equilibrium	Dynamic Equilibrium	Early Stage Incision	Incising	Managed Swale	Incising, Widening, Dynamic Equilibrium	Widening	Dynamic Equilibrium, Early Stage Incision
Weighted Scores and Results	Bank Soil Texture (Weighted)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Average Bank Slope (Weighted)	1.8	1.2	0.6	0.6	1.8	0.6	1.2	1.2	0.6
	Average Bank Height (Weighted)	1.6	0.8	1.6	1.6	1.6	0.8	0.8	1.6	0.8
	Vegetative Bank Protection (Weighted)	1.6	2.4	2.4	1.6	1.6	2.4	2.4	1.6	0.8
	Bank Cutting (Weighted)	0.4	0.4	0.4	0.8	0.8	0.4	0.4	0.8	0.4
	Mass Wasting (Weighted)	1.6	0.8	0.8	1.6	1.6	0.8	0.8	0.8	0.8
	Bar Development (Weighted)	0.6	1.2	1.2	0.6	0.6	0.6	0.6	0.6	0.6
	Debris Jam Potential (Weighted)	0.2	0.2	0.2	0.6	0.6	0.2	0.2	0.6	0.6
	Channel Obstructions (Weighted)	0.2	0.2	0.2	0.2	0.6	0.2	0.4	0.4	0.2
	Channel Bed Material (Weighted)	1.6	0.8	0.8	0.8	1.6	0.8	0.8	0.8	1.6
	Channel Constrictions (Weighted)	0.8	0.8	0.8	1.6	2.4	0.8	0.8	1.6	0.8
	Sediment Movement (Weighted)	0.8	0.8	0.8	0.8	1.6	0.8	0.8	0.8	1.6
	Channel Sinuosity (Weighted)	2.4	2.4	1.6	2.4	1.6	1.6	0.8	2.4	2.4
	Weighted Channel Score	14.2	12.6	12.0	13.8	17.0	10.6	10.6	13.8	11.8
	Channel Condition	Poor	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair

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Study Reach Names Map

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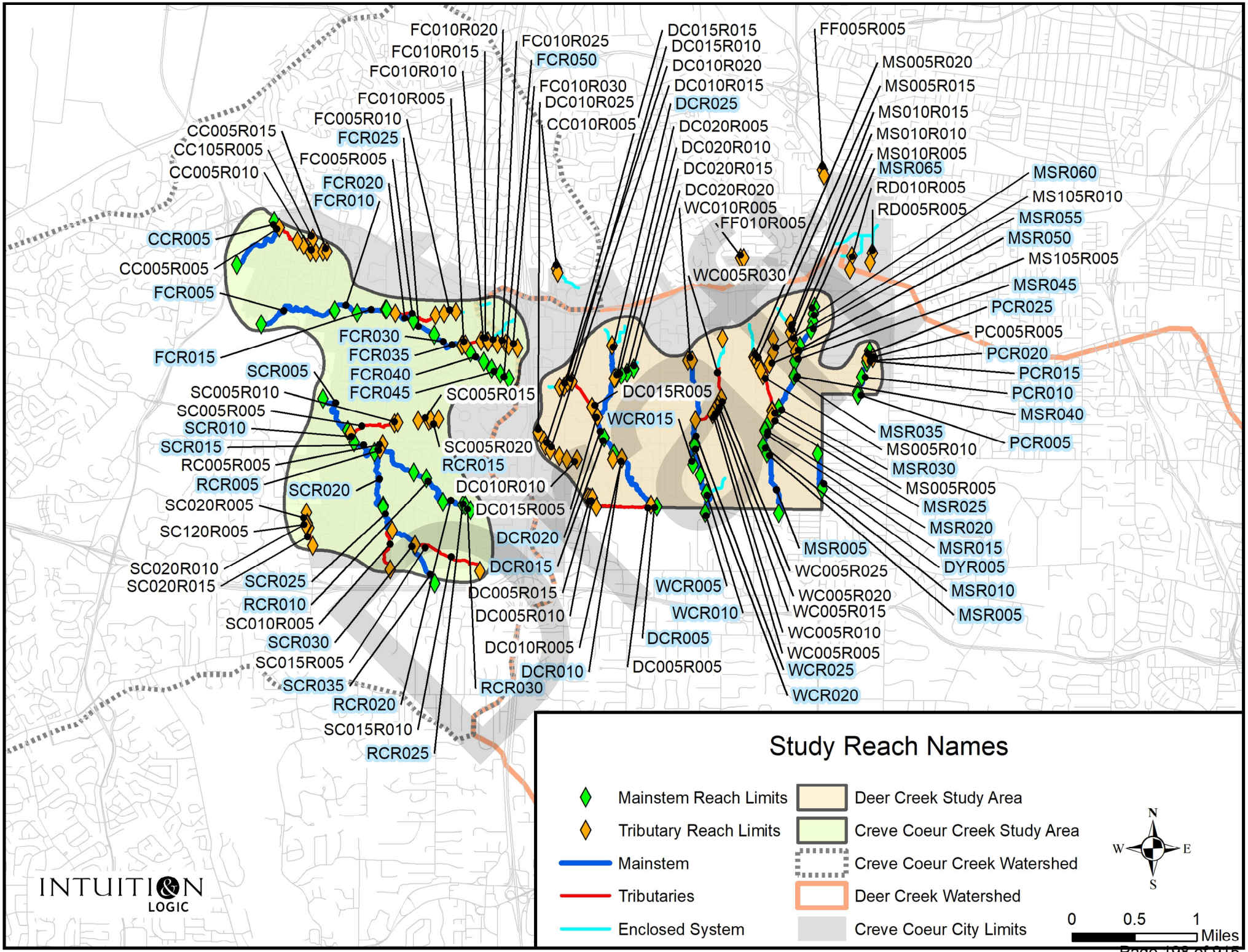
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WC005R020
WC005R015
WC005R010
WC005R005
WCR025
WCR020
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DCR005
DC005R005
Study Reach Names
Mainstem Reach Limits
Tributary Reach Limits
Mainstem
Tributaries
Enclosed System
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
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Reach Data

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Appendix D: Creve Coeur Mainstem Reach Data

	Reach Name	CCR005	FCR005	FCR010	FCR015	FCR020
	Channel Length	3,167	4,362	1,216	1,286	1,518
	Valley Length	2436	3147	963	1200	1234
	Reach Sinuosity	1.30001	1.38622	1.26257	1.07201	1.22978
	Dominant Process	Widening	Widening	Widening	Widening	Planform Adjustment
Field Observations and Data Input	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	TRUE	TRUE	-	-	-
	Persistent scouring on both banks toe to mid slope	-	TRUE	-	-	-
	Wedge failures along both banks	TRUE	TRUE	-	-	-
	Steep near vertical banks	TRUE	TRUE	-	-	-
	Perched bankfull floodplain or abandoned terraces	-	TRUE	-	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	-	-	-
	Steep bed slope	-	TRUE	-	-	-
	Scoured bed material	-	TRUE	-	-	-
	Consolidated bed material Incision	-	TRUE	-	-	-
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	-	-
	Undercut or perched infrastructure	-	-	-	-	-
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	TRUE	TRUE	TRUE	TRUE	TRUE
	Increase in cross sectional area	-	-	TRUE	TRUE	-
	Increase in channel width and decrease in bank height from upstream	-	-	TRUE	TRUE	-
	Scouring or bank failures along both banks	TRUE	TRUE	TRUE	TRUE	TRUE
	Persistent scouring on both banks mid to upper slope	TRUE	TRUE	TRUE	TRUE	TRUE
	Residual failure material at bank toes	-	TRUE	TRUE	TRUE	TRUE
	Unconsolidated depositional bed material widening	-	-	TRUE	TRUE	-
	Depositional center bars	-	-	TRUE	TRUE	-
	Unconsolidated depositional sediment bars	-	-	TRUE	TRUE	TRUE
	Reinforced knickpoints and knickzones	TRUE	TRUE	TRUE	TRUE	TRUE
	Large woody debris jams	-	TRUE	TRUE	TRUE	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	TRUE	TRUE	TRUE
	Numerous surfing or overhanging trees	TRUE	TRUE	TRUE	TRUE	TRUE
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	TRUE	TRUE	TRUE
	Circular failures along alternating banks or at the outside of banks	-	-	TRUE	TRUE	TRUE
	Alternating pattern of scour and deposition	-	-	TRUE	TRUE	TRUE
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
	Bar material unsorted with fines downstream	-	-	TRUE	TRUE	TRUE
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	TRUE	TRUE	TRUE
	Poorly sorted bed material	-	-	TRUE	TRUE	TRUE
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Creve Coeur Mainstem Reach Data

Field Observations and Data Input	Reach Name	FCR025	FCR030	FCR035	FCR040	FCR045
	Channel Length	1,118	1,575	542	718	441
	Valley Length	1070	1239	474	689	437
	Reach Sinuosity	1.04471	1.27084	1.14388	1.04181	1.01013
	Dominant Process	Managed	Widening	Incising	Widening	Managed
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	TRUE	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	-	TRUE
	Gradually sloping banks	-	-	-	-	TRUE
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	TRUE
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	TRUE	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	TRUE	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	-	-	TRUE	TRUE	TRUE
	Persistent scouring on both banks toe to mid slope	-	-	TRUE	TRUE	-
	Wedge failures along both banks	-	-	TRUE	TRUE	-
	Steep near vertical banks	-	-	TRUE	TRUE	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	TRUE	-
	Knickpoints and knickzones occurring in channel profile	-	-	TRUE	TRUE	-
	Steep bed slope	-	-	TRUE	TRUE	-
	Scoured bed material	-	-	TRUE	TRUE	-
	Consolidated bed material Incision	-	-	TRUE	TRUE	-
	Frequent large woody debris jams	-	-	TRUE	TRUE	-
	Lower limit of woody vegetation high with exposed roots	-	-	TRUE	TRUE	-
	Undercut or perched infrastructure	-	-	TRUE	TRUE	-
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	-	TRUE	-	TRUE	-
	Increase in cross sectional area	-	-	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	TRUE	-	TRUE	-
	Persistent scouring on both banks mid to upper slope	-	TRUE	-	-	-
	Residual failure material at bank toes	-	TRUE	-	-	-
	Unconsolidated depositional bed material widening	-	TRUE	-	TRUE	-
	Depositional center bars	-	TRUE	-	-	-
	Unconsolidated depositional sediment bars	-	TRUE	-	-	-
	Reinforced knickpoints and knickzones	-	TRUE	-	TRUE	-
	Large woody debris jams	-	-	-	TRUE	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	TRUE	-
	Numerous surfing or overhanging trees	-	TRUE	-	TRUE	-
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	TRUE	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	TRUE	-	-	-
	Alternating pattern of scour and deposition	-	TRUE	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	TRUE	-	-	-
	Bar material unsorted with fines downstream	-	TRUE	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	TRUE	-	-	-
	Poorly sorted bed material	-	TRUE	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	managed channel	strong planform indicators	-	-	-

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Appendix D: Creve Coeur Mainstem Reach Data

Field Observations and Data Input

Reach Name	FCR050	SCR005	SCR010	SCR015	SCR020
Channel Length	525	2,277	710	1,410	2,841
Valley Length	415	1,709	574	972	2276
Reach Sinuosity	1.26551	1.33229	1.23725	1.45026	1.24803
Dominant Process	Planform Adjustment	Widening	Incising	Widening	Incising
Indicators of Dynamic Equilibrium	-	-	-	-	-
No persistent scour or erosion features	-	-	-	-	-
Bankfull shelf along one or both banks	-	-	-	-	-
Gradually sloping banks	-	-	-	-	-
Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
Well established woody vegetation on healed failure surfaces	-	-	-	-	-
Vegetated consolidated bars	-	-	-	-	-
Consolidated bed material	-	-	-	-	-
Imbricated rock bed material	-	-	-	-	-
De facto grade controls reinforcing knickpoints	-	-	-	-	-
Healthy riparian corridor and canopy cover	-	-	-	-	-
Indicators of Incision	-	-	TRUE	-	TRUE
V" or "U" shaped channel cross section	TRUE	-	-	-	-
Persistent scouring on both banks toe to mid slope	TRUE	-	-	-	TRUE
Wedge failures along both banks	-	-	-	-	-
Steep near vertical banks	TRUE	-	-	-	TRUE
Perched bankfull floodplain or abandoned terraces	TRUE	-	-	-	-
Knickpoints and knickzones occurring in channel profile	TRUE	-	TRUE	-	TRUE
Steep bed slope	-	-	-	-	-
Scoured bed material	TRUE	-	TRUE	-	TRUE
Consolidated bed material Incision	TRUE	-	TRUE	-	-
Frequent large woody debris jams	TRUE	-	-	-	-
Lower limit of woody vegetation high with exposed roots	-	-	-	-	TRUE
Undercut or perched infrastructure	TRUE	-	-	-	-
Indicators of Widening	-	TRUE	-	TRUE	TRUE
Wide "U" shaped channel cross section	TRUE	TRUE	-	-	-
Increase in cross sectional area	-	-	-	-	-
Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
Scouring or bank failures along both banks	-	TRUE	-	TRUE	TRUE
Persistent scouring on both banks mid to upper slope	TRUE	-	-	-	TRUE
Residual failure material at bank toes	-	TRUE	-	TRUE	TRUE
Unconsolidated depositional bed material widening	-	-	-	TRUE	-
Depositional center bars	-	TRUE	-	-	-
Unconsolidated depositional sediment bars	TRUE	-	-	-	-
Reinforced knickpoints and knickzones	TRUE	-	-	-	-
Large woody debris jams	TRUE	-	-	-	-
Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	TRUE	-
Numerous surfing or overhanging trees	-	TRUE	-	TRUE	TRUE
Indicators of Plan Form Adjustment	-	TRUE	-	TRUE	TRUE
Cutbanks with active scour lines opposite of advancing bar formations	TRUE	TRUE	-	TRUE	TRUE
Circular failures along alternating banks or at the outside of banks	TRUE	TRUE	-	TRUE	-
Alternating pattern of scour and deposition	TRUE	TRUE	-	TRUE	TRUE
Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
Bar material unsorted with fines downstream	TRUE	-	-	-	-
Bar is irregularly shaped and more than 1 3 across the channel	TRUE	-	-	-	-
Poorly sorted bed material	TRUE	-	-	-	-
Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	incised to Hardpan and started pushing around	-	-	-	inciting with bedrock control

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Appendix D: Creve Coeur Mainstem Reach Data

Field Observations and Data Input	Reach Name	SCR025	SCR030	SCR035	RCR005	RCR010
	Channel Length	1,393	1,270	1,958	2,282	593
	Valley Length	1062	1152	1822	1,860	585
	Reach Sinuosity	1.31208	1.10269	1.07468	1.22686	1.01286
	Dominant Process	Widening	Planform Adjustment	Incising	Widening	Managed
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	TRUE
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	TRUE	-	TRUE
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	TRUE	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	TRUE	-	-	-
	V" or "U" shaped channel cross section	-	-	-	TRUE	-
	Persistent scouring on both banks toe to mid slope	-	TRUE	TRUE	TRUE	-
	Wedge failures along both banks	-	-	-	TRUE	-
	Steep near vertical banks	-	-	TRUE	TRUE	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	TRUE	TRUE	TRUE	-
	Steep bed slope	-	-	-	-	-
	Scoured bed material	-	-	TRUE	-	-
	Consolidated bed material Incision	-	-	TRUE	-	-
	Frequent large woody debris jams	-	-	-	TRUE	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	TRUE	-
	Undercut or perched infrastructure	-	-	TRUE	TRUE	-
	Indicators of Widening	TRUE	TRUE	-	-	-
	Wide "U" shaped channel cross section	-	-	-	TRUE	-
	Increase in cross sectional area	-	-	-	TRUE	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	TRUE	TRUE	TRUE	TRUE	-
	Persistent scouring on both banks mid to upper slope	-	-	-	TRUE	-
	Residual failure material at bank toes	TRUE	-	-	TRUE	-
	Unconsolidated depositional bed material widening	-	-	-	TRUE	-
	Depositional center bars	TRUE	-	-	TRUE	-
	Unconsolidated depositional sediment bars	-	-	-	TRUE	-
	Reinforced knickpoints and knickzones	-	-	-	TRUE	-
	Large woody debris jams	-	-	-	TRUE	-
	Lower limit of woody vegetation high with exposed roots	TRUE	-	TRUE	TRUE	-
	Numerous surfing or overhanging trees	TRUE	-	-	TRUE	-
	Indicators of Plan Form Adjustment	TRUE	TRUE	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	TRUE	TRUE	TRUE	-	-
	Circular failures along alternating banks or at the outside of banks	TRUE	-	-	-	-
	Alternating pattern of scour and deposition	TRUE	TRUE	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	TRUE	TRUE	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	TRUE	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Creve Coeur Mainstem Reach Data

Field Observations and Data Input	Reach Name	RCR015	RCR020	RCR025	RCR030
	Channel Length	1,722	1,188	108	310
	Valley Length	1231	863	107	293
	Reach Sinuosity	1.39857	1.37690	1.01032	1.05896
	Dominant Process	Widening	Planform Adjustment	Managed	Dynamic Equilibrium
	Indicators of Dynamic Equilibrium	-	-	-	-
	No persistent scour or erosion features	-	-	TRUE	TRUE
	Bankfull shelf along one or both banks	-	-	TRUE	TRUE
	Gradually sloping banks	-	-	TRUE	TRUE
	Herbaceous vegetation growing at or near the water surface	-	-	TRUE	TRUE
	Well established woody vegetation on healed failure surfaces	-	-	-	TRUE
	Vegetated consolidated bars	-	-	-	TRUE
	Consolidated bed material	-	-	TRUE	TRUE
	Imbricated rock bed material	-	-	-	TRUE
	De facto grade controls reinforcing knickpoints	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-
	Indicators of Incision	-	-	-	-
	V" or "U" shaped channel cross section	-	-	-	-
	Persistent scouring on both banks toe to mid slope	-	-	-	-
	Wedge failures along both banks	TRUE	-	-	-
	Steep near vertical banks	TRUE	-	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	-	-	-
	Steep bed slope	-	-	-	-
	Scoured bed material	-	-	-	-
	Consolidated bed material Incision	-	-	-	-
	Frequent large woody debris jams	TRUE	-	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	-	-	-
	Undercut or perched infrastructure	TRUE	-	-	-
	Indicators of Widening	-	-	-	-
	Wide "U" shaped channel cross section	TRUE	TRUE	-	-
	Increase in cross sectional area	TRUE	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-
	Scouring or bank failures along both banks	TRUE	-	-	-
	Persistent scouring on both banks mid to upper slope	TRUE	-	-	-
	Residual failure material at bank toes	TRUE	-	-	-
	Unconsolidated depositional bed material widening	TRUE	-	-	-
	Depositional center bars	TRUE	-	-	-
	Unconsolidated depositional sediment bars	TRUE	-	-	-
	Reinforced knickpoints and knickzones	TRUE	TRUE	-	-
	Large woody debris jams	TRUE	-	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	-
	Numerous surfing or overhanging trees	TRUE	TRUE	-	-
	Indicators of Plan Form Adjustment	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	TRUE	-	-
	Circular failures along alternating banks or at the outside of banks	TRUE	TRUE	-	-
	Alternating pattern of scour and deposition	-	TRUE	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	TRUE	-	-
	Bar material unsorted with fines downstream	-	TRUE	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	TRUE	-	-
	Poorly sorted bed material	-	TRUE	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-

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Appendix D: Creve Coeur Tributary Reach Data

Field Observations and Data Input	Reach Name	CC005R005	CC005R010	CC005R015	CC010R005	CC105R005
	Channel Length	1,468	243	172	189	671
	Valley Length	1,281	234	171	177	660
	Reach Sinuosity	1.14611	1.03729	1.00827	1.06729	1.01622
	Dominant Process	Widening	Incising	Incising	Incising	Incising
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	TRUE	TRUE	TRUE	TRUE	TRUE
	Persistent scouring on both banks toe to mid slope	TRUE	TRUE	TRUE	TRUE	TRUE
	Wedge failures along both banks	TRUE	TRUE	-	TRUE	TRUE
	Steep near vertical banks	TRUE	TRUE	TRUE	TRUE	TRUE
	Perched bankfull floodplain or abandoned terraces	-	TRUE	-	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	TRUE	TRUE	TRUE
	Steep bed slope	-	-	TRUE	TRUE	TRUE
	Scoured bed material	-	TRUE	TRUE	TRUE	TRUE
	Consolidated bed material Incision	TRUE	TRUE	TRUE	-	TRUE
	Frequent large woody debris jams	-	-	-	TRUE	TRUE
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	TRUE	TRUE
	Undercut or perched infrastructure	TRUE	TRUE	TRUE	TRUE	TRUE
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	TRUE	TRUE	-	-	TRUE
	Increase in cross sectional area	TRUE	TRUE	TRUE	-	-
	Increase in channel width and decrease in bank height from upstream	-	TRUE	-	-	-
	Scouring or bank failures along both banks	TRUE	TRUE	-	-	TRUE
	Persistent scouring on both banks mid to upper slope	TRUE	-	-	-	TRUE
	Residual failure material at bank toes	TRUE	-	-	-	-
	Unconsolidated depositional bed material widening	TRUE	TRUE	-	-	-
	Depositional center bars	-	-	-	-	-
	Unconsolidated depositional sediment bars	-	-	TRUE	-	-
	Reinforced knickpoints and knickzones	TRUE	TRUE	-	-	TRUE
	Large woody debris jams	TRUE	-	-	-	TRUE
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	-	TRUE
	Numerous surfing or overhanging trees	TRUE	TRUE	TRUE	-	TRUE
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	TRUE	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	TRUE	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	transitioning to widening

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Appendix D: Creve Coeur Tributary Reach Data

Field Observations and Data Input	Reach Name	FC005R005	FC005R010	FC010R005	FC010R010	FC010R015
	Channel Length	2,270	571	141	287	0
	Valley Length	1708	518	133	272	0
	Reach Sinuosity	1.32914	1.10328	1.06139	1.05389	0.00000
	Dominant Process	Widening	Incising	Incising	Planform Adjustment	Managed
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	TRUE	-	-
	Gradually sloping banks	-	-	TRUE	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	TRUE	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	TRUE	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	TRUE	-	-
	Healthy riparian corridor and canopy cover	-	-	TRUE	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	TRUE	TRUE	TRUE	TRUE	-
	Persistent scouring on both banks toe to mid slope	TRUE	TRUE	TRUE	-	-
	Wedge failures along both banks	TRUE	TRUE	-	-	-
	Steep near vertical banks	TRUE	TRUE	TRUE	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	TRUE	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	TRUE	-	-
	Steep bed slope	TRUE	TRUE	TRUE	-	-
	Scoured bed material	TRUE	TRUE	TRUE	-	-
	Consolidated bed material Incision	TRUE	TRUE	TRUE	-	-
	Frequent large woody debris jams	TRUE	TRUE	-	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	TRUE	-	-
	Undercut or perched infrastructure	TRUE	TRUE	-	-	-
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	TRUE	TRUE	-	-	-
	Increase in cross sectional area	TRUE	-	-	-	-
	Increase in channel width and decrease in bank height from upstream	TRUE	-	-	-	-
	Scouring or bank failures along both banks	TRUE	TRUE	-	-	-
	Persistent scouring on both banks mid to upper slope	TRUE	-	-	-	-
	Residual failure material at bank toes	TRUE	-	-	-	-
	Unconsolidated depositional bed material widening	TRUE	-	-	-	-
	Depositional center bars	TRUE	-	-	-	-
	Unconsolidated depositional sediment bars	TRUE	-	-	-	-
	Reinforced knickpoints and knickzones	TRUE	TRUE	-	-	-
	Large woody debris jams	TRUE	TRUE	-	TRUE	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	TRUE	-
	Numerous surfing or overhanging trees	TRUE	TRUE	-	TRUE	-
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	TRUE	-	-	TRUE	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	TRUE	-
	Alternating pattern of scour and deposition	-	-	-	TRUE	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	TRUE	-
	Bar material unsorted with fines downstream	-	-	-	TRUE	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	TRUE	-
	Poorly sorted bed material	-	-	-	TRUE	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	historical incision, reach controlled by culverts	-

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Appendix D: Creve Coeur Tributary Reach Data

Field Observations and Data Input	Reach Name	FC010R020	FC010R025	FC010R030	RC005R005	SC005R005
	Channel Length	465	377	404	300	2,322
	Valley Length	408	340	393	258	1903
	Reach Sinuosity	1.13996	1.10993	1.02824	1.16101	1.22013
	Dominant Process	Incising	Incising	Managed	Widening	Widening
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	TRUE	-	-	-	-
	Bankfull shelf along one or both banks	TRUE	-	-	TRUE	-
	Gradually sloping banks	TRUE	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	TRUE	-	-	TRUE	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	TRUE	-	-	-	-
	Consolidated bed material	TRUE	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	TRUE	-	-	TRUE	-
	Healthy riparian corridor and canopy cover	TRUE	-	-	TRUE	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	-	TRUE	-	TRUE	TRUE
	Persistent scouring on both banks toe to mid slope	-	TRUE	-	TRUE	TRUE
	Wedge failures along both banks	-	-	-	-	TRUE
	Steep near vertical banks	-	TRUE	-	-	TRUE
	Perched bankfull floodplain or abandoned terraces	-	TRUE	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	TRUE	-	TRUE	TRUE
	Steep bed slope	-	TRUE	-	TRUE	-
	Scoured bed material	-	TRUE	-	-	TRUE
	Consolidated bed material Incision	-	TRUE	-	-	TRUE
	Frequent large woody debris jams	-	TRUE	-	TRUE	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	-	TRUE
	Undercut or perched infrastructure	-	TRUE	-	-	TRUE
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	-	-	-	-	TRUE
	Increase in cross sectional area	-	-	-	-	TRUE
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	-	-	-	TRUE
	Persistent scouring on both banks mid to upper slope	-	-	-	-	TRUE
	Residual failure material at bank toes	-	-	-	-	TRUE
	Unconsolidated depositional bed material widening	-	-	-	-	TRUE
	Depositional center bars	-	-	-	-	-
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	-	-	-	-	TRUE
	Large woody debris jams	-	-	-	-	TRUE
	Lower limit of woody vegetation high with exposed roots	-	-	-	-	TRUE
	Numerous surfing or overhanging trees	-	-	-	-	TRUE
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	detention basin, managed	-	-

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Appendix D: Creve Coeur Tributary Reach Data

Field Observations and Data Input	Reach Name	SC005R010	SC005R015	SC005R020	SC010R005	SC015R005
	Channel Length	138	472	346	2,221	1,043
	Valley Length	137	446	337	1654	983
	Reach Sinuosity	1.00804	1.05754	1.02612	1.34263	1.06120
	Dominant Process	Managed	Widening	Early Stage Incision	Widening	Incising
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	TRUE	-	-	-	-
	Bankfull shelf along one or both banks	-	-	TRUE	-	-
	Gradually sloping banks	TRUE	-	TRUE	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	TRUE	-	TRUE	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	TRUE	TRUE
	V" or "U" shaped channel cross section	-	TRUE	TRUE	-	-
	Persistent scouring on both banks toe to mid slope	-	TRUE	TRUE	TRUE	TRUE
	Wedge failures along both banks	-	TRUE	-	-	-
	Steep near vertical banks	-	TRUE	-	TRUE	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	TRUE	TRUE	TRUE	TRUE
	Steep bed slope	-	TRUE	TRUE	-	-
	Scoured bed material	-	-	-	-	-
	Consolidated bed material Incision	-	TRUE	TRUE	-	-
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	TRUE	TRUE	TRUE
	Undercut or perched infrastructure	-	TRUE	TRUE	TRUE	TRUE
	Indicators of Widening	-	-	-	TRUE	-
	Wide "U" shaped channel cross section	-	TRUE	-	-	-
	Increase in cross sectional area	-	TRUE	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	TRUE	-	-	-
	Scouring or bank failures along both banks	-	TRUE	-	TRUE	-
	Persistent scouring on both banks mid to upper slope	-	TRUE	-	-	-
	Residual failure material at bank toes	-	-	-	TRUE	-
	Unconsolidated depositional bed material widening	-	TRUE	-	-	-
	Depositional center bars	-	-	TRUE	-	-
	Unconsolidated depositional sediment bars	-	TRUE	-	-	-
	Reinforced knickpoints and knickzones	-	-	-	-	-
	Large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	-	-
	Numerous surfing or overhanging trees	-	TRUE	-	TRUE	-
	Indicators of Plan Form Adjustment	-	-	-	TRUE	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	TRUE	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	TRUE	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	TRUE	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	bedrock control	-

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Appendix D: Creve Coeur Tributary Reach Data

Field Observations and Data Input

Reach Name	SC015R010	SC020R005	SC020R010	SC020R015
Channel Length	2,243	448	220	800
Valley Length	1993	443	218	784
Reach Sinuosity	1.12566	1.01227	1.00788	1.02024
Dominant Process	Incising	Dynamic Equilibrium	Incising	Early Stage Incision
Indicators of Dynamic Equilibrium	-	-	-	-
No persistent scour or erosion features	-	TRUE	-	-
Bankfull shelf along one or both banks	-	TRUE	-	TRUE
Gradually sloping banks	-	TRUE	-	TRUE
Herbaceous vegetation growing at or near the water surface	-	TRUE	-	TRUE
Well established woody vegetation on healed failure surfaces	-	TRUE	-	TRUE
Vegetated consolidated bars	-	-	-	-
Consolidated bed material	-	-	-	TRUE
Imbricated rock bed material	-	-	-	-
De facto grade controls reinforcing knickpoints	-	TRUE	-	TRUE
Healthy riparian corridor and canopy cover	-	TRUE	-	TRUE
Indicators of Incision	TRUE	-	-	-
V" or "U" shaped channel cross section	-	-	TRUE	-
Persistent scouring on both banks toe to mid slope	TRUE	TRUE	TRUE	-
Wedge failures along both banks	-	-	TRUE	-
Steep near vertical banks	-	-	TRUE	-
Perched bankfull floodplain or abandoned terraces	-	-	TRUE	TRUE
Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	TRUE	TRUE
Steep bed slope	-	-	TRUE	-
Scoured bed material	TRUE	-	TRUE	-
Consolidated bed material Incision	TRUE	-	TRUE	-
Frequent large woody debris jams	-	-	TRUE	TRUE
Lower limit of woody vegetation high with exposed roots	TRUE	-	TRUE	-
Undercut or perched infrastructure	-	-	-	-
Indicators of Widening	-	-	-	-
Wide "U" shaped channel cross section	-	-	-	-
Increase in cross sectional area	-	-	-	-
Increase in channel width and decrease in bank height from upstream	-	-	-	-
Scouring or bank failures along both banks	-	-	-	-
Persistent scouring on both banks mid to upper slope	-	-	-	-
Residual failure material at bank toes	-	-	-	-
Unconsolidated depositional bed material widening	-	-	-	-
Depositional center bars	-	-	-	-
Unconsolidated depositional sediment bars	-	-	-	-
Reinforced knickpoints and knickzones	-	-	-	-
Large woody debris jams	-	-	-	-
Lower limit of woody vegetation high with exposed roots	-	-	-	-
Numerous surfing or overhanging trees	-	-	-	-
Indicators of Plan Form Adjustment	TRUE	-	-	-
Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-
Circular failures along alternating banks or at the outside of banks	-	-	-	-
Alternating pattern of scour and deposition	TRUE	-	-	-
Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-
Bar material unsorted with fines downstream	-	-	-	-
Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-
Poorly sorted bed material	-	-	-	-
Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-

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Appendix D: Deer Creek Mainstem Reach Data

Field Observations and Data Input

Reach Name	DCR005	DCR010	DCR015	DCR020	DCR025
Channel Length	3,252	399	823	953	1,419
Valley Length	2536	371	811	925	1398
Reach Sinuosity	1.28227	1.07516	1.01451	1.03080	1.01514
Dominant Process	Planform Adjustment	Planform Adjustment	Managed	Widening	Managed
Indicators of Dynamic Equilibrium	-	-	-	-	-
No persistent scour or erosion features	-	-	-	-	-
Bankfull shelf along one or both banks	-	-	-	TRUE	-
Gradually sloping banks	-	TRUE	-	TRUE	-
Herbaceous vegetation growing at or near the water surface	-	-	-	TRUE	-
Well established woody vegetation on healed failure surfaces	-	TRUE	-	-	-
Vegetated consolidated bars	-	-	-	-	-
Consolidated bed material	-	-	-	TRUE	-
Imbricated rock bed material	-	-	-	TRUE	-
De facto grade controls reinforcing knickpoints	-	-	-	TRUE	-
Healthy riparian corridor and canopy cover	-	-	-	-	-
Indicators of Incision	-	-	-	-	-
V" or "U" shaped channel cross section	-	-	-	-	-
Persistent scouring on both banks toe to mid slope	-	-	-	-	-
Wedge failures along both banks	-	-	-	-	-
Steep near vertical banks	-	-	TRUE	-	-
Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
Knickpoints and knickzones occurring in channel profile	-	-	-	TRUE	-
Steep bed slope	-	-	TRUE	TRUE	-
Scoured bed material	-	-	-	TRUE	-
Consolidated bed material Incision	-	-	-	-	-
Frequent large woody debris jams	-	-	-	-	-
Lower limit of woody vegetation high with exposed roots	-	-	-	-	-
Undercut or perched infrastructure	-	-	-	-	-
Indicators of Widening	-	-	-	-	-
Wide "U" shaped channel cross section	TRUE	TRUE	TRUE	TRUE	-
Increase in cross sectional area	TRUE	-	-	-	-
Increase in channel width and decrease in bank height from upstream	TRUE	-	-	-	-
Scouring or bank failures along both banks	TRUE	-	-	TRUE	-
Persistent scouring on both banks mid to upper slope	-	-	-	-	-
Residual failure material at bank toes	TRUE	TRUE	-	TRUE	-
Unconsolidated depositional bed material widening	TRUE	-	-	-	-
Depositional center bars	-	-	-	-	-
Unconsolidated depositional sediment bars	-	-	-	-	-
Reinforced knickpoints and knickzones	TRUE	-	-	TRUE	-
Large woody debris jams	-	-	-	-	-
Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	-	-
Numerous surfing or overhanging trees	TRUE	TRUE	-	TRUE	-
Indicators of Plan Form Adjustment	-	-	-	-	-
Cutbanks with active scour lines opposite of advancing bar formations	TRUE	TRUE	-	TRUE	-
Circular failures along alternating banks or at the outside of banks	TRUE	TRUE	-	TRUE	-
Alternating pattern of scour and deposition	TRUE	-	-	-	-
Bar formations are consolidated with an unconsolidated leading edge	TRUE	TRUE	-	-	-
Bar material unsorted with fines downstream	TRUE	-	-	-	-
Bar is irregularly shaped and more than 1 3 across the channel	TRUE	TRUE	-	-	-
Poorly sorted bed material	-	-	-	TRUE	-
Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	controlled by gabion wall on LDB, indicators from RDB	-	-	-

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Appendix D: Deer Creek Mainstem Reach Data

Field Observations and Data Input	Reach Name	WCR005	WCR010	WCR015	WCR020	WCR025
	Channel Length	1,192	985	818	990	1,051
	Valley Length	838	794	564	803	1009
	Reach Sinuosity	1.42300	1.24053	1.44950	1.23262	1.04210
	Dominant Process	Planform Adjustment	Planform Adjustment	Widening	Widening	Widening
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	TRUE	TRUE	-	-	-
	V" or "U" shaped channel cross section	-	-	-	-	-
	Persistent scouring on both banks toe to mid slope	-	-	-	-	TRUE
	Wedge failures along both banks	-	-	-	-	-
	Steep near vertical banks	-	-	-	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	TRUE	TRUE	TRUE
	Steep bed slope	-	-	-	-	-
	Scoured bed material	TRUE	TRUE	-	-	TRUE
	Consolidated bed material Incision	TRUE	TRUE	TRUE	TRUE	TRUE
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	-	TRUE	TRUE	TRUE
	Undercut or perched infrastructure	TRUE	-	TRUE	TRUE	TRUE
	Indicators of Widening	TRUE	TRUE	-	-	-
	Wide "U" shaped channel cross section	TRUE	TRUE	-	TRUE	TRUE
	Increase in cross sectional area	-	-	TRUE	TRUE	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	-	-	-	TRUE
	Persistent scouring on both banks mid to upper slope	-	-	TRUE	TRUE	TRUE
	Residual failure material at bank toes	-	-	-	-	-
	Unconsolidated depositional bed material widening	-	-	TRUE	TRUE	TRUE
	Depositional center bars	-	-	TRUE	TRUE	TRUE
	Unconsolidated depositional sediment bars	-	-	TRUE	TRUE	TRUE
	Reinforced knickpoints and knickzones	TRUE	TRUE	TRUE	TRUE	TRUE
	Large woody debris jams	TRUE	TRUE	TRUE	TRUE	TRUE
	Lower limit of woody vegetation high with exposed roots	-	-	TRUE	TRUE	TRUE
	Numerous surfing or overhanging trees	TRUE	TRUE	TRUE	TRUE	TRUE
	Indicators of Plan Form Adjustment	TRUE	TRUE	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	TRUE	TRUE	TRUE	TRUE	-
	Circular failures along alternating banks or at the outside of banks	TRUE	TRUE	-	-	-
	Alternating pattern of scour and deposition	TRUE	TRUE	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	TRUE	TRUE	-	-	-
	Bar material unsorted with fines downstream	TRUE	TRUE	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	TRUE	TRUE	-	-	-
	Poorly sorted bed material	TRUE	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Deer Creek Mainstem Reach Data

Field Observations and Data Input	Reach Name	MSR005	MSR010	MSR015	MSR020	MSR025
	Channel Length	2,817	371	675	309	367
	Valley Length	2570	359	662	246	324
	Reach Sinuosity	1.09629	1.03258	1.02025	1.25619	1.13413
	Dominant Process	Planform Adjustment	Widening	Widening	Planform Adjustment	Dynamic Equilibrium
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	TRUE
	Bankfull shelf along one or both banks	-	-	-	-	TRUE
	Gradually sloping banks	-	-	-	-	TRUE
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	TRUE
	Well established woody vegetation on healed failure surfaces	-	-	-	-	TRUE
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	TRUE
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	TRUE
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	TRUE	-	-	-
	V" or "U" shaped channel cross section	-	-	-	-	-
	Persistent scouring on both banks toe to mid slope	-	-	TRUE	-	-
	Wedge failures along both banks	-	-	-	-	-
	Steep near vertical banks	-	-	TRUE	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	-	TRUE	-	-
	Steep bed slope	-	-	TRUE	-	-
	Scoured bed material	-	-	-	-	-
	Consolidated bed material Incision	-	-	TRUE	-	-
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	-	TRUE	-	-
	Undercut or perched infrastructure	-	TRUE	TRUE	-	-
	Indicators of Widening	TRUE	TRUE	TRUE	-	-
	Wide "U" shaped channel cross section	-	TRUE	TRUE	-	-
	Increase in cross sectional area	-	TRUE	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	TRUE	-	-	-
	Scouring or bank failures along both banks	-	TRUE	TRUE	-	-
	Persistent scouring on both banks mid to upper slope	-	TRUE	TRUE	-	-
	Residual failure material at bank toes	-	-	-	-	-
	Unconsolidated depositional bed material widening	-	TRUE	-	-	-
	Depositional center bars	-	TRUE	-	-	-
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	TRUE	TRUE	TRUE	-	-
	Large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	TRUE	-	-
	Numerous surfing or overhanging trees	TRUE	TRUE	TRUE	-	-
	Indicators of Plan Form Adjustment	TRUE	-	-	TRUE	-
	Cutbanks with active scour lines opposite of advancing bar formations	TRUE	-	-	TRUE	-
	Circular failures along alternating banks or at the outside of banks	TRUE	-	-	TRUE	-
	Alternating pattern of scour and deposition	TRUE	-	-	TRUE	-
	Bar formations are consolidated with an unconsolidated leading edge	TRUE	-	-	TRUE	-
	Bar material unsorted with fines downstream	TRUE	-	-	TRUE	-
	Bar is irregularly shaped and more than 1 3 across the channel	TRUE	-	-	TRUE	-
	Poorly sorted bed material	TRUE	-	-	TRUE	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Deer Creek Mainstem Reach Data

	Reach Name	MSR030	MSR035	MSR040	MSR045	MSR050
	Channel Length	578	1,590	621	439	306
	Valley Length	500	1496	619	415	294
	Reach Sinuosity	1.15535	1.06298	1.00304	1.05827	1.04093
	Dominant Process	Managed	Widening	Managed	Planform Adjustment	Managed
Field Observations and Data Input	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	TRUE	-	TRUE
	Bankfull shelf along one or both banks	-	-	TRUE	-	-
	Gradually sloping banks	-	-	-	-	TRUE
	Herbaceous vegetation growing at or near the water surface	-	-	TRUE	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	TRUE
	Imbricated rock bed material	-	-	-	-	TRUE
	De facto grade controls reinforcing knickpoints	-	-	TRUE	-	TRUE
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	-	TRUE	-	-	-
	Persistent scouring on both banks toe to mid slope	-	TRUE	-	-	-
	Wedge failures along both banks	-	-	-	-	-
	Steep near vertical banks	-	TRUE	-	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	TRUE	TRUE	TRUE	-
	Steep bed slope	-	TRUE	TRUE	-	-
	Scoured bed material	-	TRUE	TRUE	-	-
	Consolidated bed material Incision	-	TRUE	TRUE	-	-
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	TRUE	-
	Undercut or perched infrastructure	-	TRUE	-	TRUE	-
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	-	TRUE	TRUE	-	-
	Increase in cross sectional area	-	TRUE	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	TRUE	-	-	-
	Persistent scouring on both banks mid to upper slope	-	TRUE	-	-	-
	Residual failure material at bank toes	-	-	-	-	-
	Unconsolidated depositional bed material widening	-	TRUE	-	-	-
	Depositional center bars	-	TRUE	TRUE	-	-
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	-	TRUE	TRUE	TRUE	-
	Large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	TRUE	-
	Numerous surfing or overhanging trees	-	TRUE	-	TRUE	-
	Indicators of Plan Form Adjustment	-	TRUE	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	TRUE	-	TRUE	-
	Circular failures along alternating banks or at the outside of banks	-	TRUE	-	TRUE	-
	Alternating pattern of scour and deposition	-	-	-	TRUE	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	TRUE	-
	Bar material unsorted with fines downstream	-	-	-	TRUE	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	TRUE	-	TRUE	-
	Poorly sorted bed material	-	-	-	TRUE	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Deer Creek Mainstem Reach Data

Field Observations and Data Input

Reach Name	MSR055	MSR060	MSR065	DYR005	PCR005
Channel Length	893	339	310	1,556	129
Valley Length	826	332	310	1494	129
Reach Sinuosity	1.08107	1.02071	1.00050	1.04171	1.00289
Dominant Process	Incising	Managed	Incising	Widening	Widening
Indicators of Dynamic Equilibrium	-	TRUE	-	-	-
No persistent scour or erosion features	-	TRUE	-	-	-
Bankfull shelf along one or both banks	-	-	-	-	-
Gradually sloping banks	-	TRUE	-	-	-
Herbaceous vegetation growing at or near the water surface	-	TRUE	-	-	-
Well established woody vegetation on healed failure surfaces	-	-	-	-	-
Vegetated consolidated bars	-	TRUE	-	-	-
Consolidated bed material	-	-	-	-	-
Imbricated rock bed material	-	-	-	-	-
De facto grade controls reinforcing knickpoints	-	TRUE	-	-	-
Healthy riparian corridor and canopy cover	-	-	-	-	-
Indicators of Incision	TRUE	-	-	-	-
V" or "U" shaped channel cross section	TRUE	-	TRUE	TRUE	-
Persistent scouring on both banks toe to mid slope	TRUE	-	TRUE	TRUE	-
Wedge failures along both banks	-	-	TRUE	TRUE	-
Steep near vertical banks	TRUE	-	TRUE	TRUE	-
Perched bankfull floodplain or abandoned terraces	TRUE	-	-	-	-
Knickpoints and knickzones occurring in channel profile	TRUE	-	TRUE	TRUE	-
Steep bed slope	TRUE	-	TRUE	-	-
Scoured bed material	TRUE	-	-	TRUE	-
Consolidated bed material Incision	TRUE	-	TRUE	TRUE	-
Frequent large woody debris jams	TRUE	-	-	-	-
Lower limit of woody vegetation high with exposed roots	TRUE	-	TRUE	TRUE	-
Undercut or perched infrastructure	TRUE	-	TRUE	TRUE	-
Indicators of Widening	-	-	-	-	-
Wide "U" shaped channel cross section	-	-	TRUE	TRUE	-
Increase in cross sectional area	-	-	-	-	-
Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
Scouring or bank failures along both banks	-	-	TRUE	TRUE	-
Persistent scouring on both banks mid to upper slope	-	-	TRUE	TRUE	-
Residual failure material at bank toes	-	-	-	TRUE	-
Unconsolidated depositional bed material widening	-	-	-	TRUE	-
Depositional center bars	-	-	-	TRUE	-
Unconsolidated depositional sediment bars	-	-	-	TRUE	-
Reinforced knickpoints and knickzones	-	-	TRUE	TRUE	-
Large woody debris jams	-	-	-	-	-
Lower limit of woody vegetation high with exposed roots	-	-	TRUE	TRUE	-
Numerous surfing or overhanging trees	-	-	TRUE	TRUE	-
Indicators of Plan Form Adjustment	-	-	-	-	-
Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
Alternating pattern of scour and deposition	-	-	-	-	-
Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
Bar material unsorted with fines downstream	-	-	-	-	-
Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
Poorly sorted bed material	-	-	-	-	-
Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Deer Creek Mainstem Reach Data

Field Observations and Data Input	Reach Name	PCR010	PCR015	PCR020	PCR025
	Channel Length	755	55	116	332
	Valley Length	656	54	114	320
	Reach Sinuosity	1.15116	1.01691	1.01339	1.03693
	Dominant Process	Managed	Widening	Dynamic Equilibrium	Widening
	Indicators of Dynamic Equilibrium	-	-	-	-
	No persistent scour or erosion features	TRUE	-	-	-
	Bankfull shelf along one or both banks	TRUE	-	TRUE	-
	Gradually sloping banks	TRUE	-	TRUE	-
	Herbaceous vegetation growing at or near the water surface	TRUE	-	TRUE	TRUE
	Well established woody vegetation on healed failure surfaces	TRUE	-	TRUE	-
	Vegetated consolidated bars	-	-	-	-
	Consolidated bed material	TRUE	-	TRUE	TRUE
	Imbricated rock bed material	-	-	-	-
	De facto grade controls reinforcing knickpoints	TRUE	-	TRUE	-
	Healthy riparian corridor and canopy cover	-	-	-	-
	Indicators of Incision	-	-	-	-
	V" or "U" shaped channel cross section	-	-	-	-
	Persistent scouring on both banks toe to mid slope	-	-	TRUE	-
	Wedge failures along both banks	-	-	-	-
	Steep near vertical banks	-	TRUE	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	-	TRUE
	Steep bed slope	-	-	-	-
	Scoured bed material	-	TRUE	-	-
	Consolidated bed material Incision	-	TRUE	-	TRUE
	Frequent large woody debris jams	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	TRUE
	Undercut or perched infrastructure	TRUE	TRUE	-	TRUE
	Indicators of Widening	-	-	-	-
	Wide "U" shaped channel cross section	-	TRUE	-	TRUE
	Increase in cross sectional area	-	TRUE	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-
	Scouring or bank failures along both banks	-	TRUE	-	-
	Persistent scouring on both banks mid to upper slope	-	TRUE	-	-
	Residual failure material at bank toes	-	-	-	-
	Unconsolidated depositional bed material widening	-	-	-	-
	Depositional center bars	-	TRUE	-	-
	Unconsolidated depositional sediment bars	-	-	-	-
	Reinforced knickpoints and knickzones	-	TRUE	-	-
	Large woody debris jams	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	TRUE
	Numerous surfing or overhanging trees	-	-	-	TRUE
	Indicators of Plan Form Adjustment	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-
	Poorly sorted bed material	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	previous stabilization attempts are slowly being undermined, slowly transitioning from dynamic equilibrium to widening with loss of material at toe

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input	Reach Name	DC005R005	DC005R010	DC005R015	DC010R005	DC010R010
	Channel Length	2,437	482	104	410	427
	Valley Length	2315	446	93	390	427
	Reach Sinuosity	1.05267	1.08010	1.11444	1.05141	1.00043
	Dominant Process	Incising	Incising	Early Stage Incision	Incising	Managed
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	TRUE	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	TRUE	-	-
	Healthy riparian corridor and canopy cover	-	-	TRUE	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	TRUE	TRUE	TRUE	TRUE	-
	Persistent scouring on both banks toe to mid slope	TRUE	TRUE	TRUE	TRUE	-
	Wedge failures along both banks	TRUE	TRUE	-	TRUE	-
	Steep near vertical banks	TRUE	TRUE	-	TRUE	-
	Perched bankfull floodplain or abandoned terraces	TRUE	TRUE	TRUE	-	-
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	TRUE	TRUE	-
	Steep bed slope	TRUE	TRUE	TRUE	TRUE	-
	Scoured bed material	TRUE	TRUE	TRUE	TRUE	-
	Consolidated bed material Incision	TRUE	-	TRUE	TRUE	-
	Frequent large woody debris jams	TRUE	TRUE	TRUE	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	TRUE	TRUE	-
	Undercut or perched infrastructure	TRUE	TRUE	-	-	-
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	TRUE	-	-	-	-
	Increase in cross sectional area	TRUE	-	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	TRUE	TRUE	-	-	-
	Persistent scouring on both banks mid to upper slope	-	-	-	-	-
	Residual failure material at bank toes	TRUE	-	-	-	-
	Unconsolidated depositional bed material widening	-	-	-	-	-
	Depositional center bars	-	-	-	-	-
	Unconsolidated depositional sediment bars	TRUE	-	-	-	-
	Reinforced knickpoints and knickzones	TRUE	TRUE	-	-	-
	Large woody debris jams	TRUE	TRUE	-	-	-
	Lower limit of woody vegetation high with exposed roots	TRUE	TRUE	-	-	-
	Numerous surfing or overhanging trees	TRUE	TRUE	-	-	-
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	managed channel

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input

Reach Name	DC010R015	DC010R020	DC010R025	DC015R005	DC015R010
Channel Length	480	288	421	519	175
Valley Length	458	277	420	499	175
Reach Sinuosity	1.04878	1.04095	1.00303	1.03959	1.00088
Dominant Process	Incising	Managed	Managed	Managed	Managed
Indicators of Dynamic Equilibrium	-	-	-	-	-
No persistent scour or erosion features	-	-	-	-	-
Bankfull shelf along one or both banks	TRUE	-	-	-	-
Gradually sloping banks	TRUE	-	-	-	-
Herbaceous vegetation growing at or near the water surface	TRUE	-	-	-	-
Well established woody vegetation on healed failure surfaces	-	-	-	-	-
Vegetated consolidated bars	-	-	-	-	-
Consolidated bed material	TRUE	-	-	-	-
Imbricated rock bed material	-	-	-	-	-
De facto grade controls reinforcing knickpoints	-	-	-	-	-
Healthy riparian corridor and canopy cover	-	-	-	-	-
Indicators of Incision	-	-	-	-	-
V" or "U" shaped channel cross section	TRUE	-	-	-	-
Persistent scouring on both banks toe to mid slope	TRUE	-	-	-	-
Wedge failures along both banks	TRUE	-	-	-	-
Steep near vertical banks	TRUE	-	-	-	-
Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
Knickpoints and knickzones occurring in channel profile	TRUE	-	-	-	-
Steep bed slope	TRUE	-	-	-	-
Scoured bed material	TRUE	-	-	-	-
Consolidated bed material Incision	TRUE	-	-	-	-
Frequent large woody debris jams	-	-	-	-	-
Lower limit of woody vegetation high with exposed roots	TRUE	-	-	-	-
Undercut or perched infrastructure	-	-	-	-	-
Indicators of Widening	-	-	-	-	-
Wide "U" shaped channel cross section	TRUE	-	-	-	-
Increase in cross sectional area	-	-	-	-	-
Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
Scouring or bank failures along both banks	-	-	-	-	-
Persistent scouring on both banks mid to upper slope	-	-	-	-	-
Residual failure material at bank toes	-	-	-	-	-
Unconsolidated depositional bed material widening	-	-	-	-	-
Depositional center bars	-	-	-	-	-
Unconsolidated depositional sediment bars	-	-	-	-	-
Reinforced knickpoints and knickzones	-	-	-	-	-
Large woody debris jams	-	-	-	-	-
Lower limit of woody vegetation high with exposed roots	-	-	-	-	-
Numerous surfing or overhanging trees	-	-	-	-	-
Indicators of Plan Form Adjustment	-	-	-	-	-
Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
Alternating pattern of scour and deposition	-	-	-	-	-
Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
Bar material unsorted with fines downstream	-	-	-	-	-
Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
Poorly sorted bed material	-	-	-	-	-
Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	enclosed system with swale overtop	detention basin

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input	Reach Name	DC015R015	DC020R005	DC020R010	DC020R015	DC020R020
	Channel Length	197	72	247	265	354
	Valley Length	192	71	247	258	344
	Reach Sinuosity	1.02720	1.01331	1.00144	1.02588	1.02879
	Dominant Process	Early Stage Incision	Incising	Planform Adjustment	Early Stage Incision	Widening
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	-	-	-
	Well established woody vegetation on healed failure surfaces	-	-	-	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	-	-
	Imbricated rock bed material	-	-	-	-	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	-	TRUE	-	-	TRUE
	Persistent scouring on both banks toe to mid slope	-	TRUE	-	-	TRUE
	Wedge failures along both banks	-	-	-	TRUE	TRUE
	Steep near vertical banks	-	TRUE	-	-	TRUE
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	TRUE
	Knickpoints and knickzones occurring in channel profile	-	-	-	TRUE	TRUE
	Steep bed slope	-	TRUE	-	TRUE	TRUE
	Scoured bed material	-	TRUE	-	-	-
	Consolidated bed material Incision	-	TRUE	-	-	TRUE
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	-	-	-	-
	Undercut or perched infrastructure	-	TRUE	-	-	TRUE
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	-	-	TRUE	-	TRUE
	Increase in cross sectional area	-	-	-	-	TRUE
	Increase in channel width and decrease in bank height from upstream	-	-	TRUE	-	-
	Scouring or bank failures along both banks	-	-	-	-	TRUE
	Persistent scouring on both banks mid to upper slope	-	-	-	-	TRUE
	Residual failure material at bank toes	-	-	TRUE	TRUE	TRUE
	Unconsolidated depositional bed material widening	-	-	-	-	TRUE
	Depositional center bars	-	-	-	-	TRUE
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	-	-	TRUE	-	TRUE
	Large woody debris jams	-	-	TRUE	-	TRUE
	Lower limit of woody vegetation high with exposed roots	-	-	TRUE	-	-
	Numerous surfing or overhanging trees	-	-	-	-	TRUE
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	TRUE	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	TRUE	-	-
	Alternating pattern of scour and deposition	-	-	TRUE	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	TRUE	-	-
	Bar material unsorted with fines downstream	-	-	TRUE	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	TRUE	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input	Reach Name	WC005R005	WC005R010	WC005R015	WC005R020	WC005R025
	Channel Length	814	193	163	157	280
	Valley Length	774	170	160	155	273
	Reach Sinuosity	1.05198	1.13734	1.01802	1.01579	1.02706
	Dominant Process	Managed	Incising	Early Stage Incision	Managed	Incising
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	TRUE	-	-	TRUE	-
	Bankfull shelf along one or both banks	-	-	-	-	-
	Gradually sloping banks	-	-	-	-	-
	Herbaceous vegetation growing at or near the water surface	-	-	TRUE	-	-
	Well established woody vegetation on healed failure surfaces	-	-	TRUE	-	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	TRUE	-	TRUE	TRUE	-
	Imbricated rock bed material	-	-	TRUE	TRUE	-
	De facto grade controls reinforcing knickpoints	-	-	-	-	-
	Healthy riparian corridor and canopy cover	-	-	-	-	-
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	-	TRUE	TRUE	-	TRUE
	Persistent scouring on both banks toe to mid slope	-	TRUE	TRUE	-	TRUE
	Wedge failures along both banks	-	-	-	-	-
	Steep near vertical banks	-	TRUE	-	-	TRUE
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	TRUE	-	-	-
	Steep bed slope	-	TRUE	TRUE	-	-
	Scoured bed material	-	TRUE	-	-	TRUE
	Consolidated bed material Incision	-	TRUE	-	-	TRUE
	Frequent large woody debris jams	-	-	-	-	TRUE
	Lower limit of woody vegetation high with exposed roots	-	TRUE	TRUE	-	TRUE
	Undercut or perched infrastructure	-	TRUE	-	-	TRUE
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	-	-	-	-	-
	Increase in cross sectional area	-	-	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	-	-	-	-
	Persistent scouring on both banks mid to upper slope	-	-	-	-	-
	Residual failure material at bank toes	-	-	-	-	-
	Unconsolidated depositional bed material widening	-	-	-	-	-
	Depositional center bars	-	-	-	-	-
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	-	-	-	-	-
	Large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	-	-	-	-
	Numerous surfing or overhanging trees	-	-	-	-	-
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	-

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input

Reach Name	WC005R030	WC010R005	MS005R005	MS005R010	MS005R015
Channel Length	2,656	195	223	1,758	256
Valley Length	2522	195	222	1729	219
Reach Sinuosity	1.05332	1.00007	1.00347	1.01661	1.16909
Dominant Process	Managed	Early Stage Incision	Managed	Widening	Incising
Indicators of Dynamic Equilibrium	-	-	-	-	-
No persistent scour or erosion features	TRUE	-	TRUE	-	-
Bankfull shelf along one or both banks	-	-	-	-	TRUE
Gradually sloping banks	-	-	-	-	TRUE
Herbaceous vegetation growing at or near the water surface	-	-	-	-	TRUE
Well established woody vegetation on healed failure surfaces	-	-	-	-	TRUE
Vegetated consolidated bars	-	-	-	-	-
Consolidated bed material	-	-	TRUE	-	TRUE
Imbricated rock bed material	-	-	-	-	-
De facto grade controls reinforcing knickpoints	-	-	TRUE	-	TRUE
Healthy riparian corridor and canopy cover	-	-	-	-	-
Indicators of Incision	-	-	-	-	-
V" or "U" shaped channel cross section	-	TRUE	-	TRUE	TRUE
Persistent scouring on both banks toe to mid slope	-	-	-	TRUE	TRUE
Wedge failures along both banks	-	-	-	TRUE	-
Steep near vertical banks	-	-	-	TRUE	-
Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
Knickpoints and knickzones occurring in channel profile	-	TRUE	-	TRUE	TRUE
Steep bed slope	-	TRUE	-	-	-
Scoured bed material	-	-	-	-	-
Consolidated bed material Incision	-	-	-	-	TRUE
Frequent large woody debris jams	-	-	-	-	-
Lower limit of woody vegetation high with exposed roots	-	-	-	TRUE	-
Undercut or perched infrastructure	-	-	-	TRUE	TRUE
Indicators of Widening	-	-	-	-	-
Wide "U" shaped channel cross section	-	-	-	TRUE	-
Increase in cross sectional area	-	-	-	TRUE	-
Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
Scouring or bank failures along both banks	-	-	-	TRUE	-
Persistent scouring on both banks mid to upper slope	-	-	-	TRUE	-
Residual failure material at bank toes	-	-	-	TRUE	-
Unconsolidated depositional bed material widening	-	-	-	TRUE	-
Depositional center bars	-	-	-	TRUE	-
Unconsolidated depositional sediment bars	-	-	-	-	-
Reinforced knickpoints and knickzones	-	-	-	TRUE	-
Large woody debris jams	-	-	-	TRUE	-
Lower limit of woody vegetation high with exposed roots	-	-	-	TRUE	-
Numerous surfing or overhanging trees	-	-	-	TRUE	-
Indicators of Plan Form Adjustment	-	-	-	-	-
Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
Alternating pattern of scour and deposition	-	-	-	-	-
Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
Bar material unsorted with fines downstream	-	-	-	-	-
Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
Poorly sorted bed material	-	-	-	-	-
Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	borderline dynamic equilibrium, channel is reestablishing

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input	Reach Name	MS005R020	MS010R005	MS010R010	MS010R015	MS105R005
	Channel Length	71	457	398	402	575
	Valley Length	67	432	389	401	547
	Reach Sinuosity	1.06273	1.05776	1.02231	1.00203	1.05160
	Dominant Process	Managed	Planform Adjustment	Managed	Early Stage Incision	Early Stage Incision
	Indicators of Dynamic Equilibrium	-	-	-	TRUE	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	-	-	-	TRUE	-
	Gradually sloping banks	-	-	-	TRUE	TRUE
	Herbaceous vegetation growing at or near the water surface	-	-	-	TRUE	-
	Well established woody vegetation on healed failure surfaces	-	-	-	TRUE	-
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	-	-	TRUE	TRUE
	Imbricated rock bed material	-	-	-	-	TRUE
	De facto grade controls reinforcing knickpoints	-	-	-	TRUE	-
	Healthy riparian corridor and canopy cover	-	-	-	TRUE	-
	Indicators of Incision	-	TRUE	-	TRUE	-
	V" or "U" shaped channel cross section	-	-	-	-	-
	Persistent scouring on both banks toe to mid slope	-	-	-	TRUE	-
	Wedge failures along both banks	-	-	-	-	-
	Steep near vertical banks	-	-	-	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	-
	Knickpoints and knickzones occurring in channel profile	-	TRUE	-	-	-
	Steep bed slope	-	-	-	TRUE	-
	Scoured bed material	-	-	-	-	-
	Consolidated bed material Incision	-	-	-	-	-
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	-	-
	Undercut or perched infrastructure	-	-	-	-	-
	Indicators of Widening	-	TRUE	-	-	-
	Wide "U" shaped channel cross section	-	-	-	-	-
	Increase in cross sectional area	-	-	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	-	-	-	-
	Persistent scouring on both banks mid to upper slope	-	-	-	-	-
	Residual failure material at bank toes	-	-	-	-	-
	Unconsolidated depositional bed material widening	-	-	-	-	-
	Depositional center bars	-	-	-	-	-
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	-	TRUE	-	-	-
	Large woody debris jams	-	TRUE	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	TRUE	-	-	-
	Numerous surfing or overhanging trees	-	-	-	-	-
	Indicators of Plan Form Adjustment	-	TRUE	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	TRUE	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	TRUE	-	-	-
	Alternating pattern of scour and deposition	-	TRUE	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	TRUE	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-	-	-	-	erosion present where rock armor was absent

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Appendix D: Deer Creek Tributary Reach Data

Field Observations and Data Input	Reach Name	MS105R010	PC005R005	RD005R005	RD010R005	FF005R005
	Channel Length	579	239	432	645	257
	Valley Length	578	237	417	569	251
	Reach Sinuosity	1.00219	1.00789	1.03636	1.13392	1.02456
	Dominant Process	Dynamic Equilibrium	Widening	Dynamic Equilibrium	Early Stage Incision	Early Stage Incision
	Indicators of Dynamic Equilibrium	-	-	-	-	-
	No persistent scour or erosion features	-	-	-	-	-
	Bankfull shelf along one or both banks	TRUE	-	TRUE	-	TRUE
	Gradually sloping banks	TRUE	-	TRUE	-	TRUE
	Herbaceous vegetation growing at or near the water surface	TRUE	TRUE	TRUE	-	TRUE
	Well established woody vegetation on healed failure surfaces	TRUE	-	TRUE	-	TRUE
	Vegetated consolidated bars	-	-	-	-	-
	Consolidated bed material	-	TRUE	TRUE	-	TRUE
	Imbricated rock bed material	-	-	-	-	TRUE
	De facto grade controls reinforcing knickpoints	TRUE	-	TRUE	-	TRUE
	Healthy riparian corridor and canopy cover	TRUE	-	TRUE	-	TRUE
	Indicators of Incision	-	-	-	-	-
	V" or "U" shaped channel cross section	-	-	-	-	-
	Persistent scouring on both banks toe to mid slope	TRUE	-	-	-	TRUE
	Wedge failures along both banks	-	TRUE	-	-	-
	Steep near vertical banks	-	-	-	-	-
	Perched bankfull floodplain or abandoned terraces	-	-	-	-	TRUE
	Knickpoints and knickzones occurring in channel profile	TRUE	TRUE	-	-	TRUE
	Steep bed slope	-	-	TRUE	-	-
	Scoured bed material	-	TRUE	-	-	TRUE
	Consolidated bed material Incision	-	TRUE	-	-	TRUE
	Frequent large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	-	-	-	-
	Undercut or perched infrastructure	-	-	-	-	-
	Indicators of Widening	-	-	-	-	-
	Wide "U" shaped channel cross section	-	TRUE	-	-	-
	Increase in cross sectional area	-	-	-	-	-
	Increase in channel width and decrease in bank height from upstream	-	-	-	-	-
	Scouring or bank failures along both banks	-	TRUE	-	-	-
	Persistent scouring on both banks mid to upper slope	-	-	-	-	-
	Residual failure material at bank toes	-	TRUE	-	-	-
	Unconsolidated depositional bed material widening	-	-	-	-	-
	Depositional center bars	-	-	-	-	-
	Unconsolidated depositional sediment bars	-	-	-	-	-
	Reinforced knickpoints and knickzones	-	TRUE	-	-	-
	Large woody debris jams	-	-	-	-	-
	Lower limit of woody vegetation high with exposed roots	-	-	-	-	-
	Numerous surfing or overhanging trees	-	TRUE	-	-	-
	Indicators of Plan Form Adjustment	-	-	-	-	-
	Cutbanks with active scour lines opposite of advancing bar formations	-	-	-	-	-
	Circular failures along alternating banks or at the outside of banks	-	-	-	-	-
	Alternating pattern of scour and deposition	-	-	-	-	-
	Bar formations are consolidated with an unconsolidated leading edge	-	-	-	-	-
	Bar material unsorted with fines downstream	-	-	-	-	-
	Bar is irregularly shaped and more than 1 3 across the channel	-	-	-	-	-
	Poorly sorted bed material	-	-	-	-	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	section of early stage incision	reach was previously stabilized with Rock and Mats, lost toe protection and banks are beginning to slump, process is moving slower than expected	-	-	-

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Appendix D: Deer Creek Tributary Reach Data

	Reach Name	FF010R005
Field Observations and Data Input	Channel Length	129
	Valley Length	128
	Reach Sinuosity	1.00615
	Dominant Process	Managed
	Indicators of Dynamic Equilibrium	-
	No persistent scour or erosion features	-
	Bankfull shelf along one or both banks	-
	Gradually sloping banks	TRUE
	Herbaceous vegetation growing at or near the water surface	TRUE
	Well established woody vegetation on healed failure surfaces	-
	Vegetated consolidated bars	-
	Consolidated bed material	-
	Imbricated rock bed material	-
	De facto grade controls reinforcing knickpoints	-
	Healthy riparian corridor and canopy cover	-
	Indicators of Incision	-
	V" or "U" shaped channel cross section	-
	Persistent scouring on both banks toe to mid slope	-
	Wedge failures along both banks	-
	Steep near vertical banks	-
	Perched bankfull floodplain or abandoned terraces	-
	Knickpoints and knickzones occurring in channel profile	-
	Steep bed slope	-
	Scoured bed material	-
	Consolidated bed material Incision	-
	Frequent large woody debris jams	-
	Lower limit of woody vegetation high with exposed roots	-
	Undercut or perched infrastructure	-
	Indicators of Widening	-
	Wide "U" shaped channel cross section	-
	Increase in cross sectional area	-
	Increase in channel width and decrease in bank height from upstream	-
	Scouring or bank failures along both banks	-
	Persistent scouring on both banks mid to upper slope	-
	Residual failure material at bank toes	-
	Unconsolidated depositional bed material widening	-
	Depositional center bars	-
	Unconsolidated depositional sediment bars	-
	Reinforced knickpoints and knickzones	-
	Large woody debris jams	-
	Lower limit of woody vegetation high with exposed roots	-
	Numerous surfing or overhanging trees	-
	Indicators of Plan Form Adjustment	-
	Cutbanks with active scour lines opposite of advancing bar formations	-
	Circular failures along alternating banks or at the outside of banks	-
	Alternating pattern of scour and deposition	-
	Bar formations are consolidated with an unconsolidated leading edge	-
	Bar material unsorted with fines downstream	-
	Bar is irregularly shaped and more than 1 3 across the channel	-
	Poorly sorted bed material	-
	Notes - numbers in the notes rows are data codes corresponding to the observed indicators. these codes are displayed as "TRUE" in the above indicators of dynamic equilibrium	-

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Appendix E
Potential Projects

Content:

- North Creve Coeur Creek Watershed
- South Creve Coeur Creek Watershed
- West Deer Creek Watershed
- East Deer Creek Watershed

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North Creve Coeur Creek Watershed

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North Creve Coeur Creek Watershed

CIP Number	Project Name
CC-C-01	Ferntop Lane Bank Stabilization
CC-C-02	Ferntop Lane Outfall Repair
CC-C-03	13105 D'Artagnan Court
CC-C-04	Autumn Trails Court
CC-C-05	Olive Boulevard
CC-C-06	1009 Fernview Drive
CC-C-07	Ferngate Lane
CC-C-08	Bellerive Country Club
CC-C-09	Ambois Drive
CC-C-10	Lampadaire Drive
CC-C-11	Fernridge Creek at Bellerive Estates Drive
CC-C-12	680 Bellerive Estates Drive
CC-C-13	North Mason Road
CC-C-14	840 Angleterre Drive
CC-C-15	Millenium Park
CC-C-16	Villa Hill Lane
CC-C-17	12344 Mulberry Tree Court
CC-C-18	12426 Stratford Ridge Court
CC-C-19	Questover Lane
CC-C-20	Falaise Drive
CC-C-21	Blackheath Court and Country Manor Lane
CC-C-22	Royal Valley Drive
CC-C-23	Oak Hollow Drive
CC-S-03	Ferntrails Lane
CC-S-04	Fernpark Drive
CC-S-05	740 North Mason Road
CC-S-06	Aurburndale Drive
CC-S-07	Mason Forest Drive

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CC-C-01: Ferntop Lane Bank Stabilization

Problem description: An existing pipe outfall is perched and actively undermining. Creek erosion on the right descending bank (RDB) is causing bank failures in the rear yard of 12970 Ferntop Lane. Heavy flows also result in yard flooding. The affected parcels are private.

Knickpoint at outfall

Recommendation: Construct a step grade control at the upstream outfall and stabilize the existing concrete pad with a toewall. Stabilize the bank by laying back the slope, adding rock toe protection, and rock armored slope protection.

Water Quality Alternative Recommendations: Use a vegetated biostabilization technique for the bank stabilization approach. Extend the project from the outfall stabilization limits downstream to the inlet of the culvert under Fernview Drive on the RDB slope. Include outfall repair project for MSD owned infrastructure located within the bank stabilization limits.

Conceptual Layout of CC-C-01

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Conceptual Layout of CC-C-01 Alternative

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-01 Ferntop Lane Bank Stabilization

Project Description: Rock armoring to address erosion and grade control at outfall knickpoint.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 7,700
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF SURVEYING COST =		**$ 9,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	50	$ 35	$ 1,800
Rock Grade Control	CY	25	$ 200	$ 5,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	50	$ 150	$ 7,500
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	10.00	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 3,400	$ 3,400
			Subtotal =	$ 37,300
		Contingency =	30%	$ 11,200
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 48,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 114,700**

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-01 Ferntop Lane Bank Stabilization Alternative

Project Description: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 10,900
			Contingency = 25%	$ 2,700
			TOTAL OPINION OF SURVEYING COST =	**$ 13,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	195	$ 35	$ 6,800
Rock Grade Control	CY	25	$ 200	$ 5,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	95	$ 150	$ 14,300
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	15.00	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 5,400	$ 5,400
			Subtotal =	$ 59,300
			Contingency = 30%	$ 17,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 77,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 181,300**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	CC-C-01: Ferntop Lane Bank Stabilization	DATE:	7/31/2023
PROJECT LOCATION:	12970 Ferntop Lane, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Rock armoring to address erosion and grade control at outfall knickpoint.		
ENVIRONMENTAL CONSIDERATIONS:			
COMMON GROUND:	This project is partially located on common ground.		

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 12970 Ferntop Ln*	300		200		50	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-01: Ferntop Lane Bank Stabilization DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Total Points
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: 12970 and 12985 Ferntop Ln, 943 Ferngate Ln*		No. Lots:		3	Points/lot:		10	30
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition								
				TOTAL PROBLEM POINTS						**80**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-01: Ferntop Lane Bank Stabilization DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

SOLUTION BENEFIT CATEGORY									
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:				Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:				Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units				Points per Unit		
	Bioswales		PER 100 LF			10		
	Forebays		AC			200		
	Wet Ponds		AC			100		
	Wetlands		AC			50		
	Biostabilization of banks (per bank)	1	PER 100 LF			10		10
	Riffle Pool Complex	1	PER 100 LF			10		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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**40**
							TOTAL BENEFIT POINTS	**120**

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

TOTAL COST IN THOUSANDS= **$115**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.05**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	CC-C-01: Ferntop Lane Bank Stabilization Alternative	DATE:	7/31/2023
PROJECT LOCATION:	12970 Ferntop Lane, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.		
ENVIRONMENTAL CONSIDERATIONS:			
COMMON GROUND:	This project is partially located on common ground.		

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 12970 Ferntop Ln*	300		200		50	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	CC-C-01: Ferntop Lane Bank Stabilization Alternative	DATE:	7/31/2023
PROJECT LOCATION:	12970 Ferntop Lane, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.		
ENVIRONMENTAL CONSIDERATIONS:			
COMMON GROUND:	This project is partially located on common ground.		

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 12970 and 12985 Ferntop Ln, 943 Ferngate Ln*	No. Lots:		3	Points/lot:		10	30
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**80**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-01: Ferntop Lane Bank Stabilization Alternative DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	2	PER 100 LF		10		20
	Riffle Pool Complex	2	PER 100 LF		10		20
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**60**
						TOTAL BENEFIT POINTS	**140**

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

TOTAL COST IN THOUSANDS= **$181**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.77**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-C-02: Ferntop Lane Outfall Repair

Problem description: The existing storm sewer outfall in the rear yard of 12970 Ferntop Lane is being undermined and eroded on either side. The line was replaced/extended in 2022 by MSD, however, a headwall was not built with the construction. The affected outfall is owned by MSD and the parcels are private.

Outfall

Recommendation: Construct pipe headwall/toewall, rock armor the bank around the pipe, and add scour protection at the outfall.

Water Quality Alternative Recommendations: Combine with adjacent bank stabilization work. No other water quality alternatives are recommended for this project.

Conceptual Layout of CC-C-02

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-02 Ferntop Lane Outfall Repair

Project Description: Headwall, rock armor, and grade control at existing outfall.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 6,200
			Contingency = 25%	$ 1,600
			TOTAL OPINION OF SURVEYING COST =	**$ 7,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	20	$ 35	$ 700
Rock Grade Control	CY	5	$ 200	$ 1,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	10	$ 150	$ 1,500
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	5.00	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	104	$ 50	$ 5,200
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 2,200	$ 2,200
			Subtotal =	$ 24,400
			Contingency = 30%	$ 7,300
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 31,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 96,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	CC-C-02: Ferntop Lane Outfall Repair	DATE:	7/31/2023
PROJECT LOCATION:	12970 Ferntop Lane, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Headwall, rock armor, and grade control at existing outfall.		
ENVIRONMENTAL CONSIDERATIONS:			
COMMON GROUND:	This project is partially located on common ground.		

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 12970 Ferntop Ln*	300		200		50	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	CC-C-02: Ferntop Lane Outfall Repair	DATE:	7/31/2023
PROJECT LOCATION:	12970 Ferntop Lane, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Headwall, rock armor, and grade control at existing outfall.		
ENVIRONMENTAL CONSIDERATIONS:			
COMMON GROUND:	This project is partially located on common ground.		

2.0 STORM SEWER / OVERLAND FLOW		**PROBLEM SOLVED CATEGORY, CONT.** Note: Problem points are awarded only for those problems solved by the proposed solution.	Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
		2.1.1. Structure Flooding							
	2.1. 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: 12970 Ferntop Ln*	No. Lots:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**60**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-02: Ferntop Lane Outfall Repair DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Headwall, rock armor, and grade control at existing outfall.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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	1	PER 100 LF			10		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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**90**

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

TOTAL COST IN THOUSANDS= **$96**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.94**

Place "X" in one box below:

	Creve Coeur Project
X	**Project by Others**

Draft

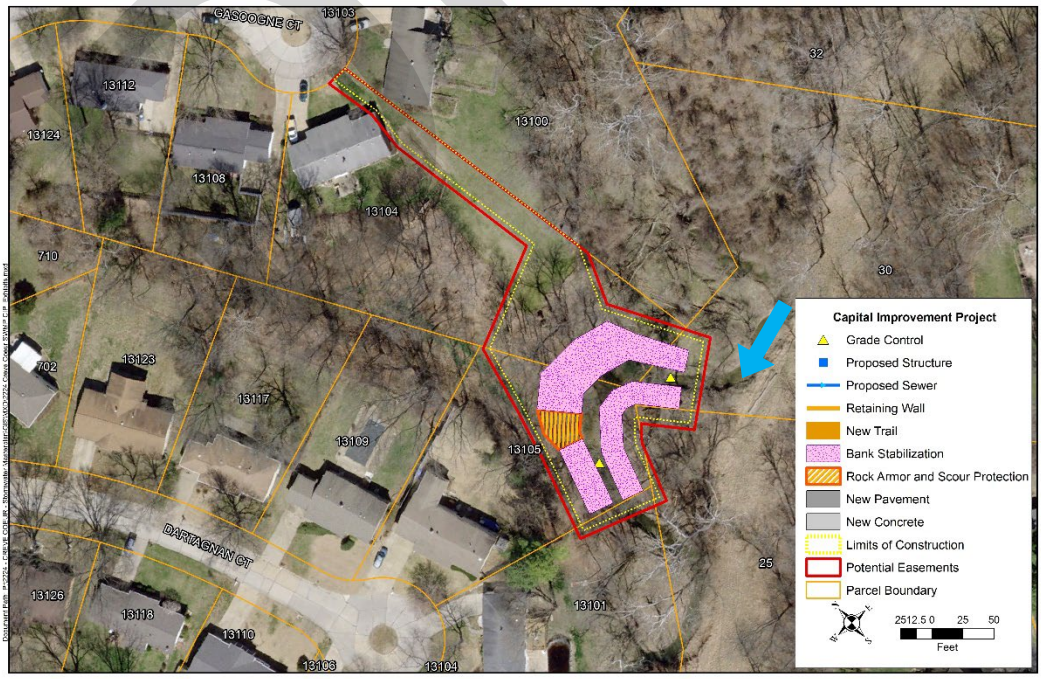
CC-C-03: 13105 D'Artagnan Court

Outside bend erosion

Problem description: Bank erosion along Fernridge Creek in the rear lot of 13105 D'Artagnan Court. The bank heights range from 6 to 12 feet and the erosion is on the outside of an advancing bend. A tree house is near the top of bank. A large drainage swale enters the channel on the outside of the bend and is incising at the confluence. The affected parcels are private.

Recommendation: Construct bank stabilization on both sides of the channel using a two stage channel to reinforce the bar formation. Construct a rock swale to convey drainage from the tributary swale to the creek in a non-erosive manner. Install grade controls at the outfall on the upstream limit of the project and where the rock swale drains into the creek.

Water Quality Alternative Recommendations: Combine with adjacent project to grade control the downstream limits of Fernridge Creek from the confluence with Smith Creek.



Conceptual Layout of CC-C-03

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-03 13105 D'Artagnan Court

Project Description: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.60	$ 12,000	$ 7,200
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.60	$ 5,000	$ 3,000
			Subtotal =	$ 17,700
			Contingency = 25%	$ 4,400
			TOTAL OPINION OF SURVEYING COST =	**$ 22,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,500
			Contingency = 25%	$ 2,600
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 13,100**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.6	$ 30,000	$ 18,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,800	$ 35	$ 63,000
Rock Grade Control	CY	50	$ 200	$ 10,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	220	$ 150	$ 33,000
Bank Stabilization	SY	850	$ 120.00	$ 102,000
Granular Backfill	CY	25.00	$ 55	$ 1,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	0.6	$ 50,000	$ 30,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 26,800	$ 26,800
			Subtotal =	$ 295,200
			Contingency = 30%	$ 88,600
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 383,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 541,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-03: 13105 D'Artagnan Court DATE: 7/31/2023

PROJECT LOCATION: 13105 D`Artagnan Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-03: 13105 D'Artagnan Court DATE: 7/31/2023

PROJECT LOCATION: 13105 D`Artagnan Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**40**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-03: 13105 D'Artagnan Court DATE: 7/31/2023

PROJECT LOCATION: 13105 D`Artagnan Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	4	PER 100 LF		10		40
	Riffle Pool Complex	4.41	PER 100 LF		10		44
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	4.41	PER 100 LF		10		44
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**148**
						TOTAL BENEFIT POINTS	**188**

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

TOTAL COST IN THOUSANDS= **$541**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.35**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

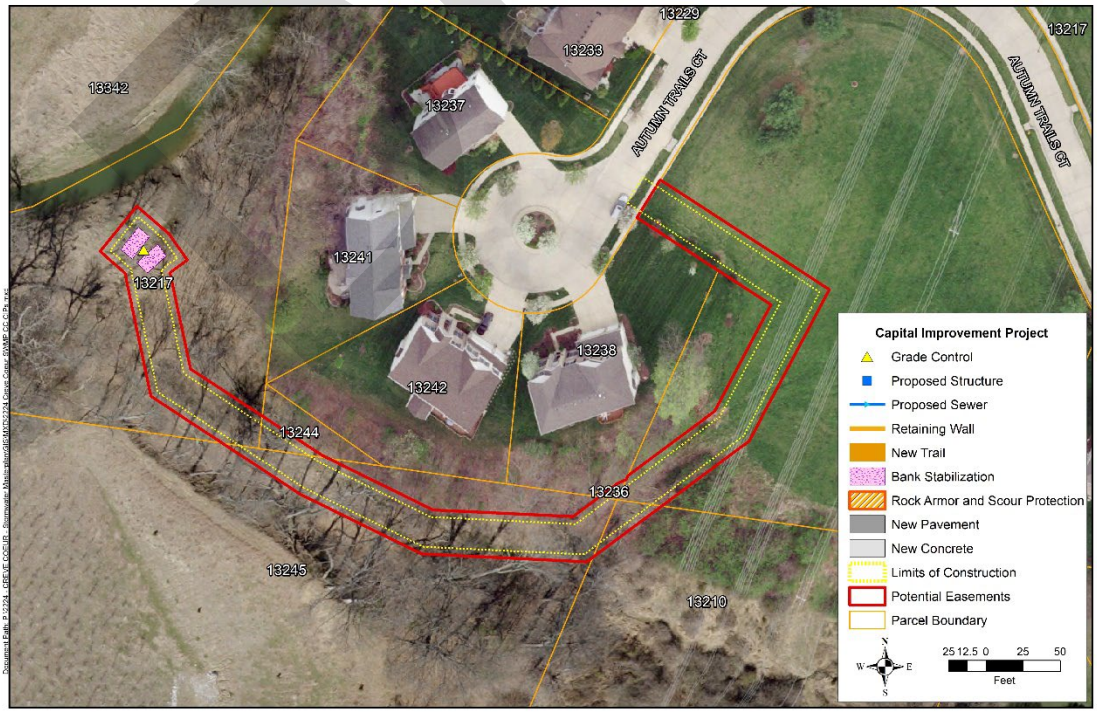
CC-C-04: Autumn Trails Court

Problem Description: A knickpoint and failing grade control were observed along a tributary to Creve Coeur Creek behind 13241 Autumn Trails Court. The affected parcels are private.

Recommendation: Install a step grade control.

Tributary

Draft



Conceptual Layout of CC-C-04

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-04 Autumn Trails Court

Project Description: Grade control to address a knickpoint in a tributary to Creve Coeur Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.4	$ 12,000	$ 4,800
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.4	$ 5,000	$ 2,000
			Subtotal =	$ 14,300
			Contingency = 25%	$ 3,600
			TOTAL OPINION OF SURVEYING COST =	**$ 17,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 12,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	60	$ 35	$ 2,100
Rock Grade Control	CY	15	$ 200	$ 3,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	20	$ 150	$ 3,000
Bank Stabilization	SY	40	$ 120.00	$ 4,800
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 5,200	$ 5,200
			Subtotal =	$ 56,900
			Contingency = 30%	$ 17,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 74,000**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 148,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-04 Autumn Trails Court DATE: 12/5/2023

PROJECT LOCATION: 13241 Autumn Trails Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control to address a knickpoint in a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10	1	5		10

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-04 Autumn Trails Court DATE: 12/5/2023

PROJECT LOCATION: 13241 Autumn Trails Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control to address a knickpoint in a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**10**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-04 Autumn Trails Court DATE: 12/5/2023

PROJECT LOCATION: 13241 Autumn Trails Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control to address a knickpoint in a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

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)	**0.96**	PER 100 LF		10		10
	Riffle Pool Complex	**2.64**	PER 100 LF		10		26
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	2.64	PER 100 LF		10		26
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**82**
						TOTAL BENEFIT POINTS	**92**

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

TOTAL COST IN THOUSANDS= **$149**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.62**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-C-05: Olive Boulevard

Problem Description: In Creve Coeur Creek and on of its tributaries south of Olive Boulevard several issues were identified as follows. Erosion threatening a transmission tower and a failed grade control turning the flow into the bank southwest of Village Du Lac Lane. Erosion along an outside bend threatening Village Du Lac Lane. Erosion along an outside bend in the tributary threatening 13150 Olive Boulevard. An existing grade control in Creve Coeur Creek is failing northwest of 13129 Bellerive Farm Drive. The affected parcels are private.

Erosion near transmission tower

Recommendation: Stabilize the LDB along the transmission tower and replace the grade control. Stabilize the RDB along Village Du Lac Lane. Stabilize the RDB threatening 13150 Olive Boulevard and install a grade control. Replace the failing grade control.

Erosion along Village Du Lac Lane

Conceptual Layout of CC-C-05

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-05 Olive Boulevard

Project Description: Bank stabilization and grade controls to address erosion threatening structures along Creve Coeur Creek and one of its tributaries.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.5	$ 12,000	$ 18,000
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	1.5	$ 5,000	$ 7,500
			Subtotal =	$ 33,000
			Contingency = 25%	$ 8,300
			TOTAL OPINION OF SURVEYING COST =	**$ 41,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	3	$ 1,000	$ 3,000
			Subtotal =	$ 11,500
			Contingency = 25%	$ 2,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 14,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	1.5	$ 30,000	$ 45,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	3,005	$ 35	$ 105,200
Rock Grade Control	CY	220	$ 200	$ 44,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	265	$ 150	$ 39,800
Bank Stabilization	SY	1,535	$ 120.00	$ 184,200
Granular Backfill	CY	40	$ 55	$ 2,200
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	1.5	$ 50,000	$ 75,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 50,100	$ 50,100
			Subtotal =	$ 551,000
			Contingency = 30%	$ 165,300
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 716,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 894,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-05 Olive Boulevard DATE: 12/5/2023

PROJECT LOCATION: 13150 Olive Boulevard, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures along Creve Coeur Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS: The transmission tower is in the regulatory floodway.

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 13150 Olive Blvd*	300		200	1	50		200
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Transmission tower base*	150		100		25	1	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	2	lots	10 points per lot				20
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: 13150 Olive Blvd driveway*	20		12		3	2	6
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10	2	5	1	25

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-05 Olive Boulevard DATE: 12/5/2023

PROJECT LOCATION: 13150 Olive Boulevard, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures along Creve Coeur Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS: The transmission tower is in the regulatory floodway.

COMMON GROUND: This project is partially located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						276

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-05 Olive Boulevard DATE: 12/5/2023

PROJECT LOCATION: 13150 Olive Boulevard, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures along Creve Coeur Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS: The transmission tower is in the regulatory floodway.

COMMON GROUND: This project is partially located on common ground.

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)	**6.54**	PER 100 LF		10		65
	Riffle Pool Complex	**8.04**	PER 100 LF		10		80
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	5.35	PER 100 LF		10		54
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**219**
						TOTAL BENEFIT POINTS	**495**

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

TOTAL COST IN THOUSANDS= **$894**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.55**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

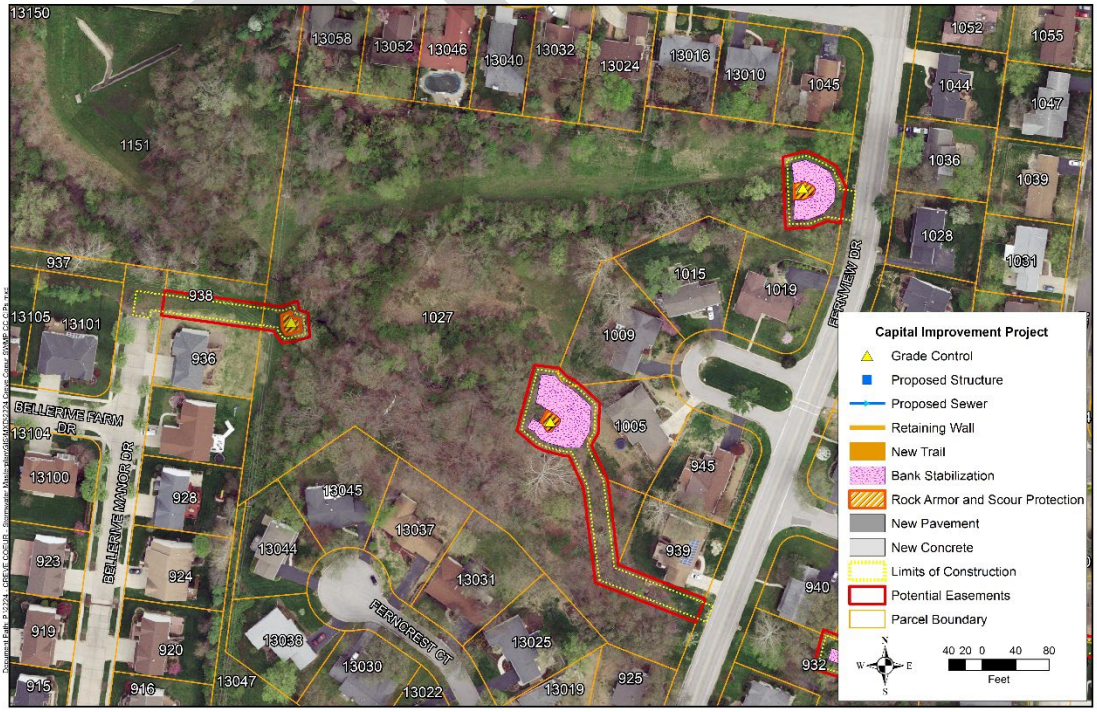
CC-C-06: 1009 Fernview Drive

Problem Description: In a tributary to Creve Coeur creek west of Fernview Drive several issues were identified as follows. Minor tributary downcutting in the rear lot of 936 Bellerive Manor Drive. Large scour hole and bank erosion at the outfall in the rear lot of 1005 Fernview Drive. Perched outfall and erosion at the upper end of a tributary south of 1045 Fernview Drive. The affected parcels are private.

Scour hole

Recommendation: Rock armor the minor tributary and install a grade control. Stabilize the banks surrounding the scour hole and install a step grade control and stilling basin. Install a step grade control and stilling basin at the perched outfall and stabilize the banks.

Perched outfall



Conceptual Layout of CC-C-06

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-06 Fernview Drive

Project Description: Bank stabilization, grade controls, stilling basins, and rock armoring to address erosion threatening structures along a tributary to Creve Coeur Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 14,500
			Contingency = 25%	$ 3,600
			TOTAL OPINION OF SURVEYING COST =	**$ 18,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,820	$ 35	$ 63,700
Rock Grade Control	CY	165	$ 200	$ 33,000
Rock Stilling Basin / Outlet Scour Protection	CY	126	$ 100	$ 12,600
Rock Toe and Slope Protection	CY	140	$ 150	$ 21,000
Bank Stabilization	SY	710	$ 120.00	$ 85,200
Granular Backfill	CY	35	$ 55	$ 1,900
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	60	$ 50	$ 3,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 26,600	$ 26,600
			Subtotal =	$ 292,500
			Contingency = 30%	$ 87,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 380,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 490,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-06 1009 Fernview Drive DATE: 12/5/2023

PROJECT LOCATION: 1009 Fernview Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins, and rock armoring to address erosion threatening structures along a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 1005, 1009, and 1045 Fernview Dr*	300		200	1	50	2	300
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	150		100		25		
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend		lots	10 points per lot				
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Undermined culvert*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-06 1009 Fernview Drive DATE: 12/5/2023

PROJECT LOCATION: 1009 Fernview Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins, and rock armoring to address erosion threatening structures along a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						360

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-06 1009 Fernview Drive DATE: 12/5/2023

PROJECT LOCATION: 1009 Fernview Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins, and rock armoring to address erosion threatening structures along a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

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)	**3.4**	PER 100 LF		10		34
	Riffle Pool Complex	**2.5**	PER 100 LF		10		25
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	2.5	PER 100 LF		10		25
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**104**
						TOTAL BENEFIT POINTS	**464**

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

TOTAL COST IN THOUSANDS= **$491**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.95**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

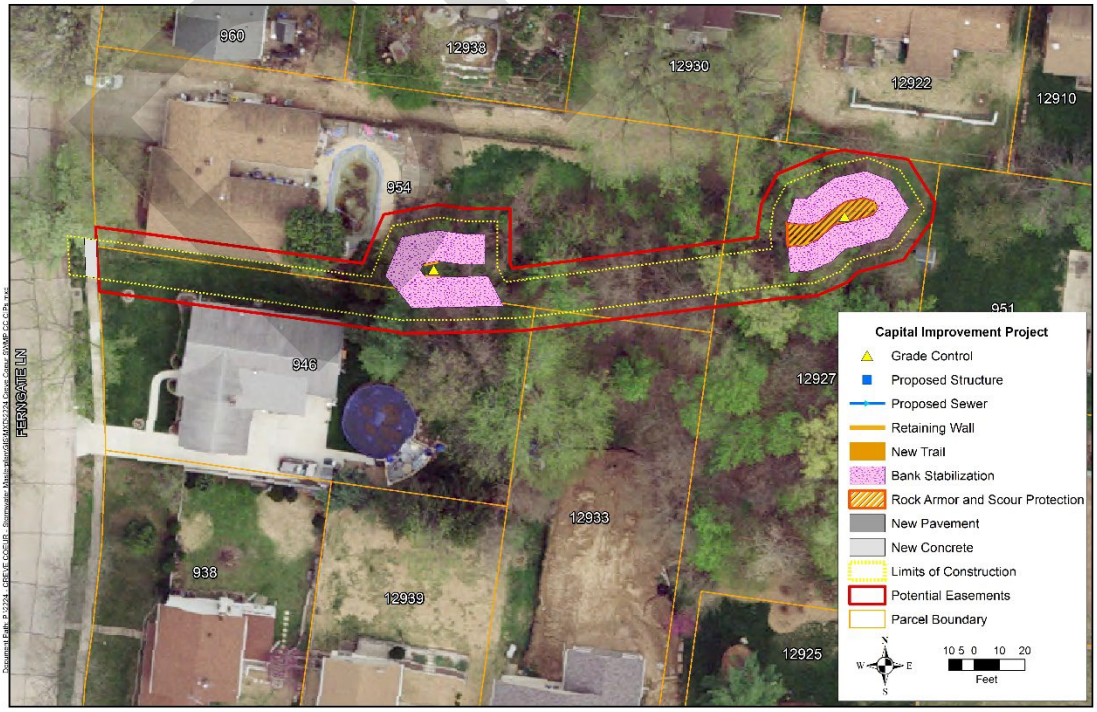
CC-C-07: Ferngate Lane

Problem Description: In a tributary to Creve Coeur creek between Ferngate Lane and Fernway Lane several issues were identified as follows. Failing grouted riprap and erosion surrounding the outlet pipe in the rear lot of 954 Ferngate Lane. Two perched outfalls with a knickpoint in the rear lot of 12922 Ferntop Lane. The affected parcels are private.

Recommendation: Install new wing walls at the outlet pipe, stabilize the banks, and install a grade control. Install a step grade control and stilling basin at the two perched outfalls. Install toe walls at the outfalls.

Outlet pipe

Perched outfall



Conceptual Layout of CC-C-07

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-07 Ferngate Lane

Project Description: Bank stabilization, grade controls, stilling basin, wing walls, and toe walls to address erosion threatening structures along a tributary to Creve Coeur Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
			Contingency = 25%	$ 2,400
			TOTAL OPINION OF SURVEYING COST =	**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	295	$ 35	$ 10,300
Rock Grade Control	CY	45	$ 200	$ 9,000
Rock Stilling Basin / Outlet Scour Protection	CY	40	$ 100	$ 4,000
Rock Toe and Slope Protection	CY	60	$ 150	$ 9,000
Bank Stabilization	SY	210	$ 120.00	$ 25,200
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF	75	$ 50	$ 3,800
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	10	$ 100	$ 1,000
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 8,500	$ 8,500
			Subtotal =	$ 93,900
			Contingency = 30%	$ 28,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 122,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 191,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-07 Ferngate Lane DATE: 12/5/2023

PROJECT LOCATION: 954 Ferngate Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basin, wing walls, and toe walls to address erosion threatening structures along a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 954 and 946 Ferngate Ln*	300		200		50	2	100
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: 954 Ferngate Ln pool*	150		100		25	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10	1	5		10

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-07 Ferngate Lane DATE: 12/5/2023

PROJECT LOCATION: 954 Ferngate Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basin, wing walls, and toe walls to address erosion threatening structures along a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**135**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-07 Ferngate Lane DATE: 12/5/2023

PROJECT LOCATION: 954 Ferngate Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basin, wing walls, and toe walls to address erosion threatening structures along a tributary to Creve Coeur Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**2.13**	PER 100 LF		10		21
	Riffle Pool Complex	**1.62**	PER 100 LF		10		16
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	1.62	PER 100 LF		10		16
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**74**
						TOTAL BENEFIT POINTS	**209**

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

TOTAL COST IN THOUSANDS= **$191**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.09**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

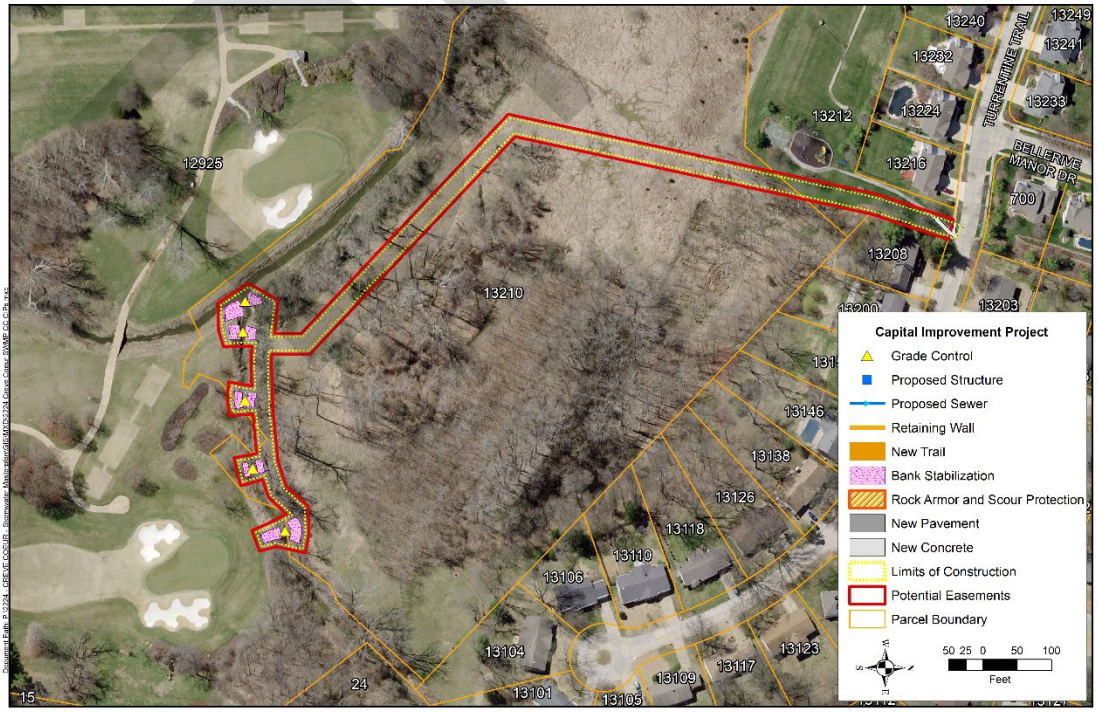
Draft

CC-C-08: Bellerive Country Club

Problem Description: Several knickpoints were observed along the downstream end of Fernridge Creek at the north end of Bellerive Country Club. The affected parcels are private.

Recommendation: Install a step grade control at the confluence and a series of grade controls along the reach.

Confluence



Conceptual Layout of CC-C-08

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-08 Bellerive Country Club

Project Description: A series of grade controls where Fernridge Creek confluences with Smith Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.9	$ 12,000	$ 10,800
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.9	$ 5,000	$ 4,500
			Subtotal =	$ 19,800
			Contingency = 25%	$ 5,000
			TOTAL OPINION OF SURVEYING COST =	**$ 24,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.9	$ 30,000	$ 27,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	740	$ 35	$ 25,900
Rock Grade Control	CY	150	$ 200	$ 30,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	95	$ 150	$ 14,300
Bank Stabilization	SY	380	$ 120.00	$ 45,600
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	35	$ 100	$ 3,500
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.9	$ 50,000	$ 45,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 19,900	$ 19,900
			Subtotal =	$ 218,800
			Contingency = 30%	$ 65,600
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 284,400**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 400,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-08 Bellerive Country Club DATE: 12/5/2023

PROJECT LOCATION: Bellerive Country Club, 12925 Ladue Road, St. Louis, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: A series of grade controls where Fernridge Creek confluences with Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	3	10		5		60

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-08 Bellerive Country Club DATE: 12/5/2023

PROJECT LOCATION: Bellerive Country Club, 12925 Ladue Road, St. Louis, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: A series of grade controls where Fernridge Creek confluences with Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**60**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-08 Bellerive Country Club DATE: 12/5/2023

PROJECT LOCATION: Bellerive Country Club, 12925 Ladue Road, St. Louis, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: A series of grade controls where Fernridge Creek confluences with Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

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)	**2.13**	PER 100 LF		10		21
	Riffle Pool Complex	**6.19**	PER 100 LF		10		62
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	6.19	PER 100 LF		10		62
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**165**
						TOTAL BENEFIT POINTS	**225**

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

TOTAL COST IN THOUSANDS= **$401**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.56**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

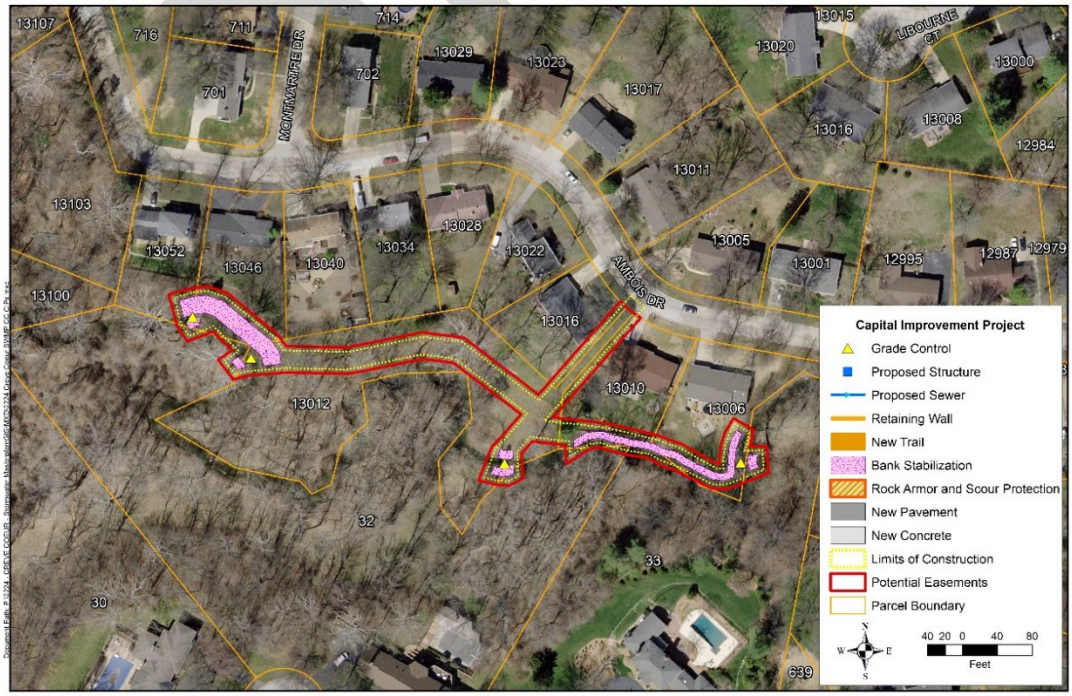
CC-C-09: Ambois Drive

Problem Description: Several issues were observed in Fernridge Creek in the rear lots of Ambois Drive properties as follows. Erosion along the RDB with seepage threatening residential fence in the rear lot of 13046 Ambois Drive and a knickpoint. Knickpoint at a minor tributary confluence in the rear lot of 13016 Ambois Drive. Erosion along the RDB threatening residential fence, yards, and a utility pole as well as an old grade control in need of replacement in the rear lots of 13006 and 13010 Ambois Drive. The affected parcels are private.

13046 Ambois Drive RDB erosion

Recommendation: Stabilize the RDB in the rear lot of 13046 Ambois Drive and install a drain to address the seepage. Install a grade control at the downstream end of the stabilization and a step grade control at the upstream end. Install a step grade control at the tributary confluence. Stabilize the RDB along the rear lots of 13006 and 13010 Ambois Drive and replace the grade control with a step grade control. Re-set the power pole guy wires.

13006 and 13010 Ambois Drive RDB erosion



Conceptual Layout of CC-C-09

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-09 Ambois Drive

Project Description: Bank stabilization and grade controls to address knickpoints and erosion threatening structures along Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.6	$ 12,000	$ 7,200
Prepare Easement Plat and Scripts	EACH	9	$ 1,500	$ 13,500
Contruction Staking and As-Built Surveying	ACRE	0.6	$ 5,000	$ 3,000
			Subtotal =	$ 23,700
			Contingency = 25%	$ 5,900
			TOTAL OPINION OF SURVEYING COST =	**$ 29,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.6	$ 30,000	$ 18,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,155	$ 35	$ 40,400
Rock Grade Control	CY	145	$ 200	$ 29,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	205	$ 150	$ 30,800
Bank Stabilization	SY	610	$ 120.00	$ 73,200
Granular Backfill	CY	30	$ 55	$ 1,700
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF	120	$ 140	$ 16,800
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.6	$ 50,000	$ 30,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 24,600	$ 24,600
			Subtotal =	$ 271,000
			Contingency = 30%	$ 81,300
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 352,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 474,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-09 Ambois Drive DATE: 12/5/2023

PROJECT LOCATION: 13010 Ambois Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address knickpoints and erosion threatening structures along Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS: 13006 Ambois Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 13046 and 13006 Ambois Dr*	300		200		50	2	100
			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	2	lots	10 points per lot				20
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	4	10		5		80

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-09 Ambois Drive DATE: 12/5/2023

PROJECT LOCATION: 13010 Ambois Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address knickpoints and erosion threatening structures along Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS: 13006 Ambois Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-09 Ambois Drive DATE: 12/5/2023

PROJECT LOCATION: 13010 Ambois Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address knickpoints and erosion threatening structures along Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS: 13006 Ambois Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

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)	**4.6**	PER 100 LF		10		46
	Riffle Pool Complex	**9.39**	PER 100 LF		10		94
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	9.39	PER 100 LF		10		94
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**244**
						TOTAL BENEFIT POINTS	**444**

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

TOTAL COST IN THOUSANDS= **$474**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.94**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

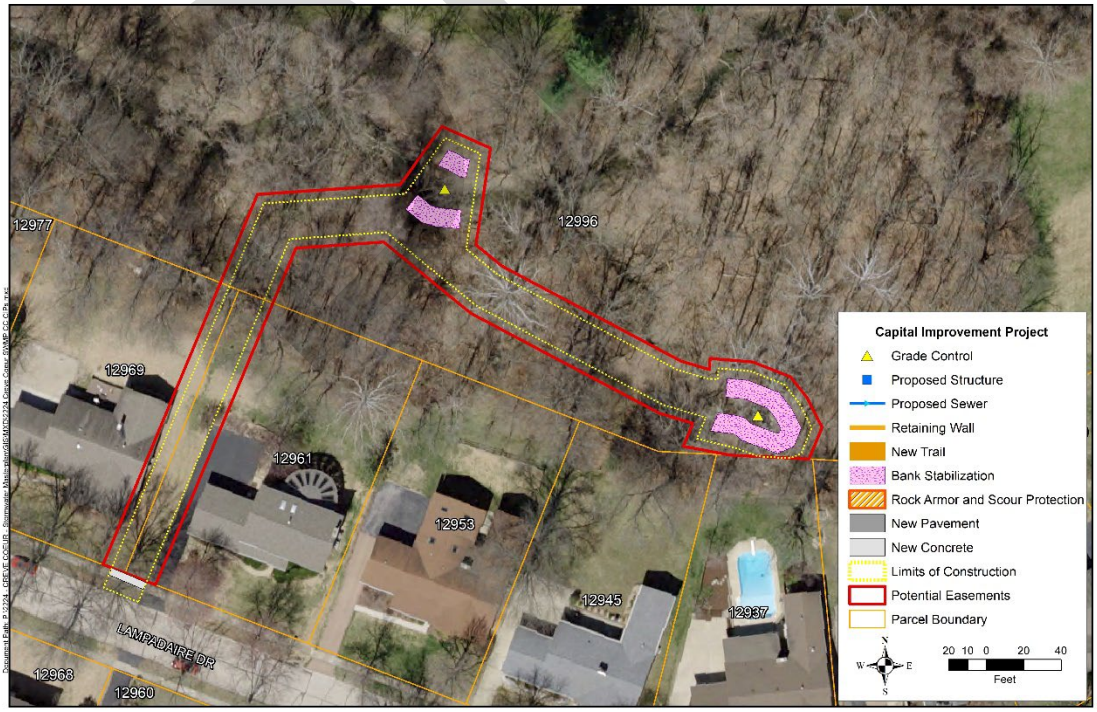
Draft

CC-C-10: Lampadaire Drive

Problem Description: Two knickpoints were observed along Fernridge Creek north of 12937 and 12953 Lampadaire Drive. The affected parcels are private.

Recommendation: Install step grade controls at the knickpoints.

Knickpoint



Conceptual Layout of CC-C-10

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-10 Lampadaire Drive

Project Description: Grade controls to stabilize knickpoints in Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.3	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.3	$ 5,000	$ 1,500
			Subtotal =	$ 9,600
			Contingency = 25%	$ 2,400
			TOTAL OPINION OF SURVEYING COST =	**$ 12,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	220	$ 35	$ 7,700
Rock Grade Control	CY	95	$ 200	$ 19,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	50	$ 150	$ 7,500
Bank Stabilization	SY	150	$ 120.00	$ 18,000
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	10	$ 100	$ 1,000
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 8,500	$ 8,500
			Subtotal =	$ 93,000
			Contingency = 30%	$ 27,900
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 120,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 190,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-10 Lampadaire Drive DATE: 12/5/2023

PROJECT LOCATION: 12961 Lampadaire Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls to stabilize knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-10 Lampadaire Drive DATE: 12/5/2023

PROJECT LOCATION: 12961 Lampadaire Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls to stabilize knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**20**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-10 Lampadaire Drive DATE: 12/5/2023

PROJECT LOCATION: 12961 Lampadaire Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls to stabilize knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

SOLUTION BENEFIT CATEGORY										
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:				Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:				Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units				Points per Unit		
	Bioswales		PER 100 LF			10		
	Forebays		AC			200		
	Wet Ponds		AC			100		
	Wetlands		AC			50		
	Biostabilization of banks (per bank)	**1.54**	PER 100 LF			10		15
	Riffle Pool Complex	**2.67**	PER 100 LF			10		27
	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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)	2.67	PER 100 LF			10		27
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**89**
							TOTAL BENEFIT POINTS	**109**

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

TOTAL COST IN THOUSANDS= **$190**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.57**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

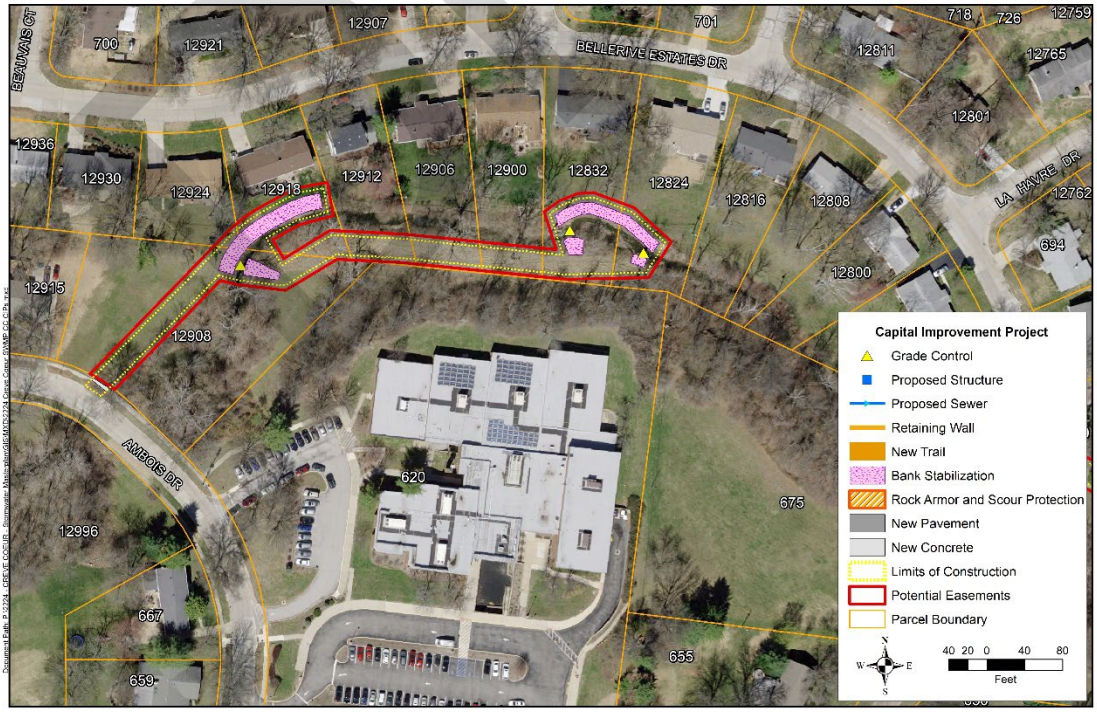
Draft

CC-C-11: Fernridge Creek at Bellerive Estates Drive

Problem Description: In Fernridge Creek along Bellerive Estates Drive several issues were observed as follows. Failing grouted riprap and erosion along an outside bend threatening residential fences in the rear lot of 12924 Bellerive Estates Drive. Erosion along the outside bend behind 12824 and 12832 Bellerive Estates Drive as well as a knickpoint. The affected parcels are private.

Erosion along outside bend

Recommendation: Replace the grouted riprap with a grade control and stabilize the outside bend. Stabilize the outside bend behind 12824 and 12832 Bellerive Estates Drive, install a grade control at the downstream end, and install a step grade control at the upstream end.



Conceptual Layout of CC-C-11

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-11 Fernridge Creek at Bellerive Estates Drive

Project Description: Bank stabilization and grade controls to address erosion threatening structures along Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	8	$ 1,500	$ 12,000
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 20,500
			Contingency = 25%	$ 5,100
			TOTAL OPINION OF SURVEYING COST =	**$ 25,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	530	$ 35	$ 18,600
Rock Grade Control	CY	115	$ 200	$ 23,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	130	$ 150	$ 19,500
Bank Stabilization	SY	505	$ 120.00	$ 60,600
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	10	$ 100	$ 1,000
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 17,000	$ 17,000
			Subtotal =	$ 187,300
			Contingency = 30%	$ 56,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 243,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 360,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-11 Fernridge Creek at Bellerive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 12918 Bellerive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion along threatening structures Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS: 12918 Bellerive Estates Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 12918 Bellerive Estates Dr*	300		200		50	1	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	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5	2	30

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-11 Fernridge Creek at Bellerive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 12918 Bellerive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion along threatening structures Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS: 12918 Bellerive Estates Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**90**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-11 Fernridge Creek at Bellerive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 12918 Bellerive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion along threatening structures Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS: 12918 Bellerive Estates Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

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)	**3.05**	PER 100 LF		10		31
	Riffle Pool Complex	**7.22**	PER 100 LF		10		72
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	2.5	PER 100 LF		10		25
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**138**
						TOTAL BENEFIT POINTS	**228**

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

TOTAL COST IN THOUSANDS= **$360**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.63**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

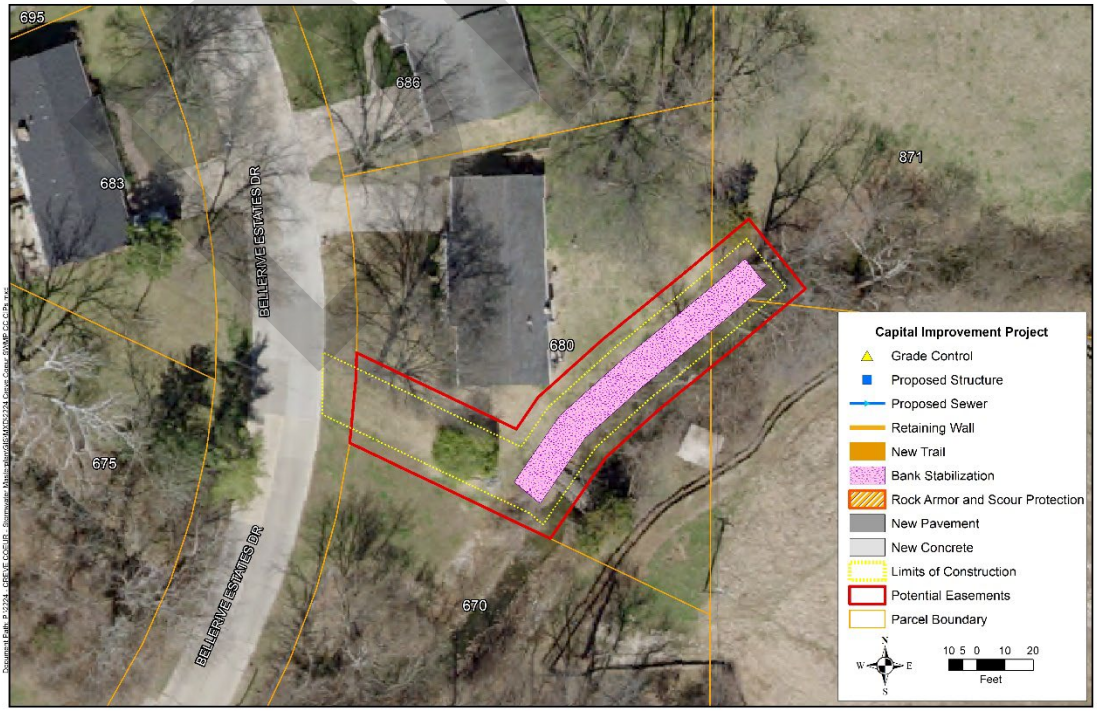
Draft

CC-C-12: 680 Bellerive Estates Drive

Problem Description: In Fernridge Creek behind 680 Bellerive Estates Drive erosion was observed along the RDB. The affected parcels are private.

Recommendation: Stabilize the RDB. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.

RDB Erosion



Conceptual Layout of CC-C-12

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-12 680 Bellerive Estates Drive

Project Description: Bank stabilization to address erosion threatening structures along Fernridge Creek. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 6,200
		Contingency =	25%	$ 1,600
		TOTAL OPINION OF SURVEYING COST =		**$ 7,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	220	$ 35	$ 7,700
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	50	$ 150	$ 7,500
Bank Stabilization	SY	150	$ 120.00	$ 18,000
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 4,800	$ 4,800
			Subtotal =	$ 52,800
		Contingency =	30%	$ 15,800
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 68,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 167,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-12 680 Bellerive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 680 Bellerive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion threatening structures along Fernridge Creek. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.

ENVIRONMENTAL CONSIDERATIONS: 680 Bellerive Estates Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 680 Bellerive Estates Dr*	300		200	1	50		200
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	150		100		25		
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-12 680 Bellerive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 680 Bellerive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion threatening structures along Fernridge Creek. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.

ENVIRONMENTAL CONSIDERATIONS: 680 Bellerive Estates Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
2.0 STORM SEWER / OVERLAND FLOW	**PROBLEM SOLVED CATEGORY, CONT.** Note: Problem points are awarded only for those problems solved by the proposed solution.		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**210**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-12 680 Bellerive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 680 Bellerive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion threatening structures along Fernridge Creek. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.

ENVIRONMENTAL CONSIDERATIONS: 680 Bellerive Estates Drive is located in the floodplain.

COMMON GROUND: This project is partially located on common ground.

SOLUTION BENEFIT CATEGORY										
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:				Max points:	1000			
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:				Points per Add'l Proj.:	50			
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units				Points per Unit				
	Bioswales		PER 100 LF			10				
	Forebays		AC			200				
	Wet Ponds		AC			100				
	Wetlands		AC			50				
	Biostabilization of banks (per bank)	**1.15**	PER 100 LF			10				12
	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				
	4.4 Preserves natural resource areas	No. Units				Points per Unit				
	Lakes, Wetlands, etc.		AC			30				
	Natural Corridor (min. 25ft width)		PER 100 LF			10				
	4.5 Conservation Easement		EA			20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**32**
								TOTAL BENEFIT POINTS		**242**

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

TOTAL COST IN THOUSANDS= **$167**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.45**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

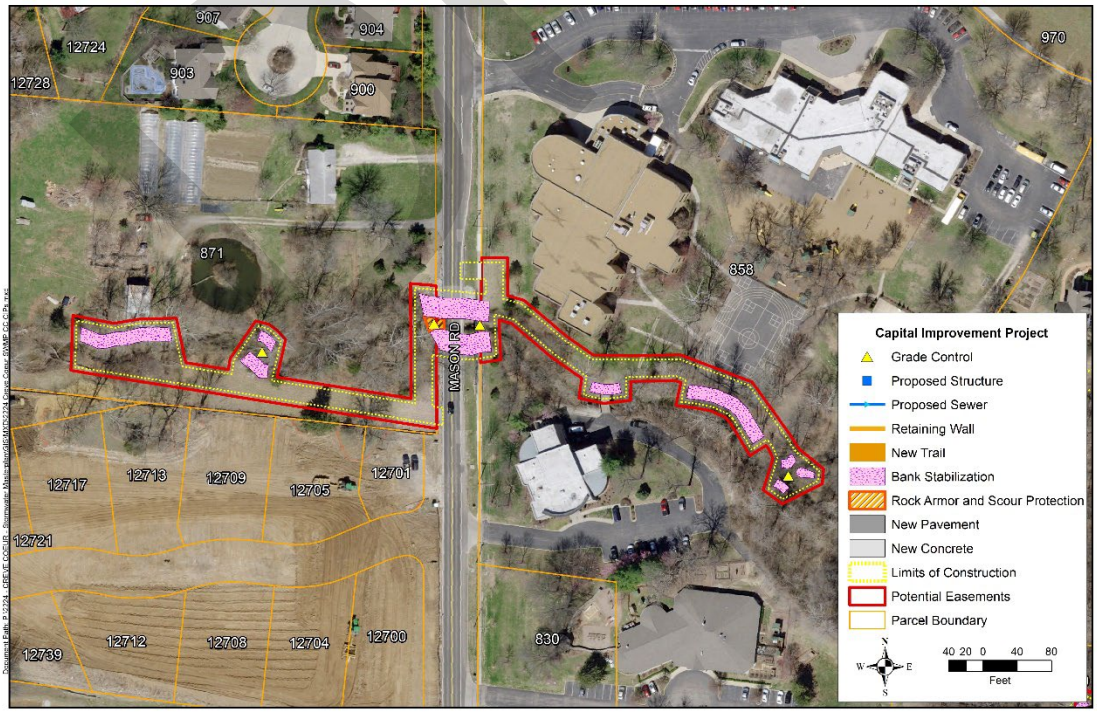
CC-C-13: North Mason Road

Problem Description: In Fernridge Creek upstream and downstream of North Mason Road several issues were observed as follows. RDB erosion along an outside bend threatening an old structure at 871 North Mason Road with an exposed utility line causing a knickpoint about 150 ft upstream. Knickpoints on either side of the North Mason Road bridge with an exposed sanitary line on the upstream side. Threatened pedestrian bridge abutment south of Andrews Academy (888 North Mason Road). RDB erosion along the outside bend threatening the school court. Knickpoint at the tributary confluence. The affected parcels are private.

North Mason Road crossing

Threatened school court

Recommendation: Stabilize the RDB threatening the old structure and install a step grade control at the knickpoint. Install a step grade control and stilling basin downstream of North Mason Road and a grade control upstream. Stabilize the RDB to protect the threatened abutment. Stabilize the RDB to protect the school court. Install a step grade control at the confluence.



Conceptual Layout of CC-C-13

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-13 North Mason Road

Project Description: Bank stabilization, grade controls, and a stilling basin to address erosion and knickpoints threatening structures in Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.9	$ 12,000	$ 10,800
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.9	$ 5,000	$ 4,500
			Subtotal =	$ 18,300
			Contingency = 25%	$ 4,600
			TOTAL OPINION OF SURVEYING COST =	**$ 22,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	3	$ 1,000	$ 3,000
			Subtotal =	$ 11,500
			Contingency = 25%	$ 2,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 14,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.9	$ 30,000	$ 27,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,590	$ 35	$ 55,700
Rock Grade Control	CY	145	$ 200	$ 29,000
Rock Stilling Basin / Outlet Scour Protection	CY	45	$ 100	$ 4,500
Rock Toe and Slope Protection	CY	225	$ 150	$ 33,800
Bank Stabilization	SY	970	$ 120.00	$ 116,400
Granular Backfill	CY	35	$ 55	$ 1,900
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	10	$ 100	$ 1,000
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.9	$ 50,000	$ 45,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 32,200	$ 32,200
			Subtotal =	$ 354,000
			Contingency = 30%	$ 106,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 460,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 619,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-13 North Mason Road DATE: 12/5/2023

PROJECT LOCATION: 900 North Mason Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion and knickpoints threatening structures in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 888 N Mason Rd school court*	150		100	1	25		100
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Pedestrian bridges*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10	3	5		70

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-13 North Mason Road DATE: 12/5/2023

PROJECT LOCATION: 900 North Mason Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion and knickpoints threatening structures in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**220**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-13 North Mason Road DATE: 12/5/2023

PROJECT LOCATION: 900 North Mason Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion and knickpoints threatening structures in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**4.96**	PER 100 LF		10		50
	Riffle Pool Complex	**11.46**	PER 100 LF		10		115
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	11.46	PER 100 LF		10		115
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**Yes**		**100**
						TOTAL SOLUTION POINTS	**399**
						TOTAL BENEFIT POINTS	**619**

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

TOTAL COST IN THOUSANDS= **$620**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.00**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

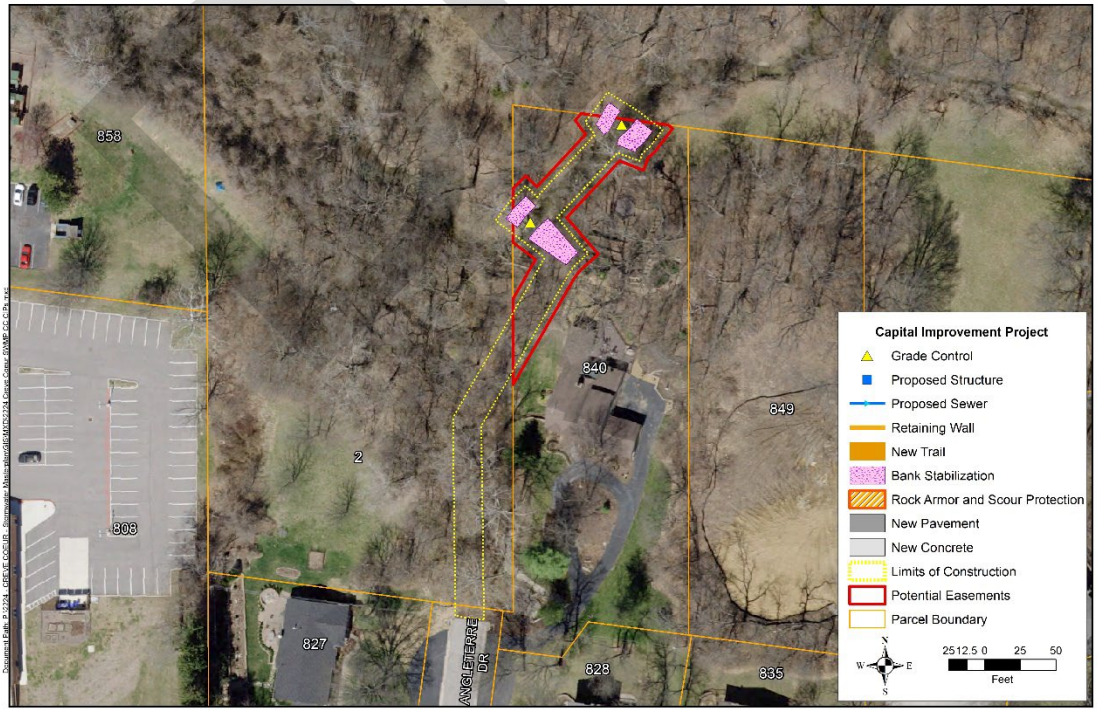
Draft

CC-C-14: 840 Angleterre Drive

Problem Description: Along a tributary to Fernridge Creek north of Angleterre Drive, two knickpoints were observed. There is also an exposed utility line. The affected parcels are private and public.

Recommendation: Install a step grade control at the knickpoint with the exposed utility and a grade control at the other knickpoint.

Knickpoint with exposed utility line



Conceptual Layout of CC-C-14

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-14 840 Angleterre Drive

Project Description: Grade controls with associated bank stabilization to address knickpoints in a tributary to Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 4,900
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 6,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	200	$ 35	$ 7,000
Rock Grade Control	CY	65	$ 200	$ 13,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	40	$ 150	$ 6,000
Bank Stabilization	SY	135	$ 120.00	$ 16,200
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 6,500	$ 6,500
			Subtotal =	$ 71,800
		Contingency =	30%	$ 21,500
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 93,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 156,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-14 840 Angleterre Drive DATE: 12/5/2023

PROJECT LOCATION: 840 Angleterre Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls with associated bank stabilization to address knickpoints in a tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5	1	25

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-14 840 Angleterre Drive DATE: 12/5/2023

PROJECT LOCATION: 840 Angleterre Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls with associated bank stabilization to address knickpoints in a tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**25**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-14 840 Angleterre Drive DATE: 12/5/2023

PROJECT LOCATION: 840 Angleterre Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls with associated bank stabilization to address knickpoints in a tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**0.7**	PER 100 LF		10		7
	Riffle Pool Complex	**3.58**	PER 100 LF		10		36
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	3.58	PER 100 LF		10		36
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**99**
						TOTAL BENEFIT POINTS	**124**

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

TOTAL COST IN THOUSANDS= **$156**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.79**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

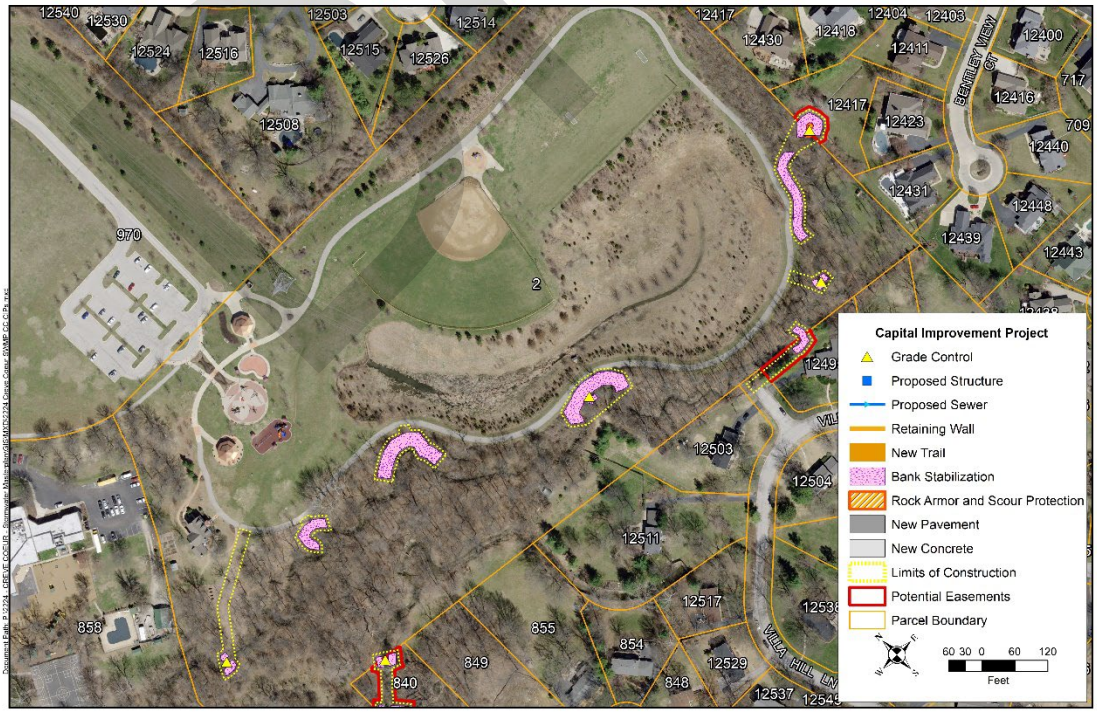
Draft

CC-C-15: Millenium Park

Problem Description: In Millenium Park several issues were identified along a tributary to Fernridge Creek as follows. Knickpoint at the west end of the property. Erosion along the outside bend threatening a sculpture. Three locations had erosion along the outside bend of the channel threatening the trail. Knickpoint north of 12511 Villa Hill Lane. Knickpoint northeast of 12495 Villa Hill Lane. Knickpoint at the outfalls on the east end of the property. The affected parcels are public and private.

Outside bend erosion

Recommendation: Install a grade control at the west knickpoint. Relocate the sculpture. Stabilize the RDB outside bends of the channel. Install a step grade control north of 12511 Villa Hill Lane and northeast of 12495 Villa Hill Lane. Install a step grade control and stilling basin at the east end of the property. This project will be combined with future project Millenium Park Phase 2.



Conceptual Layout of CC-C-15

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-15 Millenium Park

Project Description: Bank stabilization, grade controls, and a stilling basin to address erosion along a tributary to Fernridge Creek in Millenium Park. This project will be combined with future project Millenium Park Phase 2.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.8	$ 12,000	$ 9,600
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.8	$ 5,000	$ 4,000
			Subtotal =	$ 15,100
		Contingency =	25%	$ 3,800
		TOTAL OPINION OF SURVEYING COST =		**$ 18,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	100	$ 20	$ 2,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	4	$ 1,000	$ 4,000
			Subtotal =	$ 13,000
		Contingency =	25%	$ 3,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 16,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.8	$ 30,000	$ 24,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	3,605	$ 35	$ 126,200
Rock Grade Control	CY	105	$ 200	$ 21,000
Rock Stilling Basin / Outlet Scour Protection	CY	40	$ 100	$ 4,000
Rock Toe and Slope Protection	CY	290	$ 150	$ 43,500
Bank Stabilization	SY	1,560	$ 120.00	$ 187,200
Granular Backfill	CY	35	$ 55	$ 1,900
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.8	$ 50,000	$ 40,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 45,300	$ 45,300
			Subtotal =	$ 498,600
		Contingency =	30%	$ 149,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 648,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 805,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-15 Millenium Park DATE: 12/5/2023

PROJECT LOCATION: Millenium Park, 2 Barnes West Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion along a tributary to Fernridge Creek in Millenium Park. This project will be combined with future project Millenium Park Phase 2.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 24 Balcon Estates*	300		200		50		
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: 24 Balcon Estates pool*	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	4	10		5		80

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-15 Millenium Park DATE: 12/5/2023

PROJECT LOCATION: Millenium Park, 2 Barnes West Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion along a tributary to Fernridge Creek in Millenium Park. This project will be combined with future project Millenium Park Phase 2.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**80**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-15 Millenium Park DATE: 12/5/2023

PROJECT LOCATION: Millenium Park, 2 Barnes West Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion along a tributary to Fernridge Creek in Millenium Park. This project will be combined with future project Millenium Park Phase 2.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**8.52**	PER 100 LF		10		85
	Riffle Pool Complex	**9.57**	PER 100 LF		10		96
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	9.57	PER 100 LF		10		96
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**Yes**		**100**
						TOTAL SOLUTION POINTS	**397**
						TOTAL BENEFIT POINTS	**477**

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

TOTAL COST IN THOUSANDS= **$805**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.59**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

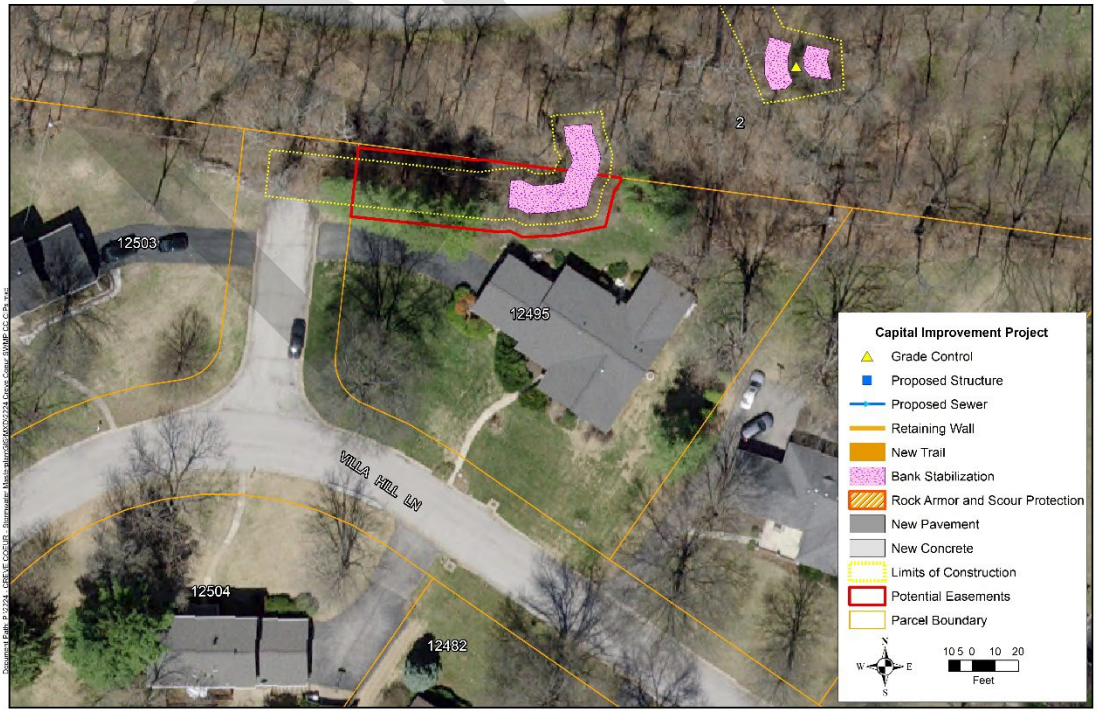
Draft

CC-C-16: Villa Hill Lane

Problem Description: Bank erosion along an outside bend threatening a retaining wall and fence was observed along a tributary to Fernridge Creek in the rear lot of 12495 Villa Hill Lane. The affected parcels are private and public.

Recommendation: Stabilize the outside bend.

Threatened fence and wall



Conceptual Layout of CC-C-16

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-16 Villa Hill Lane

Project Description: Bank stabilization to adress erosion threatening structures along an outside bend of Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 3,200
			Contingency = 25%	$ 800
			TOTAL OPINION OF SURVEYING COST =	**$ 4,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	90	$ 35	$ 3,200
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	25	$ 150	$ 3,800
Bank Stabilization	SY	80	$ 120.00	$ 9,600
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 3,000	$ 3,000
			Subtotal =	$ 33,400
			Contingency = 30%	$ 10,000
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 43,400**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 104,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-16 Villa Hill Lane DATE: 12/5/2023

PROJECT LOCATION: 12495 Villa Hill Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization to adress erosion threatening structures along an outside bend of Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 12495 Villa Hill Ln*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Retaining wall*	150	1	100		25		150
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-16 Villa Hill Lane DATE: 12/5/2023

PROJECT LOCATION: 12495 Villa Hill Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization to adress erosion threatening structures along an outside bend of Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**210**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-16 Villa Hill Lane DATE: 12/5/2023

PROJECT LOCATION: 12495 Villa Hill Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization to adress erosion threatening structures along an outside bend of Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**0.72**	PER 100 LF		10		7
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**27**
						TOTAL BENEFIT POINTS	**237**

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

TOTAL COST IN THOUSANDS= **$104**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.28**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

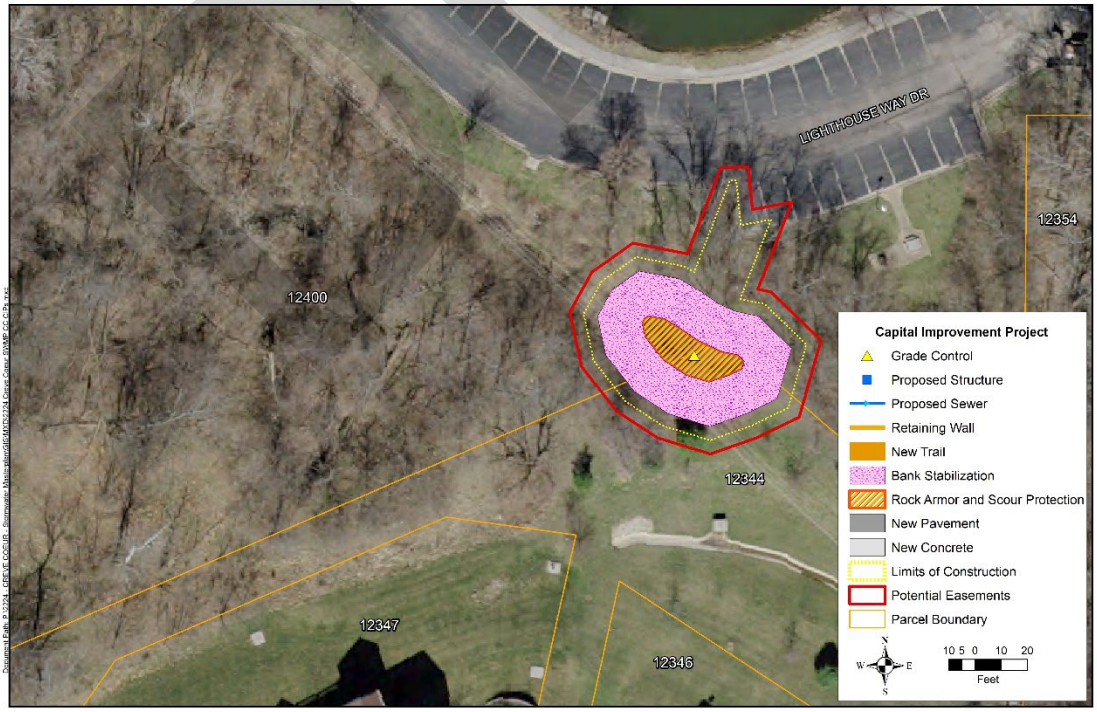
Draft

CC-C-17: 12344 Mulberry Tree Court

Problem Description: In a tributary to Fernridge Creek south of Lighthouse Way Drive two perched outfalls and a scour hole were observed. One of the outfalls has a large flanking hole on the side from piping. The affected parcels are private.

Recommendation: Install a step grade control and stilling basin.

Threatened fence



Conceptual Layout of CC-C-17

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-17 12344 Mulberry Tree Court

Project Description: Grade control and stilling basin to address perched outfalls and a scour hole in a tributary to Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	370	$ 35	$ 13,000
Rock Grade Control	CY	40	$ 200	$ 8,000
Rock Stilling Basin / Outlet Scour Protection	CY	70	$ 100	$ 7,000
Rock Toe and Slope Protection	CY	45	$ 150	$ 6,800
Bank Stabilization	SY	270	$ 120.00	$ 32,400
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 8,300	$ 8,300
			Subtotal =	$ 90,800
		Contingency =	30%	$ 27,200
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 118,000**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 180,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-17 12344 Mulberry Tree Court DATE: 12/5/2023

PROJECT LOCATION: 12344 Mulberry Tree Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and stilling basin to address perched outfalls and a scour hole in a tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-17 12344 Mulberry Tree Court DATE: 12/5/2023

PROJECT LOCATION: 12344 Mulberry Tree Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and stilling basin to address perched outfalls and a scour hole in a tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-17 12344 Mulberry Tree Court DATE: 12/5/2023

PROJECT LOCATION: 12344 Mulberry Tree Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and stilling basin to address perched outfalls and a scour hole in a tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**2.04**	PER 100 LF		10		20
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**40**
						TOTAL BENEFIT POINTS	**40**

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

TOTAL COST IN THOUSANDS= **$181**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

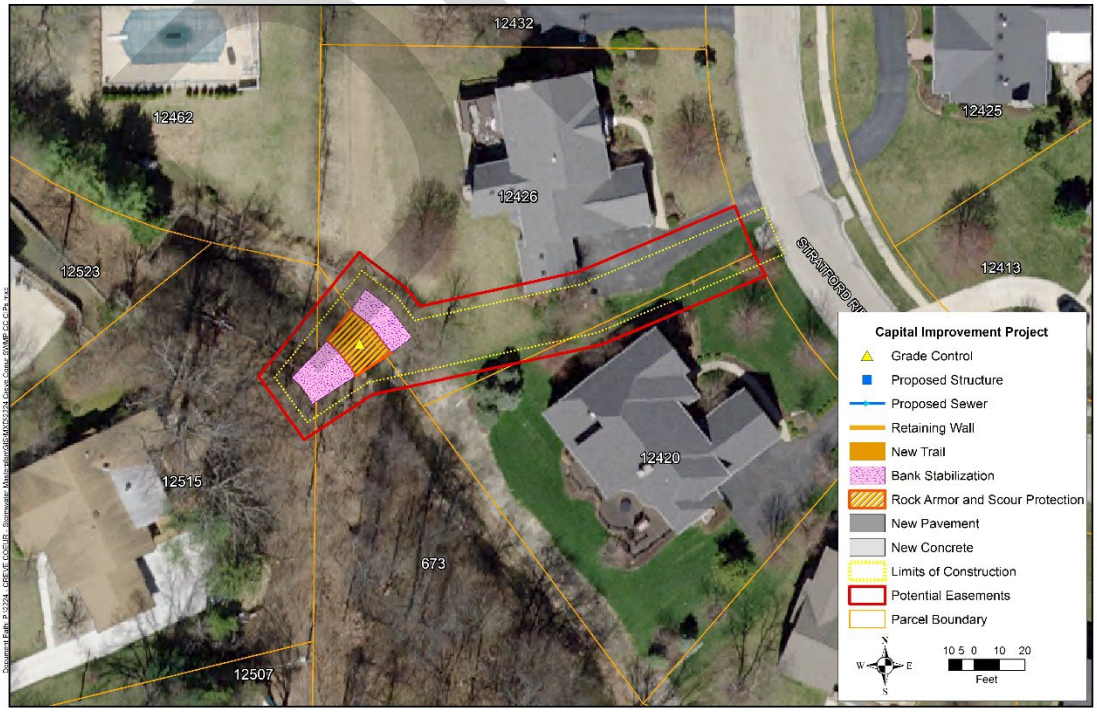
Draft

CC-C-18: 12426 Stratford Ridge Court

Problem Description: In Fernridge Creek behind 12426 Stratford Ridge Court failing reno mat and grouted riprap was observed. The affected parcels are private.

Recommendation: Install a grade control and stilling basin.

Failing reno mat



Conceptual Layout of CC-C-18

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-18 12426 Stratford Ridge Court

Project Description: Grade control and stilling basin to address failing grouted riprap in Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 7,700
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF SURVEYING COST =	**$ 9,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	165	$ 35	$ 5,800
Rock Grade Control	CY	50	$ 200	$ 10,000
Rock Stilling Basin / Outlet Scour Protection	CY	50	$ 100	$ 5,000
Rock Toe and Slope Protection	CY	20	$ 150	$ 3,000
Bank Stabilization	SY	60	$ 120.00	$ 7,200
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 4,600	$ 4,600
			Subtotal =	$ 50,700
			Contingency = 30%	$ 15,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 65,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 132,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-18 12426 Stratford Ridge Court DATE: 12/5/2023

PROJECT LOCATION: 12426 Stratford Ridge Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and stilling basin to address failing grouted riprap in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-18 12426 Stratford Ridge Court DATE: 12/5/2023

PROJECT LOCATION: 12426 Stratford Ridge Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and stilling basin to address failing grouted riprap in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**20**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-18 12426 Stratford Ridge Court DATE: 12/5/2023

PROJECT LOCATION: 12426 Stratford Ridge Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and stilling basin to address failing grouted riprap in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**0.4**	PER 100 LF		10		4
	Riffle Pool Complex	**2.66**	PER 100 LF		10		27
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	2.66	PER 100 LF		10		27
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**77**
						TOTAL BENEFIT POINTS	**97**

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

TOTAL COST IN THOUSANDS= **$132**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.74**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

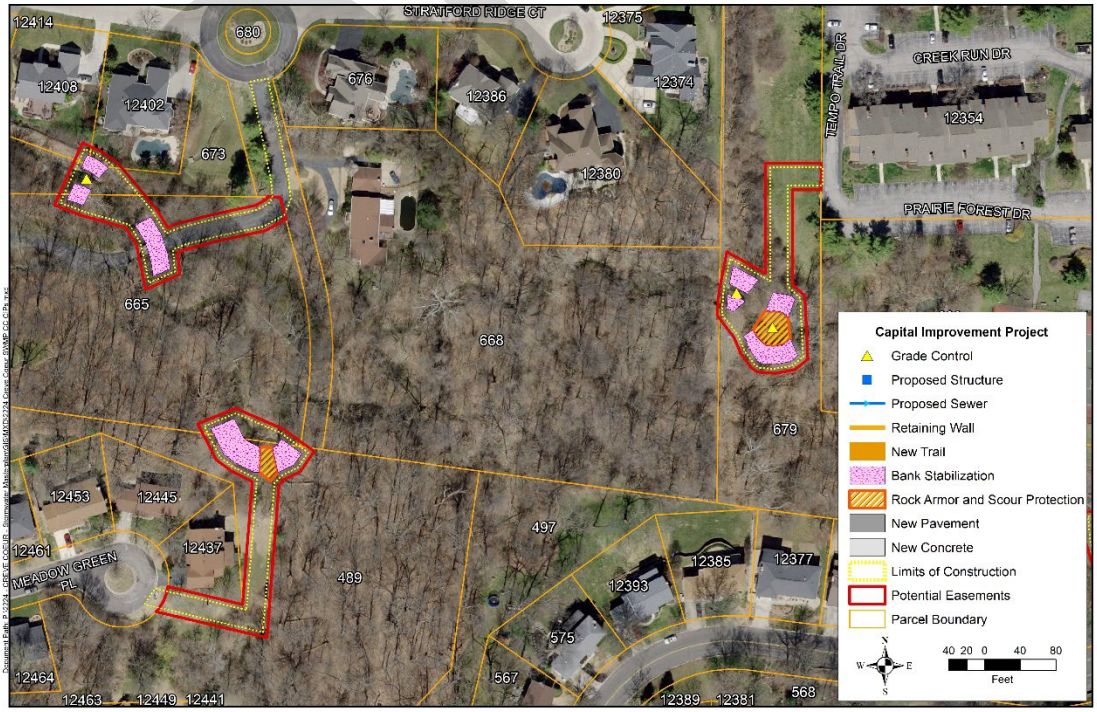
CC-C-19: Questover Lane

Bridge abutment

Exposed manhole and pipe

Problem Description: In Fernridge Creek between Questover Lane and Prairie Forest Drive several issues were observed as follows. Knickpoint in the rear lot of 12402 Stratford Ridge Court. Exposed utility pipe, failing grouted riprap, and an undermined abutment at the 665 Questover Lane driveway crossing. Erosion along the outside LDB of the channel with an exposed utility pipe, manhole, and telephone pedestal northeast of 12445 Meadow Green Place. Knickpoint and perched concrete spillway southeast of 12380 Whitworth Terrace Court. Knickpoint along tributary south of Prairie Forest Drive and a scour hole at the outfall. The affected parcels are private.

Recommendation: Install a grade control at the knickpoint behind 12402 Stratford Ridge Court. Stabilize the RDB to protect the bridge abutment. Stabilize the LDB to protect the manhole and utility pedestal and rock armor the outfall swale. Install a step grade control at the knickpoint southeast of 12380 Whitworth Terrace Court. Install a step grade control and stilling basin downstream of the concrete spillway. Install a step grade control and stilling basin at the tributary knickpoint and outfall.



Conceptual Layout of CC-C-19

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-19 Questover Lane

Project Description: Bank stabilization, grade controls, and stilling basins to address erosion in Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.8	$ 12,000	$ 9,600
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.8	$ 5,000	$ 4,000
			Subtotal =	$ 22,600
			Contingency = 25%	$ 5,700
			TOTAL OPINION OF SURVEYING COST =	**$ 28,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	3	$ 1,000	$ 3,000
			Subtotal =	$ 11,500
			Contingency = 25%	$ 2,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 14,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.8	$ 30,000	$ 24,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	2,380	$ 35	$ 83,300
Rock Grade Control	CY	200	$ 200	$ 40,000
Rock Stilling Basin / Outlet Scour Protection	CY	185	$ 100	$ 18,500
Rock Toe and Slope Protection	CY	225	$ 150	$ 33,800
Bank Stabilization	SY	775	$ 120.00	$ 93,000
Granular Backfill	CY	50	$ 55	$ 2,800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	60	$ 50	$ 3,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.8	$ 50,000	$ 40,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 34,400	$ 34,400
			Subtotal =	$ 378,300
			Contingency = 30%	$ 113,500
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 491,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 614,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-19 Questover Lane DATE: 12/5/2023

PROJECT LOCATION: 665 Questover Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Undermined driveway bridge*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-19 Questover Lane DATE: 12/5/2023

PROJECT LOCATION: 665 Questover Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**80**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-19 Questover Lane DATE: 12/5/2023

PROJECT LOCATION: 665 Questover Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

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)	**3.72**	PER 100 LF		10		37
	Riffle Pool Complex	**4.42**	PER 100 LF		10		44
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	4.42	PER 100 LF		10		44
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**136**
						TOTAL BENEFIT POINTS	**216**

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

TOTAL COST IN THOUSANDS= **$615**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.35**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

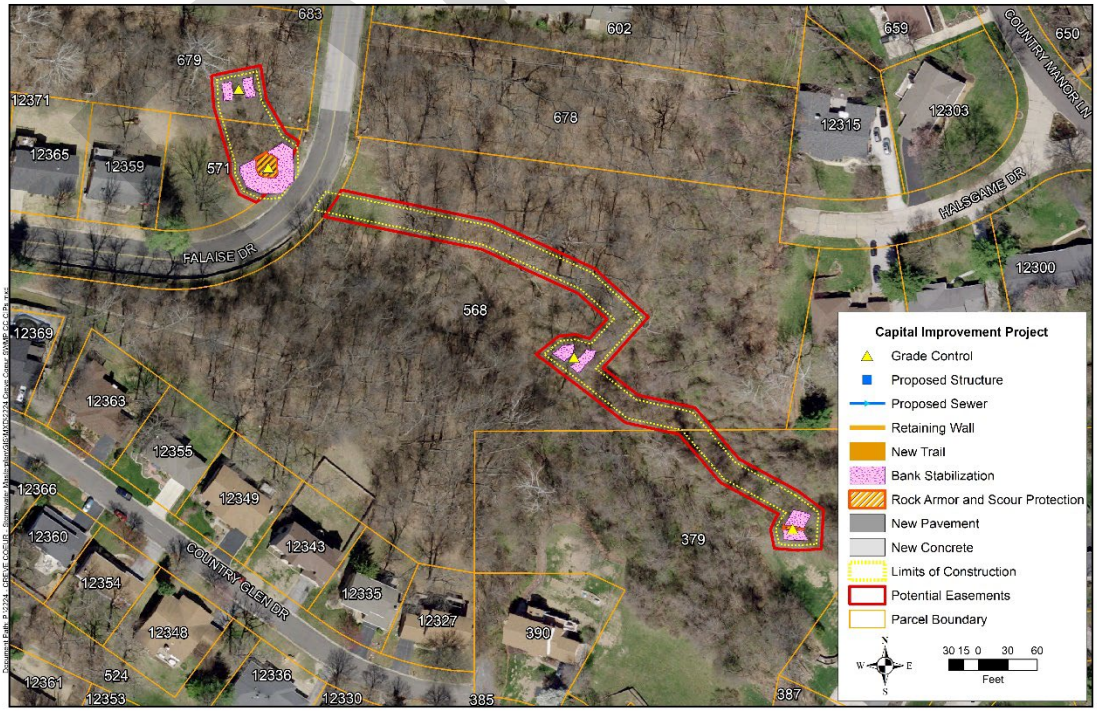
CC-C-20: Falaise Drive

Problem Description: In Fernridge Creek between Cross Creek Drive and Royal Valley Drive several issues were observed as follows. Two knickpoints and wingwalls being flanked downstream of Cross Creek Drive. Knickpoint caused by an exposed utility line. Knickpoint at the upstream outfall. The affected parcels are private.

Recommendation: Install step grade controls at the knickpoints downstream of Cross Creek Drive and a stilling basin at the outfall. Install a step grade control at the exposed utility line. Install a step grade control and stilling basin at the upstream outfall.

Cross Creek Drive outfall

Exposed utility line



Conceptual Layout of CC-C-20

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-20 Falaise Drive

Project Description: Bank stabilization, grade controls, and stilling basins to address knickpoints in Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 14,500
			Contingency = 25%	$ 3,600
			TOTAL OPINION OF SURVEYING COST =	**$ 18,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	765	$ 35	$ 26,800
Rock Grade Control	CY	140	$ 200	$ 28,000
Rock Stilling Basin / Outlet Scour Protection	CY	85	$ 100	$ 8,500
Rock Toe and Slope Protection	CY	85	$ 150	$ 12,800
Bank Stabilization	SY	325	$ 120.00	$ 39,000
Granular Backfill	CY	25	$ 55	$ 1,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 16,400	$ 16,400
			Subtotal =	$ 180,400
			Contingency = 30%	$ 54,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 234,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 345,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-20 Falaise Drive DATE: 12/5/2023

PROJECT LOCATION: 571 Falaise Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address: Cross Creek Dr, undermined culvert*	35	3	25		6		105
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-20 Falaise Drive DATE: 12/5/2023

PROJECT LOCATION: 571 Falaise Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**145**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-20 Falaise Drive DATE: 12/5/2023

PROJECT LOCATION: 571 Falaise Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

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)	**2.47**	PER 100 LF		10		25
	Riffle Pool Complex	**4.71**	PER 100 LF		10		47
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	4.71	PER 100 LF		10		47
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**139**
						TOTAL BENEFIT POINTS	**284**

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

TOTAL COST IN THOUSANDS= **$345**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.82**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

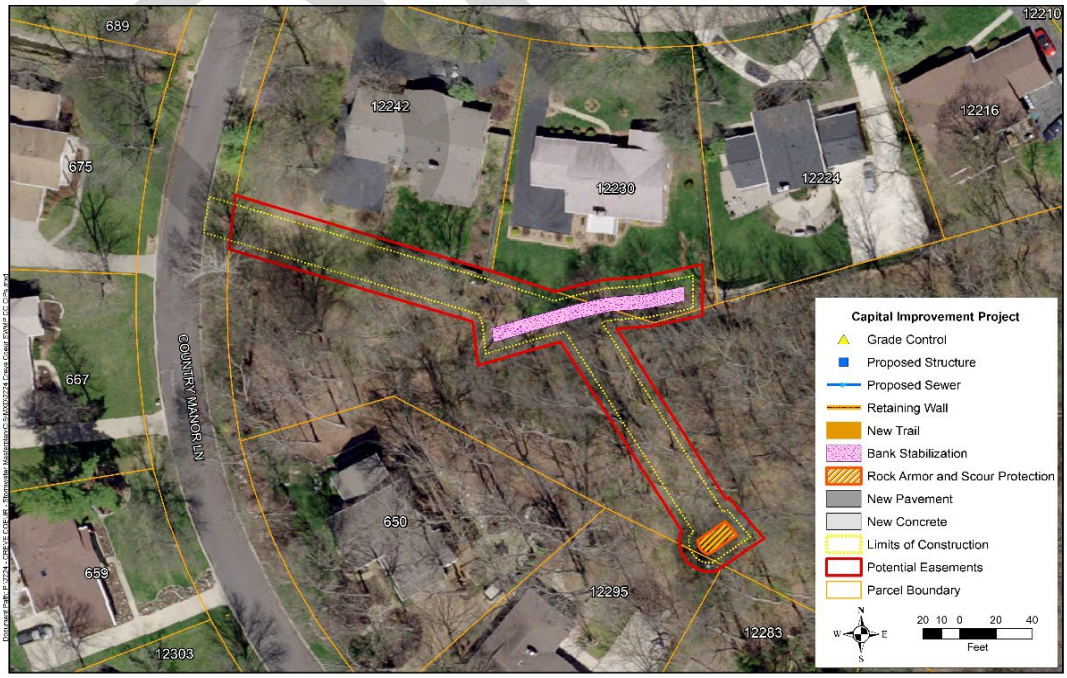
CC-C-21: Blackheath Court and Country Manor Lane

Problem Description: In an upper tributary to Fernridge Creek erosion was observed along the RDB in the rear yard of 12230 Blackheath Court. Erosion at the outfall behind 12295 Country Manor Lane was also reported. The affected parcels are private.

Recommendation: Stabilize the RDB and rock armor the pipe outfall.

RDB erosion

Draft



Conceptual Layout of CC-C-21

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-21 Blackheath Court and Country Manor Lane

Project Description: Bank stabilization and rock armoring to address erosion in an upper tributary to Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
			Contingency = 25%	$ 2,400
			TOTAL OPINION OF SURVEYING COST =	**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	100	$ 35	$ 3,500
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	85	$ 150	$ 12,800
Bank Stabilization	SY	95	$ 120.00	$ 11,400
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 5,100	$ 5,100
			Subtotal =	$ 55,600
			Contingency = 30%	$ 16,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 72,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 140,700**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-21 Blackheath Court and Country Manor Lane DATE: 12/5/2023

PROJECT LOCATION: 12230 Blackheath Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and rock armoring to address erosion in an upper tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-21 Blackheath Court and Country Manor Lane DATE: 12/5/2023

PROJECT LOCATION: 12230 Blackheath Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and rock armoring to address erosion in an upper tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-21 Blackheath Court and Country Manor Lane DATE: 12/5/2023

PROJECT LOCATION: 12230 Blackheath Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and rock armoring to address erosion in an upper tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

SOLUTION BENEFIT CATEGORY									
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units			Points per Unit		
	Bioswales		PER 100 LF		10		
	Forebays		AC		200		
	Wet Ponds		AC		100		
	Wetlands		AC		50		
	Biostabilization of banks (per bank)	**1.08**	PER 100 LF		10		11
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**31**
						TOTAL BENEFIT POINTS	**31**

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

TOTAL COST IN THOUSANDS= **$141**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

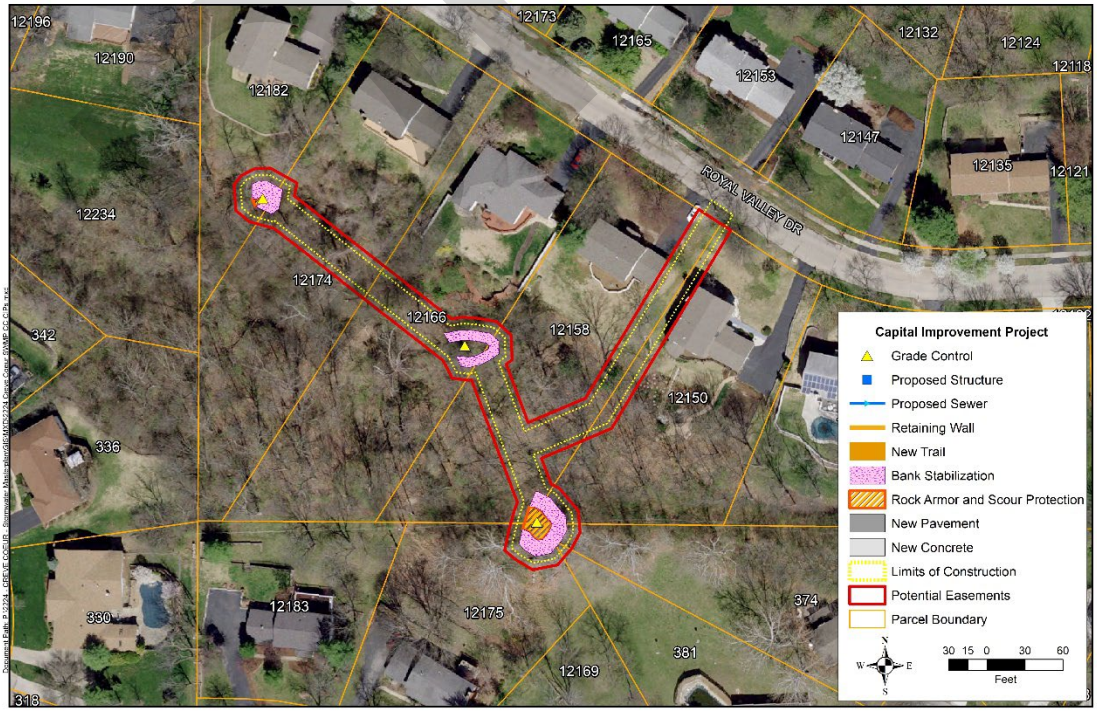
Draft

CC-C-22: Royal Valley Drive

Problem Description: In Fernridge Creek between Royal Valley Drive and Hibler Court several issues were observed as follows. Failed pipe segment with a knickpoint in the rear lot of 12182 Royal Valley Drive. Perched outfall and erosion threatening residential fence in the rear lot of 12166 Royal Valley Drive. Knickpoint and pipe section failure at the upstream end of the channel. The affected parcels are private.

Threatened fence

Recommendation: Install a step grade control and stilling basin in the rear lot of 12182 Royal Valley Drive. Install a step grade control at the perched outfall. Install a step grade control and stilling basin at the upstream end of the channel.



Conceptual Layout of CC-C-22

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-22 Royal Valley Drive

Project Description: Grade controls and stilling basins to address knickpoints in Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.3	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	8	$ 1,500	$ 12,000
Contruction Staking and As-Built Surveying	ACRE	0.3	$ 5,000	$ 1,500
			Subtotal =	$ 17,100
			Contingency = 25%	$ 4,300
			TOTAL OPINION OF SURVEYING COST =	**$ 21,400**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	475	$ 35	$ 16,600
Rock Grade Control	CY	110	$ 200	$ 22,000
Rock Stilling Basin / Outlet Scour Protection	CY	65	$ 100	$ 6,500
Rock Toe and Slope Protection	CY	65	$ 150	$ 9,800
Bank Stabilization	SY	215	$ 120.00	$ 25,800
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 11,200	$ 11,200
			Subtotal =	$ 123,500
			Contingency = 30%	$ 37,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 160,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 239,300**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-22 Royal Valley Drive DATE: 12/5/2023

PROJECT LOCATION: 12182 Royal Valley Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls and stilling basins to address knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-22 Royal Valley Drive DATE: 12/5/2023

PROJECT LOCATION: 12182 Royal Valley Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls and stilling basins to address knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-22 Royal Valley Drive DATE: 12/5/2023

PROJECT LOCATION: 12182 Royal Valley Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls and stilling basins to address knickpoints in Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2.32**	PER 100 LF		10		23
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**33**
						TOTAL BENEFIT POINTS	**33**

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

TOTAL COST IN THOUSANDS= **$239**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.14**

Place "X" in one box below:

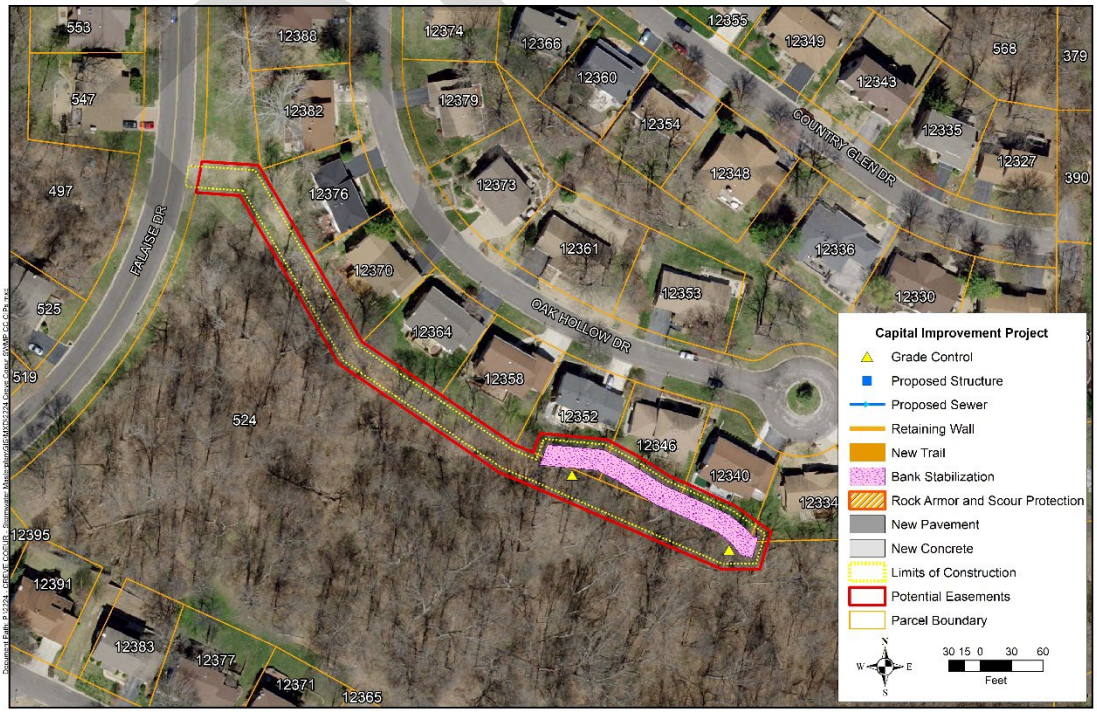
X	**Creve Coeur Project**
	Project by Others

Draft

CC-C-23: Oak Hollow Drive

Problem Description: In an upper tributary to Fernridge Creek between Oak Hollow Drive and Woodline Drive several issues were reported as follows. Erosion along the RDB threatening the backyards of 12340, 12346, and 12352 Oak Hollow Drive. Two minor tributaries downcutting in the common ground (524 Falaise Drive). The affected parcels are private.

Recommendation: Stabilize the RDB along Oak Hollow Drive and install grade controls at the minor tributary confluences.



Conceptual Layout of CC-C-23

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-23 Oak Hollow Drive

Project Description: Bank stabilization and grade controls to address erosion threatening structures along an upper tributary to Fernridge Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 16,000
			Contingency = 25%	$ 4,000
			TOTAL OPINION OF SURVEYING COST =	**$ 20,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	415	$ 35	$ 14,500
Rock Grade Control	CY	60	$ 200	$ 12,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	100	$ 150	$ 15,000
Bank Stabilization	SY	500	$ 120.00	$ 60,000
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 14,900	$ 14,900
			Subtotal =	$ 163,700
			Contingency = 30%	$ 49,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 212,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 323,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-23 Oak Hollow Drive DATE: 12/5/2023

PROJECT LOCATION: 12346 Oak Hollow Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures along an upper tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 12346, 12352, and 12358 Oak Hollow Dr*	300		200	1	50	2	300
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	150		100		25		
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	3	lots	10 points per lot				30
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-23 Oak Hollow Drive DATE: 12/5/2023

PROJECT LOCATION: 12346 Oak Hollow Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures along an upper tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						370

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-23 Oak Hollow Drive DATE: 12/5/2023

PROJECT LOCATION: 12346 Oak Hollow Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures along an upper tributary to Fernridge Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**2.25**	PER 100 LF		10				23
	Riffle Pool Complex	**4.45**	PER 100 LF		10				45
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)	4.45	PER 100 LF		10				45
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**132**
							TOTAL BENEFIT POINTS		**502**

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

TOTAL COST IN THOUSANDS= **$323**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.55**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-03: Ferntrails Lane

Problem description: Flooding of a sinkhole area which was reportedly mowed in the past but now floods frequently.

Sinkhole

Recommendation: Build berm and swale to shift overland flow path away from the houses. Study the potential to increase storage capacity of the sinkhole and increasing drainage area to the detention basin behind the Holy Cross Evangelical Lutheran Church.

Special Considerations: Investigate the area for a natural outlet that can be cleaned out and protected against clogging. Storage capacity of sinkhole should not be decreased as overflow goes to another sinkhole area to the west.

Conceptual Layout of CC-S-03

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-03 Ferntrails Lane

Project Description: Berm and swale to shift overland flow away from houses.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 4,900
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 6,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	190	$ 15	$ 2,900
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 12,900
		Contingency =	30%	$ 3,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 16,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 78,300**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-03: Ferntrails Lane DATE: 11/14/2023

PROJECT LOCATION: 13096 Ferntrails Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm and swale to shift overland flow away from houses.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-03: Ferntrails Lane DATE: 11/14/2023

PROJECT LOCATION: 13096 Ferntrails Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm and swale to shift overland flow away from houses.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-03: Ferntrails Lane DATE: 11/14/2023

PROJECT LOCATION: 13096 Ferntrails Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm and swale to shift overland flow away from houses.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**20**

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

TOTAL COST IN THOUSANDS= **$78**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.26**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-04: Fernpark Drive

Problem description: Yard and basement flooding at 1032 Fernpark Drive.

Recommendation: Construct yard drain at soutwest corner of property to collect flow from adjacent property. Pipe to street and construct curb inlet and pipe to existing inlet (16P4-017D) to the north. Construct a swale along the south side of the house.

Special Considerations: Owner recently installed french drain system along south side of house. Monitor situation to see if this has solved the issue.

South side of house looking east

Conceptual Layout of CC-S-04

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-04 Fernpark Drive

Project Description: Swale, yard drain, storm sewer, and curb inlet to address yard and basement flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.05	$ 12,000	$ 600
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.05	$ 5,000	$ 300
			Subtotal =	$ 3,900
			Contingency = 25%	$ 1,000
			TOTAL OPINION OF SURVEYING COST =	**$ 4,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	24.00	$ 55	$ 1,300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	2	$ 3,500	$ 7,000
Sewer Pipe Small	LF	180	$ 140	$ 25,200
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA	1	$ 3,130	$ 3,100
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	64	$ 15	$ 1,000
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 42,600
			Contingency = 30%	$ 12,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 55,400**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 115,700**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-04: Fernpark Drive DATE: 11/14/2023

PROJECT LOCATION: 1032 Fernpark Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, yard drain, storm sewer, and curb inlet to address yard and basement flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-04: Fernpark Drive DATE: 11/14/2023

PROJECT LOCATION: 1032 Fernpark Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, yard drain, storm sewer, and curb inlet to address yard and basement flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				N		
		Attached Garage (1 lot per structure) *Address:*	100		75		25		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		35		12		
		Yard Flooding (1 per lot) *Address:*	10	**2**	6		0		**20**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**220**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-04: Fernpark Drive DATE: 11/14/2023

PROJECT LOCATION: 1032 Fernpark Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, yard drain, storm sewer, and curb inlet to address yard and basement flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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				
	4.4 Preserves natural resource areas	No. Units				Points per Unit				
	Lakes, Wetlands, etc.		AC			30				
	Natural Corridor (min. 25ft width)		PER 100 LF			10				
	4.5 Conservation Easement		EA			20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**240**

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

TOTAL COST IN THOUSANDS= **$116**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.07**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-05: 740 North Mason Road

Problem description: Houses on the south side of Villa Hill Lane sit lower than the cemetery to the south. The majority of the cemetery has a swale and berm along the property line and being a cemetery has little impervious area.

Eroded berm at inlet

Recommendation: Construct or reconstruct the berm and swale along the north property line. Swale should be reinforced with Instaturf ShearForce. Construct berm around existing inlet 17P3-063D.

Special Considerations: Recommendation is for surface flow, for groundwater and wet yards days after rains an underdrain system is recommended for those property owners that have this issue.

Conceptual Layout of CC-S-05

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-05 740 North Mason Road

Project Description: Reconstructed berm and swale to contain overland flow in the cemetery.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.70	$ 12,000	$ 8,400
Prepare Easement Plat and Scripts	EACH	14	$ 1,500	$ 21,000
Contruction Staking and As-Built Surveying	ACRE	0.70	$ 5,000	$ 3,500
			Subtotal =	$ 32,900
			Contingency = 25%	$ 8,200
			TOTAL OPINION OF SURVEYING COST =	**$ 41,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	1,162	$ 15	$ 17,400
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 32,400
			Contingency = 30%	$ 9,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 42,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 138,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-05: 740 North Mason Road DATE: 11/14/2023

PROJECT LOCATION: 740 North Mason Road, St. Louis, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Reconstructed berm and swale to contain overland flow in the cemetery.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-05: 740 North Mason Road DATE: 11/14/2023

PROJECT LOCATION: 740 North Mason Road, St. Louis, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Reconstructed berm and swale to contain overland flow in the cemetery.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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	12	0		**72**
		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:		4	Points/lot:		10	40
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**142**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-05: 740 North Mason Road DATE: 11/14/2023

PROJECT LOCATION: 740 North Mason Road, St. Louis, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Reconstructed berm and swale to contain overland flow in the cemetery.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements				**5**			**5**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts						
						TOTAL SOLUTION POINTS		**5**
						TOTAL BENEFIT POINTS		**147**

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

TOTAL COST IN THOUSANDS= **$139**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.06**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-06: Aurburndale Drive

Problem description: Street flooding on North Mason Road at Aurburndale Drive.

East side of North Mason Road

Recommendation: Construct shoulder and swale on both sides of the road from North Walling Drive to Mason Forest Drive and extend a storm sewer on the west side north halfway to North Walling Drive from existing inlet 17P3-031D. Overlay North Mason Road with a better defined cross slope and possibly adjust the street profile.

Special Considerations: On the east side south of Aurburndale Drive grading may dictate inlets set over the existing storm sewer. North of Aurburndale Drive on the east side a curb maybe needed due to the adjacent sidewalk and the elevation difference between the street pavement and the sidewalk.

Conceptual Layout of CC-S-06

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-06 Auburndale Drive

Project Description: Shoulder and swale along N Mason Rd to address street flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.05	$ 12,000	$ 600
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.05	$ 5,000	$ 300
			Subtotal =	$ 3,900
			Contingency = 25%	$ 1,000
			TOTAL OPINION OF SURVEYING COST =	**$ 4,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	2	$ 3,500	$ 7,000
Sewer Pipe Small	LF	348	$ 140	$ 48,700
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	1,225	$ 15	$ 18,400
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	15.6	$ 100	$ 1,600
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 98,100
			Contingency = 30%	$ 29,400
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 127,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 187,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-06: Auburndale Drive DATE: 11/14/2023

PROJECT LOCATION: 39 Auburndale Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Shoulder and swale along N Mason Rd to address street flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
		Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
		Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4. Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
			20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-06: Auburndale Drive DATE: 11/14/2023

PROJECT LOCATION: 39 Auburndale Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Shoulder and swale along N Mason Rd to address street flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	Chronic (<=2-Yr) Flooding: Points per Category	Chronic (<=2-Yr) Flooding: No. Lots Affected	Frequent (>2<=15-Yr) Flooding: Points per Category	Frequent (>2<=15-Yr) Flooding: No. Lots Affected	Infrequent (>15-Yr) Flooding: Points per Category	Infrequent (>15-Yr) Flooding: No. Lots Affected	Total Points
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				Y		
		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	2	50
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition					0		0
			TOTAL PROBLEM POINTS						**60**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-06: Auburndale Drive DATE: 11/14/2023

PROJECT LOCATION: 39 Auburndale Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Shoulder and swale along N Mason Rd to address street flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**80**

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

TOTAL COST IN THOUSANDS= **$188**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-07: Mason Forest Drive

Problem description: Yard flooding at 12574 Mason Forest Drive and 416 Hibler Woods Court due to yard grading and adjacent runoff. Street and structural flooding at 12602 Mason Forest Drive which may be partially due to flow bypassing inlets.

Inlet 17P3-011D

Recommendation: Construct swale in the rear of #12574 and install a manhole with a slotted cover over the existing storm sewer. Open all four sides of inlet 17P3-011D. Modify other inlets as needed to minimize bypass and increase inlet capacity.

Special Considerations: Hydraulic analysis of storm sewer system is needed that accounts for potential bypass at inlets and inlet capacity. Analysis should include culvert at Hibler Road and the open channel on 21614 Mason Forest Drive. Initial analyis shows adequate capacity of 36" pipe at #21614.

Conceptual Layout of CC-S-07

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-07 Mason Forest Drive

Project Description: Swale, slotted manhole, and inlet modifications to address yard, street, and structural flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 4,700
			Contingency = 25%	$ 1,200
			TOTAL OPINION OF SURVEYING COST =	**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	1	$ 3,500	$ 3,500
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	52	$ 15	$ 800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 9,300
			Contingency = 30%	$ 2,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 12,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 73,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-07: Mason Forest Drive DATE: 11/14/2023

PROJECT LOCATION: 12574 Mason Forest Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, slotted manhole, and inlet modifications to address yard, street, and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-07: Mason Forest Drive DATE: 11/14/2023

PROJECT LOCATION: 12574 Mason Forest Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, slotted manhole, and inlet modifications to address yard, street, and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y	50	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	0	
		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	1		6
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**324**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-07: Mason Forest Drive DATE: 11/14/2023

PROJECT LOCATION: 12574 Mason Forest Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, slotted manhole, and inlet modifications to address yard, street, and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**344**

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

TOTAL COST IN THOUSANDS= **$73**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **4.69**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

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South Creve Coeur Creek Watershed

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South Creve Coeur Creek Watershed

PP Number	Project Name
CC-C-24	17 Chamblee Lane
CC-C-25	Chasselle and Chamblee Lane
CC-C-26	Chamonix Court
CC-C-27	Montsouris Drive
CC-C-28	2 Chasselle Lane
CC-C-29	Royal Manor Drive
CC-C-30	151 Royal Gate Drive
CC-C-31	Boothbay Court
CC-C-32	Conway Downs Drive
CC-C-33	Bellington Lane
CC-C-34	Williamsburg Road
CC-C-35	12 Broadview Farm Road
CC-C-36	438 Twin Creek Road
CC-C-37	Balcon Estates
CC-S-01	Cuiseaux Court
CC-S-02	Broadview Farms Subdivision
CC-S-08	228 Falling Leaves Court
CC-S-09	252 Bellington Lan
CC-S-10	12229 Ladue Woods Drive

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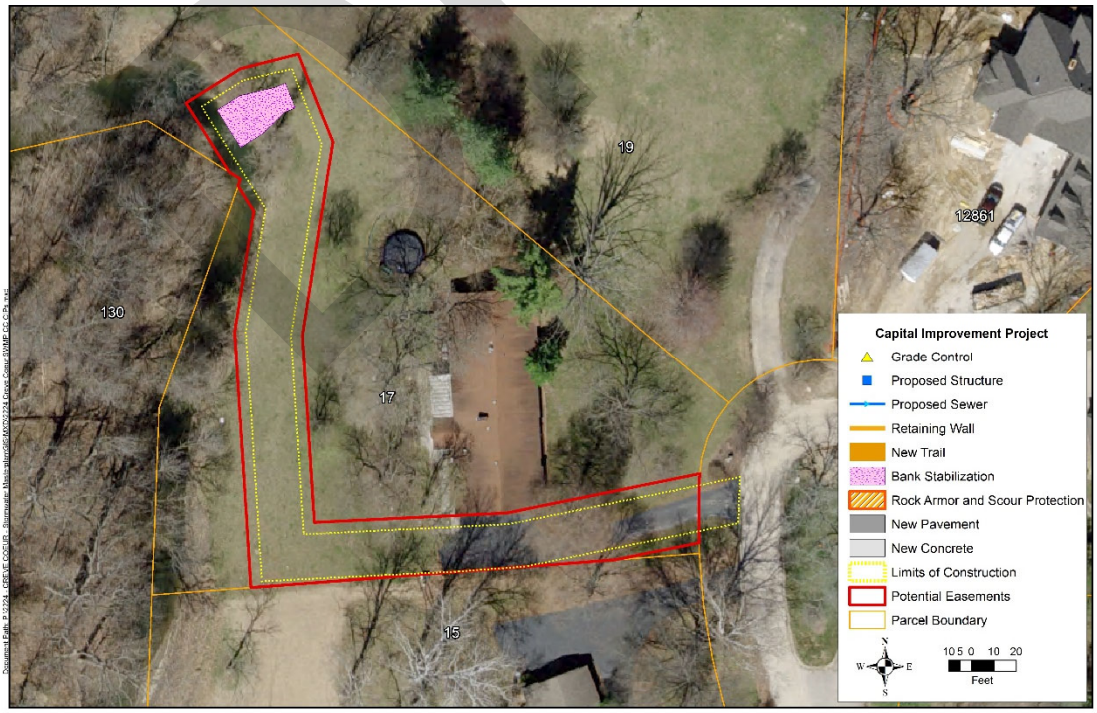
Draft

CC-C-24: 17 Chamblee Lane

Problem Description: There is bank sloughing along an outside bend of Smith Creek in the rear lot of 17 Chamblee Lane. The top of the bank is 5 feet from two exposed manholes surrounded by sinkholes. The affected parcel is private.

Recommendation: Stabilize the outside bend of the channel and fill the area surrounding the manholes with compacted fill.

Bank sloughing and sinkholes



Conceptual Layout of CC-C-24

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-24 17 Chamblee Lane

Project Description: Bank stabilization and fill to address sloughing and sinkholes along Smith Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 4,900
			Contingency = 25%	$ 1,200
			TOTAL OPINION OF SURVEYING COST =	**$ 6,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	30	$ 35	$ 1,100
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	10	$ 150	$ 1,500
Bank Stabilization	SY	60	$ 120.00	$ 7,200
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 3,200	$ 3,200
			Subtotal =	$ 35,500
			Contingency = 30%	$ 10,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 46,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 108,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-24 17 Chamblee Lane DATE: 12/5/2023

PROJECT LOCATION: 17 Chamblee Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and fill to address sloughing and sinkholes along Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-24 17 Chamblee Lane DATE: 12/5/2023

PROJECT LOCATION: 17 Chamblee Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and fill to address sloughing and sinkholes along Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-24 17 Chamblee Lane DATE: 12/5/2023

PROJECT LOCATION: 17 Chamblee Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and fill to address sloughing and sinkholes along Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**0.2**	PER 100 LF		10		2
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**22**
						TOTAL BENEFIT POINTS	**22**

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

TOTAL COST IN THOUSANDS= **$109**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

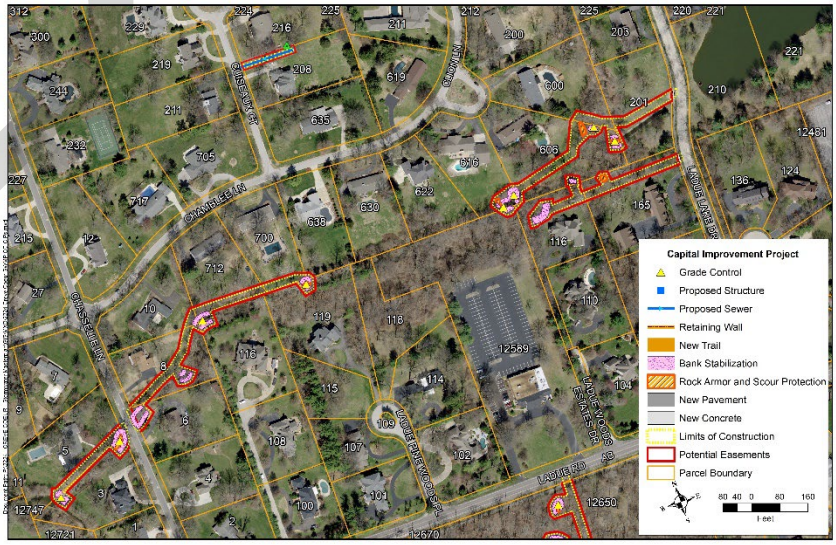
Draft

CC-C-25: Chasselle and Chamblee Lane

Downstream of Chasselle Ln culvert

Problem Description: Along a tributary to Smith Creek, several issues were observed between the confluence and Ladue Lake Drive as follows. An exposed sanitary line causing a knickpoint at the confluence. Erosion along both banks on either side of the Chasselle Lane culvert with a knickpoint downstream. A pedestrian bridge with undermined abutments in the rear lot of 10 Chamblee Lane. Knickpoint along the outside bend of the channel with erosion threatening a pipe and utility pole southeast of 10 Chamblee Lane. Perched outfall with a scour hole and bank erosion in the rear lot of 700 Chamblee Ln. Perched outfall between the rear lots of 606 and 616 Chamblee Lane as well as an incised drainage way. Erosion along the outside bend of the channel threatening the retaining wall in the rear lot of 116 Ladue Woods Estates Drive. Threatened utility pole at top of bank in the rear lot of 116 Ladue Woods Estates Drive. Perched outfall northeast of 116 Ladue Woods Estates Drive. Incision along a minor tributary and a knickpoint at the end of a concrete swale southeast of 606 Chamblee Lane. Knickpoint and bank erosion at the end of the concrete channel coming from the Ladue Lake Drive culvert. The affected parcels are private.

Recommendation: Install a step grade control at the confluence. Stabilize both banks upstream and downstream of the Chasselle Lane culvert and install a step grade control and stilling basin downstream. Stabilize both banks around the pedestrian bridge. Install a step grade control southeast of 10 Chamblee Lane. Install a grade control and stilling basin at the perched outfall in the rear lot of 700 Chamblee Lane. Install two step grade controls at the perched outfall and incised drainage way in the rear lots of 606 and 616 Chamblee Lane. Rock armor the drainage way. Stabilize the outside bend threatening the retaining wall. Stabilize the bank with the threatened utility pole. Rock armor the perched outfall northeast of 116 Ladue Woods Estates Drive. Rock armor the minor tributary and install a step grade control and toe wall at the end of the concrete swale. Install a step grade control and stilling basin at the end of the concrete channel.



Conceptual Layout of CC-C-25

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-25 Chasselle and Chamblee Lane

Project Description: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.5	$ 12,000	$ 18,000
Prepare Easement Plat and Scripts	EACH	16	$ 1,500	$ 24,000
Contruction Staking and As-Built Surveying	ACRE	1.5	$ 5,000	$ 7,500
			Subtotal =	$ 49,500
			Contingency = 25%	$ 12,400
			TOTAL OPINION OF SURVEYING COST =	**$ 61,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	225	$ 20	$ 4,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	9	$ 1,000	$ 9,000
			Subtotal =	$ 20,500
			Contingency = 25%	$ 5,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 25,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	180	$ 160	$ 28,800
ROW	HOURS	80	$ 160	$ 12,800
Permitting	HOURS	80	$ 160	$ 12,800
Final Design	HOURS	120	$ 160	$ 19,200
Develop Plans and Construction Documents	HOURS	200	$ 160	$ 32,000
Construction Support	HOURS	200	$ 160	$ 32,000
			$ -	$ -
			Subtotal =	$ 137,600
			Contingency = 25%	$ 34,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 172,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	1.5	$ 30,000	$ 45,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	3,005	$ 35	$ 105,200
Rock Grade Control	CY	300	$ 200	$ 60,000
Rock Stilling Basin / Outlet Scour Protection	CY	200	$ 100	$ 20,000
Rock Toe and Slope Protection	CY	485	$ 150	$ 72,800
Bank Stabilization	SY	1,150	$ 120.00	$ 138,000
Granular Backfill	CY	80	$ 55	$ 4,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	20	$ 100	$ 2,000
Curb - Concrete Rem & Rep	LF	112	$ 50	$ 5,600
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	1.5	$ 50,000	$ 75,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 53,900	$ 53,900
			Subtotal =	$ 592,900
			Contingency = 30%	$ 177,900
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 770,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 1,030,300**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-25 Chasselle and Chamblee Lane DATE: 12/5/2023

PROJECT LOCATION: 700 Chamblee Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 116 Ladue Woods Estates Dr*	300		200	1	50		200
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	150		100		25		
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Undermined culvert, Chasselle Ln*	20	2	12	3	3		76
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	5	10	1	5		110

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-25 Chasselle and Chamblee Lane DATE: 12/5/2023

PROJECT LOCATION: 700 Chamblee Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**396**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-25 Chasselle and Chamblee Lane DATE: 12/5/2023

PROJECT LOCATION: 700 Chamblee Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**8.87**	PER 100 LF		10		89
	Riffle Pool Complex	**14.22**	PER 100 LF		10		142
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	14.22	PER 100 LF		10		142
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements					0	
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
					TOTAL SOLUTION POINTS		**373**
					TOTAL BENEFIT POINTS		**769**

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

TOTAL COST IN THOUSANDS= **$1,030**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.75**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

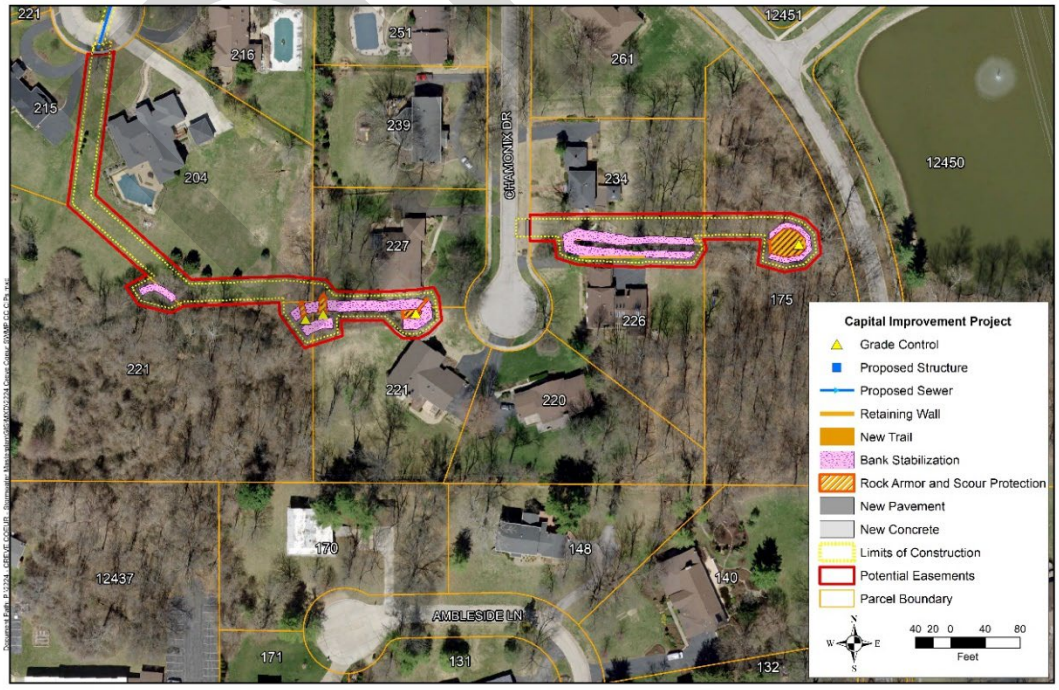
CC-C-26: Chamonix Court

Exposed manhole along outside bend

Problem Description: In a tributary to Smith Creek between Falling Leaves Court and Falaise Drive multiple issues were observed as follows. An exposed manhole along an outside bend in the channel in the rear lot of 204 Falling Leaves Court. Erosion along the RDB on 227 Chamonix Court as well as two incising tributaries and a knickpoint in the channel. An eroding swale from the front yard of 227 Chamonix Court and a knickpoint at the Chamonix Court culvert outfall. Failing retaining walls between 226 and 234 Chamonix Court. Perched Falaise Drive culvert outfall and scour hole. The affected parcels are private.

Failing retaining walls

Recommendation: Stabilize the outside bend to protect the exposed manhole. Stabilize the RDB along 227 Chamonix Court, rock armor the incising tributaries, and install step grade controls where they meet the channel. Rock armor the yard swale and install a step grade control and stilling basin downstream of the culvert outfall. Replace the failing retaining wall with bank stabilization and a new retaining wall along 226 Chamonix Court. Install a grade control and stilling basin downstream of the Falaise Drive culvert outfall. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.



Conceptual Layout of CC-C-26

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-26 Chamonix Court

Project Description: Bank stabilization, grade controls, rock armoring, stilling basin, and a retaining wall to address erosion and knickpoints threatening structures along a tributary to Smith Creek. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.7	$ 12,000	$ 8,400
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.7	$ 5,000	$ 3,500
			Subtotal =	$ 22,400
			Contingency = 25%	$ 5,600
			TOTAL OPINION OF SURVEYING COST =	**$ 28,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.7	$ 30,000	$ 21,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	1,390	$ 35	$ 48,700
Rock Grade Control	CY	185	$ 200	$ 37,000
Rock Stilling Basin / Outlet Scour Protection	CY	195	$ 100	$ 19,500
Rock Toe and Slope Protection	CY	330	$ 150	$ 49,500
Bank Stabilization	SY	710	$ 120.00	$ 85,200
Granular Backfill	CY	60	$ 55	$ 3,300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	350	$ 50	$ 17,500
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	20	$ 100	$ 2,000
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.7	$ 50,000	$ 35,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 32,800	$ 32,800
			Subtotal =	$ 361,000
			Contingency = 30%	$ 108,300
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 469,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 631,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-26 Chamonix Court DATE: 12/5/2023

PROJECT LOCATION: 227 Chamonix Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, rock armoring, stilling basin, and a retaining wall to address erosion and knickpoints threatening structures along a tributary to Smith Creek. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 221, 226, 227, and 234 Chamonix Ct*	300		200	2	50	2	500
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Failing retaining wall*	150	2	100		25		300
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5	1	5

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-26 Chamonix Court DATE: 12/5/2023

PROJECT LOCATION: 227 Chamonix Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, rock armoring, stilling basin, and a retaining wall to address erosion and knickpoints threatening structures along a tributary to Smith Creek. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**805**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-26 Chamonix Court DATE: 12/5/2023

PROJECT LOCATION: 227 Chamonix Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, rock armoring, stilling basin, and a retaining wall to address erosion and knickpoints threatening structures along a tributary to Smith Creek. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**7.33**	PER 100 LF		10		73
	Riffle Pool Complex	**1.28**	PER 100 LF		10		13
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**96**
						TOTAL BENEFIT POINTS	**901**

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

TOTAL COST IN THOUSANDS= **$632**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.43**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

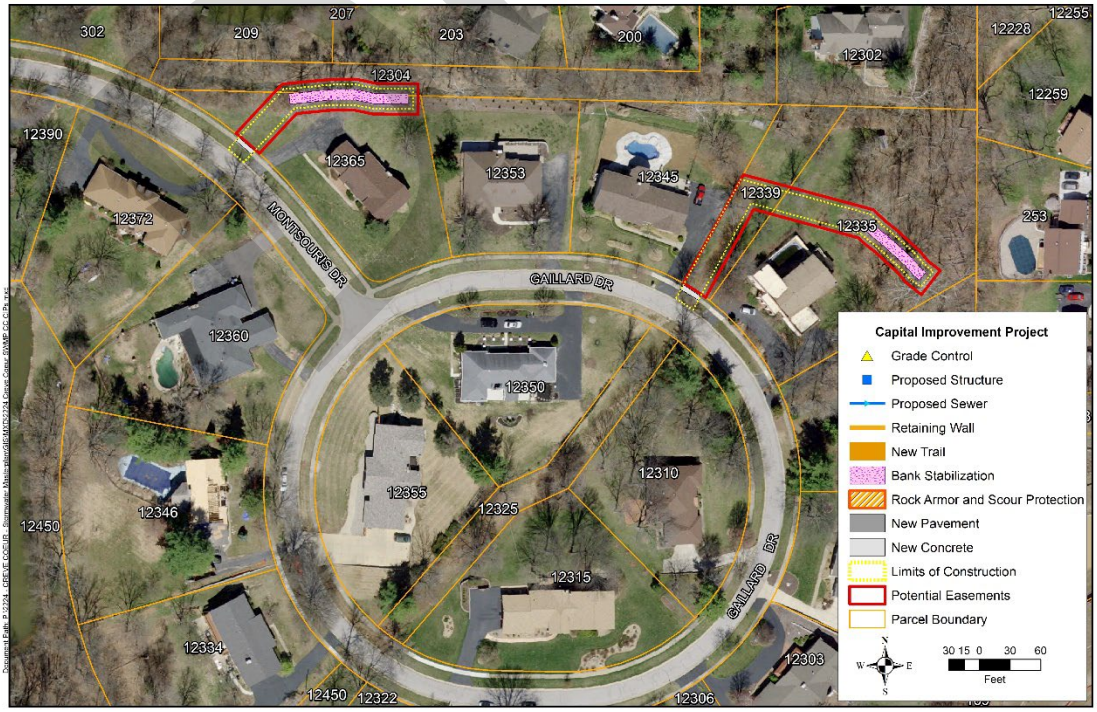
Draft

CC-C-27: Montsouris Drive

Problem Description: In the unnamed tributary along Montsouris Drive issues were reported as follows. Erosion along the LDB behind 12335 Gaillard Drive threatening a retaining wall. Erosion along the LDB behind 12365 Montsouris Drive. The affected parcels are private.

Recommendation: Stabilize the LDB in both locations.

Draft



Conceptual Layout of CC-C-27

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-27 Montsouris Drive

Project Description: Bank stabilization to address erosion along an unnamed tributary near Montsouris Drive.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
			Contingency = 25%	$ 2,400
			TOTAL OPINION OF SURVEYING COST =	**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	100	$ 35	$ 3,500
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	85	$ 150	$ 12,800
Bank Stabilization	SY	210	$ 120.00	$ 25,200
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	20	$ 100	$ 2,000
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 6,800	$ 6,800
			Subtotal =	$ 74,400
			Contingency = 30%	$ 22,300
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 96,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 167,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-27 Montsouris Drive DATE: 12/5/2023

PROJECT LOCATION: 12365 Montsouris Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion along an unnamed tributary near Montsouris Drive.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-27 Montsouris Drive DATE: 12/5/2023

PROJECT LOCATION: 12365 Montsouris Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion along an unnamed tributary near Montsouris Drive.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-27 Montsouris Drive DATE: 12/5/2023

PROJECT LOCATION: 12365 Montsouris Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion along an unnamed tributary near Montsouris Drive.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY									
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units			Points per Unit		
	Bioswales		PER 100 LF		10		
	Forebays		AC		200		
	Wet Ponds		AC		100		
	Wetlands		AC		50		
	Biostabilization of banks (per bank)	**1.9**	PER 100 LF		10		19
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**39**
						TOTAL BENEFIT POINTS	**39**

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

TOTAL COST IN THOUSANDS= **$167**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-C-28: 2 Chasselle Lane

Problem Description: There is bank cutting in a roadside swale along Ladue Road threatening the roadway. The affected parcel is private.

Recommendation: Install a grade control at the downstream end of the swale and line the swale with rock to prevent erosion. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.

Swale threatening roadway

Conceptual Layout of CC-C-28

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-28 2 Chasselle Lane

Project Description: Grade control and rock armoring to address bank cutting along Ladue Rd. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 3,200
		Contingency =	25%	$ 800
		TOTAL OPINION OF SURVEYING COST =		**$ 4,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	0	$ 20	$ -
Geotechnical Report	LUMP	0	$ 7,000	$ -
Global Stability Analysis	EACH	0	$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	135	$ 35	$ 4,700
Rock Grade Control	CY	15	$ 200	$ 3,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	110	$ 150	$ 16,500
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 3,900	$ 3,900
			Subtotal =	$ 43,200
		Contingency =	30%	$ 13,000
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 56,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 106,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-28 2 Chasselle Lane DATE: 12/5/2023

PROJECT LOCATION: 2 Chasselle Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and rock armoring to address bank cutting along Ladue Rd. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address: Ladue Rd*	75	1	50		12		75
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-28 2 Chasselle Lane DATE: 12/5/2023

PROJECT LOCATION: 2 Chasselle Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and rock armoring to address bank cutting along Ladue Rd. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**75**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-28 2 Chasselle Lane DATE: 12/5/2023

PROJECT LOCATION: 2 Chasselle Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control and rock armoring to address bank cutting along Ladue Rd. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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	1.64	PER 100 LF		10				16
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**36**
								TOTAL BENEFIT POINTS	**111**

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

TOTAL COST IN THOUSANDS= **$106**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.05**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

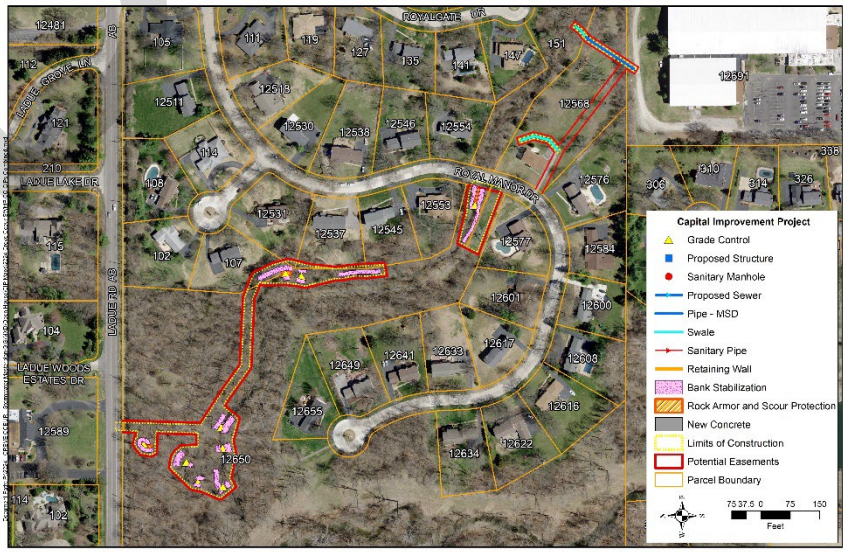
Draft

CC-C-29: Royal Manor Drive

Failing retaining wall

Problem Description: In a tributary to Smith Creek upstream of Royal Manor Drive several issues were observed as follows. Pipe outfall from the trail along Ladue Road cutting a scour hole at the upstream end of a minor tributary. Knickpoint where the minor tributary confluences with the tributary. Exposed sanitary line along the RDB channel toe upstream of this confluence. An exposed utility line crossing the channel causing a knickpoint. Bank erosion threatening a pedestrian bridge with a knickpoint downstream north of 12655 Royal Manor Drive. Erosion along the RDB with two perched pipe outfalls and a wall being undermined west of 12531 Royal Manor Drive. Exposed utility line crossing causing a knickpoint upstream of the perched outfalls. Failing retaining wall along the RDB behind 12537 and 12545 Royal Manor Drive. Erosion along both banks downstream of the Royal Manor Drive culvert as well as a knickpoint. Yard and basement flooding at 12568 Royal Manor Drive due to outfall of the adjacent Racquet & Tennis Club. The affected parcels are private.

Recommendation: Install a grade control and stilling basin downstream of the trail. Install a series of grade controls at the downstream end of the minor tributary and at the confluence. Stabilize the RDB to protect the exposed sanitary line along the toe. Install a grade control at the exposed utility line knickpoint. Stabilize both banks along the pedestrian bridge and install a grade control on the downstream end. Stabilize the RDB surrounding the pipe outfalls and install a stilling basin and grade control. Install a step grade control at the exposed utility line knickpoint. Replace the failing retaining wall with bank stabilization. Stabilize both banks downstream of Royal Manor Drive and install a stilling basin and grade control. Construct area inlet on Racquet & Tennis Club property to convey flow across 12568 and discharge into a rock swale on the subdivision common ground. A grass swale should also be constructed on the west side of the house to convey flow around the house.



Conceptual Layout of CC-C-29

Special Considerations: Owner has recently installed yard drains and underdrains in the yard. MSD is in easement negotiations for a sanitary sewer project that will also traverse 12568 and the common ground.

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-29 Royal Manor Drive

Project Description: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek as well as an area inlet and swales to convey overland flow.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.7	$ 12,000	$ 20,400
Prepare Easement Plat and Scripts	EACH	8	$ 1,500	$ 12,000
Contruction Staking and As-Built Surveying	ACRE	1.7	$ 5,000	$ 8,500
			Subtotal =	$ 40,900
		Contingency =	25%	$ 10,200
		TOTAL OPINION OF SURVEYING COST =		**$ 51,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	125	$ 20	$ 2,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	3	$ 1,000	$ 3,000
			Subtotal =	$ 12,500
		Contingency =	25%	$ 3,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 15,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	1.7	$ 30,000	$ 51,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,690	$ 35	$ 59,200
Rock Grade Control	CY	340	$ 200	$ 68,000
Rock Stilling Basin / Outlet Scour Protection	CY	340	$ 100	$ 34,000
Rock Toe and Slope Protection	CY	375	$ 150	$ 56,300
Bank Stabilization	SY	950	$ 120.00	$ 114,000
Granular Backfill	CY	70	$ 55	$ 3,900
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	2	$ 3,500	$ 7,000
Sewer Pipe Small	LF	140	$ 140	$ 19,600
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea	1	$ 2,580	$ 2,600
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	180	$ 15	$ 2,700
Asphaltic Concrete Pavement	SY	90	$ 150	$ 13,500
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	95	$ 50	$ 4,800
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	1.7	$ 50,000	$ 85,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 52,700	$ 52,700
			Subtotal =	$ 579,800
		Contingency =	30%	$ 173,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 753,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 942,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-29 Royal Manor Drive DATE: 12/5/2023

PROJECT LOCATION: 12553 Royal Manor Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek as well as an area inlet and swales to convey overland flow.

ENVIRONMENTAL CONSIDERATIONS: The pedestrian bridge and retaining wall are located in the floodplain.

COMMON GROUND: The majority of this project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: Pedestrian bridge, failing retaining wall*	150	3	100		25		450
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Royal Manor Dr*	20		12		3	1	3
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	5	10	1	5		110

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-29 Royal Manor Drive DATE: 12/5/2023

PROJECT LOCATION: 12553 Royal Manor Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek as well as an area inlet and swales to convey overland flow.

ENVIRONMENTAL CONSIDERATIONS: The pedestrian bridge and retaining wall are located in the floodplain.

COMMON GROUND: The majority of this project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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						
		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	**1**	6		0		**10**
		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:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**818**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-29 Royal Manor Drive DATE: 12/5/2023

PROJECT LOCATION: 12553 Royal Manor Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek as well as an area inlet and swales to convey overland flow.

ENVIRONMENTAL CONSIDERATIONS: The pedestrian bridge and retaining wall are located in the floodplain.

COMMON GROUND: The majority of this project is located on common ground.

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)	**8.73**	PER 100 LF		10		87
	Riffle Pool Complex	**11.22**	PER 100 LF		10		112
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	14.47	PER 100 LF		10		145
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts			**Yes**		**100**
						TOTAL SOLUTION POINTS	**454**
						TOTAL BENEFIT POINTS	**1272**

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

TOTAL COST IN THOUSANDS= **$942**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.35**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

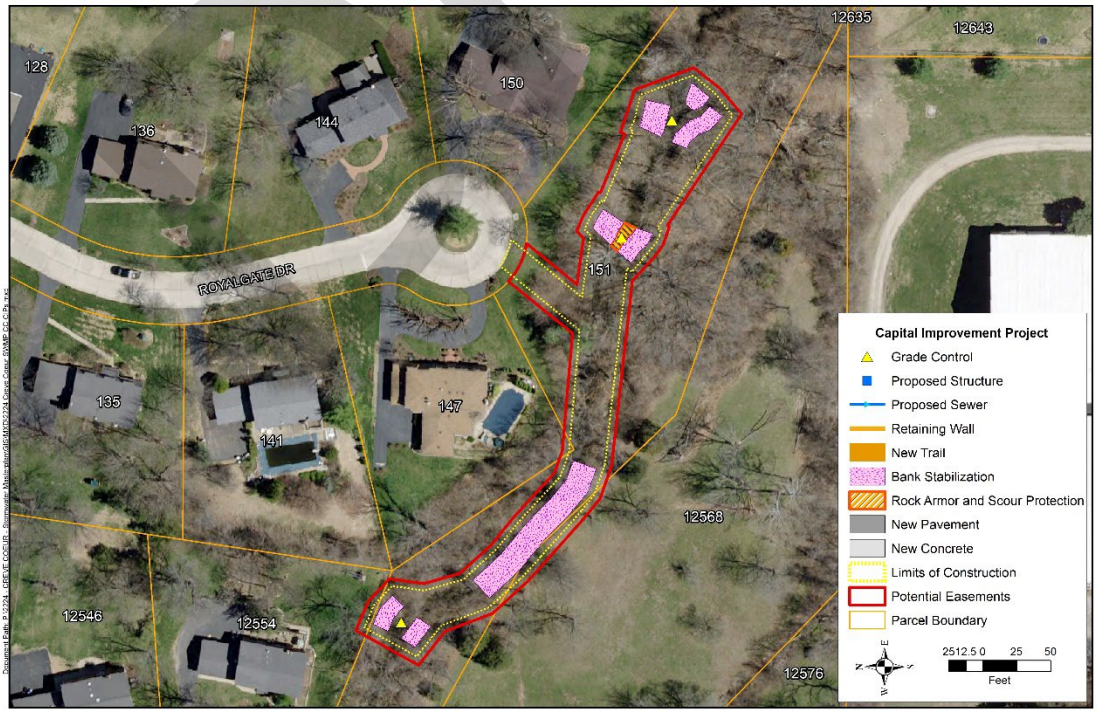
CC-C-30: 151 Royal Gate Drive

Problem Description: In Rosenfelder Creek between Royal Manor Drive and Royal Gate Drive multiple issues were observed as follows. There is a knickpoint in the channel south of 150 Royal Gate Drive at a minor tributary confluence and pipe outfall. There is a perched pipe along the RDB directly south of Royal Gate Drive. There is an exposed sanitary line along the LDB toe of bank between 12568 Royal Manor Drive and 147 Royal Gate Drive. There is an exposed sanitary crossing causing a knickpoint southeast of 12554 Royal Manor Drive. The affected parcels are private.

Exposed sanitary line along toe of bank

Recommendation: Install a grade control at the knickpoint near the stormwater outfall and tributary confluence and stabilize the tributary banks. Install a grade control structure and stilling basin at the perched pipe outfall. Stabilize the banks along the exposed sanitary line at the toe of bank. Install a grade control at the exposed sanitary crossing.

Exposed sanitary crossing



Conceptual Layout of CC-C-30

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-30 151 Royal Gate Drive

Project Description: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Rosenfelder Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 14,500
			Contingency = 25%	$ 3,600
			TOTAL OPINION OF SURVEYING COST =	**$ 18,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	860	$ 35	$ 30,100
Rock Grade Control	CY	95	$ 200	$ 19,000
Rock Stilling Basin / Outlet Scour Protection	CY	25	$ 100	$ 2,500
Rock Toe and Slope Protection	CY	135	$ 150	$ 20,300
Bank Stabilization	SY	490	$ 120.00	$ 58,800
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 17,800	$ 17,800
			Subtotal =	$ 196,100
			Contingency = 30%	$ 58,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 254,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 365,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-30 151 Royal Gate Drive DATE: 12/5/2023

PROJECT LOCATION: 151 Royal Gate Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 150 Royal Gate Dr*	300		200		50	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-30 151 Royal Gate Drive DATE: 12/5/2023

PROJECT LOCATION: 151 Royal Gate Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**90**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-30 151 Royal Gate Drive DATE: 12/5/2023

PROJECT LOCATION: 151 Royal Gate Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

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)	**2.87**	PER 100 LF		10				29
	Riffle Pool Complex	**6**	PER 100 LF		10				60
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)	6	PER 100 LF		10				60
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**169**
							TOTAL BENEFIT POINTS		**259**

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

TOTAL COST IN THOUSANDS= **$366**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.71**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

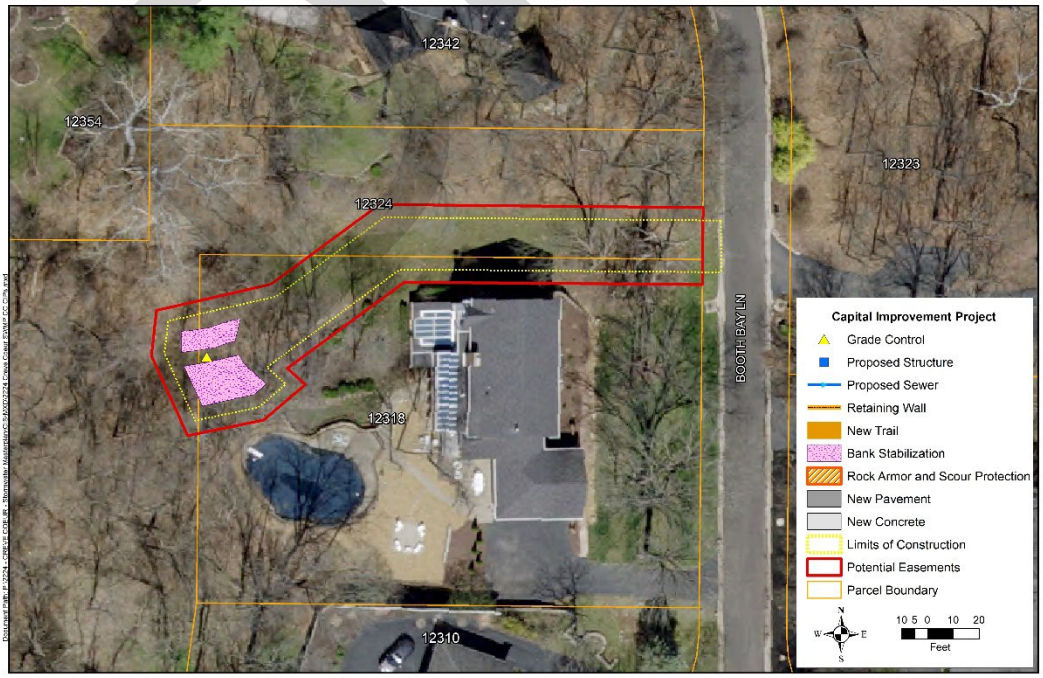
Draft

CC-C-31: Boothbay Court

Problem Description: In an upper tributary to Rosenfelder Creek erosion was reported at the pipe outfall in the rear lot of 12318 Boothbay Court. The affected parcels are private.

Recommendation: Install a grade control at the outfall.

Draft



Conceptual Layout of CC-C-31

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-31 Boothbay Court

Project Description: Grade control with associated bank stabilization to address pipe outfall erosion threatening structures.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 4,700
			Contingency = 25%	$ 1,200
			TOTAL OPINION OF SURVEYING COST =	**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	90	$ 35	$ 3,200
Rock Grade Control	CY	15	$ 200	$ 3,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	20	$ 150	$ 3,000
Bank Stabilization	SY	65	$ 120.00	$ 7,800
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 3,200	$ 3,200
			Subtotal =	$ 35,000
			Contingency = 30%	$ 10,500
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 45,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 108,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-31 Boothbay Court DATE: 12/5/2023

PROJECT LOCATION: 12318 Boothbay Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control with associated bank stabilization to address pipe outfall erosion threatening structures.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 12318 Boothbay Ct pool*	150		100		25	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-31 Boothbay Court DATE: 12/5/2023

PROJECT LOCATION: 12318 Boothbay Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control with associated bank stabilization to address pipe outfall erosion threatening structures.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**25**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-31 Boothbay Court DATE: 12/5/2023

PROJECT LOCATION: 12318 Boothbay Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control with associated bank stabilization to address pipe outfall erosion threatening structures.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**0.5**	PER 100 LF		10		5
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**25**
						TOTAL BENEFIT POINTS	**50**

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

TOTAL COST IN THOUSANDS= **$108**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.46**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

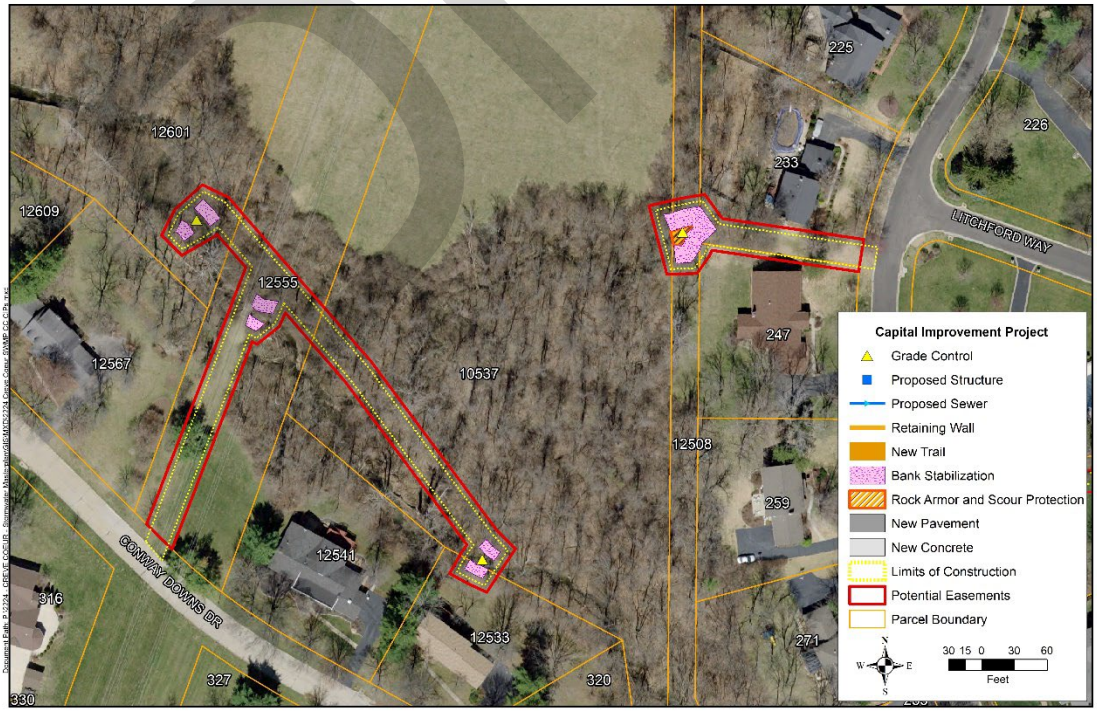
CC-C-32: Conway Downs Drive

Problem Description: In Rosenfelder Creek along Conway Downs Drive multiple issues were observed as follows. At the upstream end of the tributary in the rear lot of 233 Bellington Lane, there are 2 perched outfalls and a scour hole. In the rear lot of 12533 Conway Downs Drive, there is a knickpoint. The upstream bridge abutments at the 12555 Conway Downs Drive bridge crossing are beginning to be flanked. There is a knickpoint behind 12567 Conway Downs Drive. The affected parcels are private.

Tributary perched outfall and scour hole

Recommendation: Install a step grade control structure and stilling basin at the perched outfalls. Install a step grade control at the knickpoint in the rear lot of 12533 Conway Downs Drive. Stabilize both banks upstream of the bridge. Install a step grade control behind 12567 Conway Downs Drive.

Upstream side of bridge



Conceptual Layout of CC-C-32

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-32 Conway Downs Drive

Project Description: Bank stabilization, grade controls, and a stilling basin to address erosion in Rosenfelder Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 19,000
			Contingency = 25%	$ 4,800
			TOTAL OPINION OF SURVEYING COST =	**$ 23,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	615	$ 35	$ 21,500
Rock Grade Control	CY	125	$ 200	$ 25,000
Rock Stilling Basin / Outlet Scour Protection	CY	30	$ 100	$ 3,000
Rock Toe and Slope Protection	CY	75	$ 150	$ 11,300
Bank Stabilization	SY	280	$ 120.00	$ 33,600
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 14,300	$ 14,300
			Subtotal =	$ 157,300
			Contingency = 30%	$ 47,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 204,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 319,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-32 Conway Downs Drive DATE: 12/5/2023

PROJECT LOCATION: 12567 Conway Downs Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion in Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Bridge*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-32 Conway Downs Drive DATE: 12/5/2023

PROJECT LOCATION: 12567 Conway Downs Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion in Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**80**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-32 Conway Downs Drive DATE: 12/5/2023

PROJECT LOCATION: 12567 Conway Downs Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion in Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

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)	**2.18**	PER 100 LF		10		22
	Riffle Pool Complex	**3.73**	PER 100 LF		10		37
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	3.73	PER 100 LF		10		37
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**106**
						TOTAL BENEFIT POINTS	**186**

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

TOTAL COST IN THOUSANDS= **$320**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.58**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

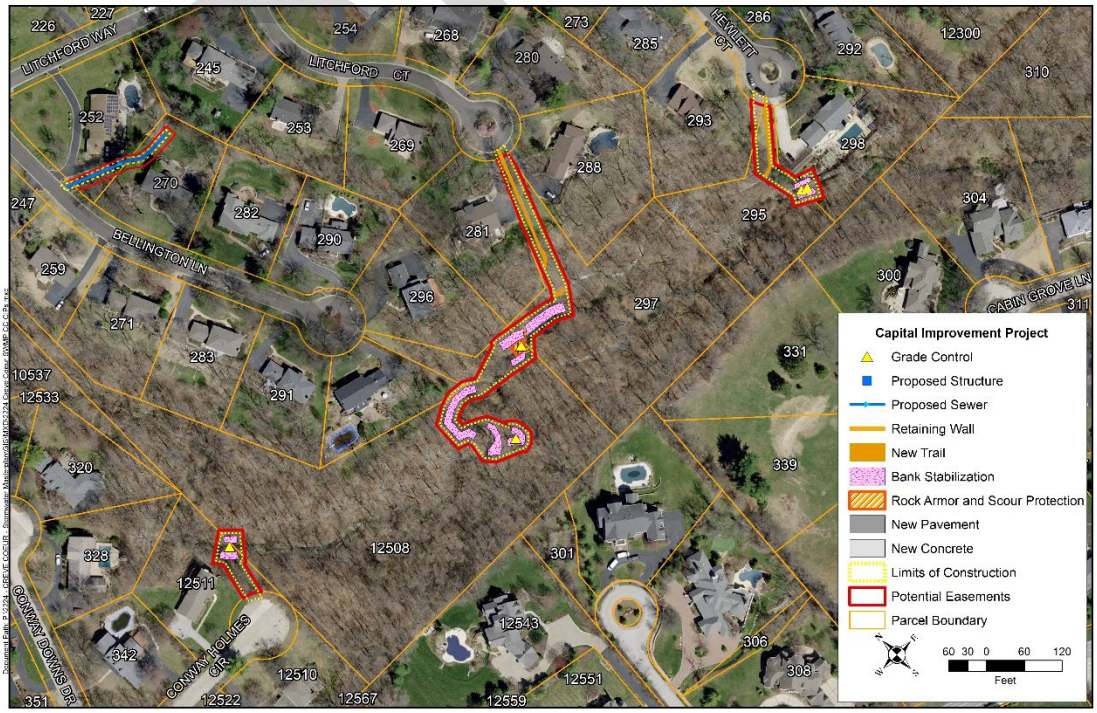
CC-C-33: Bellington Lane

Outside bend erosion

Problem Description: In Rosenfelder Creek between Conway Holmes Circle and Hewlett Court multiple issues were observed as follows. There is a perched pipe with fallen segments located east of 12511 Conway Holmes Circle. There is erosion along a minor tributary confluence and a knickpoint in the tributary north of 300 Bel Arbor Lane. There is erosion along an outside bend threatening residential fence in the rear lot of 297 Bellington Lane. The pedestrian bridge crossing Rosenfelder Creek in lots 12508 Conway Holmes Circle and 297 Hewlett Court has failing bridge abutments, a knickpoint downstream of the bridge, and erosion along the RDB upstream of the bridge. There is a knickpoint southwest of 298 Hewlett Court. The affected parcels are private.

Pedestrian bridge

Recommendation: Install a grade control at the perched pipe. Stabize the LDB at the tributary confluence and install a step grade control in the tributary. Stabilize the RDB outside bend and replace the fence. Replace the failing pedestrian bridge abutments, install a step grade control and stilling basin, and stabilize the RDB upstream of the bridge. Install two step grade controls at the knickpoint southwest of 298 Hewlett Court.



Conceptual Layout of CC-C-33

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-33 Bellington Lane

Project Description: Bank stabilization, grade controls, a stilling basin, and replacing bridge abutments to address erosion in Rosenfelder Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.6	$ 12,000	$ 7,200
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.6	$ 5,000	$ 3,000
			Subtotal =	$ 20,700
			Contingency = 25%	$ 5,200
			TOTAL OPINION OF SURVEYING COST =	**$ 25,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	3	$ 1,000	$ 3,000
			Subtotal =	$ 11,500
			Contingency = 25%	$ 2,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 14,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.6	$ 30,000	$ 18,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	990	$ 35	$ 34,700
Rock Grade Control	CY	180	$ 200	$ 36,000
Rock Stilling Basin / Outlet Scour Protection	CY	60	$ 100	$ 6,000
Rock Toe and Slope Protection	CY	205	$ 150	$ 30,800
Bank Stabilization	SY	650	$ 120.00	$ 78,000
Granular Backfill	CY	35	$ 55	$ 1,900
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	50	$ 50	$ 2,500
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	180	$ 150	$ 27,000
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	60	$ 50	$ 3,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.6	$ 50,000	$ 30,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 27,500	$ 27,500
			Subtotal =	$ 302,900
			Contingency = 30%	$ 90,900
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 393,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 556,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-33 Bellington Lane DATE: 12/5/2023

PROJECT LOCATION: 296 Bellington Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, a stilling basin, and replacing bridge abutments to address erosion in Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 12511 Conway Holmes Cir*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Pedestrian bridge*	150	1	100		25		150
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-33 Bellington Lane DATE: 12/5/2023

PROJECT LOCATION: 296 Bellington Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, a stilling basin, and replacing bridge abutments to address erosion in Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**220**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-33 Bellington Lane DATE: 12/5/2023

PROJECT LOCATION: 296 Bellington Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, a stilling basin, and replacing bridge abutments to address erosion in Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

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)	**6.39**	PER 100 LF		10		64
	Riffle Pool Complex	**3.46**	PER 100 LF		10		35
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	3.46	PER 100 LF		10		35
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**143**
						TOTAL BENEFIT POINTS	**363**

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

TOTAL COST IN THOUSANDS= **$556**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.65**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

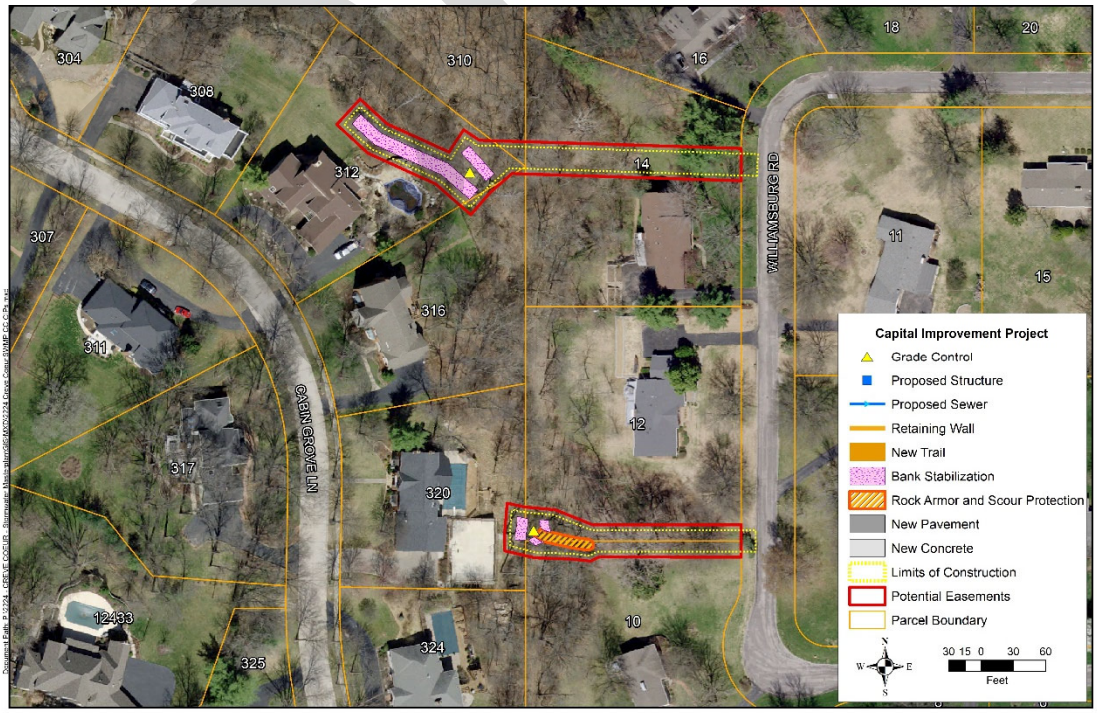
Draft

CC-C-34: Williamsburg Road

Problem Description: There is bank erosion along Rosenfelder Creek threatening the fence and pool in rear lot of 312 Cabin Grove Lane along with a 2 foot knickpoint. There is also erosion in the northwest corner of 10 Williamsburg Road where an outfall drainage way meets the channel. The affected parcels are private.

Recommendation: Stabilize the LDB along the rear lot of 312 Cabin Grove Ln and install a step grade control at the knickpoint. Rock armor the outfall drainage way and install a grade control at the confluence.

Threatened fence and pool



Conceptual Layout of CC-C-34

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-34 Williamsburg Road

Project Description: Bank stabilization, grade controls, and rock armoring to address knickpoints and erosion threatening structures along Rosenfelder Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.3	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.3	$ 5,000	$ 1,500
			Subtotal =	$ 15,600
			Contingency = 25%	$ 3,900
			TOTAL OPINION OF SURVEYING COST =	**$ 19,500**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	385	$ 35	$ 13,500
Rock Grade Control	CY	100	$ 200	$ 20,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	170	$ 150	$ 25,500
Bank Stabilization	SY	250	$ 120.00	$ 30,000
Granular Backfill	CY	25	$ 55	$ 1,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 12,200	$ 12,200
			Subtotal =	$ 134,100
			Contingency = 30%	$ 40,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 174,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 285,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-34 Williamsburg Road DATE: 12/5/2023

PROJECT LOCATION: 14 Williamsburg Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and rock armoring to address knickpoints and erosion threatening structures along Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 312 Cabin Grove Ln*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: 312 Cabin Grove Ln pool*	150		100	1	25		100
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-34 Williamsburg Road DATE: 12/5/2023

PROJECT LOCATION: 14 Williamsburg Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and rock armoring to address knickpoints and erosion threatening structures along Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						180

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-34 Williamsburg Road DATE: 12/5/2023

PROJECT LOCATION: 14 Williamsburg Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and rock armoring to address knickpoints and erosion threatening structures along Rosenfelder Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2.09**	PER 100 LF		10		21
	Riffle Pool Complex	**3.49**	PER 100 LF		10		35
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	3.49	PER 100 LF		10		35
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**101**
						TOTAL BENEFIT POINTS	**281**

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

TOTAL COST IN THOUSANDS= **$285**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.98**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

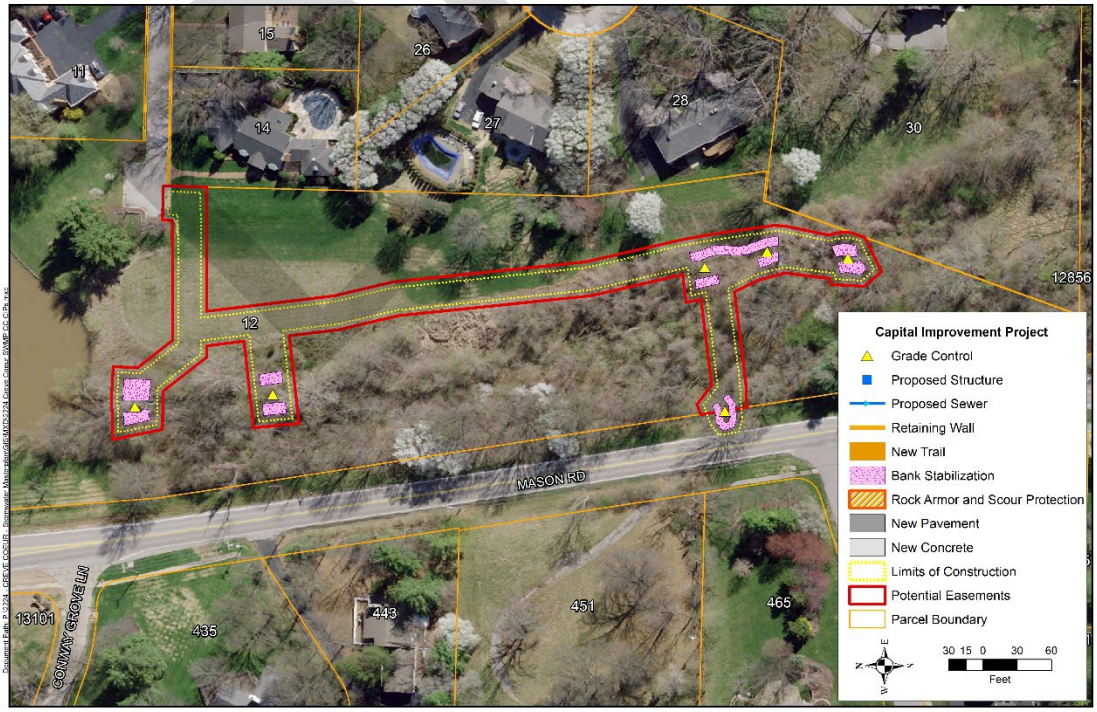
Draft

CC-C-35: 12 Broadview Farm Road

Problem Description: Several knickpoints were observed along a tributary to Smith Creek which runs parallel to South Mason Road. Bank mass wasting was seen along the rear lot of 28 Broadview Farm Road. The affected parcel is private.

Recommendation: Install step grade controls at the knickpoints and a grade control at the upstream end of the incision to halt it. Stabilize the bank along the rear lot of 28 Broadview Farm Road.

Bank mass wasting



Conceptual Layout of CC-C-35

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-35 12 Broadview Farm Road

Project Description: Bank stabilization and grade controls to address erosion in a tributary to Smith Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.6	$ 12,000	$ 7,200
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.6	$ 5,000	$ 3,000
			Subtotal =	$ 11,700
			Contingency = 25%	$ 2,900
			TOTAL OPINION OF SURVEYING COST =	**$ 14,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.6	$ 30,000	$ 18,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	470	$ 35	$ 16,500
Rock Grade Control	CY	180	$ 200	$ 36,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	130	$ 150	$ 19,500
Bank Stabilization	SY	310	$ 120.00	$ 37,200
Granular Backfill	CY	25	$ 55	$ 1,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.6	$ 50,000	$ 30,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 16,500	$ 16,500
			Subtotal =	$ 181,600
			Contingency = 30%	$ 54,500
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 236,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 343,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-35 12 Broadview Farm Road DATE: 12/5/2023

PROJECT LOCATION: 12 Broadview Farm Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion in a tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address: Mason Rd*	35		25		6	1	6
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-35 12 Broadview Farm Road DATE: 12/5/2023

PROJECT LOCATION: 12 Broadview Farm Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion in a tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**46**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-35 12 Broadview Farm Road DATE: 12/5/2023

PROJECT LOCATION: 12 Broadview Farm Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion in a tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

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)	**3.19**	PER 100 LF		10		32
	Riffle Pool Complex	**5.32**	PER 100 LF		10		53
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.	1.10	AC		30		33
	Natural Corridor (min. 25ft width)	5.32	PER 100 LF		10		53
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**191**
						TOTAL BENEFIT POINTS	**237**

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

TOTAL COST IN THOUSANDS= **$343**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.69**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

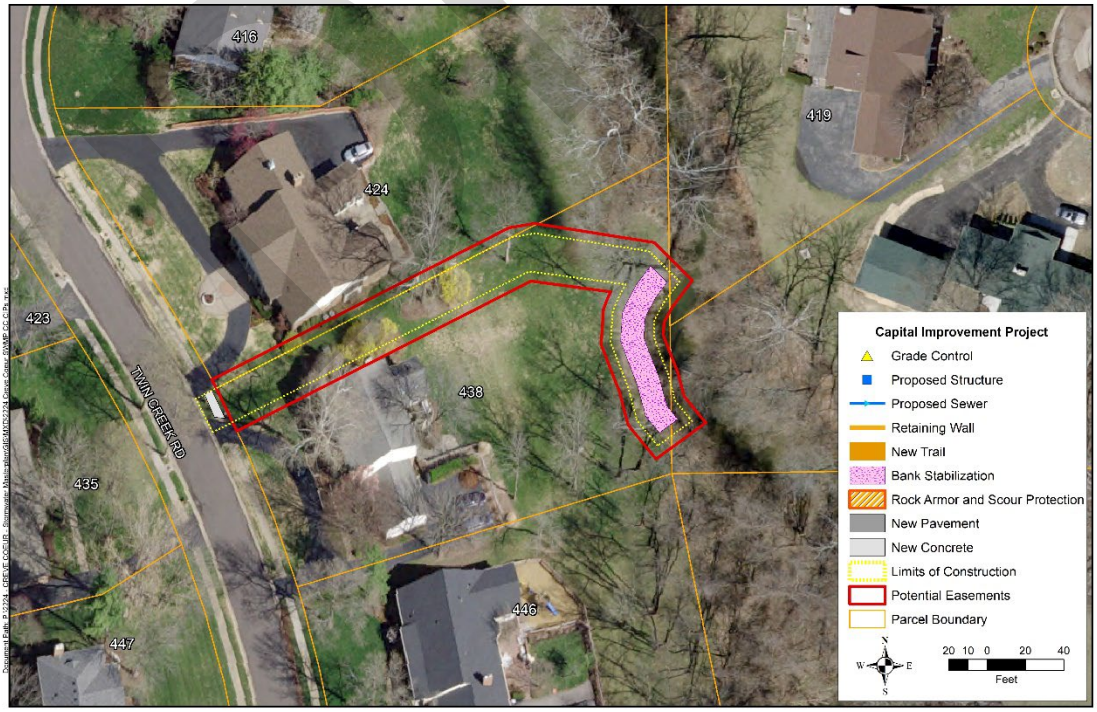
CC-C-36: 438 Twin Creek Road

Problem Description: In Smith Creek behind 438 Twin Creek Road erosion was reported along the LDB. The affected parcels are private.

Recommendation: Stabilize the LDB.

LDB Erosion

Draft



Conceptual Layout of CC-C-36

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-36 438 Twin Creek Road

Project Description: Bank stabilization to address erosion along Smith Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
			Contingency = 25%	$ 2,400
			TOTAL OPINION OF SURVEYING COST =	**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	65	$ 35	$ 2,300
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	35	$ 150	$ 5,300
Bank Stabilization	SY	115	$ 120.00	$ 13,800
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	5	$ 100	$ 500
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 4,500	$ 4,500
			Subtotal =	$ 49,200
			Contingency = 30%	$ 14,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 64,000**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 132,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-36 438 Twin Creek Road DATE: 12/5/2023

PROJECT LOCATION: 438 Twin Creek Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion along Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-36 438 Twin Creek Road DATE: 12/5/2023

PROJECT LOCATION: 438 Twin Creek Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion along Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-36 438 Twin Creek Road DATE: 12/5/2023

PROJECT LOCATION: 438 Twin Creek Road, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion along Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**0.96**	PER 100 LF		10		10
	Riffle Pool Complex		PER 100 LF		10		
	4.2. Eliminates combined sewer (per project)		EA		100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA		10		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**30**

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

TOTAL COST IN THOUSANDS= **$132**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

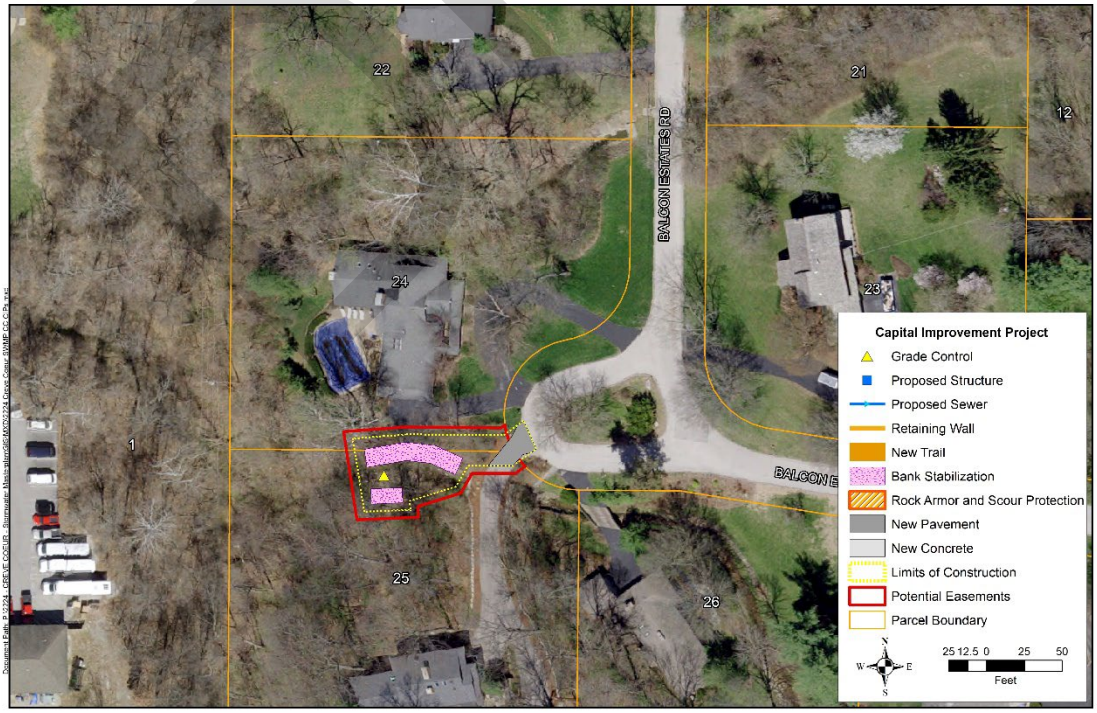
Draft

CC-C-37: Balcon Estates

Problem Description: In the unnamed tributary along Balcon Estates scour along the RDB is threatening the driveway of 24 Balcon Estates. The affected parcels are private.

Recommendation: Stabilize the RDB and install a grade control.

Scour threatening driveway



Conceptual Layout of CC-C-37

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-C-37 Balcon Estates

Project Description: Bank stabilization and grade control to address erosion threatening structures along an unnamed tributary to Smith Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	210	$ 35	$ 7,400
Rock Grade Control	CY	45	$ 200	$ 9,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	35	$ 150	$ 5,300
Bank Stabilization	SY	110	$ 120.00	$ 13,200
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	45	$ 150	$ 6,800
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 5,700	$ 5,700
			Subtotal =	$ 62,200
		Contingency =	30%	$ 18,700
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 80,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 143,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-37 Balcon Estates DATE: 12/5/2023

PROJECT LOCATION: 24 Balcon Estates, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade control to address erosion threatening structures along an unnamed tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 24 Balcon Estates*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: 24 Balcon Estates pool*	150		100		25	1	25
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: 24 Balcon Estates driveway*	20		12		3	1	3
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-37 Balcon Estates DATE: 12/5/2023

PROJECT LOCATION: 24 Balcon Estates, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade control to address erosion threatening structures along an unnamed tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**88**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-C-37 Balcon Estates DATE: 12/5/2023

PROJECT LOCATION: 24 Balcon Estates, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade control to address erosion threatening structures along an unnamed tributary to Smith Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**0.88**	PER 100 LF		10				9
	Riffle Pool Complex	**0.72**	PER 100 LF		10				7
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)	0.72	PER 100 LF		10				7
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**43**
							TOTAL BENEFIT POINTS		**131**

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

TOTAL COST IN THOUSANDS= **$143**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.91**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-01: Cuiseaux Court

Problem description: Runoff naturally drains onto 208 Cuiseaux Court. from the rear yards of homes on Cuiseaux Court and Clion Lane, north of #208. The house and pool altered the natural drainage path with the driveway on the north side of the house partially blocking the drainage path to the street.

Drainage pathway

Recommendation: Install a MSD 2 grate inlet w/ side intake east of the driveway along the property line and pipe to the existing storm sewer along the street at a new MH.

Special Considerations: The root zone of trees on #216 will need to be considered in the location of the inlet and pipe particularly a large pin oak and the placement of the inlet.

Conceptual Layout of CC-S-01

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-01 Cuiseaux Court

Project Description: New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.00	$ 12,000	$ 12,000
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	1.00	$ 5,000	$ 5,000
			Subtotal =	$ 18,500
			Contingency = 25%	$ 4,600
			TOTAL OPINION OF SURVEYING COST =	**$ 23,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	2.00	$ 55	$ 100
New Culvert	LF		$ 500.0	$ -
Manhole	LF	4	$ 625	$ 2,500
Inlet	EA	1.00	$ 3,500	$ 3,500
Sewer Pipe Small	LF	170	$ 140	$ 23,800
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 11,000	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 4,000	$ 4,000
			Subtotal =	$ 43,900
			Contingency = 30%	$ 13,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 57,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 135,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-01 Cuiseaux Court DATE: 7/31/2023

PROJECT LOCATION: 208 Cuiseaux Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-01 Cuiseaux Court DATE: 7/31/2023

PROJECT LOCATION: 208 Cuiseaux Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Total Points
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: 208 CUISEAUX CT*		50		35	1	12		35
		Yard Flooding (1 per lot) *Address: 208 CUISEAUX CT*		10	**1**	6		0		**10**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition		30						30
				TOTAL PROBLEM POINTS						**75**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-01 Cuiseaux Court DATE: 7/31/2023

PROJECT LOCATION: 208 Cuiseaux Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**95**

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

TOTAL COST IN THOUSANDS= **$136**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.70**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

CC-S-02: Broadview Farms Subdivision

Problem description: Water ponds along the curb near 18, 19, 21 and 22 Broadview Farms Road. At 1 Broadview Farms Road, water ponds in the side yard even with a 24" FES that drains the area. A Curb Inlet (CI) uphill has significant bypass potential and the curb along the east side of Broadview Farms Road. has the potential to be overtopped allowing additional flow to this area.

Pooling at end of driveway

Recommendation: For the water ponding along the curb, mill and overlay the street and adjust the pavement slope to drain across the street. At 1 Broadview Farms Road, reset the CI top and reconstruct the curb along Broadview Farms Road.

Special Considerations: Concrete should be considered in lieu of asphalt to provide a more precise grade and cross slope on the street to ensure proper drainage. The hydraulic grade line for the storm sewer downstream of the flared end section needs to be checked to ensure water isn't backing up into this area. A check valve in the adjacent inlet on the pipe should be considered.

Conceptual Layout of CC-S-02

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-02 Broadview Farms Subdivision

Project Description: Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.00	$ 12,000	$ 12,000
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	1.00	$ 5,000	$ 5,000
			Subtotal =	$ 24,500
			Contingency = 25%	$ 6,100
			TOTAL OPINION OF SURVEYING COST =	**$ 30,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
			Contingency = 25%	$ -
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	30.0	$ 150	$ 4,500
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	240	$ 50	$ 12,000
Utility Relocation	LUMP		$ 11,000	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 2,200	$ 2,200
			Subtotal =	$ 23,700
			Contingency = 30%	$ 7,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 30,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 107,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-02 Broadview Farms Subdivision DATE: 12/6/2023

PROJECT LOCATION: 19 Broadview Farm Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-02 Broadview Farms Subdivision DATE: 12/6/2023

PROJECT LOCATION: 19 Broadview Farm Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 1 BROADVIEW FARM RD*	10		6	1	0		**6**
		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:		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**36**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-02 Broadview Farms Subdivision DATE: 12/6/2023

PROJECT LOCATION: 19 Broadview Farm Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**56**

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

TOTAL COST IN THOUSANDS= **$107**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

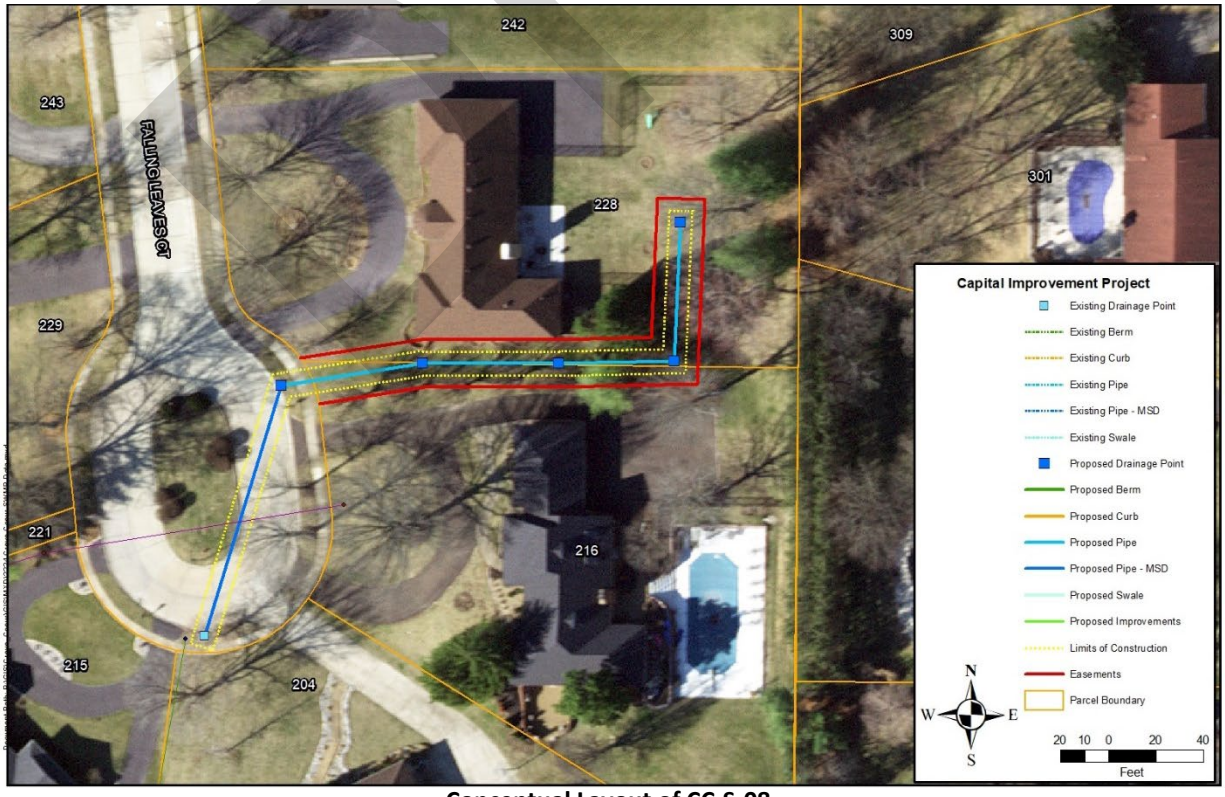
CC-S-08: 228 Falling Leaves Court

Problem description: Yard ponding at 228 Falling Leaves Court in the rear yard and along south property line.

Rear yard of 228

Recommendation: Construct yard drain in rear yard and three drains along sidge property line. Connect downspouts on south side of house. Construct MSD curb inlet at street and new pipe to existing inlet (18O1-104D) at south end of cul-de-sac.

Special Considerations: System along south property line may need to be public if crossing the property line otherwise if flow is low enough the private pipe could discharge at a pop-up.



Conceptual Layout of CC-S-08

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-08 228 Falling Leaves Court

Project Description: Drains, curb inlet, and storm sewer to address yard ponding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	36.6	$ 55	$ 2,000
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	4	$ 3,500	$ 14,000
Sewer Pipe Small	LF	334	$ 140	$ 46,800
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	90.0	$ 100	$ 9,000
Curb - Concrete Rem & Rep	LF	60	$ 50	$ 3,000
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 82,200
		Contingency =	30%	$ 24,700
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 106,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 168,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-08: 228 Falling Leaves Court DATE: 11/14/2023

PROJECT LOCATION: 228 Falling Leaves Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Drains, curb inlet, and storm sewer to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-08: 228 Falling Leaves Court DATE: 11/14/2023

PROJECT LOCATION: 228 Falling Leaves Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Drains, curb inlet, and storm sewer to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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	**1**	6		0		**10**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**25**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-08: 228 Falling Leaves Court DATE: 11/14/2023

PROJECT LOCATION: 228 Falling Leaves Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Drains, curb inlet, and storm sewer to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**45**

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

TOTAL COST IN THOUSANDS= **$168**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.27**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

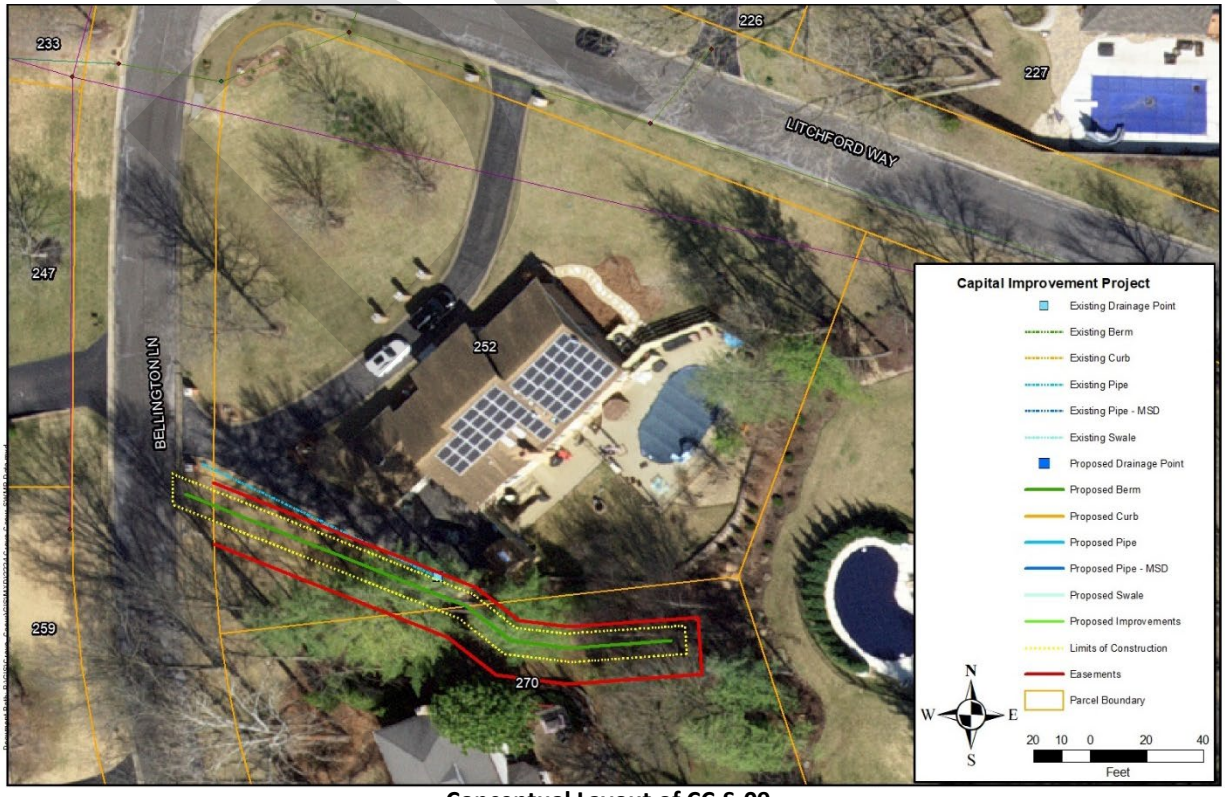
Draft

CC-S-09: 252 Bellington Lane

Problem description: Yard and basement flooding at 252 Bellington Lane due to flow from uphill properties.

Recommendation: Construct a berm and swale with underdrain to intercept the flow from the south and direct it to the street to the west. Swap out an existing inlet grate with a dome inlet grate to minimize clogging.

Existing inlet



Conceptual Layout of CC-S-09

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-09 252 Bellington Lane

Project Description: Berm, swale, and inlet modifications to address yard and basement flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	183	$ 15	$ 2,700
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 7,700
		Contingency =	30%	$ 2,300
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 10,000**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 61,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-09: 252 Bellington Lane DATE: 11/14/2023

PROJECT LOCATION: 252 Bellington Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swale, and inlet modifications to address yard and basement flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-09: 252 Bellington Lane DATE: 11/14/2023

PROJECT LOCATION: 252 Bellington Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swale, and inlet modifications to address yard and basement flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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	**1**	6		0		**10**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**60**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-09: 252 Bellington Lane DATE: 11/14/2023

PROJECT LOCATION: 252 Bellington Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swale, and inlet modifications to address yard and basement flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**80**

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

TOTAL COST IN THOUSANDS= **$62**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.29**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

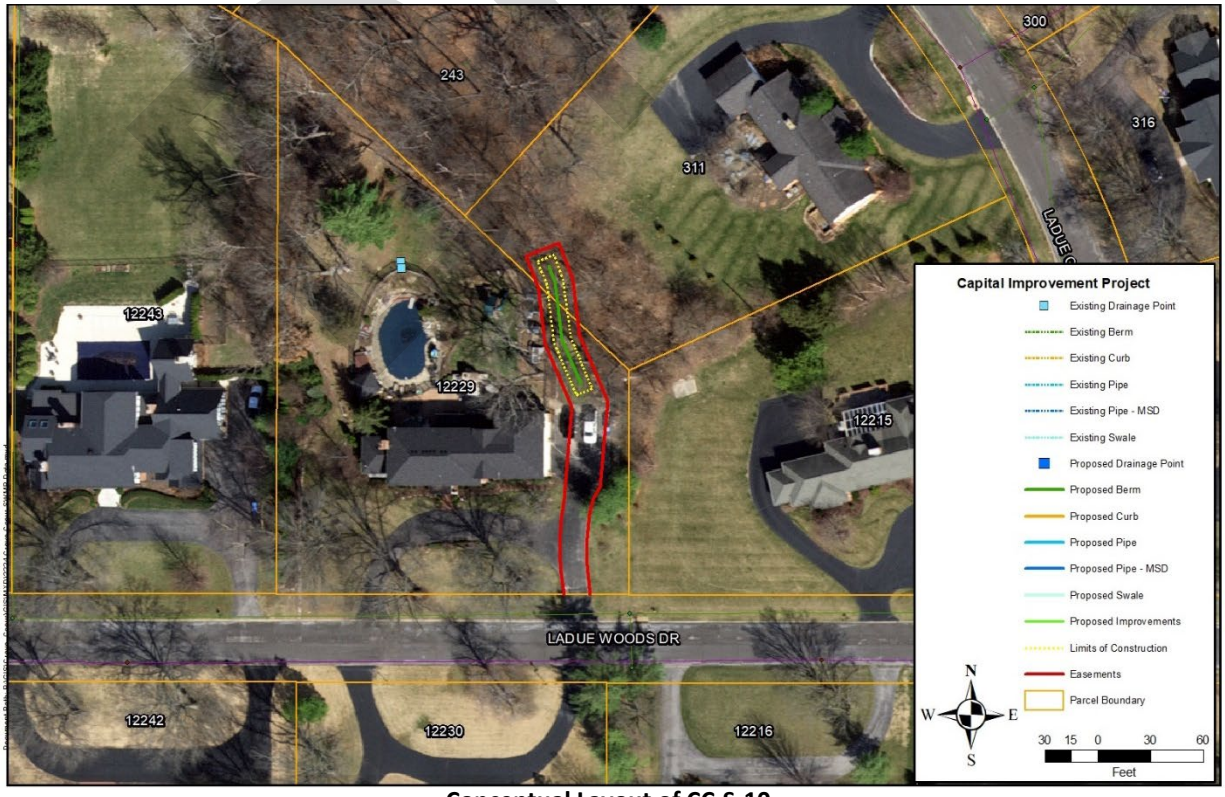
CC-S-10: 12229 Ladue Woods Drive

Problem description: Yard flooding at 12229 Ladue Woods Drive.

Recommendation: Construct berm to intercept flow from hillside that is flowing towards the east end of the house.

Special Considerations: Need additional information from owner. Owner not home during field visit. Yard drains in main flow path through property that is blocked by the pool.

Yard drain uphill of pool



Conceptual Layout of CC-S-10

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: CC-S-10 12229 Ladue Woods Drive

Project Description: Berm to address yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	70	$ 15	$ 1,100
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 6,100
		Contingency =	30%	$ 1,800
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 7,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 69,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-10: 12229 Ladue Woods Drive DATE: 11/14/2023

PROJECT LOCATION: 12229 Ladue Woods Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-10: 12229 Ladue Woods Drive DATE: 11/14/2023

PROJECT LOCATION: 12229 Ladue Woods Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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	1	12
		Yard Flooding (1 per lot) *Address:*	10		6	1	0		**6**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**18**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-10: 12229 Ladue Woods Drive DATE: 11/14/2023

PROJECT LOCATION: 12229 Ladue Woods Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**38**

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

TOTAL COST IN THOUSANDS= **$69**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.55**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

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West Deer Creek Watershed

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West Deer Creek Watershed

PP Number	Project Name
DC-C-01	Deer Creek in Malcolm Terrace Park
DC-C-03	996 East Rue De La Banque Street
DC-C-04	11572 New London Drive
DC-C-05	Westwood Country Club
DC-C-06	Malcolm Terrace Park
DC-C-07	New Salem Drive
DC-C-08	New Salem Drive and Camfield Square Drive
DC-C-09	281 Magna Carta Drive
DC-C-10	Villa Coublay Drive
DC-C-11	Brooktrail Court South
DC-C-12	Brooktrail Court North
DC-C-13	Executive Estates Drive
DC-S-01	Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive
DC-S-02	Sackston Woods lane
DC-S-03	Woodbridge Manor Road
DC-S-04	561 Sarah Lane
DC-S-05	Ladue Meadows
DC-S-06	Fairways Circle
DC-S-07	East Ladue Estates Drive
DC-S-08	121 Mystic Meadows Lane
DC-S-09	Pine Manor Drive
DC-S-11	554 North Mosley Road
DC-S-13	Morwood Lane
DC-S-14	Mary Meadows Lane

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DC-C-01: Deer Creek in Malcolm Terrace Park

Problem description: Bank erosion along Deer Creek is threatening a City service bridge, a low water crossing, and a trail in Malcolm Terrace Park. The affected parcels are owned by the City.

Recommendation: Install rock grade control extending underneath the bridge along with bank stabilization to protect the existing bridge piers and abutments. Stabilize the banks on the outside bends upstream of the bridge that is threatening the access road. Project plans were previously prepared by the City and shelved due to funding. An existing sanitary line underneath the bridge will need to be replaced.

Replace the concrete low water crossing and install a grade control structure downstream. Stabilize the bank on the outside bend upstream of the low water crossing. Turning vanes may be needed with the bank stabilization to train water over the crossing and prevent flanking.

Stabilize the bank on the outside bend next to the trail or relocate the trail within Right Of Way. Bank stabilization should also include construction of rock armored swales for the incising drainageways on the bank.

Water Quality Alternative Recommendations: Stabilize both banks upstream of the bridge and extend the stabilization upstream to address the leaning utility pole beyond the project limits shown.

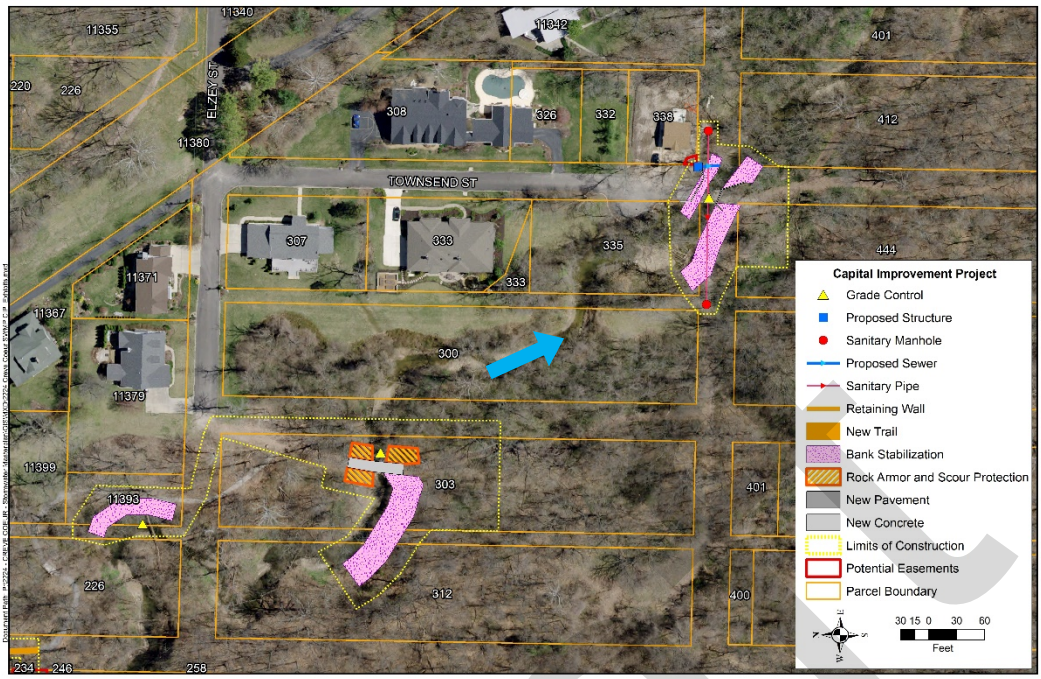
At the trail, Deer Creek is beginning to form an oxbow cutoff. Rock armor the cutoff point to prevent the cutoff from occuring and sending a new round of incision through the channel. Only implement if the bank stabilization option is selected because the bend will continue to grow if the cutoff is armored.

Underside of bridge

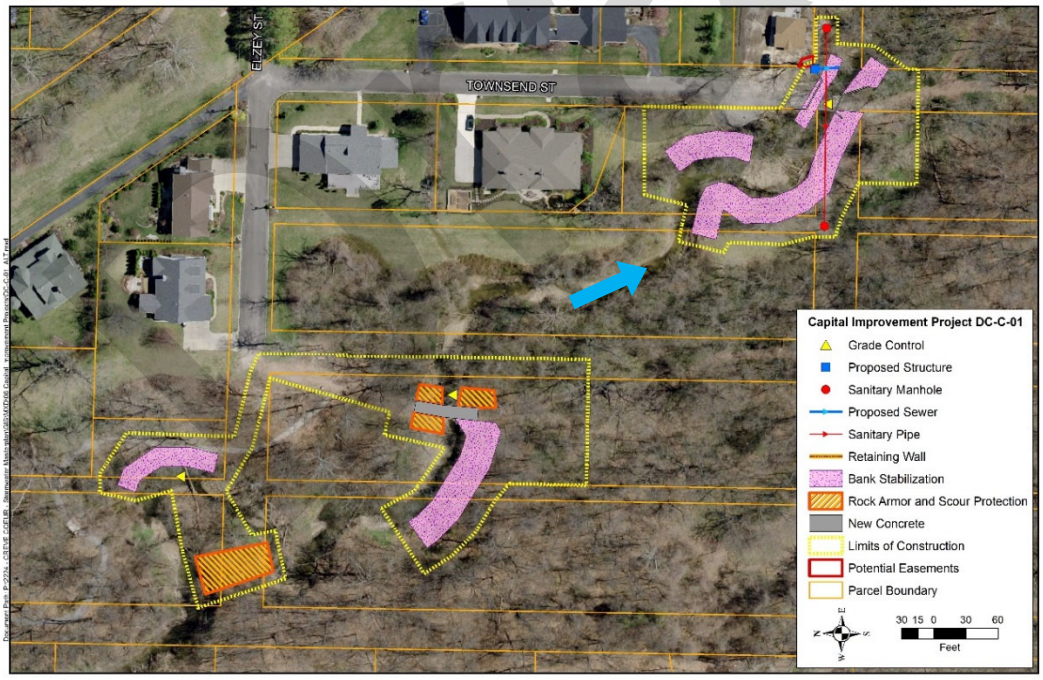
Low water crossing

Outside bank next to trail

Draft



Conceptual Layout of DC-C-01



Conceptual Layout of DC-C-01 Alternative

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-01 Deer Creek in Malcolm Terrace Park

Project Description: Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.00	$ 12,000	$ 12,000
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	1.00	$ 5,000	$ 5,000
			Subtotal =	$ 18,500
			Contingency = 25%	$ 4,600
			TOTAL OPINION OF SURVEYING COST =	**$ 23,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	100	$ 20	$ 2,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	4	$ 1,000	$ 4,000
			Subtotal =	$ 13,000
			Contingency = 25%	$ 3,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 16,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	180	$ 160	$ 28,800
ROW	HOURS	80	$ 160	$ 12,800
Permitting	HOURS	80	$ 160	$ 12,800
Final Design	HOURS	120	$ 160	$ 19,200
Develop Plans and Construction Documents	HOURS	200	$ 160	$ 32,000
Construction Support	HOURS	200	$ 160	$ 32,000
			$ -	$ -
			Subtotal =	$ 137,600
			Contingency = 25%	$ 34,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 172,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	1	$ 30,000	$ 30,000
Removal of Existing Structures	LUMP	3	$ 2,000	$ 6,000
Excavation and Embankment in Place	CY	3,100	$ 35	$ 108,500
Rock Grade Control	CY	200	$ 200	$ 40,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	790	$ 150	$ 118,500
Bank Stabilization	SY	1,100	$ 120.00	$ 132,000
Granular Backfill	CY	90.00	$ 55	$ 5,000
New Culvert	LF		$ 500.0	$ -
Manhole	LF	30	$ 625	$ 18,800
Inlet	EA	1.00	$ 3,500	$ 3,500
Sewer Pipe Small	LF	30	$ 140	$ 4,200
Sewer Pipe Medium	LF	210	$ 220	$ 46,200
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	1,040	$ 50	$ 52,000
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	75	$ 100	$ 7,500
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	1	$ 50,000	$ 50,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 63,300	$ 63,300
			Subtotal =	$ 696,500
			Contingency = 30%	$ 209,000
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 905,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 1,116,900**

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-01a Deer Creek in Malcolm Terrace Park

Project Description: Bank Stabilization to address erosion at bridge with associated grade controls. City design plans were advanced to an 80% level prior to putting on hold due to funding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.40	$ 12,000	$ 4,800
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.40	$ 5,000	$ 2,000
			Subtotal =	$ 8,300
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF SURVEYING COST =	**$ 10,400**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			Design Work Already Completed =	$ (97,600)
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 24,400**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0	$ 30,000	$ 12,000
Removal of Existing Structures	LUMP	2	$ 2,000	$ 4,000
Excavation and Embankment in Place	CY	1,200	$ 35	$ 42,000
Rock Grade Control	CY	130	$ 200	$ 26,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	100	$ 150	$ 15,000
Bank Stabilization	SY	500	$ 120.00	$ 60,000
Granular Backfill	CY	20.00	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF	30	$ 625	$ 18,800
Inlet	EA	1.00	$ 3,500	$ 3,500
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF	210	$ 220	$ 46,200
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	1,040	$ 50	$ 52,000
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 31,200	$ 31,200
			Subtotal =	$ 342,800
			Contingency = 30%	$ 102,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 445,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 491,700**

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-01b Deer Creek in Malcolm Terrace Park

Project Description: Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.70	$ 12,000	$ 8,400
Prepare Easement Plat and Scripts	EACH	0	$ 1,500	$ -
Contruction Staking and As-Built Surveying	ACRE	0.70	$ 5,000	$ 3,500
			Subtotal =	$ 11,900
			Contingency = 25%	$ 3,000
			TOTAL OPINION OF SURVEYING COST =	**$ 14,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
			Contingency = 25%	$ 2,100
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	1	$ 30,000	$ 21,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	1,700	$ 35	$ 59,500
Rock Grade Control	CY	30	$ 200	$ 6,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	660	$ 150	$ 99,000
Bank Stabilization	SY	500	$ 120.00	$ 60,000
Granular Backfill	CY	60.00	$ 55	$ 3,300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF	30	$ 140	$ 4,200
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	75	$ 100	$ 7,500
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	0.7	$ 50,000	$ 35,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 30,900	$ 30,900
			Subtotal =	$ 339,400
			Contingency = 30%	$ 101,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 441,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 588,700**

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-01 Deer Creek in Malcolm Terrace Park

Project Description: Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	2.00	$ 12,000	$ 24,000
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	2.00	$ 5,000	$ 10,000
			Subtotal =	$ 35,500
			Contingency = 25%	$ 8,900
			TOTAL OPINION OF SURVEYING COST =	**$ 44,400**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	3	$ 1,000	$ 3,000
			Subtotal =	$ 11,500
			Contingency = 25%	$ 2,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 14,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	180	$ 160	$ 28,800
ROW	HOURS	80	$ 160	$ 12,800
Permitting	HOURS	80	$ 160	$ 12,800
Final Design	HOURS	120	$ 160	$ 19,200
Develop Plans and Construction Documents	HOURS	200	$ 160	$ 32,000
Construction Support	HOURS	200	$ 160	$ 32,000
			$ -	$ -
			Subtotal =	$ 137,600
			Contingency = 25%	$ 34,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 172,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	2	$ 30,000	$ 60,000
Removal of Existing Structures	LUMP	3	$ 2,000	$ 6,000
Excavation and Embankment in Place	CY	4,200	$ 35	$ 147,000
Rock Grade Control	CY	150	$ 200	$ 30,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	1,200	$ 150	$ 180,000
Bank Stabilization	SY	1,610	$ 120.00	$ 193,200
Granular Backfill	CY	115	$ 55	$ 6,300
New Culvert	LF		$ 500.0	$ -
Manhole	LF	30	$ 625	$ 18,800
Inlet	EA	1	$ 3,500	$ 3,500
Sewer Pipe Small	LF	30	$ 140	$ 4,200
Sewer Pipe Medium	LF	210	$ 220	$ 46,200
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	1,040	$ 50	$ 52,000
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	75	$ 100	$ 7,500
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	2	$ 50,000	$ 100,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 86,600	$ 86,600
			Subtotal =	$ 952,300
			Contingency = 30%	$ 285,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 1,238,000**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 1,468,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing and service bridge are in the regulatory floodway.		
COMMON GROUND:			

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: Low water crossing*	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Low water crossing, service bridge*	20	31	12		3		620
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	3	10		5		60

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing and service bridge are in the regulatory floodway.		
COMMON GROUND:			

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition		30						30
				TOTAL PROBLEM POINTS						**720**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing and service bridge are in the regulatory floodway.		
COMMON GROUND:			

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)	5	PER 100 LF			10		50
	Riffle Pool Complex	6.78	PER 100 LF			10		68
	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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)	6.78	PER 100 LF			10		68
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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				**Yes**		100
							TOTAL SOLUTION POINTS	**406**
							TOTAL BENEFIT POINTS	**1126**

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

TOTAL COST IN THOUSANDS=	**$1,117**
BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=	**1.01**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01a: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge with associated grade controls. City design plans were advanced to an 80% level prior to putting on hold due to funding.		
ENVIRONMENTAL CONSIDERATIONS:	The service bridge is in the regulatory floodway.		
COMMON GROUND:			

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Service bridge*	20	26	12		3		520
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01a: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge with associated grade controls. City design plans were advanced to an 80% level prior to putting on hold due to funding.		
ENVIRONMENTAL CONSIDERATIONS:	The service bridge is in the regulatory floodway.		
COMMON GROUND:			

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition		30						30
				TOTAL PROBLEM POINTS						**570**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01a: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge with associated grade controls. City design plans were advanced to an 80% level prior to putting on hold due to funding.		
ENVIRONMENTAL CONSIDERATIONS:	The service bridge is in the regulatory floodway.		
COMMON GROUND:			

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)	3	PER 100 LF			10		30
	Riffle Pool Complex	3.25	PER 100 LF			10		33
	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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)	3.25	PER 100 LF			10		33
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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				**Yes**		100
						TOTAL SOLUTION POINTS		**215**
						TOTAL BENEFIT POINTS		**785**

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

TOTAL COST IN THOUSANDS= **$492**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.60**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01b: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing is in the regulatory floodway.		
COMMON GROUND:			

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: Low water crossing*	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Low water crossing, service bridge*	20	4	12		3		80
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01b: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing is in the regulatory floodway.		
COMMON GROUND:			

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**90**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01b: Deer Creek in Malcolm Terrace Park	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	2
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing is in the regulatory floodway.		
COMMON GROUND:			

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)	2	PER 100 LF			10				20
	Riffle Pool Complex	0.49	PER 100 LF			10				5
	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				
	4.4 Preserves natural resource areas	No. Units				Points per Unit				
	Lakes, Wetlands, etc.		AC			30				
	Natural Corridor (min. 25ft width)	0.49	PER 100 LF			10				5
	4.5 Conservation Easement		EA			20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)		11-15 (5 pts)	>15 (0 pts)			
	Points for Easements	**50**								50
	5.2. Recreational/Educational	Yes = 100 No = 0 pts				**Yes**				100
									TOTAL SOLUTION POINTS	**180**
									TOTAL BENEFIT POINTS	**270**

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

TOTAL COST IN THOUSANDS=	**$589**
BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=	**0.46**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01: Deer Creek in Malcolm Terrace Park Alternative	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing and service bridge are in the regulatory floodway.		
COMMON GROUND:			

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: Low water crossing*	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Low water crossing, service bridge*	20	34	12		3		680
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	3	10		5		60

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01: Deer Creek in Malcolm Terrace Park Alternative	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing and service bridge are in the regulatory floodway.		
COMMON GROUND:			

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**780**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-01: Deer Creek in Malcolm Terrace Park Alternative	DATE:	7/31/2023
PROJECT LOCATION:	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.		
ENVIRONMENTAL CONSIDERATIONS:	The low water crossing and service bridge are in the regulatory floodway.		
COMMON GROUND:			

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)	7	PER 100 LF			10			70
	Riffle Pool Complex	6.78	PER 100 LF			10			68
	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			
	4.4 Preserves natural resource areas	No. Units				Points per Unit			
	Lakes, Wetlands, etc.		AC			30			
	Natural Corridor (min. 25ft width)	6.78	PER 100 LF			10			68
	4.5 Conservation Easement		EA			20			
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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				**Yes**			100
							TOTAL SOLUTION POINTS		**426**
							TOTAL BENEFIT POINTS		**1206**

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

TOTAL COST IN THOUSANDS=	**$1,469**
BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=	**0.82**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

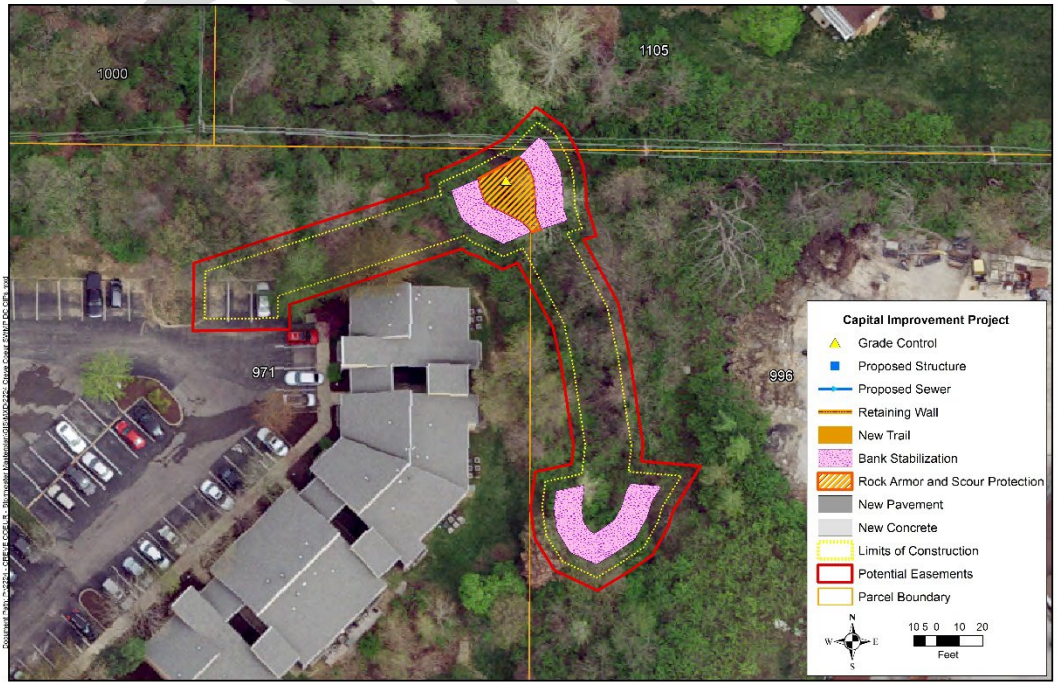
Draft

DC-C-03: 996 East Rue De La Banque Street

Problem Description: Along an upper tributary to Creve Coeur Creek west of the 996 East Rue De La Banque Street City maintenance yard erosion was observed around the outfall. There was also a knickpoint near an exposed sanitary line and manhole. The affected parcels are private and public.

Recommendation: Stabilize the banks surrounding the outfall. Install a step grade control and stilling basin at the knickpoint.

Exposed manhole and sanitary line



Conceptual Layout of DC-C-03

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-03 996 East Rue De La Banque Street

Project Description: Bank Stabilization and a stilling basin to address knickpoints threatening structures in an upper tributary.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 7,900
			Contingency = 25%	$ 2,000
			TOTAL OPINION OF SURVEYING COST =	**$ 9,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	225	$ 35	$ 7,900
Rock Grade Control	CY	70	$ 200	$ 14,000
Rock Stilling Basin / Outlet Scour Protection	CY	75	$ 100	$ 7,500
Rock Toe and Slope Protection	CY	55	$ 150	$ 8,300
Bank Stabilization	SY	190	$ 120.00	$ 22,800
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	65	$ 150	$ 9,800
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	56	$ 50	$ 2,800
Utility Relocation	LUMP	0	$ 5,500	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 9,000	$ 9,000
			Subtotal =	$ 98,900
			Contingency = 30%	$ 29,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 128,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 195,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-03 996 East Rue De La Banque Street DATE: 12/4/2023

PROJECT LOCATION: 996 East Rue De La Banque Street, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank Stabilization and a stilling basin to address knickpoints threatening structures in an upper tributary.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 1022 E Rue De La Banque Apt*	300		200	1	50		200
			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	0	
		1.2.2.	No. of lots (from 1.2.1) on outside of bend		lots	10 points per lot				
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-03 996 East Rue De La Banque Street DATE: 12/4/2023

PROJECT LOCATION: 996 East Rue De La Banque Street, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank Stabilization and a stilling basin to address knickpoints threatening structures in an upper tributary.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition								
				TOTAL PROBLEM POINTS						**220**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-03 996 East Rue De La Banque Street DATE: 12/4/2023

PROJECT LOCATION: 996 East Rue De La Banque Street, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank Stabilization and a stilling basin to address knickpoints threatening structures in an upper tributary.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2**	PER 100 LF		10		20
	Riffle Pool Complex	**1.84**	PER 100 LF		10		18
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	1.84	PER 100 LF		10		18
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**77**
					TOTAL BENEFIT POINTS		**297**

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

TOTAL COST IN THOUSANDS= **$196**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.52**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

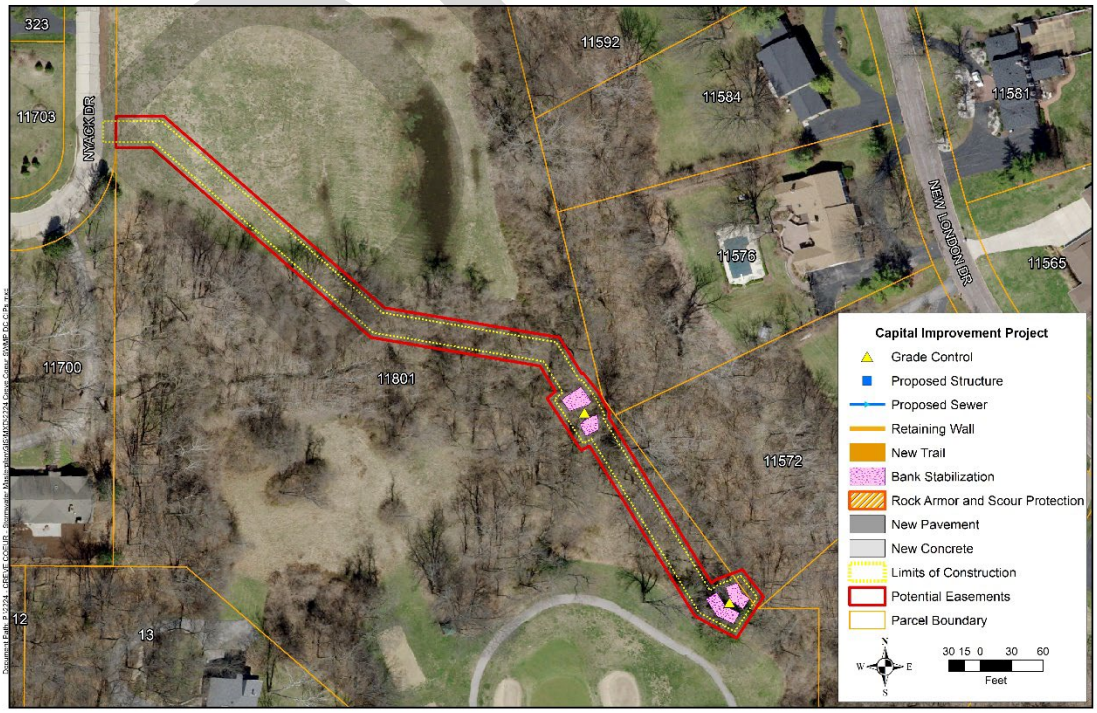
Draft

DC-C-04: 11572 New London Drive

Problem Description: In the unnamed tributary behind lot 1572 New London Drive the existing concrete grade control structure is failing. The affected parcels are private.

Recommendation: Install a new step grade control structure with associated bank stabilization to replace the failing concrete grade control structure in the unnamed tributary behind lot 1572 New London Drive.

Failing concrete grade control



Conceptual Layout of DC-C-04

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-04 11572 New London Drive

Project Description: Bank stabilization to address erosion in an unnamed tributary.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.4	$ 12,000	$ 4,800
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.4	$ 5,000	$ 2,000
			Subtotal =	$ 9,800
		Contingency =	25%	$ 2,500
		TOTAL OPINION OF SURVEYING COST =		**$ 12,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 12,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	120	$ 35	$ 4,200
Rock Grade Control	CY	55	$ 200	$ 11,000
Rock Stilling Basin / Outlet Scour Protection	CY	0	$ 100	$ -
Rock Toe and Slope Protection	CY	45	$ 150	$ 6,800
Bank Stabilization	SY	145	$ 120.00	$ 17,400
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	0	$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 7,900	$ 7,900
			Subtotal =	$ 86,400
		Contingency =	30%	$ 25,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 112,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 181,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-04 11572 New London Drive DATE: 12/4/2023

PROJECT LOCATION: 11572 New London Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion in an unnamed tributary.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-04 11572 New London Drive DATE: 12/4/2023

PROJECT LOCATION: 11572 New London Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion in an unnamed tributary.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**40**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-04 11572 New London Drive DATE: 12/4/2023

PROJECT LOCATION: 11572 New London Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion in an unnamed tributary.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is located on common ground.

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)	**2**	PER 100 LF		10				20
	Riffle Pool Complex	**5.42**	PER 100 LF		10				54
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)	**5.42**	PER 100 LF		10				54
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**148**
							TOTAL BENEFIT POINTS		**188**

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

TOTAL COST IN THOUSANDS= **$182**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.04**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

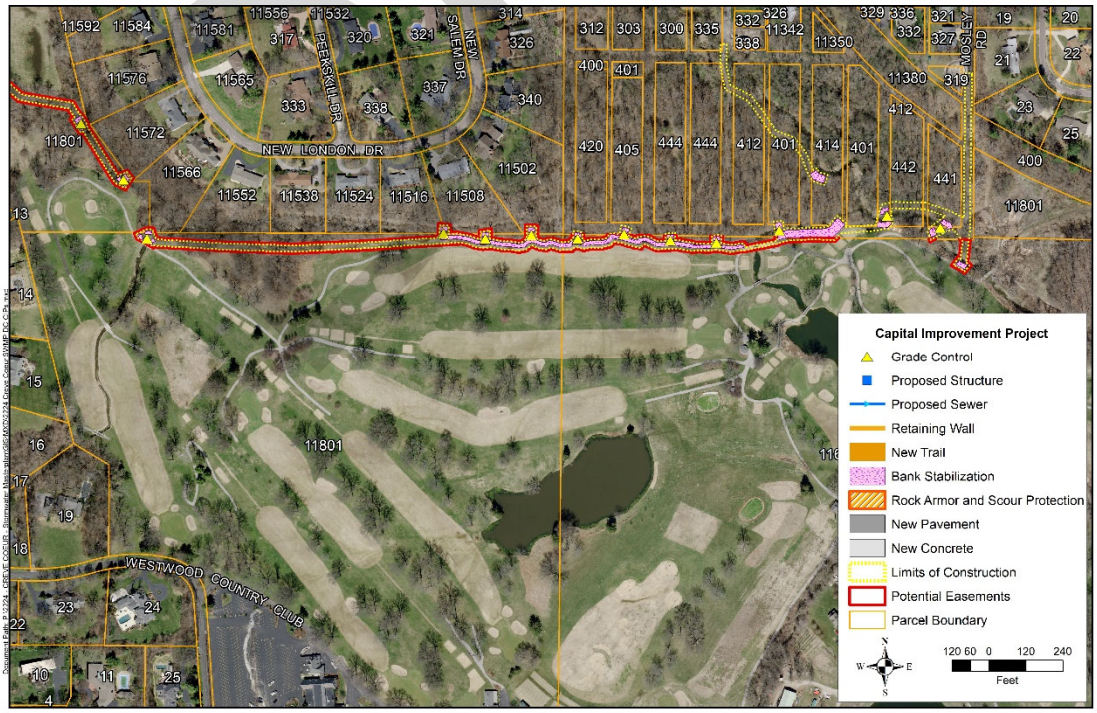
Draft

DC-C-05: Westwood Country Club

Tributary RDB erosion along north end of country club

Problem Description: In Deer Creek and the unnamed tributary along the north end of Westwood Country Club several issues were observed as follows. Bank erosion is threatening the maintenance cart path upstream of the Deer Creek bridge crossing. There is an exposed sanitary crossing causing a knickpoint in Deer Creek between South Mosley Road and the country club. Just downstream of the tributary confluence, there is bank erosion threatening a manhole at the top of bank and a knickpoint in the channel. There is bank erosion along the RDB of the unnamed tributary on the north edge of Westwood Country Club. There is bank erosion threatening the bridge abutments and a knickpoint at the northwest end of the country club. The affected parcels are private.

Recommendation: Stabilize the RDB threatening the maintenance cart path. Install a step grade control at the exposed sanitary crossing. Stabilize the RDB to protect the manhole at top of bank and install a grade control in the channel. Stabilize a portion of the RDB of the tributary between the country club pond outfall and the confluence and install a grade control at the upstream end of the stabilization. Stabilize the RDB of the tributary along the north end of the country club with grade controls every 150 feet. Install a step grade control at the northwest country club bridge and stabilize the banks to protect the bridge abutments.



Conceptual Layout of DC-C-05

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-05 Westwood Country Club

Project Description: Grade controls and bank stabilization to address bank erosion and knickpoints in Deer Creek and one of its tributaries.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	2.2	$ 12,000	$ 26,400
Prepare Easement Plat and Scripts	EACH	12	$ 1,500	$ 18,000
Contruction Staking and As-Built Surveying	ACRE	2.2	$ 5,000	$ 11,000
			Subtotal =	$ 55,400
		Contingency =	25%	$ 13,900
		TOTAL OPINION OF SURVEYING COST =		**$ 69,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	150	$ 20	$ 3,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 11,000
		Contingency =	25%	$ 2,800
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 13,800**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	250	$ 160	$ 40,000
ROW	HOURS	100	$ 160	$ 16,000
Permitting	HOURS	120	$ 160	$ 19,200
Final Design	HOURS	200	$ 160	$ 32,000
Develop Plans and Construction Documents	HOURS	250	$ 160	$ 40,000
Construction Support	HOURS	250	$ 160	$ 40,000
			$ -	$ -
			Subtotal =	$ 187,200
		Contingency =	25%	$ 46,800
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 234,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	2.2	$ 30,000	$ 66,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	3,210	$ 35	$ 112,400
Rock Grade Control	CY	570	$ 200	$ 114,000
Rock Stilling Basin / Outlet Scour Protection	CY	0	$ 100	$ -
Rock Toe and Slope Protection	CY	725	$ 150	$ 108,800
Bank Stabilization	SY	2,580	$ 120.00	$ 309,600
Granular Backfill	CY	110	$ 55	$ 6,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	1,304	$ 150	$ 195,700
Pavement/Sidewalk Removal & Replacement	SY	0	$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	2.2	$ 50,000	$ 110,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 102,900	$ 102,900
			Subtotal =	$ 1,132,000
		Contingency =	30%	$ 339,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 1,471,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$**	**1,788,700**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-05 Westwood Country Club DATE: 12/4/2023

PROJECT LOCATION: Westwood Country Club, 11801 Conway Road, St. Louis, MO 63131 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls and bank stabilization to address bank erosion and knickpoints in Deer Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	9	10		5		180

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-05 Westwood Country Club DATE: 12/4/2023

PROJECT LOCATION: Westwood Country Club, 11801 Conway Road, St. Louis, MO 63131 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls and bank stabilization to address bank erosion and knickpoints in Deer Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

2.0 STORM SEWER / OVERLAND FLOW

2.1. FLOODING

PROBLEM SOLVED CATEGORY, CONT.

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

		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
2.1.1. Structure Flooding								
Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* *Address:*		350		250		65		
Basement (1 lot per structure)* *Address:*		250		200		50		
Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* *Address:*		300		200		50		
*	If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N						
Attached Garage (1 lot per structure) *Address:*		100		75		25		
Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*		50		35		12		
Yard Flooding (1 per lot) *Address:*		10		6		0		
2.1.2.	Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*		200		150		25		
Traffic obstruction (> 6" of water) on arterial street *Address:*		50		35		6		
Traffic obstruction (> 6" of water) on collector street *Address:*		25		15		2		
Traffic obstruction (> 6" of water) on residential street *Address:*		10		6		1		
Ponding (per ponding area) *Address:*		No. Ponds:			Points/pond:		5	
2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
	Points for Condition							
		TOTAL PROBLEM POINTS						**180**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-05 Westwood Country Club DATE: 12/4/2023

PROJECT LOCATION: Westwood Country Club, 11801 Conway Road, St. Louis, MO 63131 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade controls and bank stabilization to address bank erosion and knickpoints in Deer Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**17**	PER 100 LF		10		170
	Riffle Pool Complex	**21.88**	PER 100 LF		10		219
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	21.88	PER 100 LF		10		219
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements				**5**		**5**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**613**
						TOTAL BENEFIT POINTS	**793**

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

TOTAL COST IN THOUSANDS= **$1,789**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.44**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

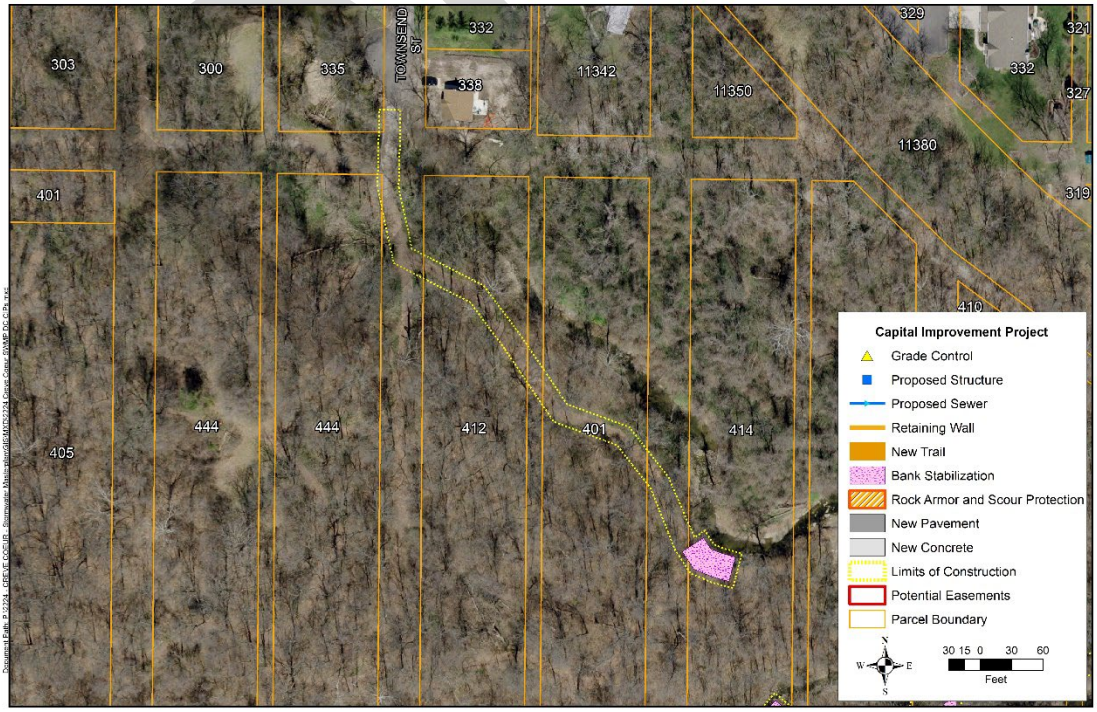
Draft

DC-C-06: Malcolm Terrace Park

Problem Description: In Malcolm Terrace Park along Deer there is erosion threatening the trail located in the southeast corner of Malcom Terrace Park. The affected parcels are public.

Recommendation: Stabilize the RDB and relocate the trail.

Bank erosion threatening trail



Conceptual Layout of DC-C-06

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-06 Malcolm Terrace Park

Project Description: Bank stabilization to address bank erosion in Deer Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.3	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.3	$ 5,000	$ 1,500
			Subtotal =	$ 14,100
		Contingency =	25%	$ 3,500
		TOTAL OPINION OF SURVEYING COST =		**$ 17,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	120	$ 35	$ 4,200
Rock Grade Control	CY	0	$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY	0	$ 100	$ -
Rock Toe and Slope Protection	CY	15	$ 150	$ 2,300
Bank Stabilization	SY	125	$ 120.00	$ 15,000
Granular Backfill	CY	2	$ 55	$ 100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	0	$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	0	$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 5,100	$ 5,100
			Subtotal =	$ 56,200
		Contingency =	30%	$ 16,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 73,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$**	**148,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-06 Malcolm Terrace Park DATE: 12/5/2023

PROJECT LOCATION: Malcolm Terrace Park, 11370 St Paul Street, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address bank erosion in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10	1	5		10

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-06 Malcolm Terrace Park DATE: 12/5/2023

PROJECT LOCATION: Malcolm Terrace Park, 11370 St Paul Street, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address bank erosion in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**10**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-06 Malcolm Terrace Park DATE: 12/5/2023

PROJECT LOCATION: Malcolm Terrace Park, 11370 St Paul Street, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address bank erosion in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY										
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:				Max points:	1000			
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:				Points per Add'l Proj.:	50			
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units				Points per Unit				
	Bioswales		PER 100 LF			10				
	Forebays		AC			200				
	Wet Ponds		AC			100				
	Wetlands		AC			50				
	Biostabilization of banks (per bank)	1	PER 100 LF			10				10
	Riffle Pool Complex		PER 100 LF			10				
	4.2. Eliminates combined sewer (per project)		EA			100				
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA			10				
	4.4 Preserves natural resource areas	No. Units				Points per Unit				
	Lakes, Wetlands, etc.		AC			30				
	Natural Corridor (min. 25ft width)	1	PER 100 LF			10				10
	4.5 Conservation Easement		EA			20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)		11-15 (5 pts)	>15 (0 pts)			
	Points for Easements			10						10
	5.2. Recreational/Educational	Yes = 100 No = 0 pts				Yes				100
								TOTAL SOLUTION POINTS		130
								TOTAL BENEFIT POINTS		140

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

TOTAL COST IN THOUSANDS= **$148**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.95**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

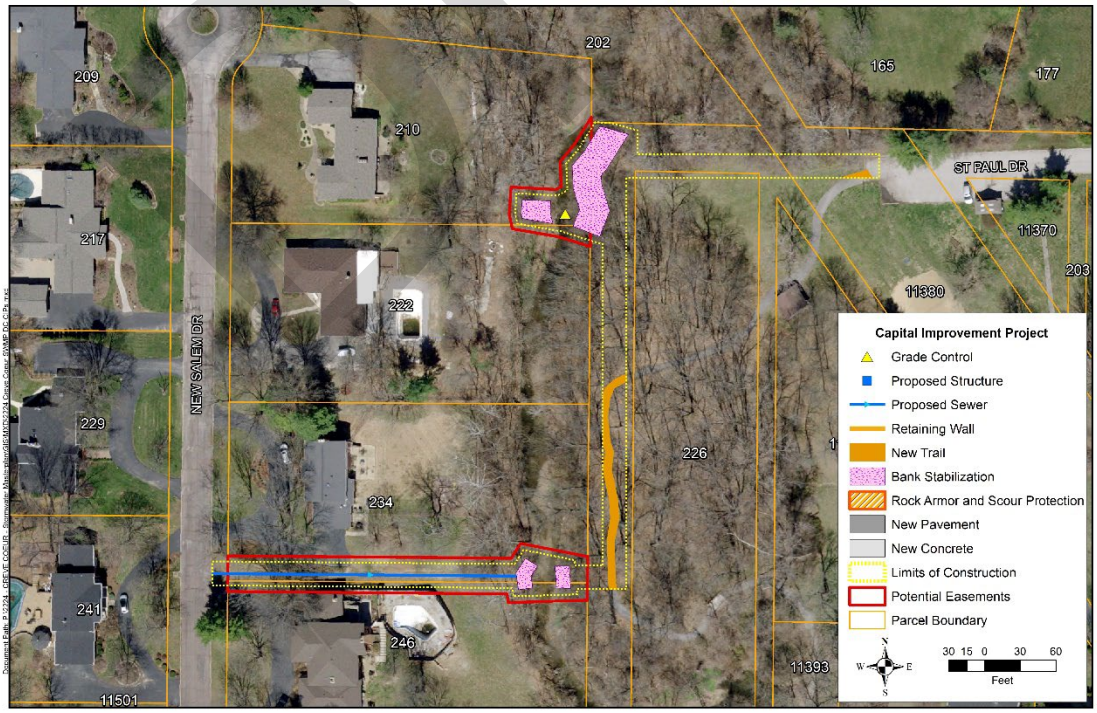
DC-C-07: New Salem Drive

Problem Description: In Deer Creek within Malcolm Terrace Park issues were observed as follows. Bank erosion surrounding a pipe outfall with a rusted invert in the rear lot of 234 New Salem Drive. There is a threatened utility pole on the opposite bank. In the rear lot of 210 New Salem Drive there is a perched outfall, knickpoint, exposed sanitary manhole, and leaning utility pole. The affected parcels are private.

Recommendation: Stabilize both banks in the rear lot of 234 New Salem Drive and replace the pipe. Stabilize the LDB to protect the exposed sanitary manhole and replace the utility pole. Install a step grade control at the knickpoint.

234 New Salem Drive pipe outfall

Leaning utility pole



Conceptual Layout of DC-C-07

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-07 New Salem Drive

Project Description: Bank stabilization to address bank erosion in Deer Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 19,000
			Contingency = 25%	$ 4,800
			TOTAL OPINION OF SURVEYING COST =	**$ 23,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
			Contingency = 25%	$ 2,300
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
			Contingency = 25%	$ 24,400
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	590	$ 35	$ 20,700
Rock Grade Control	CY	50	$ 200	$ 10,000
Rock Stilling Basin / Outlet Scour Protection	CY	0	$ 100	$ -
Rock Toe and Slope Protection	CY	65	$ 150	$ 9,800
Bank Stabilization	SY	355	$ 120.00	$ 42,600
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	1,312	$ 150	$ 196,700
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	0	$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 32,600	$ 32,600
			Subtotal =	$ 358,500
			Contingency = 30%	$ 107,600
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 466,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 623,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-07 New Salem Drive DATE: 12/4/2023

PROJECT LOCATION: 234 New Salem Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address bank erosion in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-07 New Salem Drive DATE: 12/4/2023

PROJECT LOCATION: 234 New Salem Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address bank erosion in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**20**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-07 New Salem Drive DATE: 12/4/2023

PROJECT LOCATION: 234 New Salem Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address bank erosion in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2**	PER 100 LF			10			20
	Riffle Pool Complex	**2.85**	PER 100 LF			10			28
	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			
	4.4 Preserves natural resource areas	No. Units				Points per Unit			
	Lakes, Wetlands, etc.		AC			30			
	Natural Corridor (min. 25ft width)	**2.85**	PER 100 LF			10			28
	4.5 Conservation Easement		EA			20			
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)		11-15 (5 pts)	>15 (0 pts)		
	Points for Easements			**10**					**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts							
							TOTAL SOLUTION POINTS		**87**
							TOTAL BENEFIT POINTS		**107**

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

TOTAL COST IN THOUSANDS= **$623**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.17**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

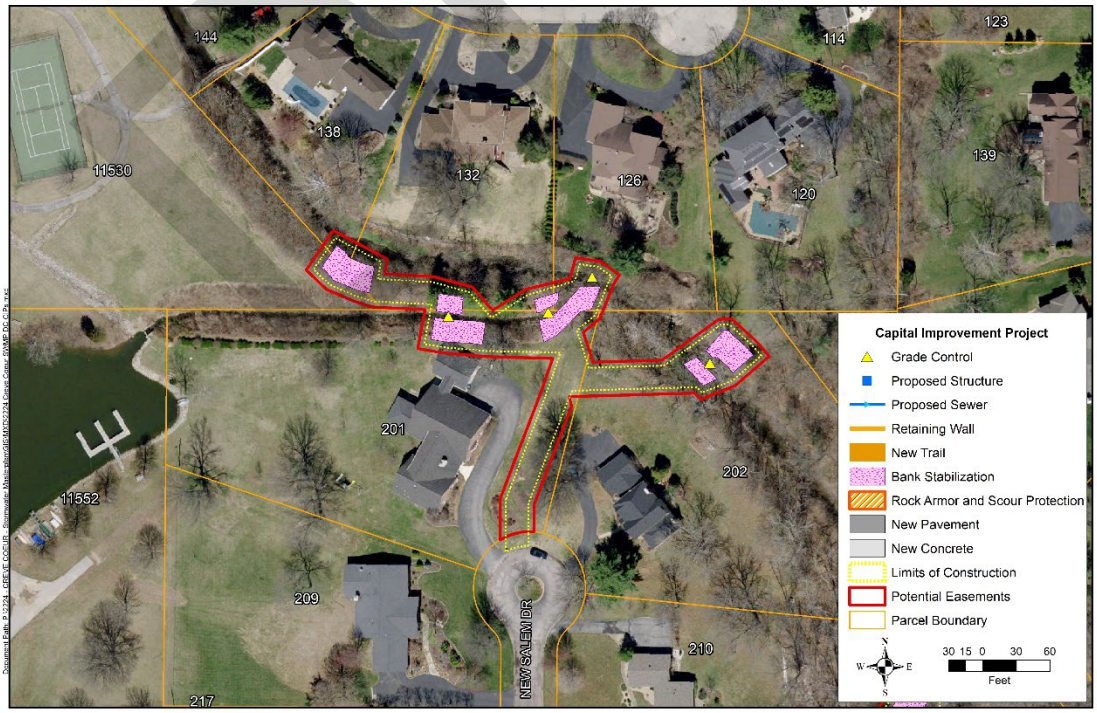
DC-C-08: New Salem Drive and Camfield Square Drive

Problem Description: In Deer Creek between Camfield Square Drive and New Salem Drive several issues were observed as follows. In the rear lot of 202 New Salem Drive there is an exposed sanitary crossing turning flow and causing a knickpoint. Just downstream of the tributary confluence, there is a knickpoint in the channel. At the downstream end of the tributary, there is a knickpoint along with failing grouted riprap on the banks. North of 201 New Salem Drive, there is a knickpoint in the tributary and the garage is within 10 ft of the top of bank. There is erosion along the outside bend of Deer Creek behind 132 and 138 Camfield Square Drive. The affected parcels are private.

Garage at top of bank

Scour along outside bend of Deer Creek

Recommendation: Install a grade control at the exposed sanitary crossing. Install a grade control at the knickpoint downstream of the confluence. Install a step grade control at the downstream end of the tributary and replace the failing bank armament. Stabilize the banks threatening the garage and install a grade control at the knickpoint. Stabilize the outside bend behind 132 and 138 Camfield Square Drive.



Conceptual Layout of DC-C-08

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-08 New Salem Drive and Camfield Square Drive

Project Description: Bank stabilization and grade controls to address erosion threatening structures in Deer Creek and one of its tributaries.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.4	$ 12,000	$ 4,800
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.4	$ 5,000	$ 2,000
			Subtotal =	$ 15,800
		Contingency =	25%	$ 4,000
		TOTAL OPINION OF SURVEYING COST =		**$ 19,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	100	$ 20	$ 2,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 10,000
		Contingency =	25%	$ 2,500
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 12,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,310	$ 35	$ 45,900
Rock Grade Control	CY	120	$ 200	$ 24,000
Rock Stilling Basin / Outlet Scour Protection	CY	0	$ 100	$ -
Rock Toe and Slope Protection	CY	115	$ 150	$ 17,300
Bank Stabilization	SY	525	$ 120.00	$ 63,000
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	0	$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	21	$ 50	$ 1,100
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 19,000	$ 19,000
			Subtotal =	$ 208,900
		Contingency =	30%	$ 62,700
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 271,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 383,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-08 New Salem Drive and Camfield Square Drive DATE: 12/5/2023

PROJECT LOCATION: 201 New Salem Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures in Deer Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 210 New Salem Dr*	300	1	200		50		300
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: 120 Camfield Square Dr pool*	150		100		25	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5	3	15

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-08 New Salem Drive and Camfield Square Drive DATE: 12/5/2023

PROJECT LOCATION: 201 New Salem Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures in Deer Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**340**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-08 New Salem Drive and Camfield Square Drive DATE: 12/5/2023

PROJECT LOCATION: 201 New Salem Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion threatening structures in Deer Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**8**	PER 100 LF			10					80
	Riffle Pool Complex	**8.05**	PER 100 LF			10					81
	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					
	4.4 Preserves natural resource areas	No. Units				Points per Unit					
	Lakes, Wetlands, etc.		AC			30					
	Natural Corridor (min. 25ft width)		PER 100 LF			10					
	4.5 Conservation Easement		EA			20					
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)		11-15 (5 pts)	>15 (0 pts)				
	Points for Easements			**10**							**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts									
								TOTAL SOLUTION POINTS			**171**
								TOTAL BENEFIT POINTS			**511**

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

TOTAL COST IN THOUSANDS= **$384**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.33**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

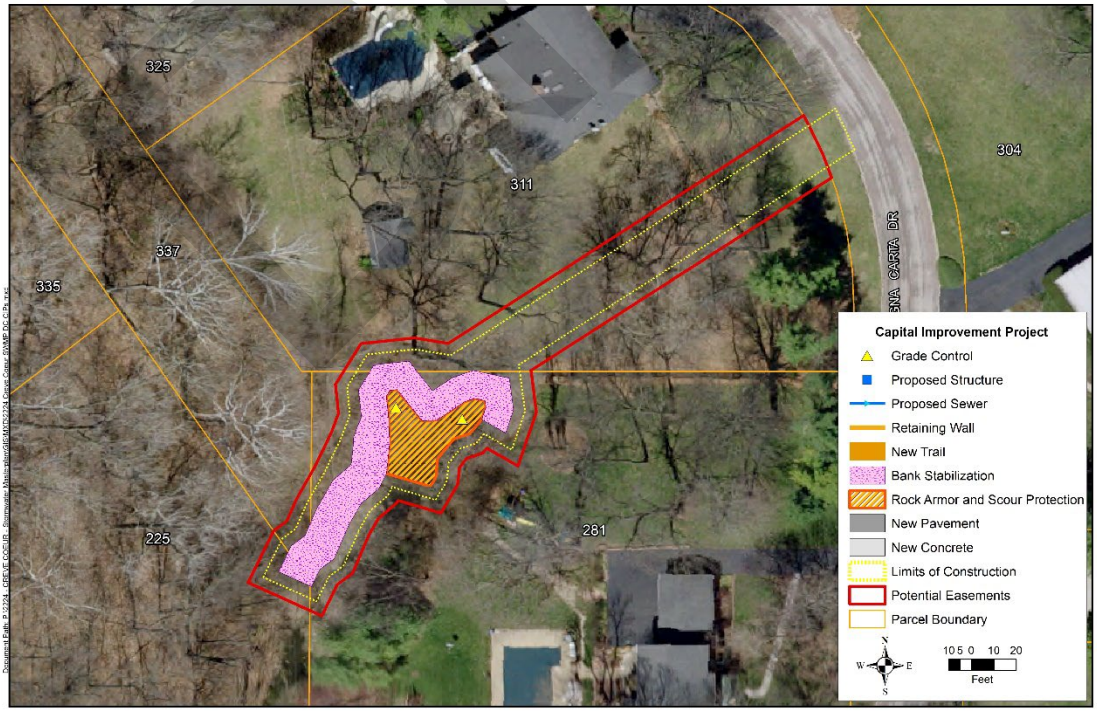
Draft

DC-C-09: 281 Magna Carta Drive

Problem Description: In the northwest portion of the 281 Magna Carta Drive along Deer Creek, there is failing grouted riprap and a scour hole forming downstream of the two perched outfalls. The gabion wall along the LDB seems to be in good condition. The affected parcels are private.

Recommendation: Install two step grade controls at each outfall with a stilling basin downstream. Stabilize the banks between the outfalls and along the RDB.

Outfall and scour hole



Conceptual Layout of DC-C-09

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-09 281 Magna Carta Drive

Project Description: Step grade control and stilling basin to protect outfall and replace failing grouted riprap structure in Deer Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF SURVEYING COST =		**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	535	$ 35	$ 18,700
Rock Grade Control	CY	70	$ 200	$ 14,000
Rock Stilling Basin / Outlet Scour Protection	CY	150	$ 100	$ 15,000
Rock Toe and Slope Protection	CY	70	$ 150	$ 10,500
Bank Stabilization	SY	275	$ 120.00	$ 33,000
Granular Backfill	CY	25	$ 55	$ 1,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	0	$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	21	$ 50	$ 1,100
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 11,500	$ 11,500
			Subtotal =	$ 126,700
		Contingency =	30%	$ 38,000
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 164,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 233,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-09 281 Magna Carta Drive DATE: 12/5/2023

PROJECT LOCATION: 281 Magna Carta Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Step grade control and stilling basin to protect outfall and replace failing grouted riprap structure in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 311 Magna Carta Dr Shed*	150		100		25	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-09 281 Magna Carta Drive DATE: 12/5/2023

PROJECT LOCATION: 281 Magna Carta Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Step grade control and stilling basin to protect outfall and replace failing grouted riprap structure in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**25**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-09 281 Magna Carta Drive DATE: 12/5/2023

PROJECT LOCATION: 281 Magna Carta Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Step grade control and stilling basin to protect outfall and replace failing grouted riprap structure in Deer Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	3	PER 100 LF		10				30
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		50
							TOTAL BENEFIT POINTS		75

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

TOTAL COST IN THOUSANDS= **$234**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.32**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-C-10: Villa Coublay Drive

Problem Description: There is erosion along both banks at the downstream end of Windrush Creek as well as an exposed sanitary line in the channel bed. Upstream of the Villa Coublay Drive bridge crossing, there is bank erosion along the LDB. The bridge abutments are also cracking. The affected parcels are private.

Downstream end of Windrush Creek

Recommendation: Install a series of four grade controls at the downstream end of Windrush Creek as well as 100 feet of bank stabilization to prevent further bank failures. Install bank stabilization along the LDB upstream of the Villa Coublay Drive bridge crossing. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.

LDB upstream of Villa Coublay Drive

Conceptual Layout of DC-C-10

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-10 Villa Coublay Drive

Project Description: Bank stabilization and grade controls to repair erosion in Windrush Creek. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF SURVEYING COST =		**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	350	$ 35	$ 12,300
Rock Grade Control	CY	80	$ 200	$ 16,000
Rock Stilling Basin / Outlet Scour Protection	CY	0	$ 100	$ -
Rock Toe and Slope Protection	CY	110	$ 150	$ 16,500
Bank Stabilization	SY	345	$ 120.00	$ 41,400
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	0	$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	64	$ 50	$ 3,200
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 11,200	$ 11,200
			Subtotal =	$ 122,900
		Contingency =	30%	$ 36,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 159,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 228,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-10 Villa Coublay Drive DATE: 12/5/2023

PROJECT LOCATION: 44 Villa Coublay Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to repair erosion in Windrush Creek. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Villa Coublay Dr*	20	2	12	1	3	2	58
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-10 Villa Coublay Drive DATE: 12/5/2023

PROJECT LOCATION: 44 Villa Coublay Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to repair erosion in Windrush Creek. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						**78**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-10 Villa Coublay Drive DATE: 12/5/2023

PROJECT LOCATION: 44 Villa Coublay Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to repair erosion in Windrush Creek. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: This project is partially located on common ground.

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)	**3**	PER 100 LF		10				30
	Riffle Pool Complex	**3.31**	PER 100 LF		10				33
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)	3.31	PER 100 LF		10				33
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**116**
							TOTAL BENEFIT POINTS		**194**

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

TOTAL COST IN THOUSANDS= **$229**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.85**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

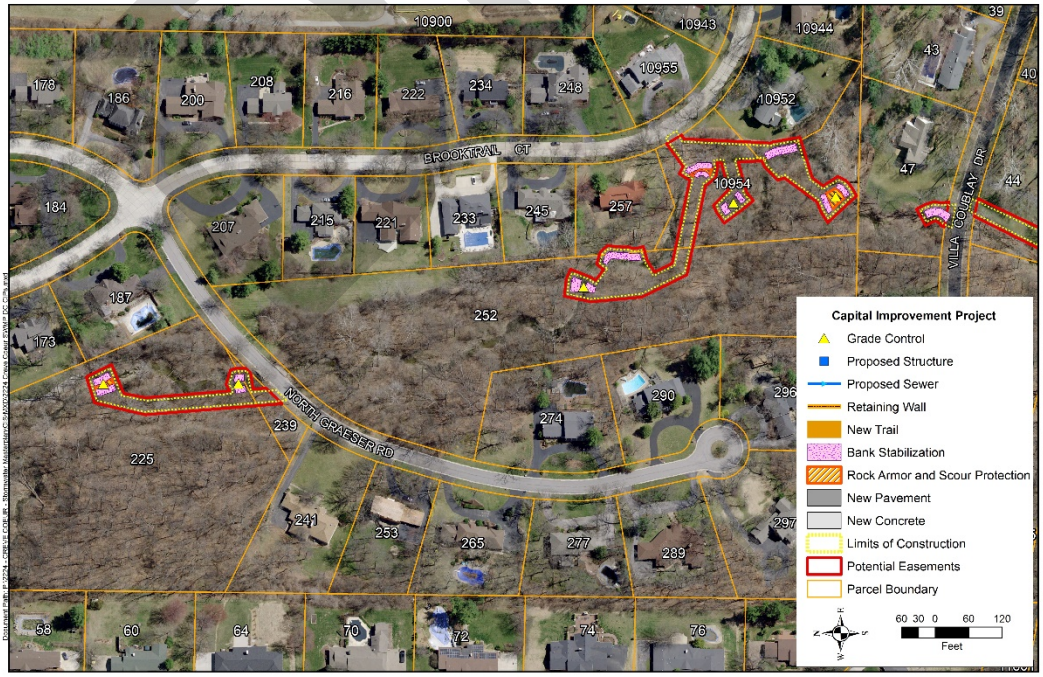
DC-C-11: Brooktrail Court South

257 Brooktrail Court beaver dam

Bank erosion at 257 Brooktrail Court

Problem Description: Several knickpoints and eroded banks were observed along Windrush Creek upstream and downstream of South Graeser Road as follows. In the rear lot of 187 Brooktrail Court, the existing grouted riprap is failing and there is a 3 foot knickpoint. Immediately upstream of South Graeser Road, there is a 1 foot knickpoint. Along the rear lot of 257 Brooktrail Court, there is a beaver dam with a 2 foot knickpoint and bank erosion along the outside bend of the channel. On the 10954 Brooktrail Court property, there is bank erosion along the outside bend of the channel. In the rear lot of 10952 Brooktrail Court, there is bank erosion along the outside bend of the channel and failing grouted riprap with a 1.5 foot knickpoint. During an extreme event, water was up to back door on 257 Brooktrail Court. The affected parcels are private.

Recommendation: Install a step grade control structure and and stilling basin at 187 Brooktrail Court. Install a grade control structure upstream of South Graeser Road. Install a step grade control and stabilize the outside bend of the channel at 257 Brooktrail Court. Stabilize the outside bend of the channel, install a stilling basin, and install a step grade control structure at 10954 Brooktrail Court and 10952 Brooktrail Court respectively.



Conceptual Layout of DC-C-11

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-11 Brooktrail Court South

Project Description: Bank stabilization, grade controls, and stilling basins to address erosion threatening structures in Windrush Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.9	$ 12,000	$ 10,800
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.9	$ 5,000	$ 4,500
			Subtotal =	$ 24,300
		Contingency =	25%	$ 6,100
		TOTAL OPINION OF SURVEYING COST =		**$ 30,400**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,500
		Contingency =	25%	$ 2,600
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 13,100**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.9	$ 30,000	$ 27,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,095	$ 35	$ 38,300
Rock Grade Control	CY	230	$ 200	$ 46,000
Rock Stilling Basin / Outlet Scour Protection	CY	185	$ 100	$ 18,500
Rock Toe and Slope Protection	CY	200	$ 150	$ 30,000
Bank Stabilization	SY	590	$ 120.00	$ 70,800
Granular Backfill	CY	50	$ 55	$ 2,800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.9	$ 50,000	$ 45,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 28,600	$ 28,600
			Subtotal =	$ 314,500
		Contingency =	30%	$ 94,400
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 408,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 574,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-11 Brooktrail Court South DATE: 12/5/2023

PROJECT LOCATION: 257 Brooktrail Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion threatening structures in Windrush Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 10952 Brooktrail Ct*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: 10952 Brooktrail Ct pool*	150		100		25	1	25
			Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200		50		
		1.2.2.	No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	6	10		5		120

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-11 Brooktrail Court South DATE: 12/5/2023

PROJECT LOCATION: 257 Brooktrail Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion threatening structures in Windrush Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						205

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-11 Brooktrail Court South DATE: 12/5/2023

PROJECT LOCATION: 257 Brooktrail Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion threatening structures in Windrush Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

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)	**4.52**	PER 100 LF		10		45
	Riffle Pool Complex	**15.25**	PER 100 LF		10		152
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	15.25	PER 100 LF		10		152
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**360**
						TOTAL BENEFIT POINTS	**565**

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

TOTAL COST IN THOUSANDS= **$574**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.98**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

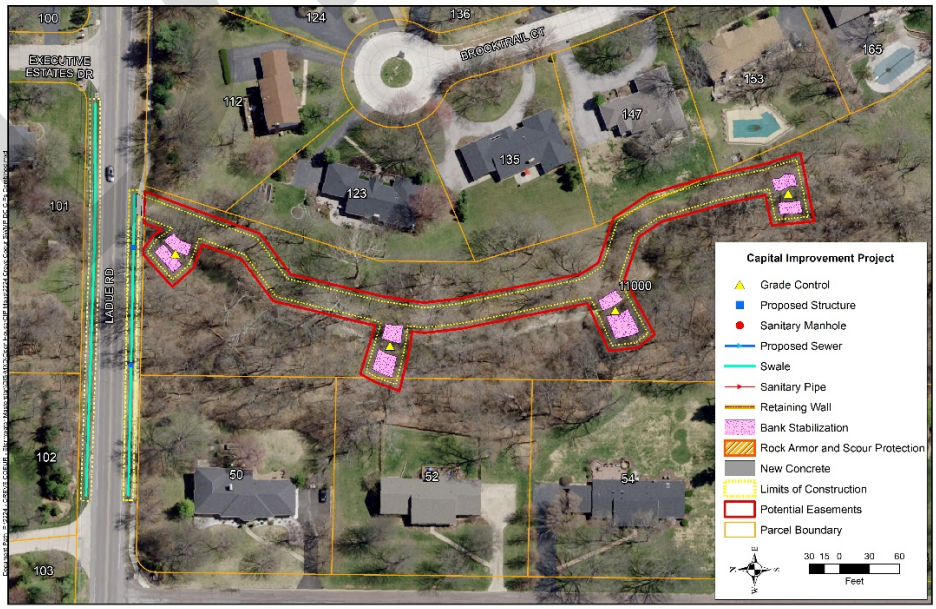
DC-C-12: Brooktrail Court North

Downstream end of Ladue Road crossing

Problem Description: In Windrush Creek downstream of Ladue Road, multiple knickpoints were observed as follows. There is a 2 foot knickpoint and scour pool forming at the Ladue Road crossing outfall. In the rear lot of 123 Brooktrail Court, there is failing grouted riprap with a 2 foot knickpoint. In the rear lot of 147 Brooktrail Court, there is a 1 foot knickpoint and failing grouted riprap. In the rear lot of 153 Brooktrail Court, there is a 1 foot knickpoint and failing grouted riprap. Flooding of Ladue Road. Mainly due to water not being able to run off of the pavement due to build up of road debris and turf at the pavement edge. The affected parcels are private.

Recommendation: Install a step grade control structure at the Ladue Rd crossing outfall. Install step grade control structures with associated bank stabilization to address knickpoints and failing grouted riprap in the rear lots of 123 and 153 Brooktrail Court. Install a grade control structure with associated bank stabilization to address knickpoint and failing grouted riprap in the rear lot of 147 Brooktrail Court. On the north side of Ladue Road construct a shoulder and swale from Hunters Grove Drive to Executive Estates Drive. On the south side of Ladue Road construct a swale between the road and the sidewalk from Hunters Grove Drive to 112 Brooktail Court with an inlet constructed over the existing storm sewer and one constructed over the existing culvert.

Special Considerations: There is evidence from debris on the fence on the downstream side of the culvert that the road may be overtopped due to culvert capacity issues. The culvert is 6 feet tall x 10 feet wide with an approximate slope of 0.63% which results in a full flow culvert capacity of approximately 900 cubic feet per second. The watershed is approximately 466 acres and 30% impervious, the estimated MSD 15-year flow is 1000 cubic feet per second. Additional hydraulic analysis is needed to confirm the actual culvert hydraulic capacity and freeboard. Current MSD regulations would be 2 feet of freeboard for the 100-yr event or approximately 1360 cubic feet per second.



Conceptual Layout of DC-C-12

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-12 Brooktrail Court North

Project Description: Bank stabilization and grade controls to address erosion in Windrush Creek as well as swales to address overland flow issues.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.7	$ 12,000	$ 8,400
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.7	$ 5,000	$ 3,500
			Subtotal =	$ 16,400
		Contingency =	25%	$ 4,100
		TOTAL OPINION OF SURVEYING COST =		**$ 20,500**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	100	$ 20	$ 2,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 10,000
		Contingency =	25%	$ 2,500
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.7	$ 30,000	$ 21,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	530	$ 35	$ 18,600
Rock Grade Control	CY	125	$ 200	$ 25,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	85	$ 150	$ 12,800
Bank Stabilization	SY	305	$ 120.00	$ 36,600
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA	1	$ 3,130	$ 3,100
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	690	$ 15	$ 10,400
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	690	$ 50	$ 34,500
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.7	$ 50,000	$ 35,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 20,400	$ 20,400
			Subtotal =	$ 224,000
		Contingency =	30%	$ 67,200
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 291,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 404,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-12 Brooktrail Court North DATE: 12/5/2023

PROJECT LOCATION: 123 Brooktrail Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion in Windrush Creek as well as swales to address overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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	5	0		25
		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	1	4		25
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Undermined culvert*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	3	10		5		60

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-12 Brooktrail Court North DATE: 12/5/2023

PROJECT LOCATION: 123 Brooktrail Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion in Windrush Creek as well as swales to address overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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:		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**190**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-12 Brooktrail Court North DATE: 12/5/2023

PROJECT LOCATION: 123 Brooktrail Court, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and grade controls to address erosion in Windrush Creek as well as swales to address overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND: The majority of this project is located on common ground.

SOLUTION BENEFIT CATEGORY									
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units			Points per Unit		
	Bioswales		PER 100 LF		10		
	Forebays		AC		200		
	Wet Ponds		AC		100		
	Wetlands		AC		50		
	Biostabilization of banks (per bank)	**1.79**	PER 100 LF		10		18
	Riffle Pool Complex	**7.46**	PER 100 LF		10		75
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	7.46	PER 100 LF		10		75
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**187**
						TOTAL BENEFIT POINTS	**377**

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

TOTAL COST IN THOUSANDS= **$404**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.93**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

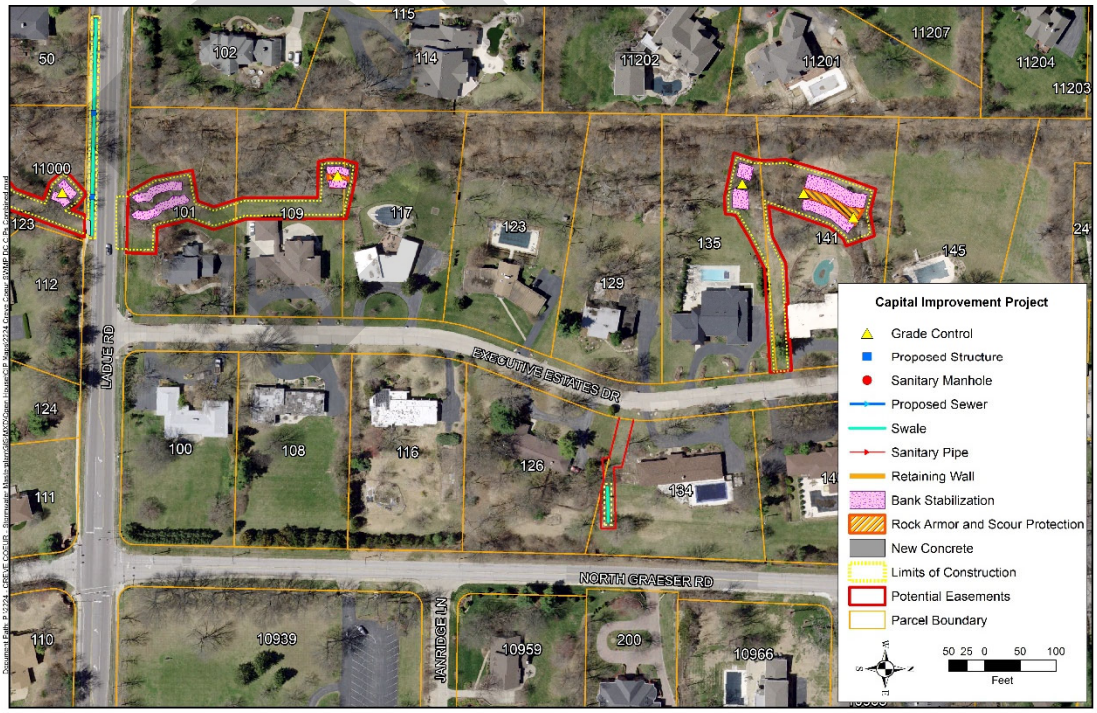
DC-C-13: Executive Estates Drive

Upstream of Ladue Road crossing

Problem Description: The following issues were observed along Windrush Creek north of the Ladue Road crossing. The upstream side of the Ladue Road crossing needs to be reshaped. There is a 2 foot knickpoint in the rear lot of 109 Executive Estates Drive. There is a 1 foot knickpoint in the rear lot of 135 Executive Estates Drive. There is a 1.5 foot knickpoint and scour hole at the outfall in the rear lot of 141 Executive Estates Drive as well as a perched grouted riprap tributary. Groundwater seepage onto the street at 126 Executive Estates Drive and excessive flows from Graeser Road. The affected parcels are private.

Recommendation: Reshape and stabilize the banks upstream of the Ladue Road crossing. Install a stilling basin and step grade control structure at 109 Executive Estates Drive. Install a series of step grade control structures from 141 to 135 Executive Estates Drive along with a stilling basin. Install a toe wall at the end of the grouted riprap tributary. Cut notch in berm that runs behind the homes on the east side of Executive Estates Drive between 126 and 134 and protect new swale with Instaturf ShearForce.

Special Considerations: Street panel in front of 126 was just replaced and may have resolved the issue, to be monitored. Owners at 134 installed drainage sytsem in 2023, which may have resolved the issue and should be monitored.



Conceptual Layout of DC-C-13

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-13 Executive Estates Drive

Project Description: Bank stabilization, grade controls, and stilling basins to address erosion in Windrush Creek as well as a swale to address overland flow issues.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.8	$ 12,000	$ 9,600
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.8	$ 5,000	$ 4,000
			Subtotal =	$ 24,100
		Contingency =	25%	$ 6,000
		TOTAL OPINION OF SURVEYING COST =		**$ 30,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
		Contingency =	25%	$ 2,500
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.8	$ 30,000	$ 24,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	1,160	$ 35	$ 40,600
Rock Grade Control	CY	180	$ 200	$ 36,000
Rock Stilling Basin / Outlet Scour Protection	CY	230	$ 100	$ 23,000
Rock Toe and Slope Protection	CY	185	$ 150	$ 27,800
Bank Stabilization	SY	715	$ 120.00	$ 85,800
Granular Backfill	CY	50	$ 55	$ 2,800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	50	$ 15	$ 800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	95	$ 50	$ 4,800
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.8	$ 50,000	$ 40,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 29,100	$ 29,100
			Subtotal =	$ 320,200
		Contingency =	30%	$ 96,100
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 416,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 580,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-13 Executive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 109 Executive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion in Windrush Creek as well as a swale to address overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address: Undermined/failing wing wall*	35	2	25		6		70
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-13 Executive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 109 Executive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion in Windrush Creek as well as a swale to address overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	**1**	6		0		**10**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**120**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-13 Executive Estates Drive DATE: 12/5/2023

PROJECT LOCATION: 109 Executive Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade controls, and stilling basins to address erosion in Windrush Creek as well as a swale to address overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**4.34**	PER 100 LF		10		43
	Riffle Pool Complex	**5.18**	PER 100 LF		10		52
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	5.18	PER 100 LF		10		52
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**157**
						TOTAL BENEFIT POINTS	**277**

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

TOTAL COST IN THOUSANDS= **$581**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.48**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

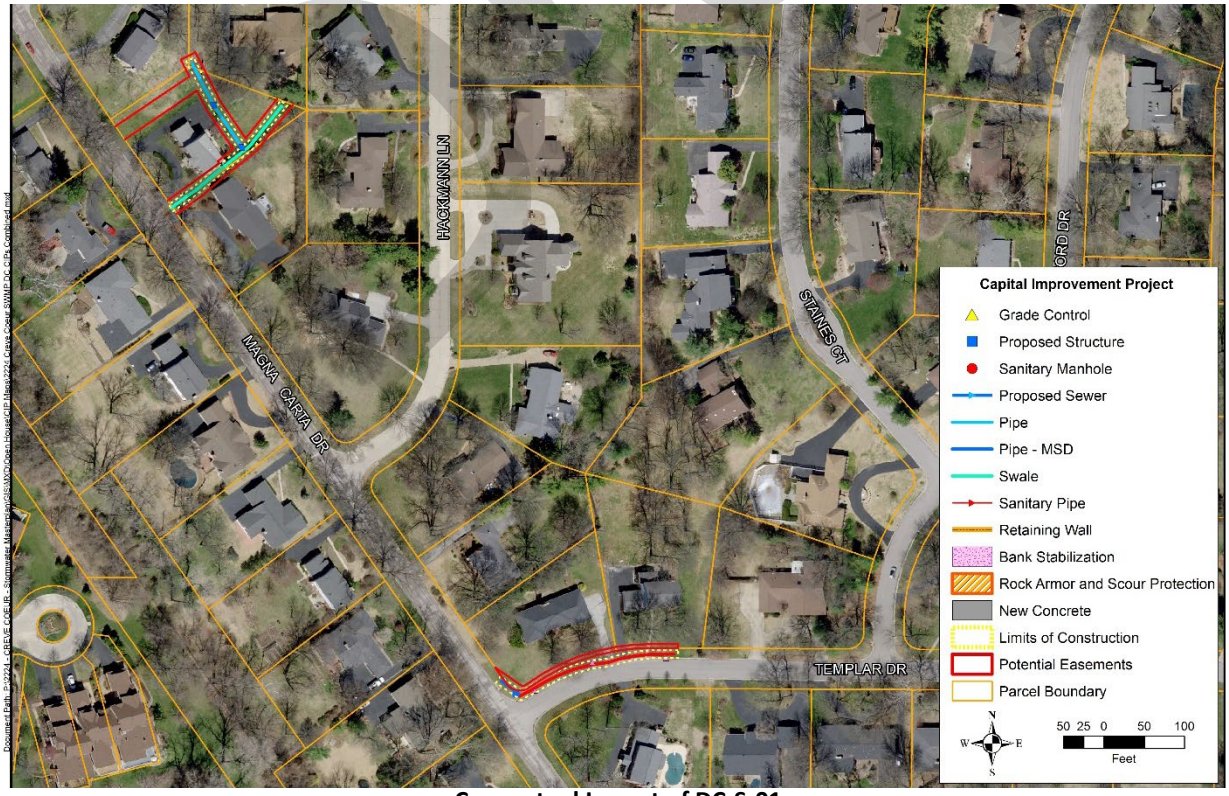
DC-S-01: Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive

Magna Carta Drive at Runnymede Dr

Problem description: Water ponds along the curb at the southwest corner of the intersection of Runnymede Drive and Magna Carta Drive and along the north curb of Templar Drive east of Magna Carta Drive. Yard ponding and erosion at 424 and 432 Magna Carta Drive.

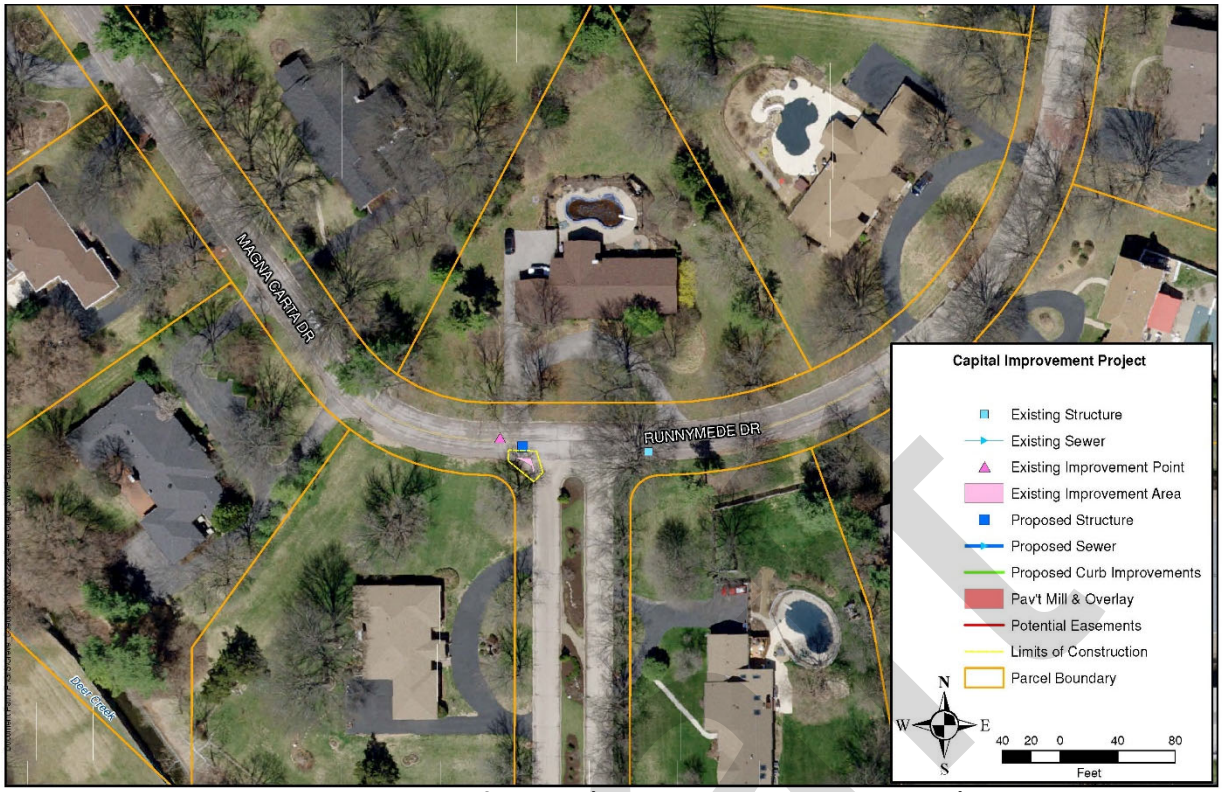
Recommendation: Install new MSD two grate inlet with side intake (2GIw/SI) at Runnymede Drive. intersection over existing 48" storm sewer, replace corner panel of street and warp to inlet. Mill and overlay curb pavement at Templar Drive to remove low/high spots. Replace non-MSD inlet at intersection with new MSD 2GIw/SI and outgoing pipe with a new 12" storm sewer dedicated to MSD. Build swale with Instaturf ShearForce from the street to the back property corner between the two houses at #424 and #432. Add two yard drains at #432 and connect to existing inlet 18O2-010D. Grade #424 yard to drain to new swale.

Special Considerations: At the Runnymede Drive intersection other utilities will need to be located to identify the location of the inlet. The inlet may need to be offset from the 48” pipe or moved away from the curb with no side intake. A potential alternative to the yard drains is a swale graded to the existing inlet if the topography does not result in steep sideslope on the swale.



Conceptual Layout of DC-S-01

Draft



Conceptual Layout of DC-S-01 (Intersection with Runnymede Dr)

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-01 Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive

Project Description: New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.45	$ 12,000	$ 5,400
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.45	$ 5,000	$ 2,300
			Subtotal =	$ 15,200
			Contingency = 25%	$ 3,800
			TOTAL OPINION OF SURVEYING COST =	**$ 19,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 8,000
			Contingency = 25%	$ 2,000
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 10,000**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	3.00	$ 55	$ 200
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	4.00	$ 3,500	$ 14,000
Sewer Pipe Small	LF	152	$ 140	$ 21,300
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	187	$ 15	$ 2,800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	210	$ 50	$ 10,500
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 6,600	$ 6,600
			Subtotal =	$ 72,800
			Contingency = 30%	$ 21,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 94,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 169,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-01 Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive

DATE: 12/5/2023

PROJECT LOCATION: 11577 Templar Drive, Creve Coeur, MO 63141

PROJECT TYPE: 3

PROJECT DESCRIPTION: New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-01 Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive

DATE: 12/5/2023

PROJECT LOCATION: 11577 Templar Drive, Creve Coeur, MO 63141

PROJECT TYPE: 3

PROJECT DESCRIPTION: New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	**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:		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:		2	Points/lot:		10	20
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**85**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-01 Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive

DATE: 12/5/2023

PROJECT LOCATION: 11577 Templar Drive, Creve Coeur, MO 63141

PROJECT TYPE: 3

PROJECT DESCRIPTION: New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**105**

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

TOTAL COST IN THOUSANDS= **$170**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.62**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

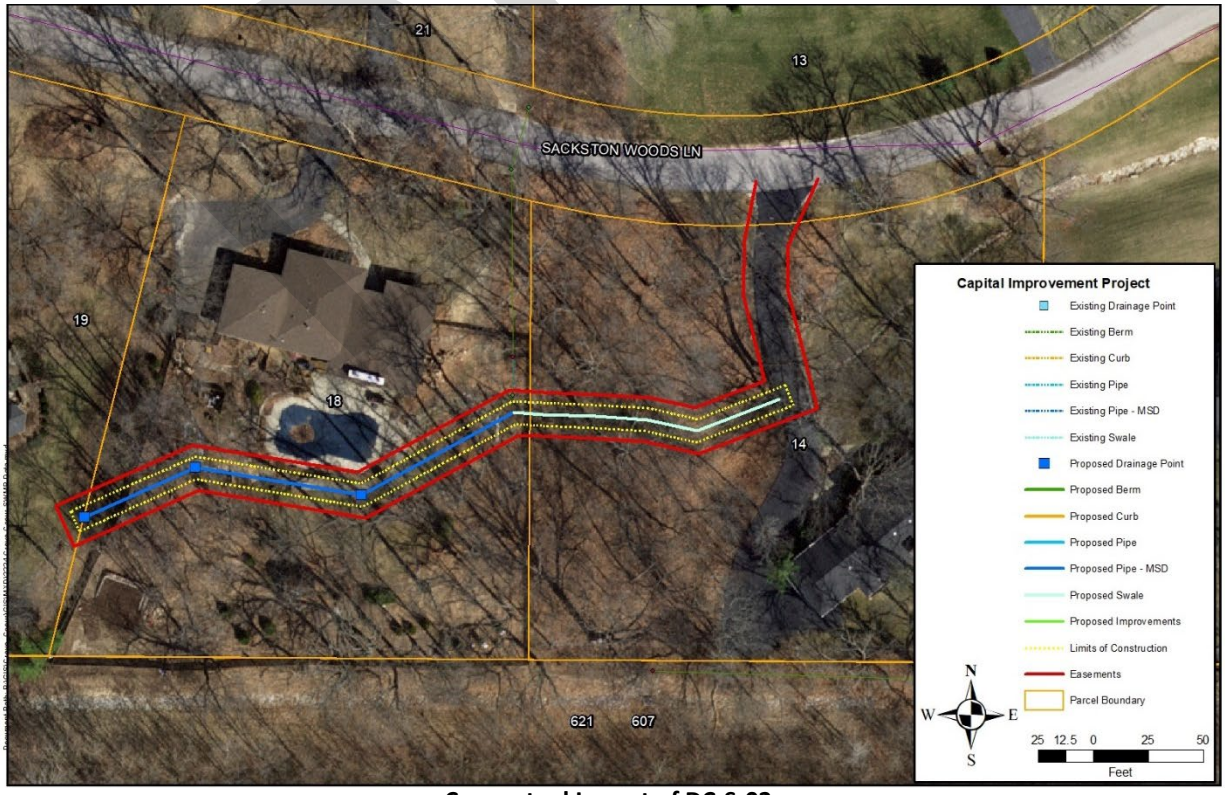
DC-S-02: 18 Sackston Woods Lane

Problem description: Yard flooding with overflow into the pool.

West side of fence

Recommendation: Construct storm sewer across property with two 2 grate inlets w/ side intake in the yard to route pipe around the pool and an area inlet with a berm at the west property line on the west side of the fence. Construct rock swale from discharge at east property line to driveway culvert at #14.

Special Considerations: Sewer will need to be constructed adjacent to the pool and minimize disruption to trees. Storm sewer from street also discharges at east property line.



Conceptual Layout of DC-S-02

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-02 18 Sackston Woods Lane

Project Description: Storm sewer, inlets, and rock swale to address yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 7,900
			Contingency = 25%	$ 2,000
			TOTAL OPINION OF SURVEYING COST =	**$ 9,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	3	$ 3,500	$ 10,500
Sewer Pipe Small	LF	310	$ 140	$ 43,400
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	124	$ 15	$ 1,900
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 71,800
			Contingency = 30%	$ 21,500
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 93,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 158,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-02: 18 Sackston Woods Lane DATE: 11/14/2023

PROJECT LOCATION: 18 Sackston Woods Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer, inlets, and rock swale to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-02: 18 Sackston Woods Lane DATE: 11/14/2023

PROJECT LOCATION: 18 Sackston Woods Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer, inlets, and rock swale to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	1	65		250
		Basement (1 lot per structure)* *Address:*	250		200		50		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* *Address:*	300		200		50		
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N				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	**1**	6		0		**10**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**310**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-02: 18 Sackston Woods Lane DATE: 11/14/2023

PROJECT LOCATION: 18 Sackston Woods Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer, inlets, and rock swale to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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= **$159**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.08**

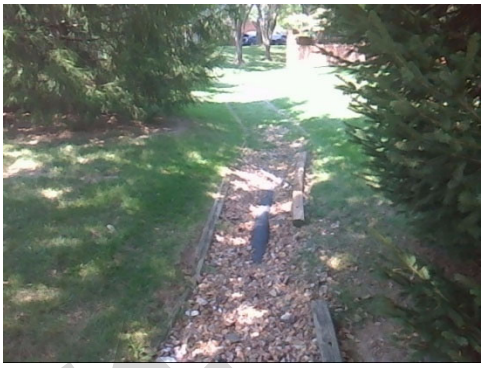
Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-S-03: Woodbridge Manor Rd

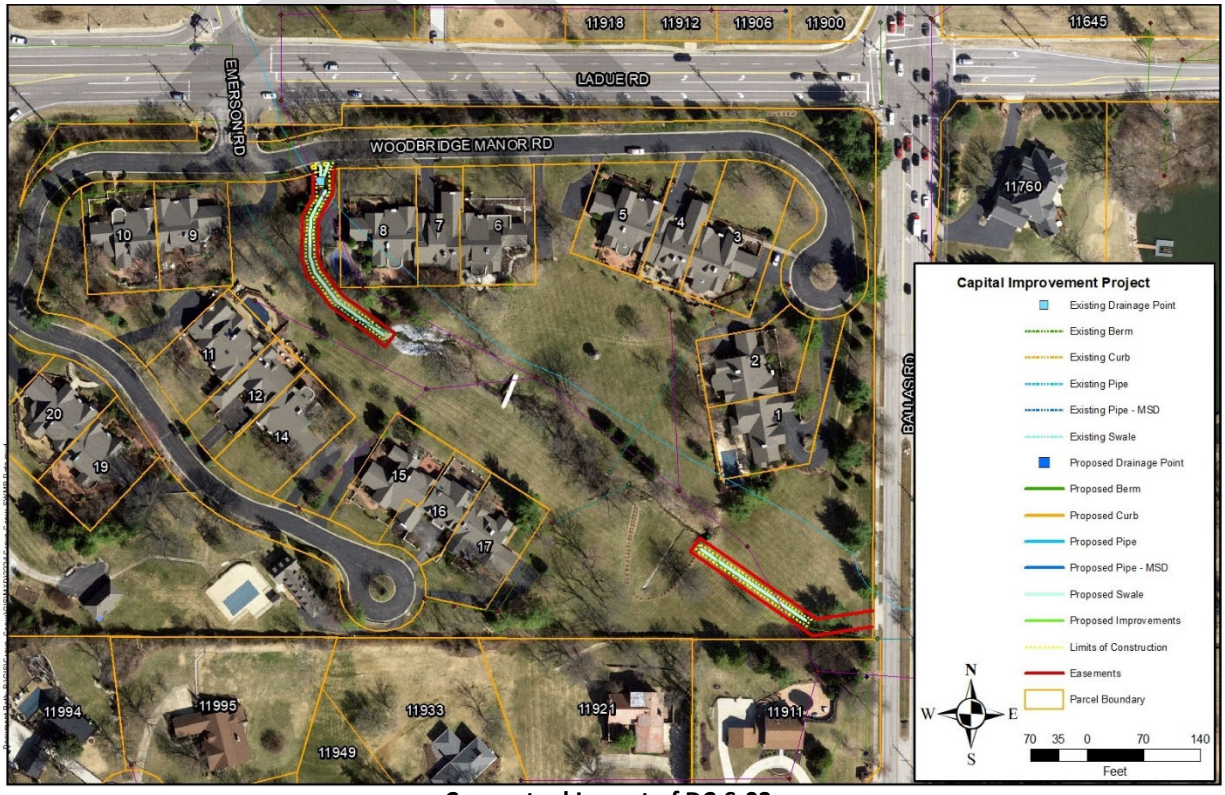
Problem description: Street and structural flooding at 8 Woodbridge Manor Road.



Overflow path near #8

Recommendation: Provide 100-yr overland flow path off of street and around the west side of the driveway for #8 and from the detention area to South New Ballas Road.

Special Considerations: Hydraulic analysis of the storm system and detention area between Ladue Road and South New Ballas Road is needed to confirm adequate system capacity. The drainage area is approximately 170 acres at Woodbridge Manor Road with an estimated 380 cubic feet per second for the 15-year 20 minute storm. The overland flow path over South New Ballas Road should also be evaluated.



Conceptual Layout of DC-S-03

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-03 Woodbridge Manor Road

Project Description: Swales and inlet modifications to address street and structural flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.25	$ 12,000	$ 3,000
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.25	$ 5,000	$ 1,300
			Subtotal =	$ 5,800
		Contingency =	25%	$ 1,500
		TOTAL OPINION OF SURVEYING COST =		**$ 7,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 500
		Contingency =	25%	$ 100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	424	$ 15	$ 6,400
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE		$ 50,000	$ -
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 6,400
		Contingency =	30%	$ 1,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 8,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 62,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-03: Woodbridge Manor Road DATE: 11/14/2023

PROJECT LOCATION: 8 Woodbridge Manor Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swales and inlet modifications to address street and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-03: Woodbridge Manor Road DATE: 11/14/2023

PROJECT LOCATION: 8 Woodbridge Manor Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swales and inlet modifications to address street and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y	50	50
		Attached Garage (1 lot per structure) *Address:*	100		75	1	25		75
		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	4	0		**24**
		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	1		6
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**405**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-03: Woodbridge Manor Road DATE: 11/14/2023

PROJECT LOCATION: 8 Woodbridge Manor Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swales and inlet modifications to address street and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**425**

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

TOTAL COST IN THOUSANDS= **$62**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **6.83**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

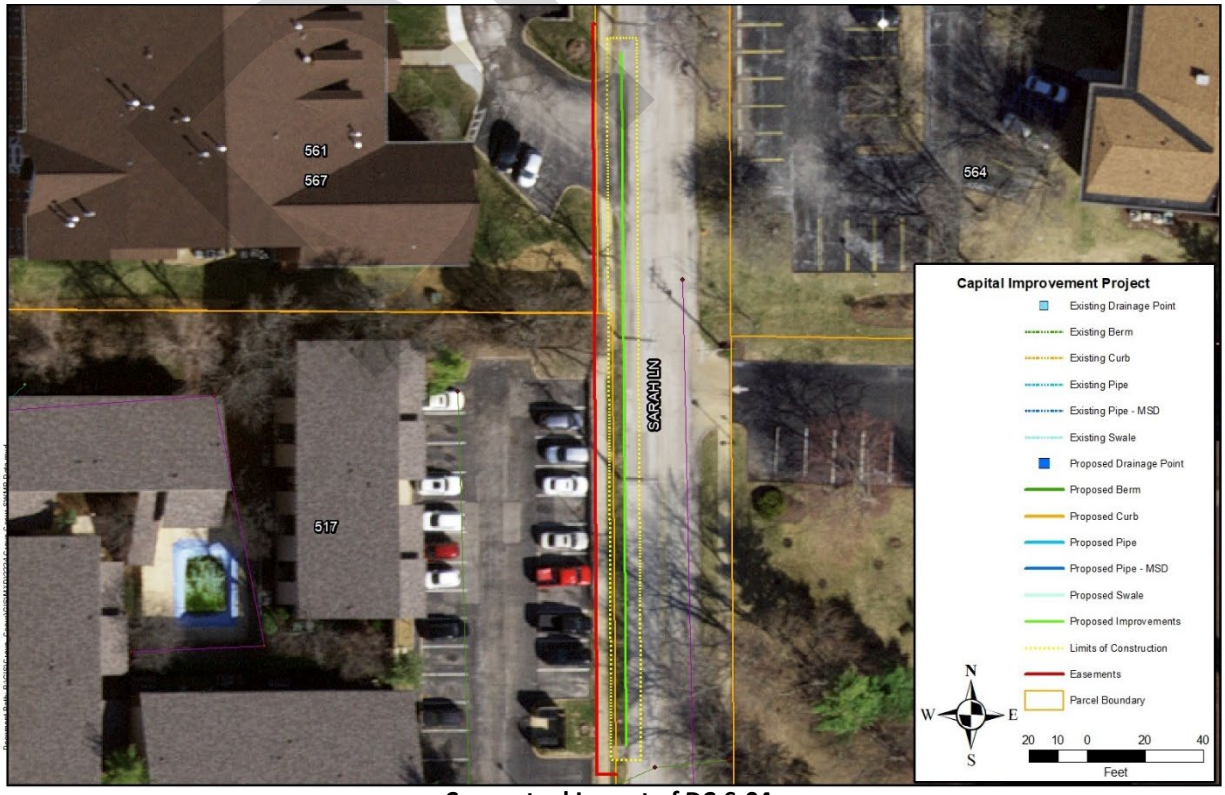
DC-S-04: 561 Sarah Lane

Problem description: Street ponding.

Recommendation: Profile and mill asphalt across south driveway to existing inlet 17O3-097D.

Special Considerations: Maintain bump across the driveway.

Inlet 17O3-097D



Conceptual Layout of DC-S-04

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-04 561 Sarah Lane

Project Description: Profile and mill asphalt to address street ponding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.05	$ 12,000	$ 600
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.05	$ 5,000	$ 300
			Subtotal =	$ 3,900
			Contingency = 25%	$ 1,000
			TOTAL OPINION OF SURVEYING COST =	**$ 4,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
			Contingency = 25%	$ -
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	11.10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	53.3	$ 100	$ 5,300
Curb - Concrete Rem & Rep	LF	240	$ 50	$ 12,000
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
Construction Cost Reduction			$ -	$ (11,400)
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 11,500
			Contingency = 30%	$ 3,400
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 14,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 65,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-04: 561 Sarah Lane DATE: 11/14/2023

PROJECT LOCATION: 561 Sarah Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Profile and mill asphalt to address street ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-04: 561 Sarah Lane DATE: 11/14/2023

PROJECT LOCATION: 561 Sarah Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Profile and mill asphalt to address street ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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:		1	Points/pond:		5	5
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**5**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-04: 561 Sarah Lane DATE: 11/14/2023

PROJECT LOCATION: 561 Sarah Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Profile and mill asphalt to address street ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**25**

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

TOTAL COST IN THOUSANDS= **$66**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.38**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

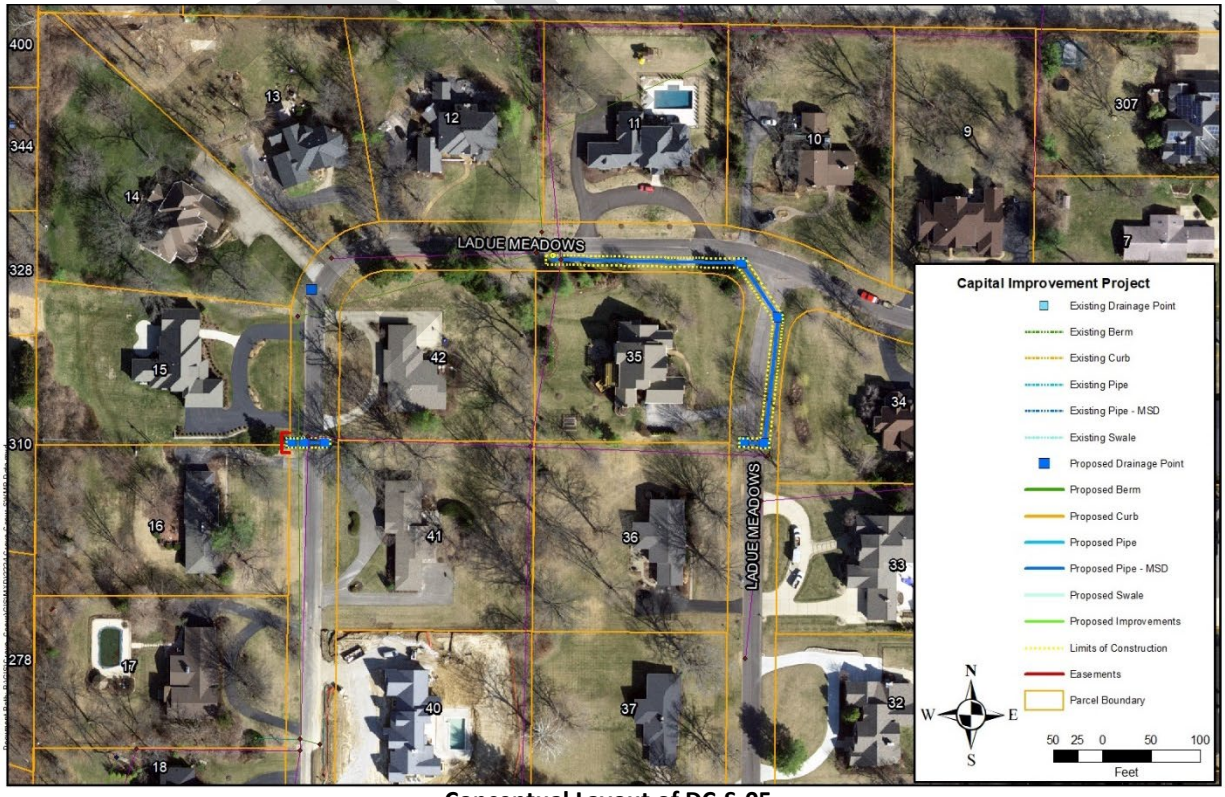
Draft

DC-S-05: Ladue Meadows

Problem description: Yard flooding at 16 and 42 Ladue Meadows.

Debris from flooding at #16

Recommendation: Construct street inlets at the low spot on both sides of Ladue Meadows between #15, #16, #41 and #42 and connect to the exising 36" pipe that runs west of the street with a setover manhole. The inlet on the east side of the street will be an area inlet open on the street side and the east side to accept flow from the swale between #41 and #42. Construct a 2 grate inlet w/ side intake over the exist storm sewer in front of #14. Construct a new storm sewer from 18N1-135D east to the intersection and then south to #36.



Conceptual Layout of DC-S-05

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-05 Ladue Meadows

Project Description: Inlets and storm sewers to address yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.01	$ 12,000	$ 100
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.01	$ 5,000	$ 100
			Subtotal =	$ 3,200
			Contingency = 25%	$ 800
			TOTAL OPINION OF SURVEYING COST =	**$ 4,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	152.30	$ 55	$ 8,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	8	$ 3,500	$ 28,000
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	250	$ 50	$ 12,500
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 56,300
			Contingency = 30%	$ 16,900
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 73,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 132,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-05: Ladue Meadows DATE: 11/14/2023

PROJECT LOCATION: 16 Ladue Meadows, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewers to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-05: Ladue Meadows DATE: 11/14/2023

PROJECT LOCATION: 16 Ladue Meadows, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewers to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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	**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:		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**75**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-05: Ladue Meadows DATE: 11/14/2023

PROJECT LOCATION: 16 Ladue Meadows, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewers to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**95**

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

TOTAL COST IN THOUSANDS= **$133**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.72**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-S-06: Fairways Circle

Pipe outfall

Problem Description: Erosion surrounding the pipe outfall next to the Creve Coeur Golf Course maintenance shed was observed. Houses on the west side of Fairways Circle sit lower than the golf course to the west. #541 reports yard flooding and wet yard days after rainfall. The affected parcels are public and private.

Recommendation: Stabilize the banks surrounding the outfall. Extend storm sewer from existing inlet 17N4-047D across #601 to new inlet on golf course, extend pipe to existing yard drains to the north to be replaced with an MSD inlet. Construct berm and swale along east property line of golf course to intercept and direct flow to inlets. Construct swale to intercept and direct flow to existing area inlet not on MSD facilities map near the service drive behind #549. Construct swale with underdrain across #541 and #533 and tie into swale on golf course.

Special Considerations: Storm system on the golf course needs to be identified and could be incorporated into the solution and possibly eliminate the storm sewer from the golf course to Fairways Circle.

Conceptual Layout of DC-S-06

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-06 Fairways Circle

Project Description: Storm sewer, inlets, berm, and swales to address yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.72	$ 12,000	$ 8,600
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.72	$ 5,000	$ 3,600
			Subtotal =	$ 19,700
			Contingency = 25%	$ 4,900
			TOTAL OPINION OF SURVEYING COST =	**$ 24,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 11,100
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	150	$ 35	$ 5,300
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	30	$ 150	$ 4,500
Bank Stabilization	SY	115	$ 120.00	$ 13,800
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	2	$ 3,500	$ 7,000
Sewer Pipe Small	LF	355	$ 140	$ 49,700
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	906	$ 15	$ 13,600
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.65	$ 50,000	$ 32,500
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 140,200
			Contingency = 30%	$ 42,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 182,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 262,300**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-06: Fairways Circle DATE: 11/14/2023

PROJECT LOCATION: 541 Fairways Circle, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer, inlets, berm, and swales to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: Golf course maintenance shed*	150		100		25	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-06: Fairways Circle DATE: 11/14/2023

PROJECT LOCATION: 541 Fairways Circle, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer, inlets, berm, and swales to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		Attached Garage (1 lot per structure) *Address:*	100		75		25		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		35		12		
		Yard Flooding (1 per lot) *Address:*	10	**4**	6		0		**40**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**95**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-06: Fairways Circle DATE: 11/14/2023

PROJECT LOCATION: 541 Fairways Circle, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer, inlets, berm, and swales to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY								
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units			Points per Unit		
	Bioswales		PER 100 LF		10		
	Forebays		AC		200		
	Wet Ponds		AC		100		
	Wetlands		AC		50		
	Biostabilization of banks (per bank)	**1.04**	PER 100 LF		10		10
	Riffle Pool Complex		PER 100 LF		10		
	4.2. Eliminates combined sewer (per project)		EA		100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA		10		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**125**

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

TOTAL COST IN THOUSANDS= **$262**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.48**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-S-07: East Ladue Estates Drive

Problem description: Yard ponding and wet yards in rear yards of house on west side of East Ladue Estates Drive.

Yard drain at #57

Recommendation: At #57 construct a swale and berm along the west property line and tie into existing berm on property to the north and install underdrain field and tie into existing yard drains.

Special Considerations: SocialPinPoint report at #65 however, resident said they did not have an issue. Further investigation revealed that the report came from the neighboring property at #38 and confirmed that the issue is on #65.

Draft

Conceptual Layout of DC-S-07

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-07 East Ladue Estates Drive

Project Description: Swale, berm, and underdrain field to address yard ponding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF SURVEYING COST =		**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	183	$ 15	$ 2,700
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 15,700
		Contingency =	30%	$ 4,700
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 20,400**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 78,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-07: East Ladue Estates Drive DATE: 11/14/2023

PROJECT LOCATION: 57 East Ladue Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, berm, and underdrain field to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-07: East Ladue Estates Drive DATE: 11/14/2023

PROJECT LOCATION: 57 East Ladue Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, berm, and underdrain field to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				N		
		Attached Garage (1 lot per structure) *Address:*	100		75		25		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		35		12		
		Yard Flooding (1 per lot) *Address:*	10	**2**	6		0		**20**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**20**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-07: East Ladue Estates Drive DATE: 11/14/2023

PROJECT LOCATION: 57 East Ladue Estates Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, berm, and underdrain field to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**40**

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

TOTAL COST IN THOUSANDS= **$78**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.51**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

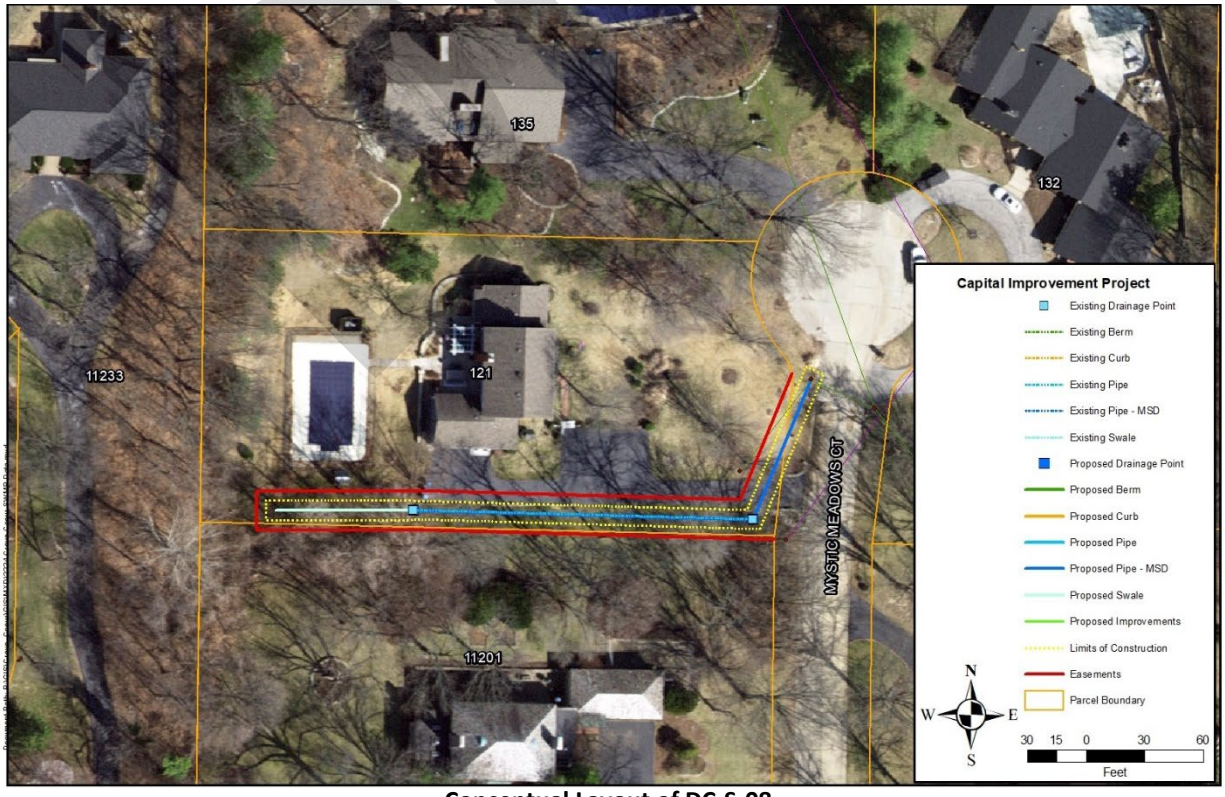
DC-S-08: 121 Mystic Meadows Lane

Problem description: Erosion on south side of property.

Recommendation: Extend a storm sewer from existing inlet 18N1-007D across the driveway to a curb inlet with the opening facing west. Continue new system to the west end of the driveway to an area inlet with swale along driveway. Construct a berm and swale to the west.

Special Considerations: Due to being in shaded area consider Instaturf ShearForce. An alternate private solution is to construct swales and replace existing rip rap rock with Instaturf ShearForce.

Existing inlet at west end of driveway



Conceptual Layout of DC-S-08

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-08 121 Mystic Meadows Lane

Project Description: Storm sewer extension and inlet to address overland flow erosion.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.15	$ 12,000	$ 1,800
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.15	$ 5,000	$ 800
			Subtotal =	$ 4,100
		Contingency =	25%	$ 1,000
		TOTAL OPINION OF SURVEYING COST =		**$ 5,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	5.70	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	4	$ 3,500	$ 14,000
Sewer Pipe Small	LF	250	$ 140	$ 35,000
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	70	$ 15	$ 1,100
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	13.2	$ 100	$ 1,300
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 59,100
		Contingency =	30%	$ 17,700
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 76,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 137,300**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-08: 121 Mystic Meadows Lane DATE: 11/14/2023

PROJECT LOCATION: 121 Mystic Meadows Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer extension and inlet to address overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-08: 121 Mystic Meadows Lane DATE: 11/14/2023

PROJECT LOCATION: 121 Mystic Meadows Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer extension and inlet to address overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**25**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-08: 121 Mystic Meadows Lane DATE: 11/14/2023

PROJECT LOCATION: 121 Mystic Meadows Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Storm sewer extension and inlet to address overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**45**

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

TOTAL COST IN THOUSANDS= **$137**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.33**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

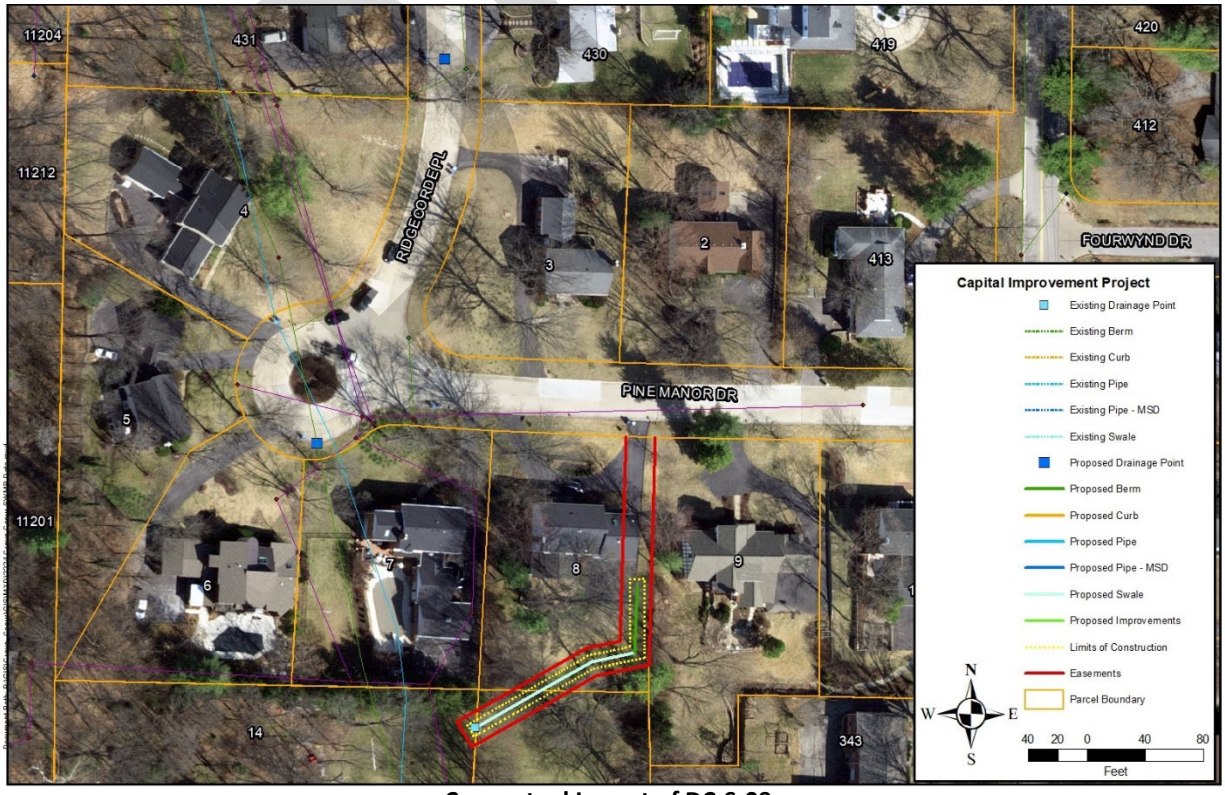
DC-S-09: Pine Manor Drive

Problem description: Street flooding at cul-de-sac and yard flooding at 7 and 8 Pine Manor Drive.

Existing yard drain on west property line of #8

Recommendation: Construct trench drain across Ridgecore Place between inlets 18N2-107D and 18N2-178D. Construct double curb inlet over existing pipe on south side of cul-de-sac. Modify other inlets as needed to minimize bypass and increase inlet capacity. Swap out solid cover for slotted cover at manhole 18N2-060D at the south property line of #7. Construct berm and swale along east property line of #8 from end of driveway to natural low point and then construct swale across the yard to an existing yard drain on the west property line.

Special Considerations: Hydraulic analysis of storm sewer system is needed that accounts for potential bypass at inlets and inlet capacity on the street. Initial analyis shows adequate capacity of 84" pipe at #7. The 100-year overland flow path needs to be verified across #7.



Conceptual Layout of DC-S-09

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-09 Pine Manor Drive

Project Description: Trench drain, inlets, inlet modifications, berm, and swales to address street and yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.15	$ 12,000	$ 1,800
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.15	$ 5,000	$ 800
			Subtotal =	$ 7,100
			Contingency = 25%	$ 1,800
			TOTAL OPINION OF SURVEYING COST =	**$ 8,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	1.20	$ 55	$ 100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	167	$ 15	$ 2,500
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	11.1	$ 100	$ 1,100
Curb - Concrete Rem & Rep	LF	10	$ 50	$ 500
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 12,200
			Contingency = 30%	$ 3,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 15,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 80,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-09: Pine Manor Drive DATE: 11/14/2023

PROJECT LOCATION: 8 Pine Manor Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Trench drain, inlets, inlet modifications, berm, and swales to address street and yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-09: Pine Manor Drive DATE: 11/14/2023

PROJECT LOCATION: 8 Pine Manor Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Trench drain, inlets, inlet modifications, berm, and swales to address street and yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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	1	12
		Yard Flooding (1 per lot) *Address:*	10	**2**	6		0		**20**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6	2	1		12
		Ponding (per ponding area) *Address:*	No. Ponds:		1	Points/pond:		5	5
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**64**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-09: Pine Manor Drive DATE: 11/14/2023

PROJECT LOCATION: 8 Pine Manor Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Trench drain, inlets, inlet modifications, berm, and swales to address street and yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**84**

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

TOTAL COST IN THOUSANDS= **$80**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.05**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

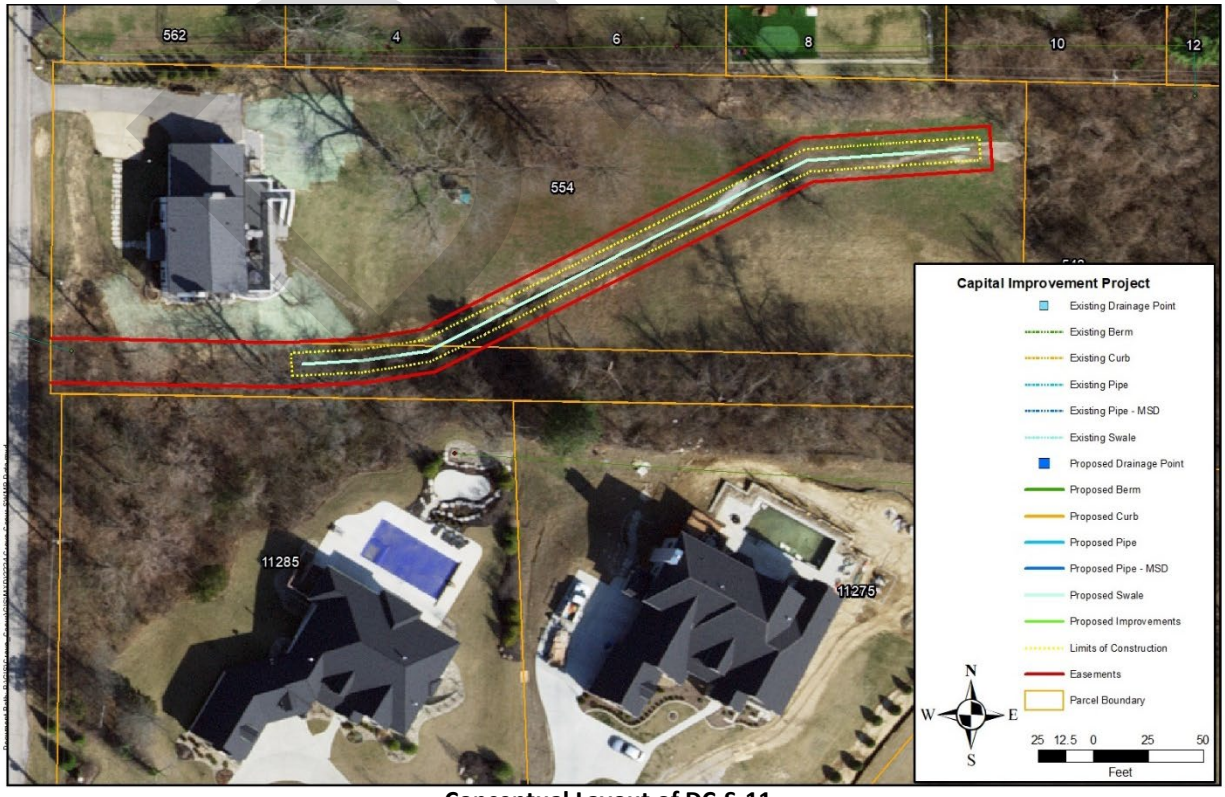
DC-S-11: 554 North Mosley Road

Problem description: Gully formation across the property with associated deposition causing drainage issues.

Gully erosion

Recommendation: Construct swale with Instaturf ShearForce across the property.

Special Considerations: Property to the south and west is a flag lot and is about 25 feet wide off of North Mosley Road in which storm sewer on the road discharges onto. Extending the storm sewer should be considered as an alternative.



Conceptual Layout of DC-S-11

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-11 554 North Mosley Road

Project Description: Swale to address yard gully and drainage issues.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 6,400
		Contingency =	25%	$ 1,600
		TOTAL OPINION OF SURVEYING COST =		**$ 8,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	323	$ 15	$ 4,800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 14,800
		Contingency =	30%	$ 4,400
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 19,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 73,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-11: 554 North Mosley Road DATE: 11/14/2023

PROJECT LOCATION: 554 North Mosley Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale to address yard gully and drainage issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-11: 554 North Mosley Road DATE: 11/14/2023

PROJECT LOCATION: 554 North Mosley Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale to address yard gully and drainage issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		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				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:		1	Points/lot:		20	20
	2.3.	Yard Erosion (1 per lot) *Address:*		No. Lots:		2	Points/lot:		10	20
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition								0
				TOTAL PROBLEM POINTS						**40**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-11: 554 North Mosley Road DATE: 11/14/2023

PROJECT LOCATION: 554 North Mosley Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale to address yard gully and drainage issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**60**

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

TOTAL COST IN THOUSANDS= **$73**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.82**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

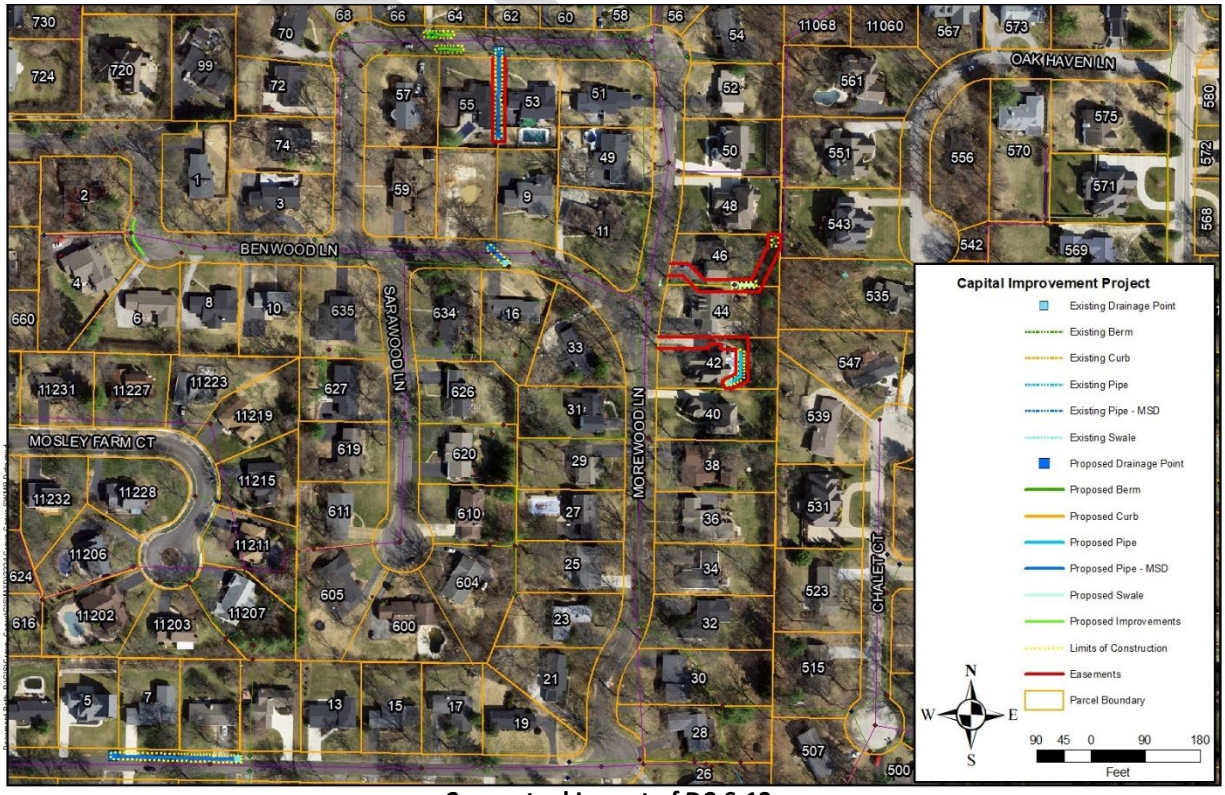
DC-S-13: Morwood Lane

Problem description: Seepage water at 6, 55 and 64 Morwood Lane and 7 Benwood Lane and yard flooding at 42 and 53 Morwood Lane.

Seep water at #55

Recommendation: For seep water at #55 and #64 mill the asphalt along the curb. At #7 construct 2 grate inlet w/ side intake and connect pipe to existing inlet (17N4-016D) across the street. At #6 construct 2 grate inlet w/ side intake and connect pipe to existing inlet (17N4-024D) at #11. Improvements to address issue at #42, connect downspounts on rear of house at #42 and connect to existing yard drain and construct berm around inlet 17N3-025D at #46 and swap the cover of manhole 17N3-034D with a slotted cover and constuct a swale to the east to intercept the flow path. Construct a 2 grate inlet w/ side intake in the rear yard of #55 along with some grading and pipe to new manhole over the existing storm sewer along the street.

Special Considerations: #55 recently added yard drains but has not had a significant rainfall to determine the effectiveness of their system. Yard flooding had also been reported at #25 and #29, however there are existing inlets at the rear of those yards that were recently cleaned by MSD. This area should be monitored.



Conceptual Layout of DC-S-13

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-13 Morwood Lane

Project Description: Mill asphalt, inlets, berm, manhole, and grading to address seepage and yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.30	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.30	$ 5,000	$ 1,500
			Subtotal =	$ 12,600
		Contingency =	25%	$ 3,200
		TOTAL OPINION OF SURVEYING COST =		**$ 15,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	3	$ 3,500	$ 10,500
Sewer Pipe Small	LF	176	$ 140	$ 24,600
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	38	$ 15	$ 600
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	27.8	$ 100	$ 2,800
Curb - Concrete Rem & Rep	LF	76	$ 50	$ 3,800
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 59,700
		Contingency =	30%	$ 17,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 77,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 148,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-13: Morwood Lane DATE: 11/14/2023

PROJECT LOCATION: 53 Morwood Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Mill asphalt, inlets, berm, manhole, and grading to address seepage and yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-13: Morwood Lane DATE: 11/14/2023

PROJECT LOCATION: 53 Morwood Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Mill asphalt, inlets, berm, manhole, and grading to address seepage and yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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:		4	Points/pond:		5	20
	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**120**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-13: Morwood Lane DATE: 11/14/2023

PROJECT LOCATION: 53 Morwood Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Mill asphalt, inlets, berm, manhole, and grading to address seepage and yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**140**

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

TOTAL COST IN THOUSANDS= **$149**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.94**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

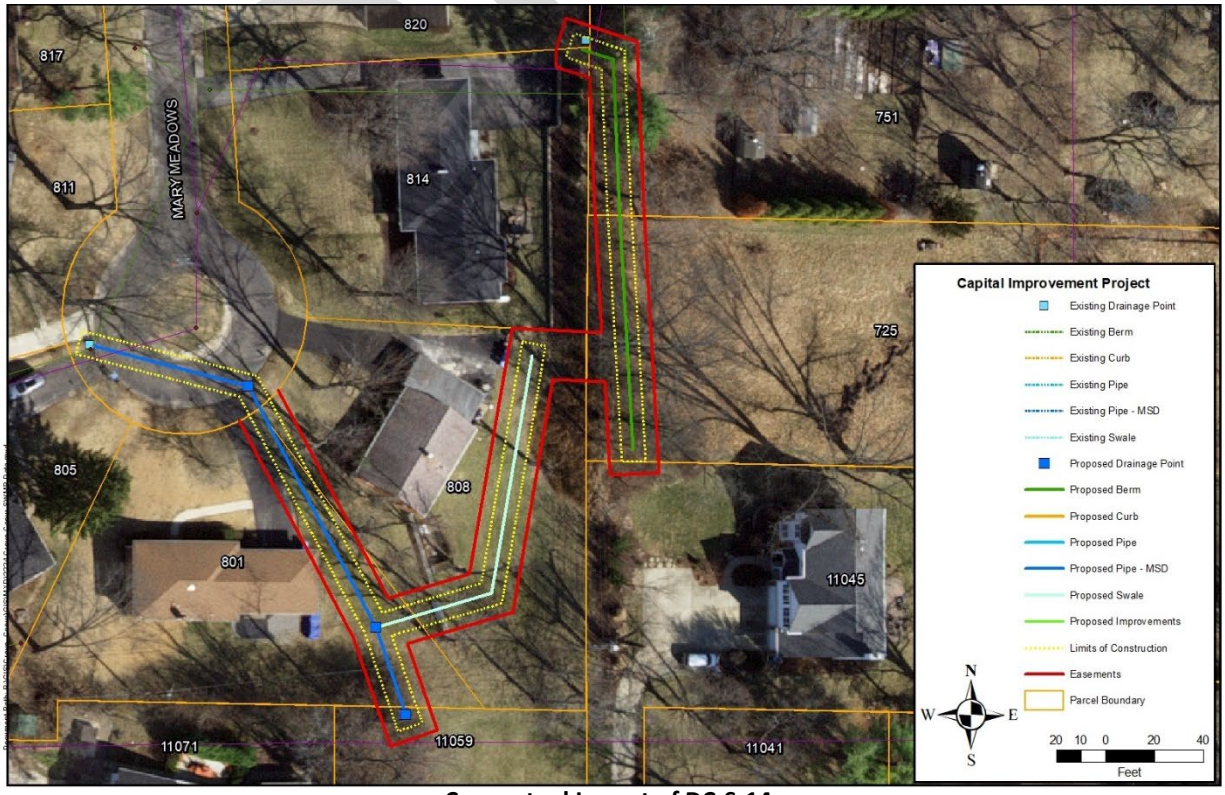
Draft

DC-S-14: Mary Meadows Lane

Problem description: Flooding and erosion at #801 and #808 from uphill properties especially redeveloped properties on Graeser Road.

Inlet 17N2-077D

Recommendation: Berm and swale across the back property line of #725 and #751 Graeser Road to existing inlet 17N2-077D. Swale around back side of house at #808 with Instaturf ShearForce on steep slope. Area inlet in flow path with a berm at rear of #11059 Graeser Lane that is piped down the slope to a manhole with slotted cover or 2 grate inlet w/ side intake to take flow from the swale across #808. Pipe to a 2 grate inlet w/ side intake at the curb and pipe to existing inlet 17N2-036D.



Conceptual Layout of DC-S-14

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-14 Mary Meadows Lane

Project Description: Berm, swales, inlets, and storm sewer to address flooding and overland flow erosion.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.25	$ 12,000	$ 3,000
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	0.25	$ 5,000	$ 1,300
			Subtotal =	$ 14,800
			Contingency = 25%	$ 3,700
			TOTAL OPINION OF SURVEYING COST =	**$ 18,500**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	25.70	$ 55	$ 1,400
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	3.00	$ 3,500	$ 10,500
Sewer Pipe Small	LF	216	$ 140	$ 30,200
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	319	$ 15	$ 4,800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	51.7	$ 100	$ 5,200
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.25	$ 50,000	$ 12,500
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 71,000
			Contingency = 30%	$ 21,300
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 92,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 166,200**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-14: Mary Meadows Lane DATE: 11/14/2023

PROJECT LOCATION: 808 Mary Meadows Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, inlets, and storm sewer to address flooding and overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-14: Mary Meadows Lane DATE: 11/14/2023

PROJECT LOCATION: 808 Mary Meadows Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, inlets, and storm sewer to address flooding and overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		Attached Garage (1 lot per structure) *Address:*	100		75		25		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		35		12		
		Yard Flooding (1 per lot) *Address:*	10	**2**	6		0		**20**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:		2	Points/lot:		10	20
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**70**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-14: Mary Meadows Lane DATE: 11/14/2023

PROJECT LOCATION: 808 Mary Meadows Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, inlets, and storm sewer to address flooding and overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)		11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			10				10
	5.2. Recreational/Educational	Yes = 100 No = 0 pts						
							TOTAL SOLUTION POINTS	10
							TOTAL BENEFIT POINTS	80

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

TOTAL COST IN THOUSANDS= $166

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= 0.48

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

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East Deer Creek Watershed

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East Deer Creek Watershed

PP Number	Project Name
DC-C-02	Beaver Drive Crossing
DC-C-14	East Windrush Creek
DC-C-15	Chaminade Drive
DC-C-16	Ladue and South Spoede Road
DC-C-17	10675 Ladue Road
DC-C-18	Alden Lane
DC-C-19	Middlebrook Lane
DC-C-20	Sherwyn Lane
DC-C-21	10694 Country View Drive
DC-C-22	Denny Creek
DC-C-23	10620 Country View Drive
DC-C-24	Sunswept Drive
DC-C-26	Lindbergh Boulevard
DC-C-27	22 South Tealbrook Drive
DC-C-28	Tealwood Drive
DC-C-29	The Knolls Lane
DC-S-15	Fourwynd Drive
DC-S-16	Wedgewood Lane
DC-S-17	Sona Lane
DC-S-18	3 Oak Park Court
DC-S-19	308 South Spoede Road
DC-S-21	Chilton Lane
DC-S-22	North Spoede Road & Mission Hills Court
DC-S-23	6 Spoede Ridge Lane
DC-S-24	7 Quailways Drive
DC-S-25	Haven View Drive
DC-S-26	Warington Square

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DC-C-02: Beaver Drive Crossing

Problem Description: The downstream end of the Pebble Creek culvert under Beaver Drive has rusted out and the culvert is undermined. The road above the culvert is cracking and there is a limited amount of cover over the pipe. A portion of the gabion walls along the left descending bank downstream of the culvert have rusted out and are failing.

Downstream end of culvert

In the project vicinity, there is structural flooding at 27 Beaver Drive and yard erosion at 1 Beaver Drive. Although the street is private, it has been maintained by the City. Along the south property line of 16 Tealwood Drive, there is an active incision knickpoint moving up the previously stabilized tributary and undermining the grade control. There is also gully erosion along the stabilized bank. Additionally, along the west edge of 48 Beaver Drive, toe erosion on the outside of bend of the channel is beginning to undermine the grouted riprap slope and culvert entrance.

Incision at Grade Control

Recommendation: Remove and replace the culvert with a two stage culvert to maintain sediment continuity. Raise the road section to provide additional cover over the pipes. Install a grade control structure downstream of the culvert. Remove the gabion walls and stabilize the bank using biostabilized slope techniques and layback the bank. Combine this project with the adjacent grouted riprap stabilization (downstream) and tributary stabilization (upstream) projects to minimize mobilization and disturbance. For the downstream grouted riprap stabilization, place rock toe protection from the existing retaining wall to the culvert entrance. Due to bedrock in the area, consider using a poured concrete toe below the grouted riprap slope. At the tributary stabilization, construct a new step grade control downstream of the existing grade control. Reshape the bank and stabilize the gully erosion. Ensure overland drainage is directed into the tributary.

At 27 Beaver Drive, construct an MSD area inlet to replace the existing inlet in the northwest corner of the parcel and pipe to a new inlet at the low point above the wall at the west end of the driveway. Construct a swale with a berm from the end of the driveway at 5 Beaver Drive to the new inlet and wrap the berm around the inlet. Pipe down the driveway to a 2 grate inlet or manhole at the east end of the driveway, then continue down Beaver Drive to a 2 grate inlet w/ side intake at the southeast corner of the intersection, and then pipe to the channel on the downstream end of the culvert. Extend the curb near this inlet along the south side of the street to the end of the cul-de-sac. Also, construct a curb on the north side of the street from the culvert to the driveway at 45 Beaver Drive and continue the curb along the west side of the driveway.

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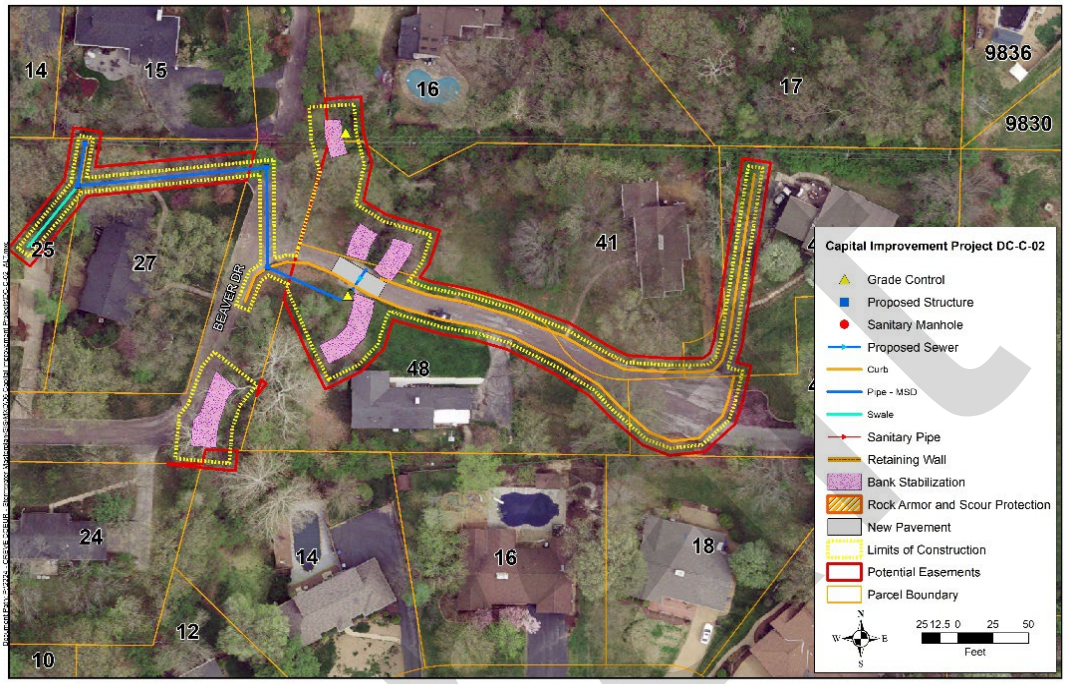
Water Quality Alternative Recommendations: A berm instead of a curb along the driveway at 45 Beaver Drive may be a viable alternative. This work should be considered to occur with the replacement of the culvert at 45 Beaver Drive.



Conceptual Layout of DC-C-02

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-02 Beaver Drive Crossing Alternative

Project Description: Culvert replacement with associated grade control, bank stabilization, and a retaining wall downstream. #27 Beaver Dr. Structural Flooding and #41 Beaver Dr. erosion issues. Include upstream tributary stabilization and downstream stabilization of undermined grouted riprap.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.8	$ 12,000	$ 9,000
Prepare Easement Plat and Scripts	EACH	12	$ 1,500	$ 18,000
Contruction Staking and As-Built Surveying	ACRE	0.8	$ 5,000	$ 3,800
			Subtotal =	$ 30,800
		Contingency =	25%	$ 7,700
		TOTAL OPINION OF SURVEYING COST =		**$ 38,500**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	125	$ 20	$ 2,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 10,500
		Contingency =	25%	$ 2,600
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 13,100**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 10,500
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	350	$ 35	$ 12,300
Rock Grade Control	CY	50	$ 200	$ 10,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	80	$ 150	$ 12,000
Bank Stabilization	SY	310	$ 120.00	$ 37,200
Granular Backfill	CY	50	$ 55	$ 2,800
Reinforced Concrete Box Culvert	LF	20	$ 880.0	$ 17,600
Manhole	LF		$ 625	$ -
Inlet	EA	4.00	$ 3,500	$ 14,000
Sewer Pipe Small	LF	294	$ 140	$ 41,200
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	56	$ 15	$ 800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	116	$ 100	$ 11,600
Curb - Concrete Rem & Rep	LF	813	$ 50	$ 40,700
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	0.4	$ 50,000	$ 17,500
			$ -	$ -
Mobilization and Bond	10%	1	$ 24,100	$ 24,100
			Subtotal =	$ 265,300
		Contingency =	30%	$ 79,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 344,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 518,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:	DC-C-02: Beaver Drive Crossing	DATE:	11/2/2023
PROJECT LOCATION:	48 Beaver Drive, Creve Coeur, MO 63141	PROJECT TYPE:	1
PROJECT DESCRIPTION:	Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues.		
ENVIRONMENTAL CONSIDERATIONS:			
COMMON GROUND:			

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 48 Beaver Drive*	300		200		50	1	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	1	lots	10 points per lot				10
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Beaver Drive*	20	8	12		3		160
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-02: Beaver Drive Crossing DATE: 11/2/2023

PROJECT LOCATION: 48 Beaver Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Total Points
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		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	8	6		1		80
		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:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition		30						30
				TOTAL PROBLEM POINTS						**470**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-02: Beaver Drive Crossing DATE: 11/2/2023

PROJECT LOCATION: 48 Beaver Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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:		4		Points per Add'l Proj.:	50	200
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)	3	PER 100 LF			10		30
	Riffle Pool Complex	1	PER 100 LF			10		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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**260**
							TOTAL BENEFIT POINTS	**730**

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

TOTAL COST IN THOUSANDS= **$519**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.41**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

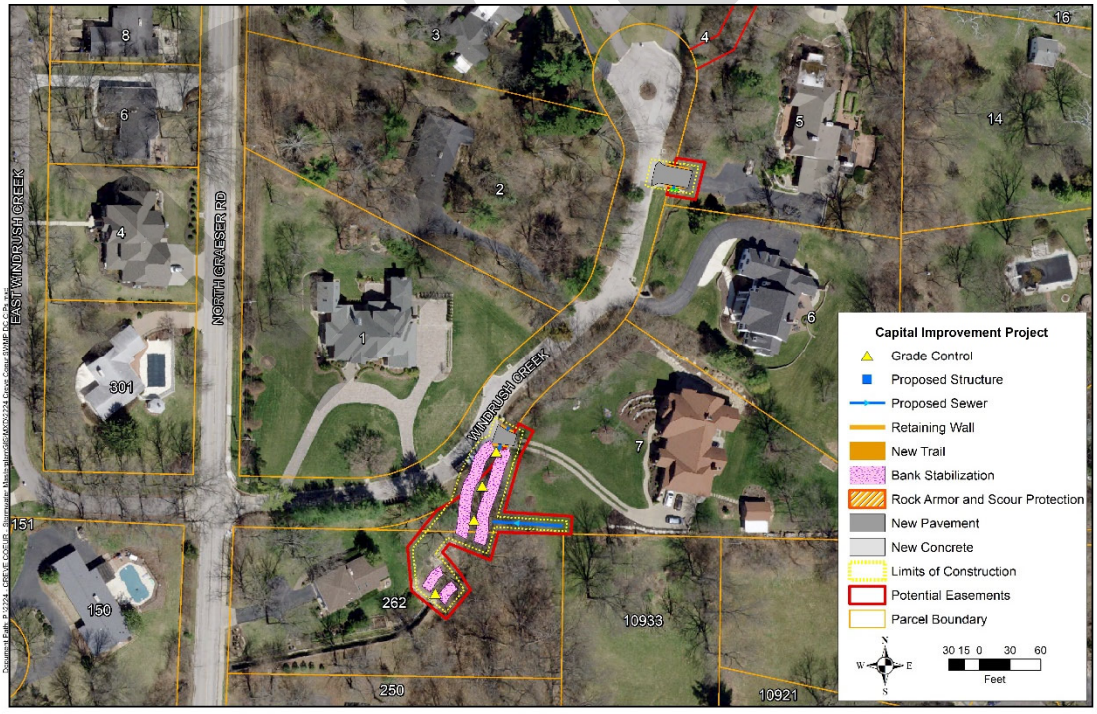
Draft

DC-C-14: East Windrush Creek

Problem Description: The following issues were observed along a tributary to Windrush Creek. The 5 East Windrush Creek driveway is failing at the channel crossing. Downstream of the 7 East Windrush Creek driveway crossing, there is erosion and a 4 foot knickpoint. There is also a failing CMP on the LDB of the channel. Failing grouted riprap is present on the upstream side of the concrete channel in the rear lot of 262 North Graeser Road. The affected parcels are private.

7 East Windrush Creek erosion

Recommendation: Replace the culvert and driveway at 5 East Windrush Creek. Stabilize both banks downstream of the driveway at 7 East Windrush Creek and install a series of three step grade controls. Replace the failing CMP. Replace the failing grouted riprap at 262 North Graeser Road with a grade control structure and bank stabilization.



Conceptual Layout of DC-C-14

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-14 East Windrush Creek

Project Description: Bank stabilization, grade controls, and a culvert replacement to address erosion threatening structures in a tributary to Windrush Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.4	$ 12,000	$ 4,800
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.4	$ 5,000	$ 2,000
			Subtotal =	$ 11,300
		Contingency =	25%	$ 2,800
		TOTAL OPINION OF SURVEYING COST =		**$ 14,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 12,000
Removal of Existing Structures	LUMP	2	$ 2,000	$ 4,000
Excavation and Embankment in Place	CY	475	$ 35	$ 16,600
Rock Grade Control	CY	90	$ 200	$ 18,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	100	$ 150	$ 15,000
Bank Stabilization	SY	305	$ 120.00	$ 36,600
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF	45	$ 500.0	$ 22,500
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF	70	$ 140	$ 9,800
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	450	$ 50	$ 22,500
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	110	$ 150	$ 16,500
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 20,200	$ 20,200
			Subtotal =	$ 222,000
		Contingency =	30%	$ 66,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 288,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 394,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-14 East Windrush Creek DATE: 12/5/2023

PROJECT LOCATION: 1 East Windrush Creek, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a culvert replacement to address erosion threatening structures in a tributary to Windrush Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: E Windrush Creek*	20	5	12		3		100
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-14 East Windrush Creek DATE: 12/5/2023

PROJECT LOCATION: 1 East Windrush Creek, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a culvert replacement to address erosion threatening structures in a tributary to Windrush Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-14 East Windrush Creek DATE: 12/5/2023

PROJECT LOCATION: 1 East Windrush Creek, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a culvert replacement to address erosion threatening structures in a tributary to Windrush Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2.47**	PER 100 LF		10		25
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**45**
						TOTAL BENEFIT POINTS	**145**

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

TOTAL COST IN THOUSANDS= **$394**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.37**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-C-15: Chaminade Drive

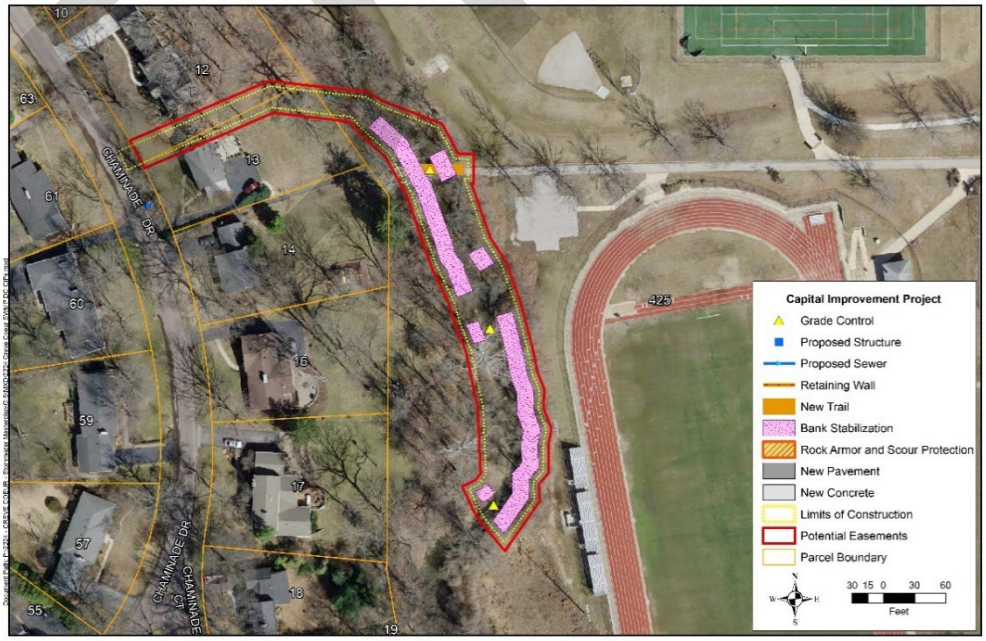
Collapsed retaining wall

Problem Description: In Monsanto-Sunswept Creek west of Chaminade College Preparatory School several issues were observed as follows. Along the bank behind 13 and 14 Chaminade Drive, the existing retaining wall is failing. The pedestrian bridge located to the northwest of the school field has failing piers and needs replacement. Perched outfalls were also observed on either bank behind 14 and 16 Chaminade Drive. There are knickpoints and bank erosion in several locations along the school field. Erosion from street runoff reported at #16 Chaminade Drive. Evidence of erosion was not observed. The affected parcels are private.

Failing bridge piers

Recommendation: Install bank stabilization to replace the collapsed retaining wall. Stabilize the banks surrounding the perched outfalls. Replace the pedestrian bridge and install a step grade control structure below the new bridge. Install bank stabilization along the field with grade control structures at the upstream and downstream limits of stabilization. Review inlet capacity of existing single curb inlet 18M4-060D and replace with double curb inlet if warranted. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.

Special Considerations: Review potential for bypass of adjacent inlets on Chaminade Drive.



Conceptual Layout of DC-C-15

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-15 Chaminade Drive

Project Description: Bank stabilization, grade controls, and a pedestrian bridge replacement to address erosion along Monsanto-Sunswept Creek as well as an inlet capacity review to address overland flow issues. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.6	$ 12,000	$ 7,200
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.6	$ 5,000	$ 3,000
			Subtotal =	$ 14,700
		Contingency =	25%	$ 3,700
		TOTAL OPINION OF SURVEYING COST =		**$ 18,400**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.6	$ 30,000	$ 18,000
Removal of Existing Structures	LUMP	2	$ 2,000	$ 4,000
Excavation and Embankment in Place	CY	1,440	$ 35	$ 50,400
Rock Grade Control	CY	125	$ 200	$ 25,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	220	$ 150	$ 33,000
Bank Stabilization	SY	860	$ 120.00	$ 103,200
Granular Backfill	CY	30	$ 55	$ 1,700
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	515	$ 150	$ 77,300
Pavement/Sidewalk Removal & Replacement	SY	10	$ 100	$ 1,000
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.6	$ 50,000	$ 30,000
Pedestrian Bridge	LF	60	$ 1,500	$ 90,000
Mobilization and Bond	10%	1	$ 44,000	$ 44,000
			Subtotal =	$ 484,100
		Contingency =	30%	$ 145,200
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 629,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 781,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-15 Chaminade Drive DATE: 12/5/2023

PROJECT LOCATION: 14 Chaminade Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a pedestrian bridge replacement to address erosion along Monsanto-Sunswept Creek as well as an inlet capacity review to address overland flow issues. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.

ENVIRONMENTAL CONSIDERATIONS: The retaining wall and pedestrian bridge are in the regulatory floodway.

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: Failing wall and pedestrian bridge*	150	2	100		25		300
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5		20

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-15 Chaminade Drive DATE: 12/5/2023

PROJECT LOCATION: 14 Chaminade Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a pedestrian bridge replacement to address erosion along Monsanto-Sunswept Creek as well as an inlet capacity review to address overland flow issues. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.

ENVIRONMENTAL CONSIDERATIONS: The retaining wall and pedestrian bridge are in the regulatory floodway.

COMMON GROUND:

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		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:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition		30						30
				TOTAL PROBLEM POINTS						**360**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-15 Chaminade Drive DATE: 12/5/2023

PROJECT LOCATION: 14 Chaminade Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a pedestrian bridge replacement to address erosion along Monsanto-Sunswept Creek as well as an inlet capacity review to address overland flow issues. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.

ENVIRONMENTAL CONSIDERATIONS: The retaining wall and pedestrian bridge are in the regulatory floodway.

COMMON GROUND:

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)	**4.96**	PER 100 LF		10		50
	Riffle Pool Complex	**3.4**	PER 100 LF		10		34
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	3.40	PER 100 LF		10		34
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**Yes**		**100**
						TOTAL SOLUTION POINTS	**238**
						TOTAL BENEFIT POINTS	**598**

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

TOTAL COST IN THOUSANDS= **$781**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.77**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

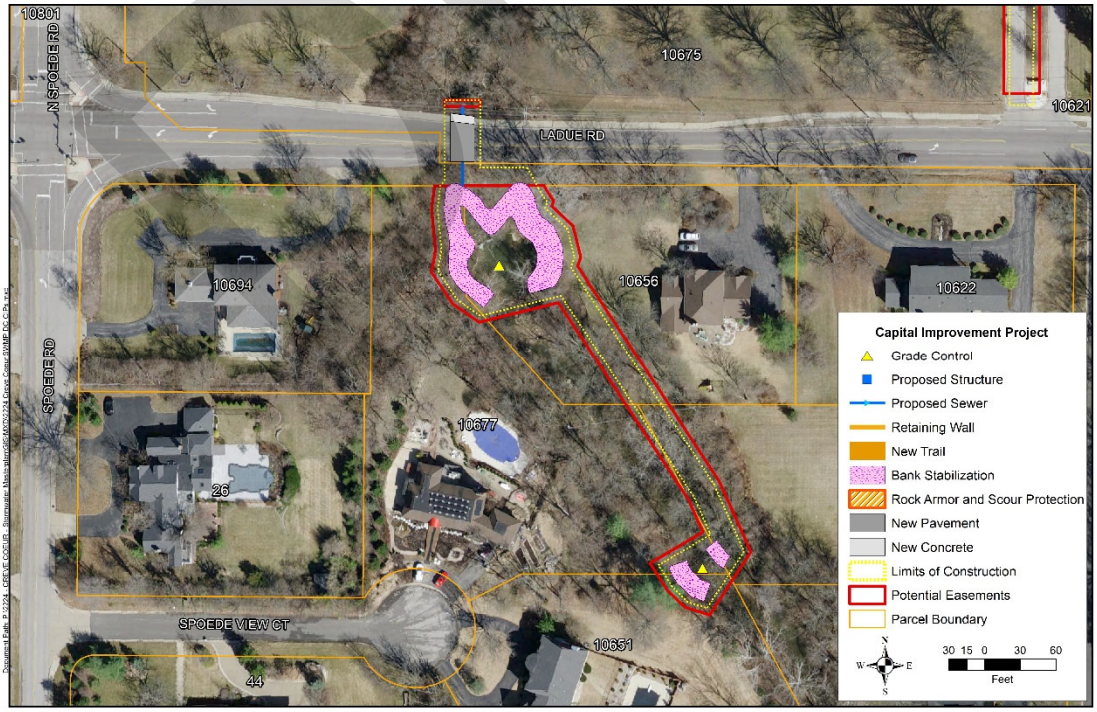
DC-C-16: Ladue and South Spoede Road

Problem Description: The culvert located at the Monsanto Creek and Ladue Road crossing is failing with visible wall bulging, cracking and seepage on the interior. Downstream of the culvert, there is bank erosion. In the rear of lot 10677 Spoede View Court, there is an exposed sanitary crossing causing a 1 foot knickpoint. The affected parcels are private.

Recommendation: Replace the Ladue Road culvert. Install a step grade control structure with associated bank stabilization downstream of the Ladue Road crossing. Install a step grade control structure and bank stabilization at the sanitary crossing.

Ladue Road culvert cracking and seepage

Downstream of Ladue Road crossing



Conceptual Layout of DC-C-16

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-16 Ladue and South Spoede Road

Project Description: Bank stabilization, grade controls, and a culvert replacement to address erosion in Monsanto-Sunswept Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.5	$ 12,000	$ 6,000
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.5	$ 5,000	$ 2,500
			Subtotal =	$ 17,500
		Contingency =	25%	$ 4,400
		TOTAL OPINION OF SURVEYING COST =		**$ 21,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.5	$ 30,000	$ 15,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	1,485	$ 35	$ 52,000
Rock Grade Control	CY	230	$ 200	$ 46,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	125	$ 150	$ 18,800
Bank Stabilization	SY	615	$ 120.00	$ 73,800
Granular Backfill	CY	30	$ 55	$ 1,700
New Culvert	LF	80	$ 500.0	$ 40,000
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	70	$ 150	$ 10,500
Pavement/Sidewalk Removal & Replacement	SY	15	$ 100	$ 1,500
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.5	$ 50,000	$ 25,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 29,400	$ 29,400
			Subtotal =	$ 323,200
		Contingency =	30%	$ 97,000
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 420,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 533,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-16 Ladue and South Spoede Road DATE: 12/5/2023

PROJECT LOCATION: 10656 Ladue Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a culvert replacement to address erosion in Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address: Ladue Rd*	75	4	50		12		300
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25	2	6		50
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	2	10		5		40

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-16 Ladue and South Spoede Road DATE: 12/5/2023

PROJECT LOCATION: 10656 Ladue Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a culvert replacement to address erosion in Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**405**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-16 Ladue and South Spoede Road DATE: 12/5/2023

PROJECT LOCATION: 10656 Ladue Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a culvert replacement to address erosion in Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**3.57**	PER 100 LF		10		36
	Riffle Pool Complex	**3.66**	PER 100 LF		10		37
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	3.66	PER 100 LF		10		37
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**119**
						TOTAL BENEFIT POINTS	**524**

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

TOTAL COST IN THOUSANDS= **$533**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.98**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

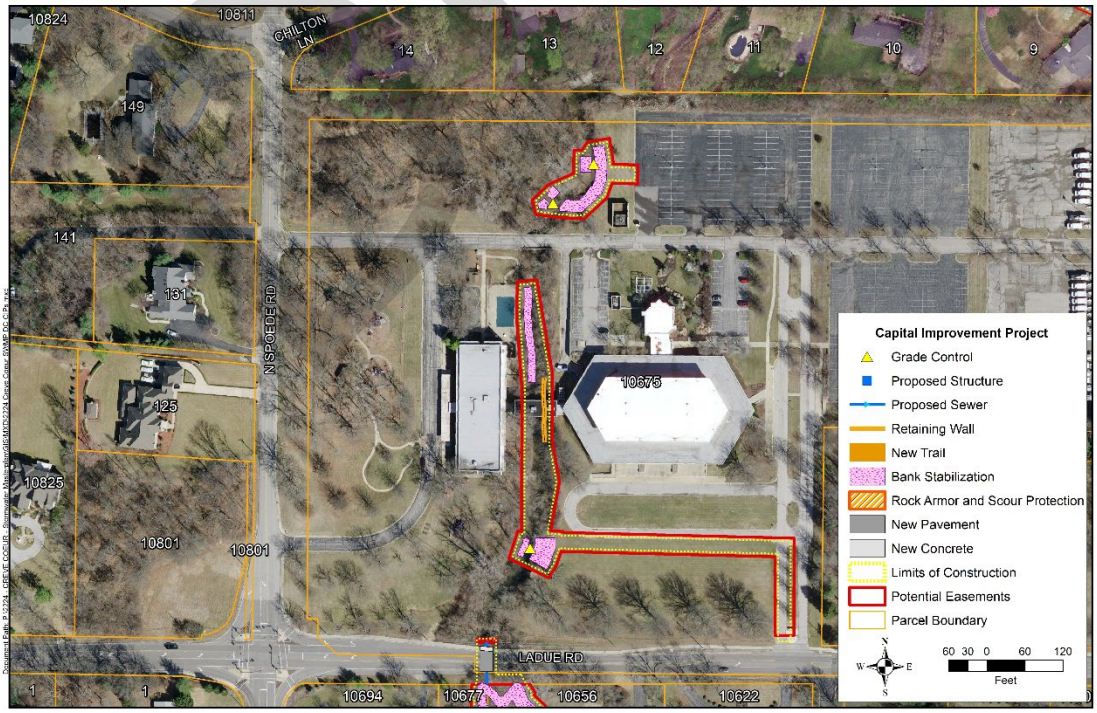
DC-C-17: 10675 Ladue Road

Problem Description: In Monsanto-Sunswept Creek within the Congregation Temple Israel property (10675 Ladue Road) several issues were observed as follows. A perched pipe and bank cutting at the end of Brodsky Circle, a failing gabion wall between the buildings, bank erosion threatening the fence surrounding the pool, bank erosion at the north end of the property threatening a utility pole with two knickpoints, and utility poles in poor, rotting conditions at the north end of the property. The affected parcel is private.

Perched pipe

Recommendation: Install bank stabilization to address the perched pipe and bank cutting and install a grade control structure. Replace the failing gabion wall. Install bank stabilization to protect the threatened fence. Stabilize the bank to protect the threatened utility pole and install step grade controls at the knickpoints.

Bank erosion threatening utility pole



Conceptual Layout of DC-C-17

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-17 10675 Ladue Road

Project Description: Bank stabilization, grade controls, and a gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.8	$ 12,000	$ 9,600
Prepare Easement Plat and Scripts	EACH	1	$ 1,500	$ 1,500
Contruction Staking and As-Built Surveying	ACRE	0.8	$ 5,000	$ 4,000
			Subtotal =	$ 15,100
		Contingency =	25%	$ 3,800
		TOTAL OPINION OF SURVEYING COST =		**$ 18,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,500
		Contingency =	25%	$ 2,600
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 13,100**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	120	$ 160	$ 19,200
ROW	HOURS	60	$ 160	$ 9,600
Permitting	HOURS	60	$ 160	$ 9,600
Final Design	HOURS	100	$ 160	$ 16,000
Develop Plans and Construction Documents	HOURS	150	$ 160	$ 24,000
Construction Support	HOURS	120	$ 160	$ 19,200
			$ -	$ -
			Subtotal =	$ 97,600
		Contingency =	25%	$ 24,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 122,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.8	$ 30,000	$ 24,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	1,495	$ 35	$ 52,300
Rock Grade Control	CY	105	$ 200	$ 21,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	235	$ 150	$ 35,300
Bank Stabilization	SY	765	$ 120.00	$ 91,800
Granular Backfill	CY	30	$ 55	$ 1,700
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	1,030	$ 50	$ 51,500
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.8	$ 50,000	$ 40,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 32,700	$ 32,700
			Subtotal =	$ 359,800
		Contingency =	30%	$ 107,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 467,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 621,700**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-17 10675 Ladue Road DATE: 12/5/2023

PROJECT LOCATION: 10675 Ladue Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS: The retaining wall is in the regulatory floodway.

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: Retaining wall, parking lot*	150	1	100	1	25		250
			Industrial, office, commercial and warehouse (1 lot per structure) *Address: Temple Israel Religious School and Congregation Temple Israel*	300		200		50	2	100
		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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	1	10		5	3	35

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-17 10675 Ladue Road DATE: 12/5/2023

PROJECT LOCATION: 10675 Ladue Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS: The retaining wall is in the regulatory floodway.

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**395**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-17 10675 Ladue Road DATE: 12/5/2023

PROJECT LOCATION: 10675 Ladue Road, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS: The retaining wall is in the regulatory floodway.

COMMON GROUND:

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)	**4.16**	PER 100 LF		10		42
	Riffle Pool Complex	**9.16**	PER 100 LF		10		92
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	1.92	PER 100 LF		10		19
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**Yes**		**100**
						TOTAL SOLUTION POINTS	**272**
						TOTAL BENEFIT POINTS	**667**

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

TOTAL COST IN THOUSANDS= **$622**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.07**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

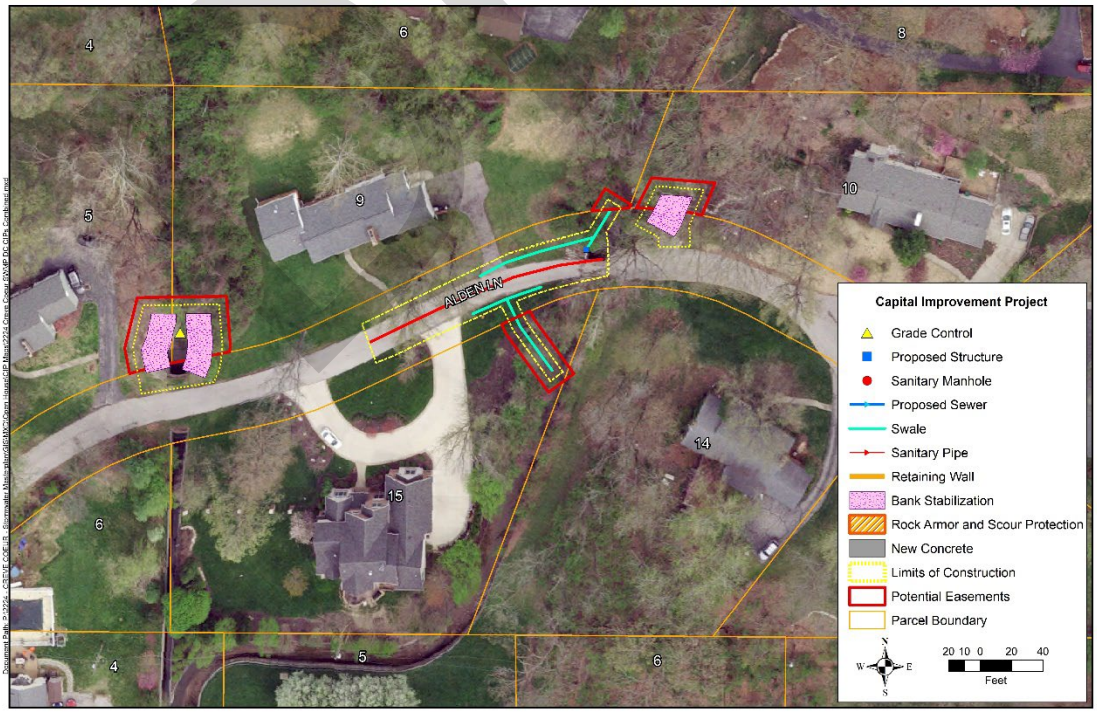
DC-C-18: Alden Lane

Problem Description: In Monsanto-Sunswept Creek upstream of the Alden Lane crossing there is a failing railroad tie wall on the LDB. In the unnamed tributary to Monsanto-Sunswept Creek upstream of the Alden Lane crossing there is a failing grouted riprap structure. Flow on the east end of the street bypasses the channel at the culvert causing street flooding west of the culvert. The affected parcels are private.

Failing grouted riprap

Recommendation: Replace the failing railroad tie wall with bank stabilization. Install a grade control structure with to replace the failing grouted riprap. Construct a curb chute off the street into a concrete swale along the west wing wall. Construct a grass swale along the north side of the street to drain to the concrete swale. Repave the apron to create a swale across the driveway at 9 Alden Lane. Construct a grass swale along the south side of the street with a swale across 15 Alden Lane to the channel that is grass in the turf area and rock in the landscape area. Repave and crown Alden Lane.

Special Considerations: A second chute or inlet over the culvert maybe needed to adequately direct flow from the street into the channel. An alternative solution would be to construct an inlet on each side of the street and pipe to the channel.



Conceptual Layout of DC-C-18

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-18 Alden Lane

Project Description: Bank stabilization, grade control, and swaled to address erosion threatening structures in Monsanto Sunswept Creek and one of its tributaries as well as overland flow issues.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 9,200
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF SURVEYING COST =		**$ 11,500**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,500
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,900**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	405	$ 35	$ 14,200
Rock Grade Control	CY	35	$ 200	$ 7,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	40	$ 150	$ 6,000
Bank Stabilization	SY	185	$ 120.00	$ 22,200
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	190	$ 15	$ 2,900
Asphaltic Concrete Pavement	SY	10	$ 150	$ 1,500
Pavement/Sidewalk Removal & Replacement	SY	320	$ 100	$ 32,000
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 10,000	$ 10,000
			Subtotal =	$ 109,900
		Contingency =	30%	$ 33,000
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 142,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 212,300**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-18 Alden Lane DATE: 12/5/2023

PROJECT LOCATION: 9 Alden Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade control, and swaled to address erosion threatening structures in Monsanto Sunswept Creek and one of its tributaries as well as overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 5 Alden Ln*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Failing retaining wall*	150		100	1	25		100
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10	1	5		10

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-18 Alden Lane DATE: 12/5/2023

PROJECT LOCATION: 9 Alden Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade control, and swaled to address erosion threatening structures in Monsanto Sunswept Creek and one of its tributaries as well as overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	**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:		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**220**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-18 Alden Lane DATE: 12/5/2023

PROJECT LOCATION: 9 Alden Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade control, and swaled to address erosion threatening structures in Monsanto Sunswept Creek and one of its tributaries as well as overland flow issues.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY										
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:				Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:				Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units				Points per Unit		
	Bioswales		PER 100 LF			10		
	Forebays		AC			200		
	Wet Ponds		AC			100		
	Wetlands		AC			50		
	Biostabilization of banks (per bank)	**1.09**	PER 100 LF			10		11
	Riffle Pool Complex	**3.08**	PER 100 LF			10		31
	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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)	3.08	PER 100 LF			10		31
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**93**
							TOTAL BENEFIT POINTS	**313**

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

TOTAL COST IN THOUSANDS= **$212**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.47**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-C-19: Middlebrook Lane

Problem Description: Bank erosion threatening a fence and utility pole was observed along a tributary to Monsanto-Sunswept Creek in the rear lot of 8 Sherwyn Lane. Where Monsanto-Sunswept Creek crosses the 8 Middlebrook Lane driveway, the RDB abutment and the bridge are failing. The affected parcels are private.

Recommendation: Install bank stabilization in the rear of lot 3 Middlebrook Lane to protect the existing fence and utility pole. Install bank stabilization both upstream and downstream of the unnammed tributary crossing of Middlebrook Lane. Replace the failing bridge abutment located at the Monsanto Creek crossing of Middlebrook Lane.

Bank erosion threatening fence and utility pole

Failing abutment and bridge

Conceptual Layout of DC-C-19

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-19 Middlebrook Lane

Project Description: Bank stabilization and bridge abutment replacement to address erosion in Monsanto-Sunswept Creek and one of its tributaries.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	4	$ 1,500	$ 6,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 9,400
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF SURVEYING COST =		**$ 11,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	210	$ 35	$ 7,400
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	25	$ 150	$ 3,800
Bank Stabilization	SY	115	$ 120.00	$ 13,800
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	180	$ 50	$ 9,000
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	95	$ 150	$ 14,300
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 7,400	$ 7,400
			Subtotal =	$ 81,500
		Contingency =	30%	$ 24,500
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 106,000**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 174,400**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-19 Middlebrook Lane DATE: 12/5/2023

PROJECT LOCATION: 5 Middlebrook Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization and bridge abutment replacement to address erosion in Monsanto-Sunswept Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: 8 Middlebrook Ln driveway*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-19 Middlebrook Lane DATE: 12/5/2023

PROJECT LOCATION: 5 Middlebrook Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization and bridge abutment replacement to address erosion in Monsanto-Sunswept Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**40**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-19 Middlebrook Lane DATE: 12/5/2023

PROJECT LOCATION: 5 Middlebrook Lane, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization and bridge abutment replacement to address erosion in Monsanto-Sunswept Creek and one of its tributaries.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**0.47**	PER 100 LF		10		5
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**25**
						TOTAL BENEFIT POINTS	**65**

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

TOTAL COST IN THOUSANDS= **$174**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.37**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

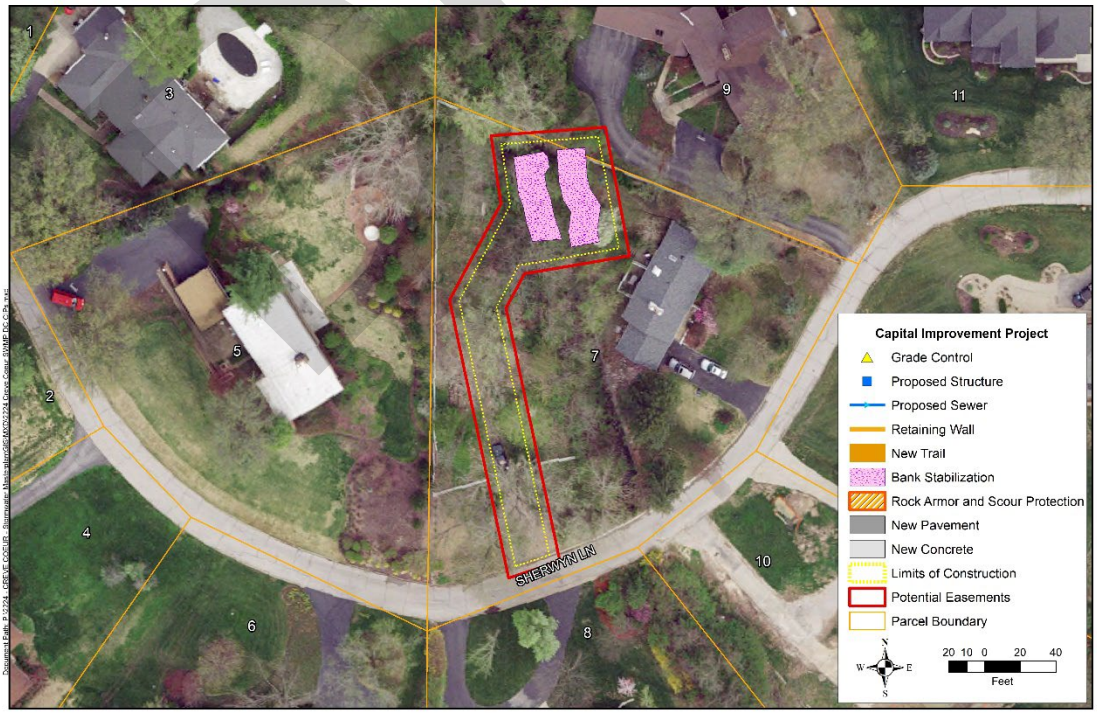
Draft

DC-C-20: Sherwyn Lane

Problem Description: In a tributary to Monsanto-Sunswept Creek, bank erosion was observed threatening the driveway of 9 Sherwyn Lane and the rear lot of 7 Sherwyn Lane. The affected parcels are private.

Recommendation: Install bank stabilization on both banks in the rear lot of 7 Sherwyn Lane.

Bank erosion



Conceptual Layout of DC-C-20

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-20 Sherwyn Lane

Project Description: Bank stabilization to address erosion threatening structures in a tributary to Monsanto-Sunswept Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 6,400
		Contingency =	25%	$ 1,600
		TOTAL OPINION OF SURVEYING COST =		**$ 8,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	265	$ 35	$ 9,300
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	50	$ 150	$ 7,500
Bank Stabilization	SY	190	$ 120.00	$ 22,800
Granular Backfill	CY	5	$ 55	$ 300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 6,200	$ 6,200
			Subtotal =	$ 68,600
		Contingency =	30%	$ 20,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 89,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 153,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-20 Sherwyn Lane DATE: 12/5/2023

PROJECT LOCATION: 7 Sherwyn Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion threatening structures in a tributary to Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 7 Sherwyn Ln*	300		200		50	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-20 Sherwyn Lane DATE: 12/5/2023

PROJECT LOCATION: 7 Sherwyn Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion threatening structures in a tributary to Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**50**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-20 Sherwyn Lane DATE: 12/5/2023

PROJECT LOCATION: 7 Sherwyn Lane, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization to address erosion threatening structures in a tributary to Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY									
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units			Points per Unit		
	Bioswales		PER 100 LF		10		
	Forebays		AC		200		
	Wet Ponds		AC		100		
	Wetlands		AC		50		
	Biostabilization of banks (per bank)	**1.04**	PER 100 LF		10		10
	Riffle Pool Complex		PER 100 LF		10		
	4.2. Eliminates combined sewer (per project)		EA		100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA		10		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**80**

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

TOTAL COST IN THOUSANDS= **$154**

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

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-C-21: 10694 Country View Drive

Problem Description: In Monsanto-Sunswept Creek downstream of the culvert crossing Country View Drive, failing grouted riprap and bank erosion threatening the fence along the property line of 10694 Country View Drive was observed. The affected parcels are private.

Recommendation: Install a step grade control structure to replace the failing grouted riprap. Stabilize the banks on either side of the channel.

Failing grouted riprap

Bank erosion threatening fence

Conceptual Layout of DC-C-21

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-21 10694 Country View Drive

Project Description: Grade control with associated bank stabilization to address erosion along Monsanto-Sunswept Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.1	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.1	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	500	$ 35	$ 17,500
Rock Grade Control	CY	65	$ 200	$ 13,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	35	$ 150	$ 5,300
Bank Stabilization	SY	175	$ 120.00	$ 21,000
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	65	$ 50	$ 3,300
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 7,400	$ 7,400
			Subtotal =	$ 81,600
		Contingency =	30%	$ 24,500
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 106,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 168,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-21 10694 Country View Drive DATE: 12/5/2023

PROJECT LOCATION: 10694 Country View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control with associated bank stabilization to address erosion along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Country View Dr*	20	3	12		3		60
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-21 10694 Country View Drive DATE: 12/5/2023

PROJECT LOCATION: 10694 Country View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control with associated bank stabilization to address erosion along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**60**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-21 10694 Country View Drive DATE: 12/5/2023

PROJECT LOCATION: 10694 Country View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Grade control with associated bank stabilization to address erosion along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY									
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:			Max points:	1000			
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50			
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units			Points per Unit				
	Bioswales		PER 100 LF		10				
	Forebays		AC		200				
	Wet Ponds		AC		100				
	Wetlands		AC		50				
	Biostabilization of banks (per bank)	**1.26**	PER 100 LF		10				13
	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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**33**
								TOTAL BENEFIT POINTS	**93**

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

TOTAL COST IN THOUSANDS= **$169**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.55**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

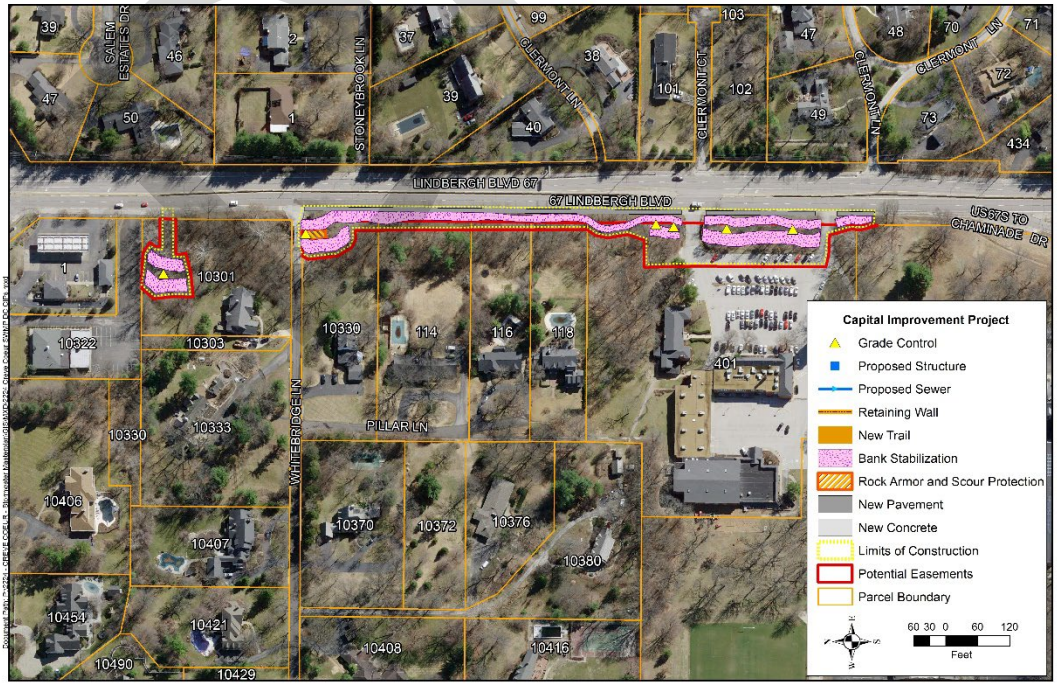
Draft

DC-C-22: Denny Creek

LDB erosion between church entrances

Problem Description: In Denny Creek along Lindbergh Boulevard multiple issues were observed as follows. Upstream of the Lindbergh Boulevard crossing, erosion was observed along the roadway and LDB wingwall. Between the entrances to Our Lady of the Pillar Church, erosion was observed along both banks. There was a knickpoint upstream of the southern entrance and downstream of the northern entrance. Perched pipes were also observed towards the upstream end of the reach on the RDB. Between the northern entrance and Whitebridge Lane, erosion was observed along the LDB throughout the entire reach threatening the roadway and two utility poles. Tension cracks were seen forming near the sidewalk and along the top of bank. Two knickpoints were observed upstream of the northern entrance. Downstream of Whitebridge Lane, a knickpoint and scour hole was observed along with erosion threatening the wingwalls and roadway. At the upstream end of Denny Creek, a perched outfall and knickpoint were observed. The affected parcels are private.

Recommendation: Stabilize the LDB upstream of the Lindbergh Boulevard crossing. Stabilize both banks between the church entrances and install grade controls at the knickpoints. Stabilize the LDB between the northern church entrance and Whitebridge Lane. Stabilize the RDB upstream of the northern entrance and install two step grade controls. Stabilize the RDB downstream of Whitebridge Lane and install a step grade control and stilling basin. Stabilize both banks at the upstream end of Denny Creek and install a step grade control.



Conceptual Layout of DC-C-22

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-22 Denny Creek

Project Description: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Denny Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	1.7	$ 12,000	$ 20,400
Prepare Easement Plat and Scripts	EACH	7	$ 1,500	$ 10,500
Contruction Staking and As-Built Surveying	ACRE	1.7	$ 5,000	$ 8,500
			Subtotal =	$ 39,400
		Contingency =	25%	$ 9,900
		TOTAL OPINION OF SURVEYING COST =		**$ 49,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,500
		Contingency =	25%	$ 2,600
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 13,100**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	180	$ 160	$ 28,800
ROW	HOURS	80	$ 160	$ 12,800
Permitting	HOURS	80	$ 160	$ 12,800
Final Design	HOURS	120	$ 160	$ 19,200
Develop Plans and Construction Documents	HOURS	200	$ 160	$ 32,000
Construction Support	HOURS	200	$ 160	$ 32,000
			$ -	$ -
			Subtotal =	$ 137,600
		Contingency =	25%	$ 34,400
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 172,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	1.7	$ 30,000	$ 51,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	5,525	$ 35	$ 193,400
Rock Grade Control	CY	225	$ 200	$ 45,000
Rock Stilling Basin / Outlet Scour Protection	CY	115	$ 100	$ 11,500
Rock Toe and Slope Protection	CY	690	$ 150	$ 103,500
Bank Stabilization	SY	3,130	$ 120.00	$ 375,600
Granular Backfill	CY	85	$ 55	$ 4,700
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	880	$ 150	$ 132,000
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	1,090	$ 50	$ 54,500
Utility Relocation	LUMP	1	$ 11,000	$ 11,000
Site Restoration	ACRE	1.7	$ 50,000	$ 85,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 106,700	$ 106,700
			Subtotal =	$ 1,173,900
		Contingency =	30%	$ 352,200
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 1,526,100**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 1,760,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-22 Denny Creek DATE: 12/5/2023

PROJECT LOCATION: 403 South Lindbergh Boulevard, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Denny Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address: Lindbergh Blvd*	75	11	50		12		825
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Whitebridge Ln*	20	7	12		3		140
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20	3	10	1	5		70

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-22 Denny Creek DATE: 12/5/2023

PROJECT LOCATION: 403 South Lindbergh Boulevard, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Denny Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**1035**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-22 Denny Creek DATE: 12/5/2023

PROJECT LOCATION: 403 South Lindbergh Boulevard, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Denny Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**28.36**	PER 100 LF		10		284
	Riffle Pool Complex	**10.09**	PER 100 LF		10		101
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)	10.09	PER 100 LF		10		101
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**495**
						TOTAL BENEFIT POINTS	**1530**

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

TOTAL COST IN THOUSANDS= **$1,761**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.87**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

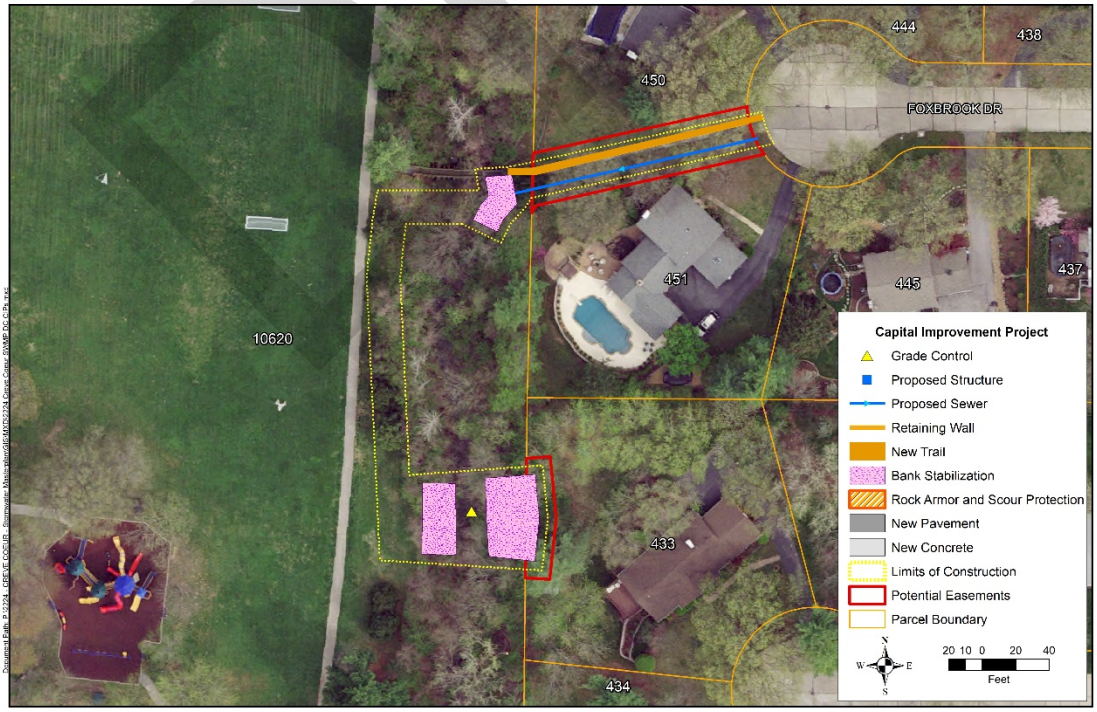
DC-C-23: 10620 Country View Drive

Problem Description: Within Dr. Phillip Venable Memorial Park multiple issues were observed along Monsanto-Sunswept Creek as follows. Behind 433 Shadybrook Drive there is a 3 foot knickpoint, failing gabions, and a failing retaining wall. Immediately downstream of the pedestrian bridge crossing behind 450 Foxbrook Drive, the grouted riprap structure protecting the pipe outfall is failing. The affected parcels are private and public.

Failing gabions and retaining wall

Recommendation: Install a step grade control structure and bank stabilization to replace the failing gabions and retaining wall. Replace the failing pipe and replace the grouted riprap with bank stabilization. Bridge work will be combined with the planned Venerable Park project.

Failing grouted riprap



Conceptual Layout of DC-C-23

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-23 10620 Country View Drive

Project Description: Bank stabilization, grade control, and pipe replacement to address erosion threatening structures along Monsanto-Sunswept Creek in Dr. Phillip Venable Memorial Park. Bridge work will be combined with the planned Venerable Park project.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.3	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.3	$ 5,000	$ 1,500
			Subtotal =	$ 9,600
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF SURVEYING COST =		**$ 12,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP	2	$ 2,000	$ 4,000
Excavation and Embankment in Place	CY	295	$ 35	$ 10,300
Rock Grade Control	CY	55	$ 200	$ 11,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	55	$ 150	$ 8,300
Bank Stabilization	SY	320	$ 120.00	$ 38,400
Granular Backfill	CY	10	$ 55	$ 600
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF	165	$ 140	$ 23,100
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	65	$ 150	$ 9,800
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 13,600	$ 13,600
			Subtotal =	$ 149,600
		Contingency =	30%	$ 44,900
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 194,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 263,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-23 10620 Country View Drive DATE: 12/5/2023

PROJECT LOCATION: 10620 Country View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, and pipe replacement to address erosion threatening structures along Monsanto-Sunswept Creek in Dr. Phillip Venable Memorial Park. Bridge work will be combined with the planned Venerable Park project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 433 Shadybrook Dr*	300		200		50	1	50
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Gabion and retaining wall*	150		100		25	2	50
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10	1	5		10

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-23 10620 Country View Drive DATE: 12/5/2023

PROJECT LOCATION: 10620 Country View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, and pipe replacement to address erosion threatening structures along Monsanto-Sunswept Creek in Dr. Phillip Venable Memorial Park. Bridge work will be combined with the planned Venerable Park project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition			15				15
			TOTAL PROBLEM POINTS						**125**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-23 10620 Country View Drive DATE: 12/5/2023

PROJECT LOCATION: 10620 Country View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, and pipe replacement to address erosion threatening structures along Monsanto-Sunswept Creek in Dr. Phillip Venable Memorial Park. Bridge work will be combined with the planned Venerable Park project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

SOLUTION BENEFIT CATEGORY										
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate:				Max points:	1000			
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:				Points per Add'l Proj.:	50			
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units				Points per Unit				
	Bioswales		PER 100 LF			10				
	Forebays		AC			200				
	Wet Ponds		AC			100				
	Wetlands		AC			50				
	Biostabilization of banks (per bank)	**1.33**	PER 100 LF			10				13
	Riffle Pool Complex	**2.04**	PER 100 LF			10				20
	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				
	4.4 Preserves natural resource areas	No. Units				Points per Unit				
	Lakes, Wetlands, etc.		AC			30				
	Natural Corridor (min. 25ft width)	2.04	PER 100 LF			10				20
	4.5 Conservation Easement		EA			20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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				**Yes**				**100**
									TOTAL SOLUTION POINTS	**174**
									TOTAL BENEFIT POINTS	**299**

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

TOTAL COST IN THOUSANDS= **$264**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.13**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

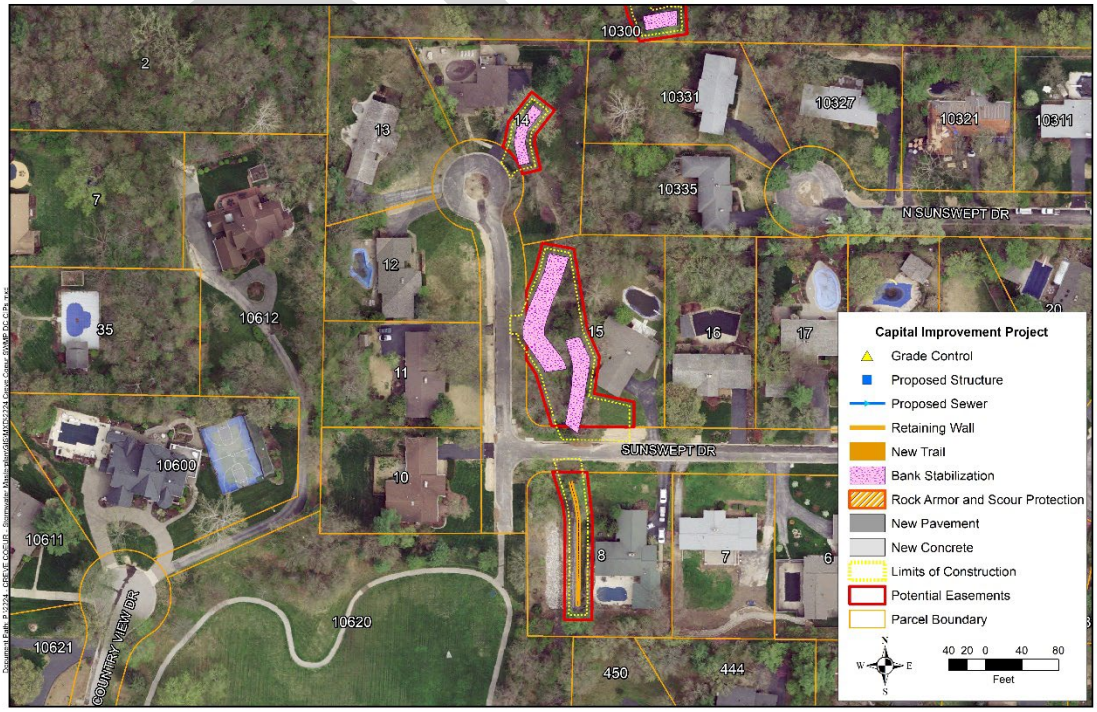
DC-C-24: Sunswept Drive

Problem Description: Along Sunswept Drive multiple issues were observed along Monsanto-Sunswept Creek as follows. Along the driveway of 14 Sunswept Drive there is a failing gabion wall. Where the creek crosses 15 Sunswept Drive, there is erosion along the outside bend nearing the road and failing grouted riprap and gabion baskets upstream of the Sunswept Drive crossing. In the Sunswept Drive culvert, there is a hole in the concrete below a pipe outfall. Downstream of the Sunswept Drive crossing the LDB gabion wall is failing. The affected parcels are private.

14 Sunswept Drive gabion wall

15 Sunswept Drive erosion

Recommendation: Install bank stabilization along the driveway of 14 Sunswept Drive to replace the failing gabion wall. Install bank stabilization along the creek at 15 Sunswept Drive to address the bank erosion, failing grouted riprap, and gabion baskets. Patch the concrete below the pipe outfall in the culvert. Replace the gabion wall along 8 Sunswept Drive.



Conceptual Layout of DC-C-24

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-24 Sunswept Drive

Project Description: Bank stabilization and gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.4	$ 12,000	$ 4,800
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.4	$ 5,000	$ 2,000
			Subtotal =	$ 11,300
		Contingency =	25%	$ 2,800
		TOTAL OPINION OF SURVEYING COST =		**$ 14,100**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	2	$ 1,000	$ 2,000
			Subtotal =	$ 10,000
		Contingency =	25%	$ 2,500
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 12,500**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.4	$ 30,000	$ 12,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	745	$ 35	$ 26,100
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	190	$ 150	$ 28,500
Bank Stabilization	SY	615	$ 120.00	$ 73,800
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	1,680	$ 50	$ 84,000
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	135	$ 50	$ 6,800
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.4	$ 50,000	$ 20,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 26,000	$ 26,000
			Subtotal =	$ 285,500
		Contingency =	30%	$ 85,700
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 371,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 477,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-24 Sunswept Drive DATE: 12/5/2023

PROJECT LOCATION: 15 Sunswept Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 8, 14, and 15 Sunswept Dr*	300		200	2	50	1	450
			Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address: Gabion wall, 8 Sunswept Dr pool*	150	1	100	1	25		250
			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	2	lots	10 points per lot				20
		1.2.3.	Threatening Roadway (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Sunswept Dr*	20		12	2	3		24
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-24 Sunswept Drive DATE: 12/5/2023

PROJECT LOCATION: 15 Sunswept Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**744**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-24 Sunswept Drive DATE: 12/5/2023

PROJECT LOCATION: 15 Sunswept Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization and gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**3.25**	PER 100 LF		10		33
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**53**
						TOTAL BENEFIT POINTS	**797**

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

TOTAL COST IN THOUSANDS= **$478**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.67**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-C-26: Lindbergh Boulevard

Problem Description: In the unnamed tributary along the Lindbergh Boulevard ROW, an asphalt swale conveying drainage from the roadway is failing and being bypassed causing bank erosion. At the downstream end of the tributary, a knickpoint and scour hole have formed. These issues are contained within Lindbergh Boulevard ROW.

Recommendation: Replace the asphalt swale and stabilize the banks. Install a stilling basin and step grade control structure at the downstream end of the tributary.

Failing asphalt swale

Knickpoint and scour hole

Conceptual Layout of DC-C-26

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-26 Lindbergh Boulevard

Project Description: Bank stabilization, grade control, rock armoring, and a stilling basin to address erosion in an unnamed tributary along Lindbergh Blvd.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.3	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	0	$ 1,500	$ -
Contruction Staking and As-Built Surveying	ACRE	0.3	$ 5,000	$ 1,500
			Subtotal =	$ 5,100
		Contingency =	25%	$ 1,300
		TOTAL OPINION OF SURVEYING COST =		**$ 6,400**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	50	$ 20	$ 1,000
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,000
		Contingency =	25%	$ 2,300
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,300**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	1,300	$ 35	$ 45,500
Rock Grade Control	CY	35	$ 200	$ 7,000
Rock Stilling Basin / Outlet Scour Protection	CY	45	$ 100	$ 4,500
Rock Toe and Slope Protection	CY	85	$ 150	$ 12,800
Bank Stabilization	SY	475	$ 120.00	$ 57,000
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 16,000	$ 16,000
			Subtotal =	$ 176,100
		Contingency =	30%	$ 52,800
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 228,900**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 326,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-26 Lindbergh Boulevard DATE: 12/5/2023

PROJECT LOCATION: 8 Millstone Campus Drive, St. Louis, MO 63146 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, rock armoring, and a stilling basin to address erosion in an unnamed tributary along Lindbergh Blvd.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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: 21 and 22 Tealbrook Dr*	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address: Lindbergh Blvd*	75	3	50		12		225
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-26 Lindbergh Boulevard DATE: 12/5/2023

PROJECT LOCATION: 8 Millstone Campus Drive, St. Louis, MO 63146 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, rock armoring, and a stilling basin to address erosion in an unnamed tributary along Lindbergh Blvd.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**225**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-26 Lindbergh Boulevard DATE: 12/5/2023

PROJECT LOCATION: 8 Millstone Campus Drive, St. Louis, MO 63146 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, rock armoring, and a stilling basin to address erosion in an unnamed tributary along Lindbergh Blvd.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2.13**	PER 100 LF		10		21
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements	**50**					**50**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**71**
						TOTAL BENEFIT POINTS	**296**

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

TOTAL COST IN THOUSANDS= **$327**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.91**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

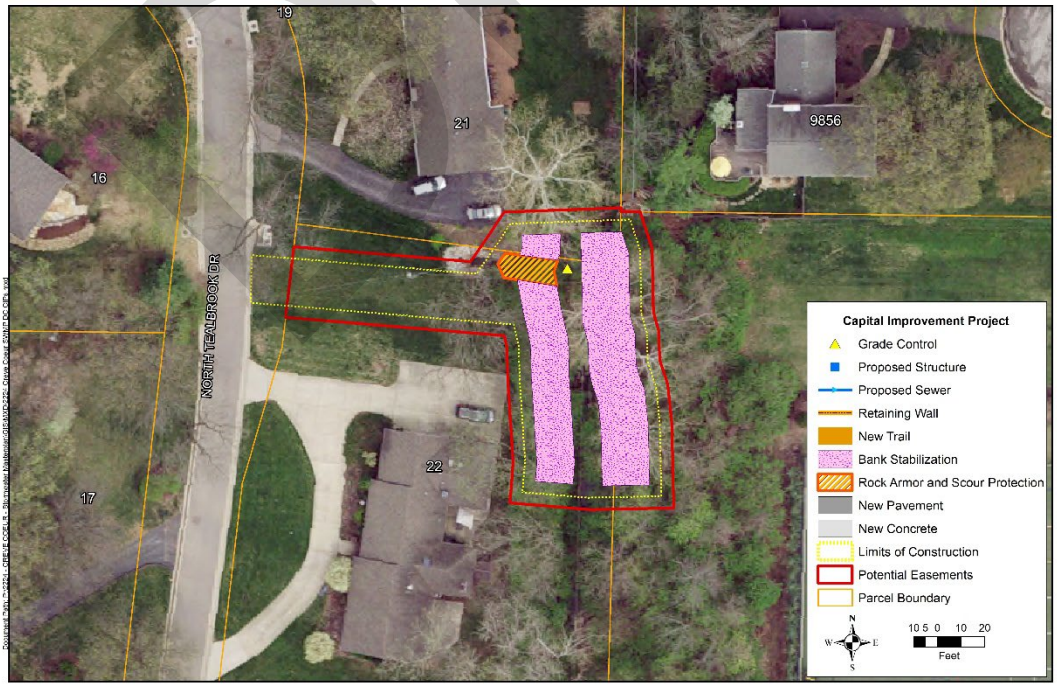
DC-C-27: 22 South Tealbrook Drive

Problem Description: In Pebble Creek there is bank erosion present at the outfall and along the rear lot of 22 South Tealbrook Drive. The affected parcels are private.

Recommendation: Install a step grade control structure, stabilize both banks, and armor the drainage swale. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.

Outfall

Bank erosion along rear lot of 22 South Tealbrook Drive



Conceptual Layout of DC-C-27

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-27 22 South Tealbrook Drive

Project Description: Bank stabilization, grade control, and rock armoring to address erosion threatening structures in Pebble Creek. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.2	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.2	$ 5,000	$ 1,000
			Subtotal =	$ 7,900
		Contingency =	25%	$ 2,000
		TOTAL OPINION OF SURVEYING COST =		**$ 9,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 8,500
		Contingency =	25%	$ 2,100
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 10,600**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY	825	$ 35	$ 28,900
Rock Grade Control	CY	35	$ 200	$ 7,000
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY	135	$ 150	$ 20,300
Bank Stabilization	SY	405	$ 120.00	$ 48,600
Granular Backfill	CY	15	$ 55	$ 800
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	20	$ 50	$ 1,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 12,800	$ 12,800
			Subtotal =	$ 140,900
		Contingency =	30%	$ 42,300
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 183,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 249,700**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-27 22 South Tealbrook Drive DATE: 12/5/2023

PROJECT LOCATION: 22 South Tealbrook Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, and rock armoring to address erosion threatening structures in Pebble Creek. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 21 and 22 Tealbrook Dr*	300		200		50	2	100
			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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: Driveway culvert*	20	2	12		3		40
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-27 22 South Tealbrook Drive DATE: 12/5/2023

PROJECT LOCATION: 22 South Tealbrook Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, and rock armoring to address erosion threatening structures in Pebble Creek. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**140**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-27 22 South Tealbrook Drive DATE: 12/5/2023

PROJECT LOCATION: 22 South Tealbrook Drive, Creve Coeur, MO 63141 PROJECT TYPE: 2

PROJECT DESCRIPTION: Bank stabilization, grade control, and rock armoring to address erosion threatening structures in Pebble Creek. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2.03**	PER 100 LF		10		20
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**40**
						TOTAL BENEFIT POINTS	**180**

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

TOTAL COST IN THOUSANDS= **$250**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.72**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

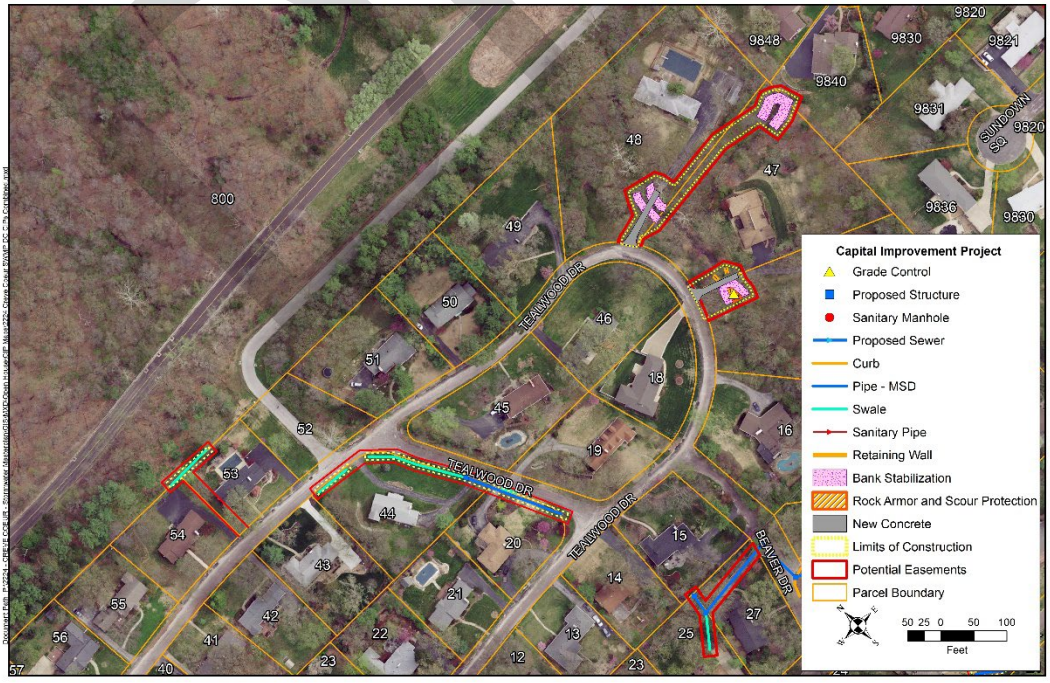
DC-C-28: Tealwood Drive

Problem Description: In Pebble Creek along Tealwood Drive multiple issues were observed as follows. At the upstream end of the tributary along 47 Tealwood Drive there are failing gabion walls. At the 48 Tealwood Drive driveway crossing, there is erosion threatening the bridge abutments. The wingwalls and culvert walls are failing at the shared driveway of 17 and 47 Tealwood Drive and sinkholes are forming near the driveway. Yard and structural flooding and yard erosion. The affected parcels are private.

Failing culvert

Recommendation: Install bank stabilization to replace the failing gabion walls. Install bank stabilization upstream and downstream of the 48 Tealwood Drive driveway to protect the bridge abutments. Replace the 17/47 Tealwood Drive driveway culvert and wingwalls and install a stilling basin and step grade control structure downstream. Construct swale on the Bayer campus along the north property line of 53 & 54 to capture the flow off of the driveway at 54 Tealwood Drive. Construct a swale along the street at 44 to better intercept water at an existing inlet and driveway culvert. Contruct new inlet at south driveway entrance at 44 and pipe to existing inlet 17M4-165D. Grade a swale to drain the north driveway at 20 into the existing swale.

Special Considerations: Evaluate modification of detention area on the Bayer campus just north of their entrance in Tealwood. Review hydraulics of the culvert across Tealwood Drive at 51, the pipes at 19 and the culvert across Beaver Drive to determine if they need to be upsized.



Conceptual Layout of DC-C-28

draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-28 Tealwood Drive

Project Description: Bank stabilization, grade controls, stilling basin, new culvert, wing wall replacement, overland swales, and a new inlet to address erosion and overland flow issues in Pebble Creek and along Tealwood Dr.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.8	$ 12,000	$ 9,600
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.8	$ 5,000	$ 4,000
			Subtotal =	$ 22,600
		Contingency =	25%	$ 5,700
		TOTAL OPINION OF SURVEYING COST =		**$ 28,300**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	75	$ 20	$ 1,500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	1	$ 1,000	$ 1,000
			Subtotal =	$ 9,500
		Contingency =	25%	$ 2,400
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 11,900**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.8	$ 30,000	$ 24,000
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY	680	$ 35	$ 23,800
Rock Grade Control	CY	40	$ 200	$ 8,000
Rock Stilling Basin / Outlet Scour Protection	CY	40	$ 100	$ 4,000
Rock Toe and Slope Protection	CY	95	$ 150	$ 14,300
Bank Stabilization	SY	380	$ 120.00	$ 45,600
Granular Backfill	CY	20	$ 55	$ 1,100
New Culvert	LF	15	$ 500.0	$ 7,500
Manhole	LF		$ 625	$ -
Inlet	EA	1	$ 3,500	$ 3,500
Sewer Pipe Small	LF	155	$ 140	$ 21,700
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF	160	$ 50	$ 8,000
Berm/Swale	LF	205	$ 15	$ 3,100
Asphaltic Concrete Pavement	SY	205	$ 150	$ 30,800
Pavement/Sidewalk Removal & Replacement	SY	25	$ 100	$ 2,500
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE	0.8	$ 50,000	$ 40,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 24,700	$ 24,700
			Subtotal =	$ 272,100
		Contingency =	30%	$ 81,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 353,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 473,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-28 Tealwood Drive DATE: 12/5/2023

PROJECT LOCATION: 47 Tealwood Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basin, new culvert, wing wall replacement, overland swales, and a new inlet to address erosion and overland flow issues in Pebble Creek and along Tealwood Dr.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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: 48 Tealwood Dr garage*	150		100		25	1	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address: 17/47 Tealwood Dr driveway with failing culvert*	20	2	12		3	2	46
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-28 Tealwood Drive DATE: 12/5/2023

PROJECT LOCATION: 47 Tealwood Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basin, new culvert, wing wall replacement, overland swales, and a new inlet to address erosion and overland flow issues in Pebble Creek and along Tealwood Dr.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y	50	50
		Attached Garage (1 lot per structure) *Address:*	100		75	2	25		150
		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	**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:		3	Points/lot:		10	30
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**596**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-28 Tealwood Drive DATE: 12/5/2023

PROJECT LOCATION: 47 Tealwood Drive, Creve Coeur, MO 63141 PROJECT TYPE: 1

PROJECT DESCRIPTION: Bank stabilization, grade controls, stilling basin, new culvert, wing wall replacement, overland swales, and a new inlet to address erosion and overland flow issues in Pebble Creek and along Tealwood Dr.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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)	**2.77**	PER 100 LF		10		28
	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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			**10**			**10**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	**38**
						TOTAL BENEFIT POINTS	**634**

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

TOTAL COST IN THOUSANDS= **$474**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.34**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

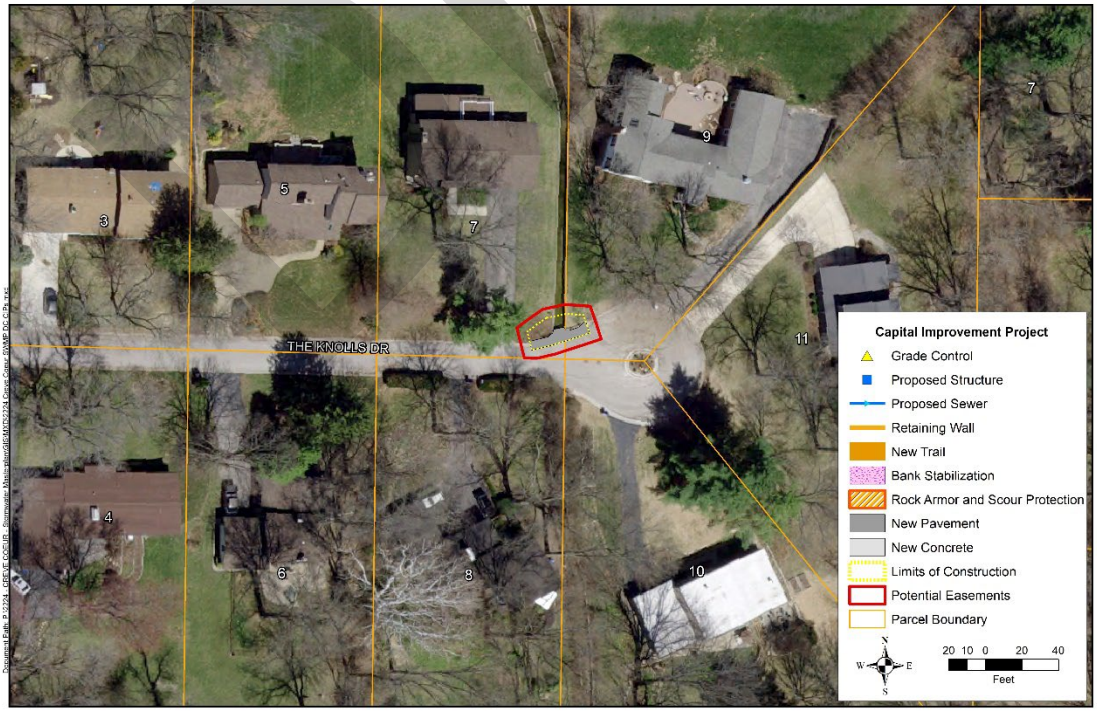
Draft

DC-C-29: The Knolls Lane

Problem Description: The curb/drainageway on the northside of The Knolls Lane is broken. The affected parcels are private.

Recommendation: Install a new curb and drainage way.

Broken curb where drainage enters channel



Conceptual Layout of DC-C-29

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-C-29 The Knolls Lane

Project Description: Broken curb/drainageway replacement.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.01	$ 12,000	$ 100
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.01	$ 5,000	$ 100
			Subtotal =	$ 3,200
		Contingency =	25%	$ 800
		TOTAL OPINION OF SURVEYING COST =		**$ 4,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	0	$ 20	$ -
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH	0	$ 1,000	$ -
			Subtotal =	$ 7,000
		Contingency =	25%	$ 1,800
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 8,800**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP	1	$ 2,000	$ 2,000
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	20	$ 100	$ 2,000
Curb - Concrete Rem & Rep	LF	30	$ 50	$ 1,500
Utility Relocation	LUMP	1	$ 5,500	$ 5,500
Site Restoration	ACRE		$ 50,000	$ -
			$ -	$ -
Mobilization and Bond	10%	1	$ 1,100	$ 1,100
			Subtotal =	$ 12,100
		Contingency =	30%	$ 3,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 15,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 74,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-29 The Knolls Lane DATE: 12/5/2023

PROJECT LOCATION: 7 The Knolls Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Broken curb/drainageway replacement.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.				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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.) (1 lot per 250' of stream)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-29 The Knolls Lane DATE: 12/5/2023

PROJECT LOCATION: 7 The Knolls Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Broken curb/drainageway replacement.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

				Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.		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				Y		
		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	1		6
		Ponding (per ponding area) *Address:*		No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*		No. Lots:		1	Points/lot:		20	20
	2.3.	Yard Erosion (1 per lot) *Address:*		No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition								0
				TOTAL PROBLEM POINTS						**26**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-29 The Knolls Lane DATE: 12/5/2023

PROJECT LOCATION: 7 The Knolls Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Broken curb/drainageway replacement.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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	**46**

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

TOTAL COST IN THOUSANDS= **$75**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.62**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

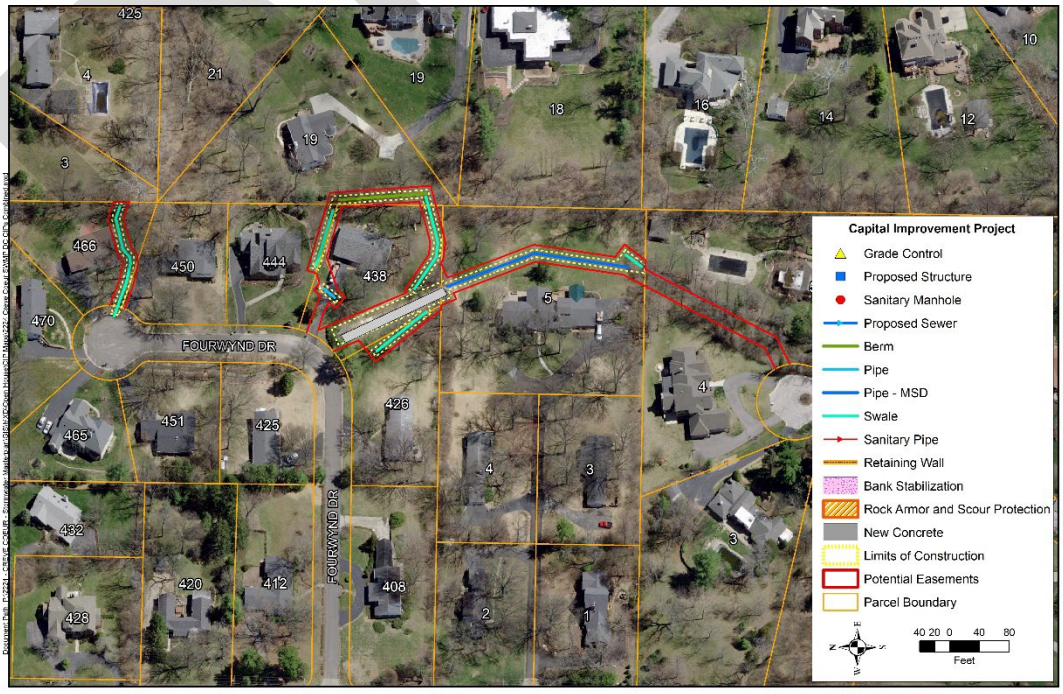
DC-S-15: Fourwynd Drive

Problem Description: The following issues were observed along a tributary to Windrush Creek. The concrete channel near 438 Fourwynd Drive is starting to fail. Yard flooding and erosion at 438, 444 and 466 Fourwynd Drive. Failing 42" CMP across 5 Wyndtop Lane. The affected parcels are private.

Cracking concrete slabs at 438 Fourwynd Drive

Recommendation: Remove and replace the concrete channel at 438 Fourwynd Drive. Construct a berm and swale along the east property line of #438 and swale to an existing inlet on the east side of the concrete channel. Construct a swale along the west property line of #438 to improve drainage to the existing inlet on the west side of the concrete channel. Replace the dual 18" pipe culvert across the driveway at #438 with a 36"x18" box culvert. Construct a swale on #444 from the southeast property corner along the property line to the concrete swale with an underdrain. Construct a swale with Instaturf ShearForce at #466 from the east property line to the street on the south side of the house. Replace 5 Wyndtop Lane pipe with new pipe and construct short swale with Instaturf ShearForce to convey overland flow to channel at south end of pipe.

Special Considerations: Concrete channel is in fair condition and reviewed for replacing or enclosing. Pipe across 5 Wyndtop Lane is not straight and has a bend in the middle of the yard there may or may not be a buried structure.



Conceptual Layout of DC-S-15

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-15 Fourwynd Drive

Project Description: Berm, swales, and a culvert replacement to address yard flooding and overland flow erosion.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.65	$ 12,000	$ 7,800
Prepare Easement Plat and Scripts	EACH	8	$ 1,500	$ 12,000
Contruction Staking and As-Built Surveying	ACRE	0.65	$ 5,000	$ 3,300
			Subtotal =	$ 23,100
			Contingency = 25%	$ 5,800
			TOTAL OPINION OF SURVEYING COST =	**$ 28,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.2	$ 30,000	$ 6,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF	252	$ 140	$ 35,300
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF	36	$ 360	$ 13,000
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA	1	$ 2,580	$ 2,600
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	593	$ 15	$ 8,900
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	14.4	$ 100	$ 1,400
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.7	$ 50,000	$ 32,500
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 99,700
			Contingency = 30%	$ 29,900
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 129,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 213,900**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-15: Fourwynd Drive DATE: 11/14/2023

PROJECT LOCATION: 438 Fourwynd Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, and a culvert replacement to address yard flooding and overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-15: Fourwynd Drive DATE: 11/14/2023

PROJECT LOCATION: 438 Fourwynd Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, and a culvert replacement to address yard flooding and overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		Attached Garage (1 lot per structure) *Address:*	100		75		25		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		35		12		
		Yard Flooding (1 per lot) *Address:*	10	**4**	6		0		**40**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:		5	Points/lot:		10	50
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**120**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-15: Fourwynd Drive DATE: 11/14/2023

PROJECT LOCATION: 438 Fourwynd Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, and a culvert replacement to address yard flooding and overland flow erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements			10				10
	5.2. Recreational/Educational	Yes = 100 No = 0 pts						
						TOTAL SOLUTION POINTS		10
						TOTAL BENEFIT POINTS		130

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

TOTAL COST IN THOUSANDS= **$214**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.61**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

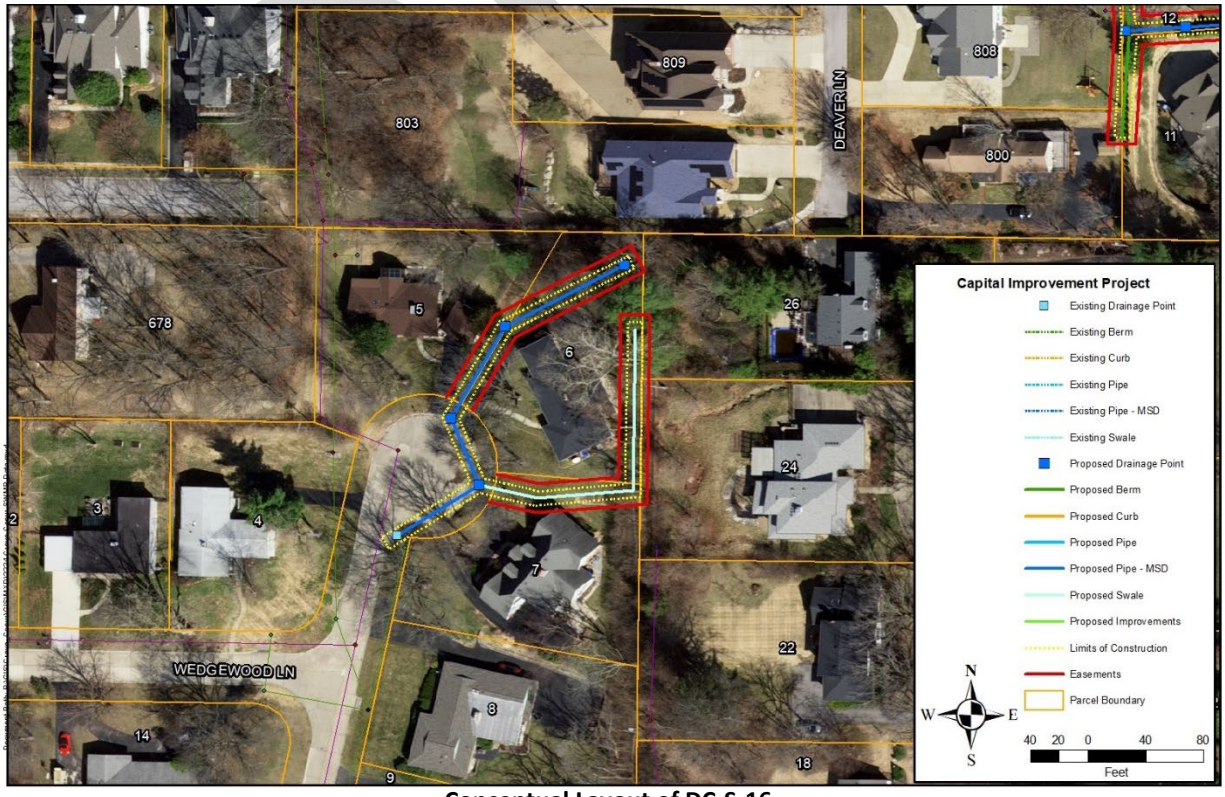
DC-S-16: Wedgewood Lane

Looking south behind #6

Problem description: Storm flows from Deaver Lane and Colonial Hills Parkway along with poor grading causing yard ponding at 6 Wedgewood Lane.

Recommendation: Construct area inlet in near east corner of #6 to intercept flow from Deaver Lane and pipe to existing inlet 17N2054D with curb inlets between #6 & #7 and between #5 & #6 and a 2 grate inlet w/ side intake or manhole with slotted cover along the property line about even with the front of the house. Construct a swale parallel to the east property line of #6 to #7 the out to the street, yard drains may be needed in the back yard if adequate slope is not available and the steeper reaches reinforced with Instaturf ShearForce.

Special Considerations: The rear yards of #7 and # 8 may also experience the same issue.



Conceptual Layout of DC-S-16

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-16 Wedgewood Lane

Project Description: Inlets, storm sewer, and swale to address yard ponding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 10,900
			Contingency = 25%	$ 2,700
			TOTAL OPINION OF SURVEYING COST =	**$ 13,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	39.00	$ 55	$ 2,100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	4	$ 3,500	$ 14,000
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	220	$ 15	$ 3,300
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	77.8	$ 100	$ 7,800
Curb - Concrete Rem & Rep	LF	10	$ 50	$ 500
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 32,700
			Contingency = 30%	$ 9,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 42,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 111,500**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-16: Wedgewood Lane DATE: 11/14/2023

PROJECT LOCATION: 6 Wedgewood Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets, storm sewer, and swale to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
		Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
		Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4. Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
			20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-16: Wedgewood Lane DATE: 11/14/2023

PROJECT LOCATION: 6 Wedgewood Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets, storm sewer, and swale to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		Attached Garage (1 lot per structure) *Address:*	100		75		25		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		35		12		
		Yard Flooding (1 per lot) *Address:*	10	**2**	6		0		**20**
		2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50		35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25		15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10		6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:			Points/pond:		5	
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**50**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-16: Wedgewood Lane DATE: 11/14/2023

PROJECT LOCATION: 6 Wedgewood Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets, storm sewer, and swale to address yard ponding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**70**

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

TOTAL COST IN THOUSANDS= **$112**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.63**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-S-17: Sona Lane

Problem description: Structural flooding and yard erosion of homes on the east side of Sona Lane due to runoff from properties on west side of Deaver Lane.

Recommendation: Construct berm with swale along top of the slope along the rear property line with inlets at the side property line of each lot on Sona Lane pipe to Sona Lane a manhole at the base of the hill will be necessary to accommodate the grade change.

Special Considerations: 12 Sona Lane reports that they did not have an issue until new houses on Deaver Lane were constructed and said they could handle the water that falls on the hill side. An alternate solution woud be to pipe all the downspouts of each home on the east side Deaver Lane to a storm system on Deaver Lane and require any new homes to do the same.

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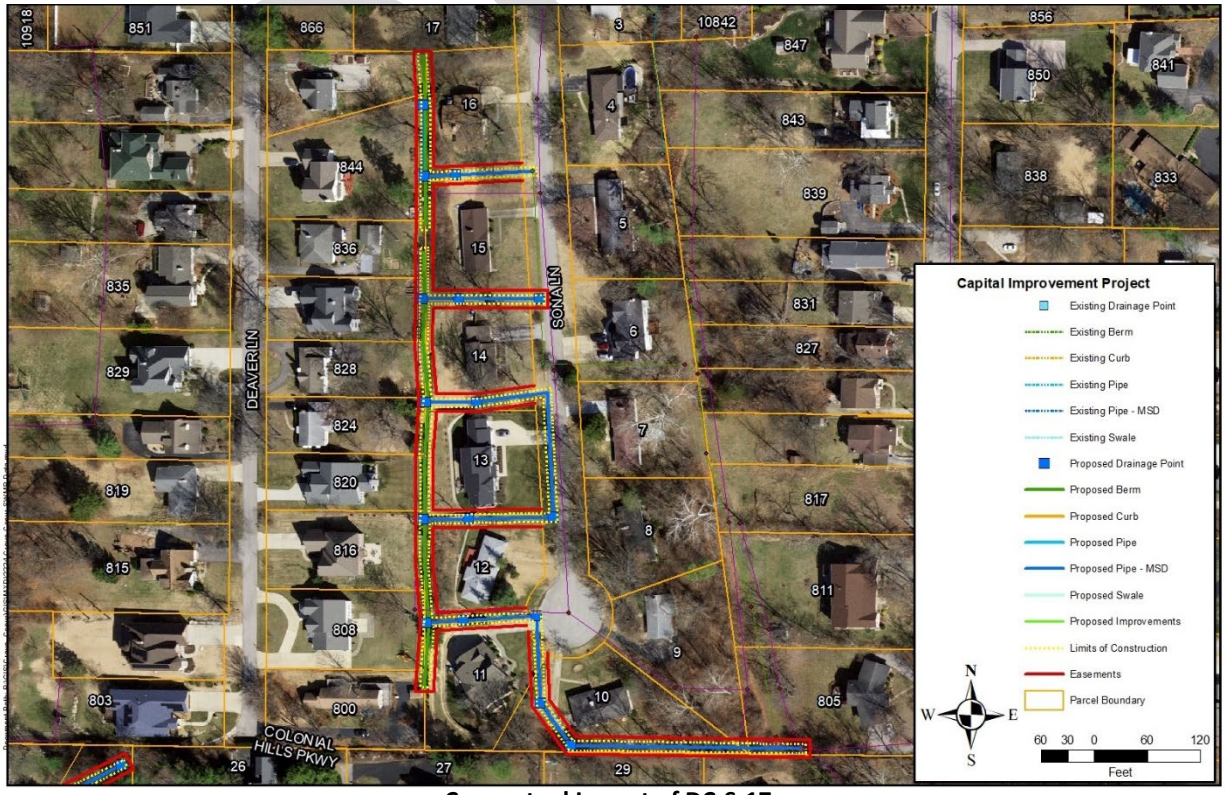


Conceptual Layout of DC-S-17

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-17 Sona Lane

Project Description: Berm, swale, inlets, and storm sewer to address structural flooding and yard erosion.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.80	$ 12,000	$ 9,600
Prepare Easement Plat and Scripts	EACH	19	$ 1,500	$ 28,500
Contruction Staking and As-Built Surveying	ACRE	0.80	$ 5,000	$ 4,000
			Subtotal =	$ 42,100
			Contingency = 25%	$ 10,500
			TOTAL OPINION OF SURVEYING COST =	**$ 52,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
			Contingency = 25%	$ 16,000
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.3	$ 30,000	$ 9,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	60.00	$ 55	$ 3,300
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	16	$ 3,500	$ 56,000
Sewer Pipe Small	LF	1,310	$ 140	$ 183,400
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	2	$ 2,365	$ 4,700
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA	1	$ 2,580	$ 2,600
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	680	$ 15	$ 10,200
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	144.4	$ 100	$ 14,400
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.8	$ 50,000	$ 40,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 323,600
			Contingency = 30%	$ 97,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 420,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 562,700**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-17: Sona Lane DATE: 11/14/2023

PROJECT LOCATION: 14 Sona Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swale, inlets, and storm sewer to address structural flooding and yard erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-17: Sona Lane DATE: 11/14/2023

PROJECT LOCATION: 14 Sona Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swale, inlets, and storm sewer to address structural flooding and yard erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	2	65	3	695
		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				Y	50	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	5	35		12		250
		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:			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:		5	Points/lot:		10	50
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**1125**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-17: Sona Lane DATE: 11/14/2023

PROJECT LOCATION: 14 Sona Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swale, inlets, and storm sewer to address structural flooding and yard erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements					0		
	5.2. Recreational/Educational	Yes = 100 No = 0 pts						
						TOTAL SOLUTION POINTS		
						TOTAL BENEFIT POINTS		1125

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

TOTAL COST IN THOUSANDS= **$563**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.00**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

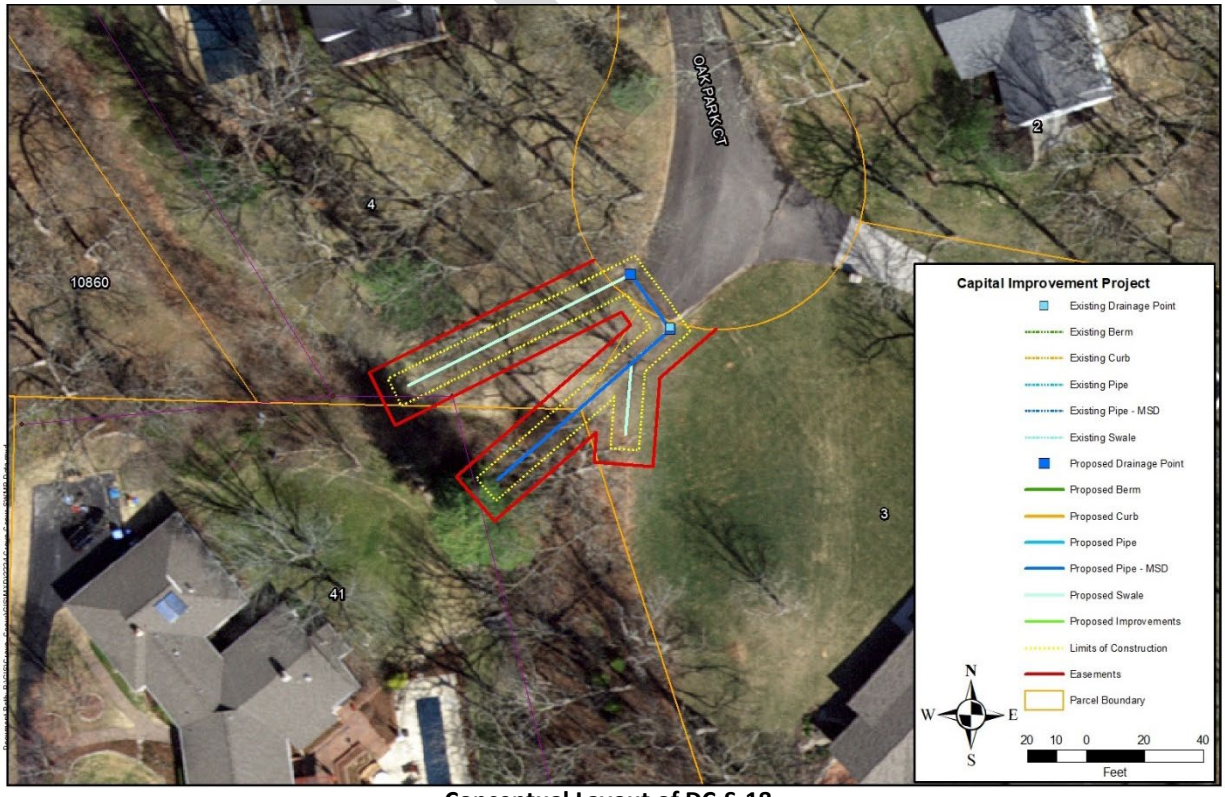
DC-S-18: 3 Oak Park Court

Problem description: Yard erosion on hillside due to flow off of end of street.

Recommendation: Install curb inlets at end of street and pipe to channel at bottom of hill.

Special Considerations: An alternative is to remove old asphalt swales and replace with grass swales with Instaturf ShearForce.

Existing clogged inlet



Conceptual Layout of DC-S-18

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-18 3 Oak Park Court

Project Description: Inlets and storm sewer to address yard erosion.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 6,200
			Contingency = 25%	$ 1,600
			TOTAL OPINION OF SURVEYING COST =	**$ 7,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	2.00	$ 55	$ 100
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	2	$ 3,500	$ 7,000
Sewer Pipe Small	LF	101	$ 140	$ 14,100
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA	1	$ 2,580	$ 2,600
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	126	$ 15	$ 1,900
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	17.8	$ 100	$ 1,800
Curb - Concrete Rem & Rep	LF	23	$ 50	$ 1,200
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 33,700
			Contingency = 30%	$ 10,100
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 43,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 107,000**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-18: 3 Oak Park Court DATE: 11/14/2023

PROJECT LOCATION: 3 Oak Park Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewer to address yard erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-18: 3 Oak Park Court DATE: 11/14/2023

PROJECT LOCATION: 3 Oak Park Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewer to address yard erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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:		3	Points/lot:		10	30
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**30**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-18: 3 Oak Park Court DATE: 11/14/2023

PROJECT LOCATION: 3 Oak Park Court, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewer to address yard erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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			**50**

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

TOTAL COST IN THOUSANDS= **$107**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.47**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

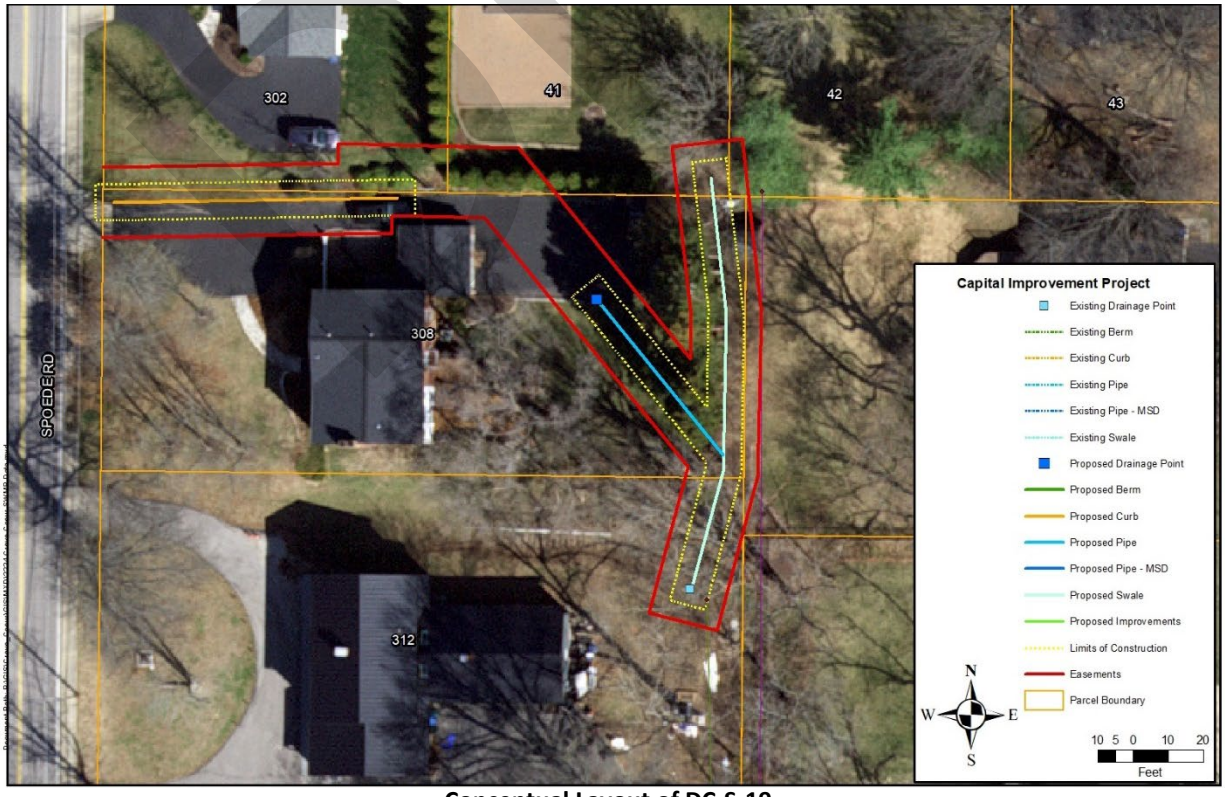
DC-S-19: 308 South Spoede Road

Problem description: Structural flooding due to increased flow from new construction at 41 Chaminade Drive.

Inlet 18N3-187D

Recommendation: Construct swale along east property line to inlet 18N3-187D with Instaturf ShearForce on steep section at downstream end near the inlet. Constuct catch basin on south side of driveway at east end of wall and pipe to southwest corner of property and discharge into swale. Construct curb along driveway from garage to the street.

Special Considerations: Additional grading maybe needed on 41 Chaminade Drive to intercept flow to the swale.



Conceptual Layout of DC-S-19

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-19 308 South Spoede Road

Project Description: Swale, catch basin, storm sewer, and curb to address structural flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.15	$ 12,000	$ 1,800
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.15	$ 5,000	$ 800
			Subtotal =	$ 10,100
			Contingency = 25%	$ 2,500
			TOTAL OPINION OF SURVEYING COST =	**$ 12,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	0.70	$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	1	$ 3,500	$ 3,500
Sewer Pipe Small	LF	57	$ 140	$ 8,000
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA	1	$ 2,580	$ 2,600
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	118	$ 15	$ 1,800
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	80	$ 50	$ 4,000
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.15	$ 50,000	$ 7,500
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 27,400
			Contingency = 30%	$ 8,200
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 35,600**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 103,600**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-19: 308 South Spoede Road DATE: 11/14/2023

PROJECT LOCATION: 308 South Spoede Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, catch basin, storm sewer, and curb to address structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-19: 308 South Spoede Road DATE: 11/14/2023

PROJECT LOCATION: 308 South Spoede Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, catch basin, storm sewer, and curb to address structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		Attached Garage (1 lot per structure) *Address:*	100		75	1	25		75
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**105**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-19: 308 South Spoede Road DATE: 11/14/2023

PROJECT LOCATION: 308 South Spoede Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Swale, catch basin, storm sewer, and curb to address structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**125**

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

TOTAL COST IN THOUSANDS= **$104**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.21**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

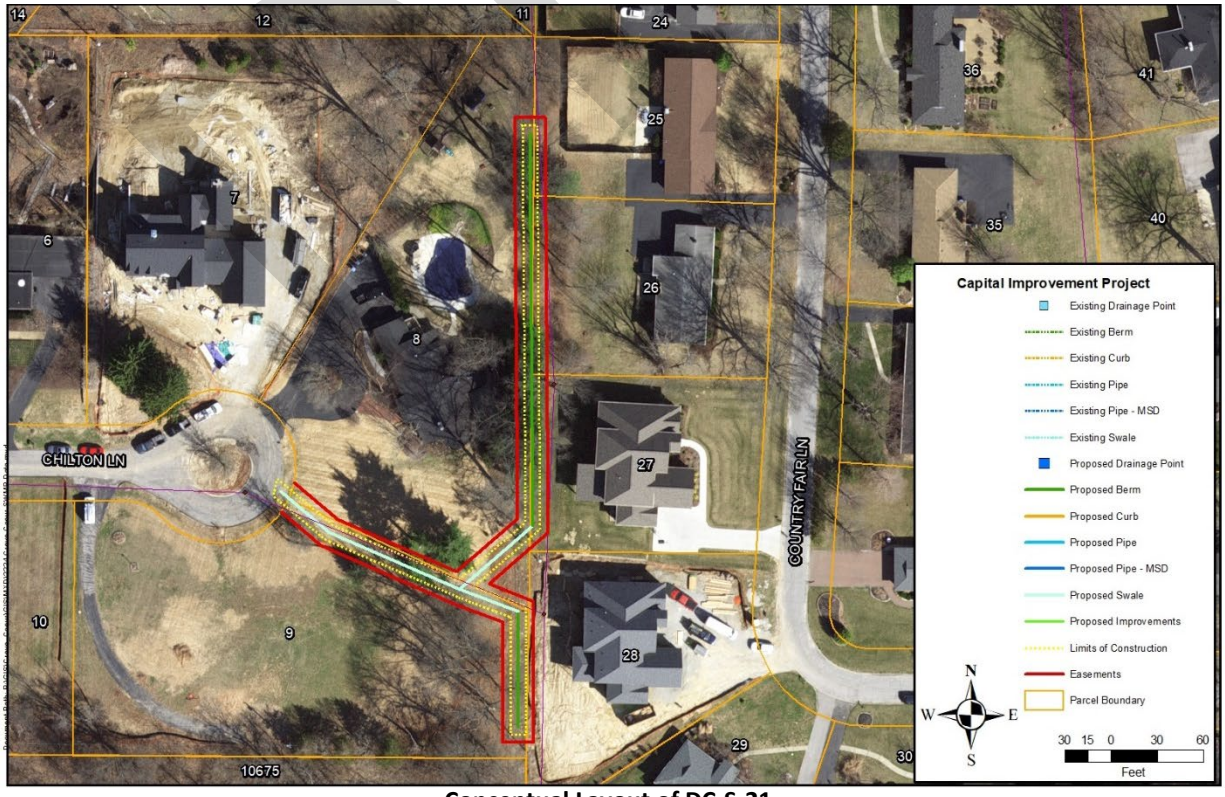
DC-S-21: Chilton Lane

Problem description: Erosion on south side of street at east culvert. Increased flows at 8 Chilton Lane due to new construction to the east on Country Fair Lane.

Looking east from street between #8 and #9

Recommendation: Provide erosion control at culvert using either rock or Instaturf ShearForce. Construct a berm w/ swale along the east property line of #8 and #9 then swale w/ berm to the street along the property line between #8 and #9 that is protected with Instaturf ShearForce.

Special Considerations: A storm basin in the north corner of #8 should be considered as a best management practive and additional discharge area for the berm and swale along the east property line.



Conceptual Layout of DC-S-21

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-21 Chilton Lane

Project Description: Erosion control, berms, and swales to address erosion.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.30	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	6	$ 1,500	$ 9,000
Contruction Staking and As-Built Surveying	ACRE	0.30	$ 5,000	$ 1,500
			Subtotal =	$ 14,100
			Contingency = 25%	$ 3,500
			TOTAL OPINION OF SURVEYING COST =	**$ 17,600**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
			Contingency = 25%	$ -
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	565	$ 15	$ 8,500
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 26,500
			Contingency = 30%	$ 8,000
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 34,500**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 98,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-21: Chilton Lane DATE: 11/14/2023

PROJECT LOCATION: 8 Chilton Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Erosion control, berms, and swales to address erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-21: Chilton Lane DATE: 11/14/2023

PROJECT LOCATION: 8 Chilton Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Erosion control, berms, and swales to address erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	Chronic (<=2-Yr) Flooding: Points per Category	Chronic (<=2-Yr) Flooding: No. Lots Affected	Frequent (>2<=15-Yr) Flooding: Points per Category	Frequent (>2<=15-Yr) Flooding: No. Lots Affected	Infrequent (>15-Yr) Flooding: Points per Category	Infrequent (>15-Yr) Flooding: No. Lots Affected	Total Points
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				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	**1**	6		0		**10**
		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:		2	Points/lot:		10	20
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**30**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-21: Chilton Lane DATE: 11/14/2023

PROJECT LOCATION: 8 Chilton Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Erosion control, berms, and swales to address erosion.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units			Points per Unit		
	Lakes, Wetlands, etc.		AC		30		
	Natural Corridor (min. 25ft width)		PER 100 LF		10		
	4.5 Conservation Easement		EA		20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements			10			10
	5.2. Recreational/Educational	Yes = 100 No = 0 pts					
						TOTAL SOLUTION POINTS	10
						TOTAL BENEFIT POINTS	40

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

TOTAL COST IN THOUSANDS= **$98**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.41**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

DC-S-22: North Spoede Road & Mission Hills Court

Problem description: Street flooding near the intersection.

Recommendation: Construct 2 grate inlets w/ side intake on north side of Mission Hills Court approximately 50 feet east of North Spoede Road and connect to existing storm sewer with a manhole with a slotted cover.

Special Considerations: Hydraulic analysis of storm sewer system is needed that accounts for potential bypass at inlets and inlet capacity on the street and review spread if additional inlets are warranted on North Spoede Road.

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Conceptual Layout of DC-S-22

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-22 North Spoede Road & Mission Hills Court

Project Description: Inlets and storm sewer to address street flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE		$ 12,000	$ -
Prepare Easement Plat and Scripts	EACH		$ 1,500	$ -
Contruction Staking and As-Built Surveying	ACRE		$ 5,000	$ -
			Subtotal =	$ -
			Contingency = 25%	$ -
			TOTAL OPINION OF SURVEYING COST =	**$ -**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
			Contingency = 25%	$ -
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	15.70	$ 55	$ 900
New Culvert	LF		$ 500.0	$ -
Manhole	LF	1	$ 625	$ 600
Inlet	EA	1.00	$ 3,500	$ 3,500
Sewer Pipe Small	LF	40	$ 140	$ 5,600
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY	17.8	$ 100	$ 1,800
Curb - Concrete Rem & Rep	LF	40	$ 50	$ 2,000
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 19,400
			Contingency = 30%	$ 5,800
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 25,200**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 71,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-22: North Spoede Road & Mission Hills Court DATE: 11/14/2023

PROJECT LOCATION: 800 North Spoede Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewer to address street flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-22: North Spoede Road & Mission Hills Court DATE: 11/14/2023

PROJECT LOCATION: 800 North Spoede Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewer to address street flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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:		1	Points/pond:		5	5
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:			Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:			Points/lot:		10	
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**35**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-22: North Spoede Road & Mission Hills Court DATE: 11/14/2023

PROJECT LOCATION: 800 North Spoede Road, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Inlets and storm sewer to address street flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements	**50**						**50**
	5.2. Recreational/Educational	Yes = 100 No = 0 pts						
							TOTAL SOLUTION POINTS	**50**
							TOTAL BENEFIT POINTS	**85**

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= **1.19**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

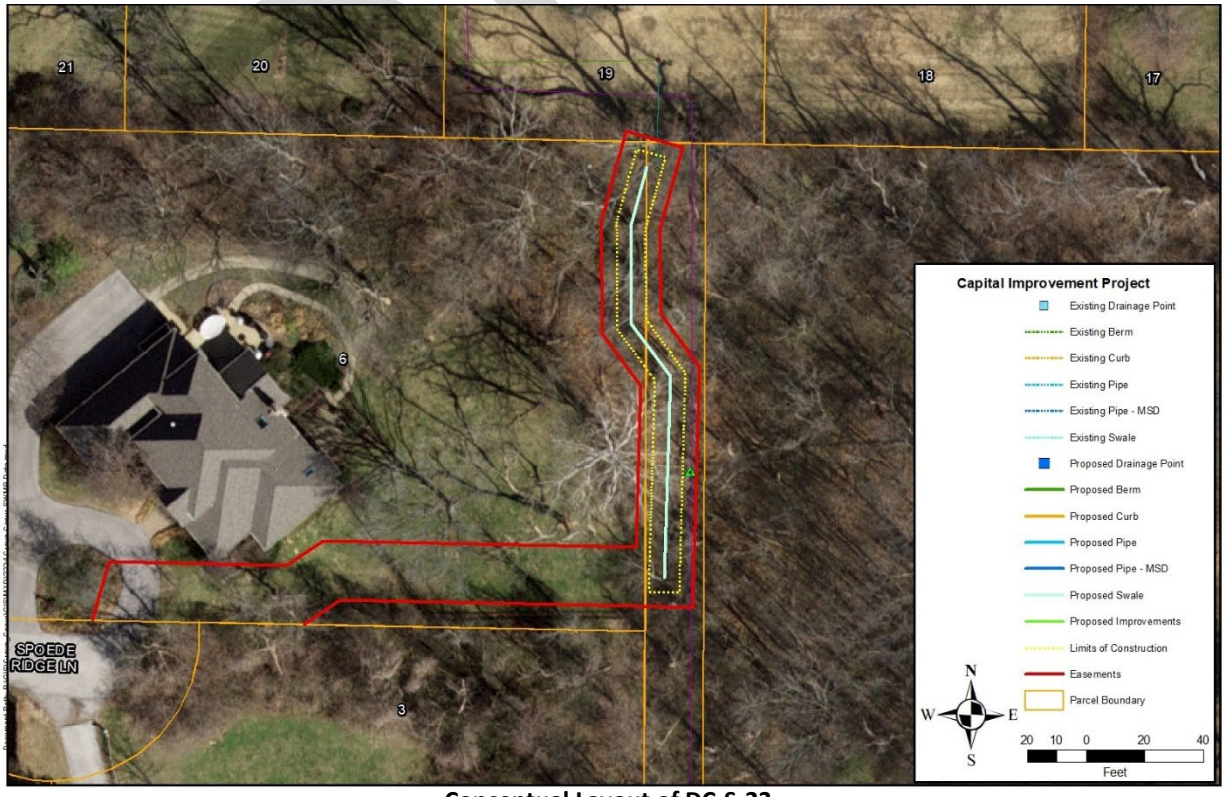
Draft

DC-S-23: 6 Spoede Ridge Lane

Problem description: Water backs up onto 19 Spoede Hills Drive potentially due to erosion from construction at 4 Allegro Lane silting in channel.

Recommendation: Construct better defined rock channel on 6 Spoede Ridge Lane and 6 Allegro Lane.

Silted in channel



Conceptual Layout of DC-S-23

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-23 6 Spoede Ridge Lane

Project Description: Rock channel to address yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.20	$ 12,000	$ 2,400
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.20	$ 5,000	$ 1,000
			Subtotal =	$ 6,400
		Contingency =	25%	$ 1,600
		TOTAL OPINION OF SURVEYING COST =		**$ 8,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	145	$ 15	$ 2,200
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.2	$ 50,000	$ 10,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 15,200
		Contingency =	30%	$ 4,600
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 19,800**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 73,800**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-23: 6 Spoede Ridge Lane DATE: 11/14/2023

PROJECT LOCATION: 6 Spoede Ridge Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Rock channel to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-23: 6 Spoede Ridge Lane DATE: 11/14/2023

PROJECT LOCATION: 6 Spoede Ridge Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Rock channel to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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	1	0		**6**
		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:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**16**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-23: 6 Spoede Ridge Lane DATE: 11/14/2023

PROJECT LOCATION: 6 Spoede Ridge Lane, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Rock channel to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**36**

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

TOTAL COST IN THOUSANDS= **$74**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.49**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

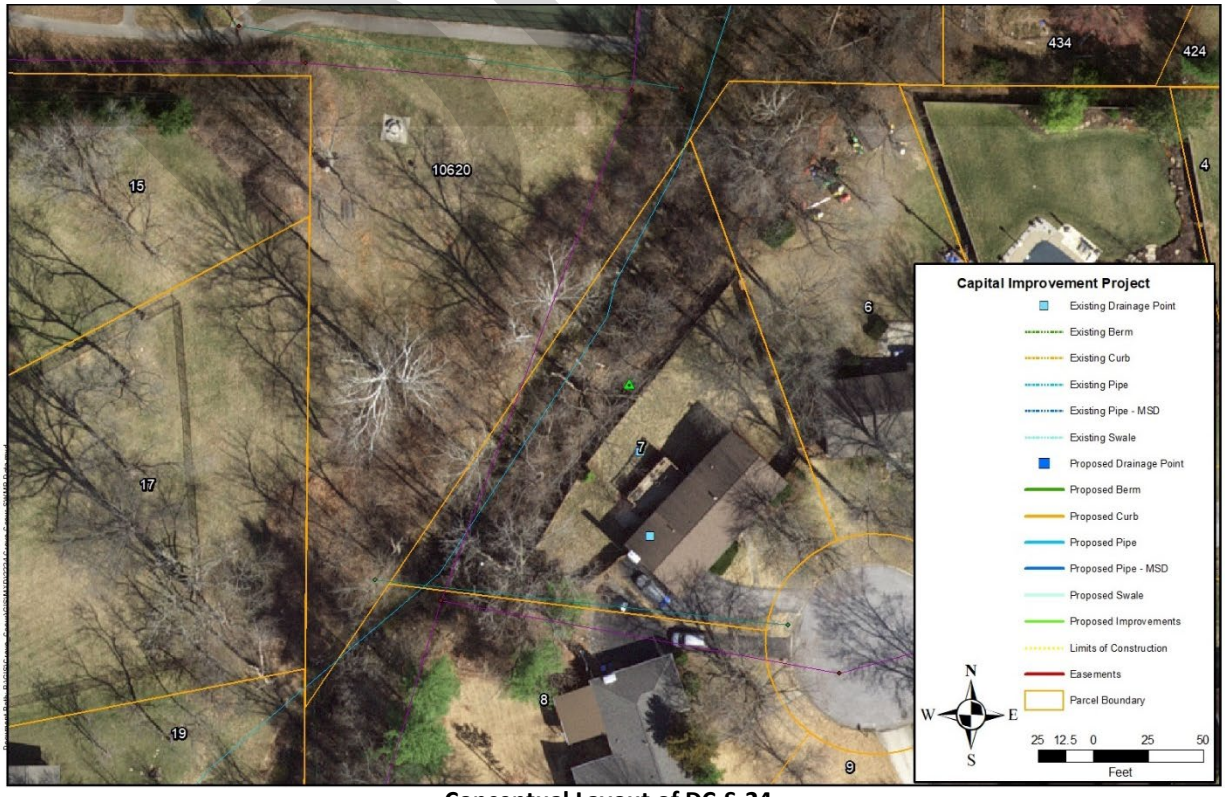
Draft

DC-S-24: 7 Quailways Drive

Problem description: Erosion, sinkholes and failing retaining wall.

Recommendation: Inspect pipe from existing inlets in rear yard for potential cause of sinkholes. Make necessary repairs. Replace retaining wall.

Failing retaining wall



Conceptual Layout of DC-S-24

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-24 7 Quailways Drive

Project Description: Pipe repairs and retaining wall replacement to address erosion and sinkholes.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.10	$ 12,000	$ 1,200
Prepare Easement Plat and Scripts	EACH	2	$ 1,500	$ 3,000
Contruction Staking and As-Built Surveying	ACRE	0.10	$ 5,000	$ 500
			Subtotal =	$ 4,700
		Contingency =	25%	$ 1,200
		TOTAL OPINION OF SURVEYING COST =		**$ 5,900**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
		Contingency =	25%	$ 9,200
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF	750	$ 50	$ 37,500
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.1	$ 50,000	$ 5,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 42,500
		Contingency =	30%	$ 12,800
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 55,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 107,200**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-24: 7 Quailways Drive DATE: 11/14/2023

PROJECT LOCATION: 7 Quailways Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Pipe repairs and retaining wall replacement to address erosion and sinkholes.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
		Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
		Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4. Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
			20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-24: 7 Quailways Drive DATE: 11/14/2023

PROJECT LOCATION: 7 Quailways Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Pipe repairs and retaining wall replacement to address erosion and sinkholes.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				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:		1	Points/lot:		20	20
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:		1	Points/lot:		10	10
	2.4	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							0
			TOTAL PROBLEM POINTS						**30**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-24: 7 Quailways Drive DATE: 11/14/2023

PROJECT LOCATION: 7 Quailways Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Pipe repairs and retaining wall replacement to address erosion and sinkholes.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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				
	4.4 Preserves natural resource areas	No. Units				Points per Unit				
	Lakes, Wetlands, etc.		AC			30				
	Natural Corridor (min. 25ft width)		PER 100 LF			10				
	4.5 Conservation Easement		EA			20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**50**

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

TOTAL COST IN THOUSANDS= **$107**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.47**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

Draft

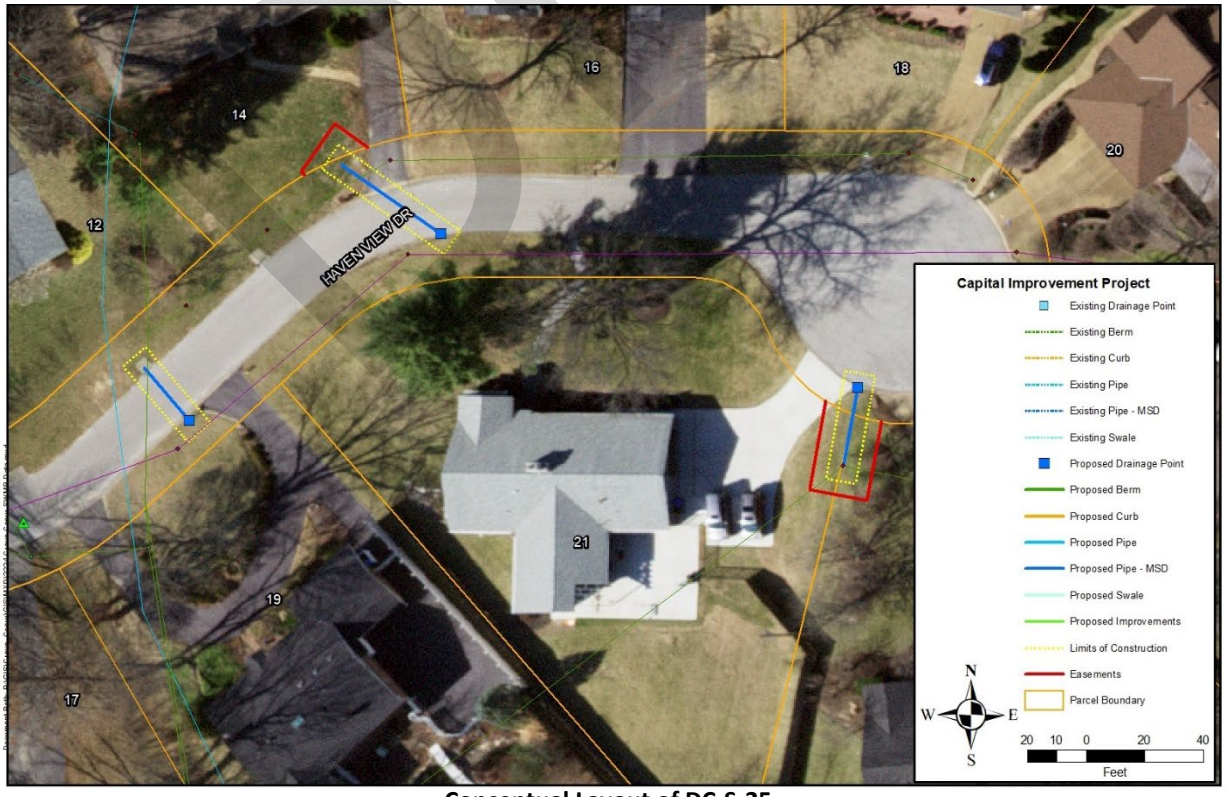
DC-S-25: Haven View Drive

Problem description: Curb and gutters have been filled in due to pavement overlay and flows overtop curb and flows onto 19 Haven View Drive.

Haven View Drive

Recommendation: Mill out gutters and construct three 2 grate inlet w/ side intake on south side of the street. One to connect to manhole 17M3-008D on the cul-de-sac, one in front of #21 to connect to manhole 17M3-133D and one in front of #19 to connect to inlet 17M3-136D.

Special Considerations: The inlet in front of #19 could be connected directly to the 72”x72” box culvert that traverses #19.



Conceptual Layout of DC-S-25

Draft

Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-25 Haven View Drive

Project Description: Gutters, inlets and storm sewer to address yard flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.02	$ 12,000	$ 200
Prepare Easement Plat and Scripts	EACH	3	$ 1,500	$ 4,500
Contruction Staking and As-Built Surveying	ACRE	0.02	$ 5,000	$ 100
			Subtotal =	$ 4,800
			Contingency = 25%	$ 1,200
			TOTAL OPINION OF SURVEYING COST =	**$ 6,000**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
			Contingency = 25%	$ 1,900
			TOTAL OPINION OF GEOTECHNICAL COST =	**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	50	$ 160	$ 8,000
ROW	HOURS	20	$ 160	$ 3,200
Permitting	HOURS	20	$ 160	$ 3,200
Final Design	HOURS	50	$ 160	$ 8,000
Develop Plans and Construction Documents	HOURS	50	$ 160	$ 8,000
Construction Support	HOURS	40	$ 160	$ 6,400
			$ -	$ -
			Subtotal =	$ 36,800
			Contingency = 25%	$ 9,200
			TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =	**$ 46,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	17.00	$ 55	$ 900
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	3.00	$ 3,500	$ 10,500
Sewer Pipe Small	LF	90	$ 140	$ 12,600
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	2	$ 2,365	$ 4,700
Connection to Existing Manhole	EA	1	$ 3,130	$ 3,100
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY	61	$ 150	$ 9,200
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	50	$ 50	$ 2,500
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.02	$ 50,000	$ 1,000
			$ -	$ -
Mobilization and Bond	10%	1	$ 4,500	$ 4,500
			Subtotal =	$ 49,000
			Contingency = 30%	$ 14,700
			TOTAL OPINION OF CONSTRUCTION COST =	**$ 63,700**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 125,100**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-25: Haven View Drive DATE: 11/14/2023

PROJECT LOCATION: 19 Haven View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Gutters, inlets and storm sewer to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-25: Haven View Drive DATE: 11/14/2023

PROJECT LOCATION: 19 Haven View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Gutters, inlets and storm sewer to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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				Y		
		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	**1**	6		0		**10**
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**40**

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-25: Haven View Drive DATE: 11/14/2023

PROJECT LOCATION: 19 Haven View Drive, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Gutters, inlets and storm sewer to address yard flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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				
	4.4 Preserves natural resource areas	No. Units			Points per Unit				
	Lakes, Wetlands, etc.		AC		30				
	Natural Corridor (min. 25ft width)		PER 100 LF		10				
	4.5 Conservation Easement		EA		20				
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**60**

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

TOTAL COST IN THOUSANDS= **$125**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.48**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

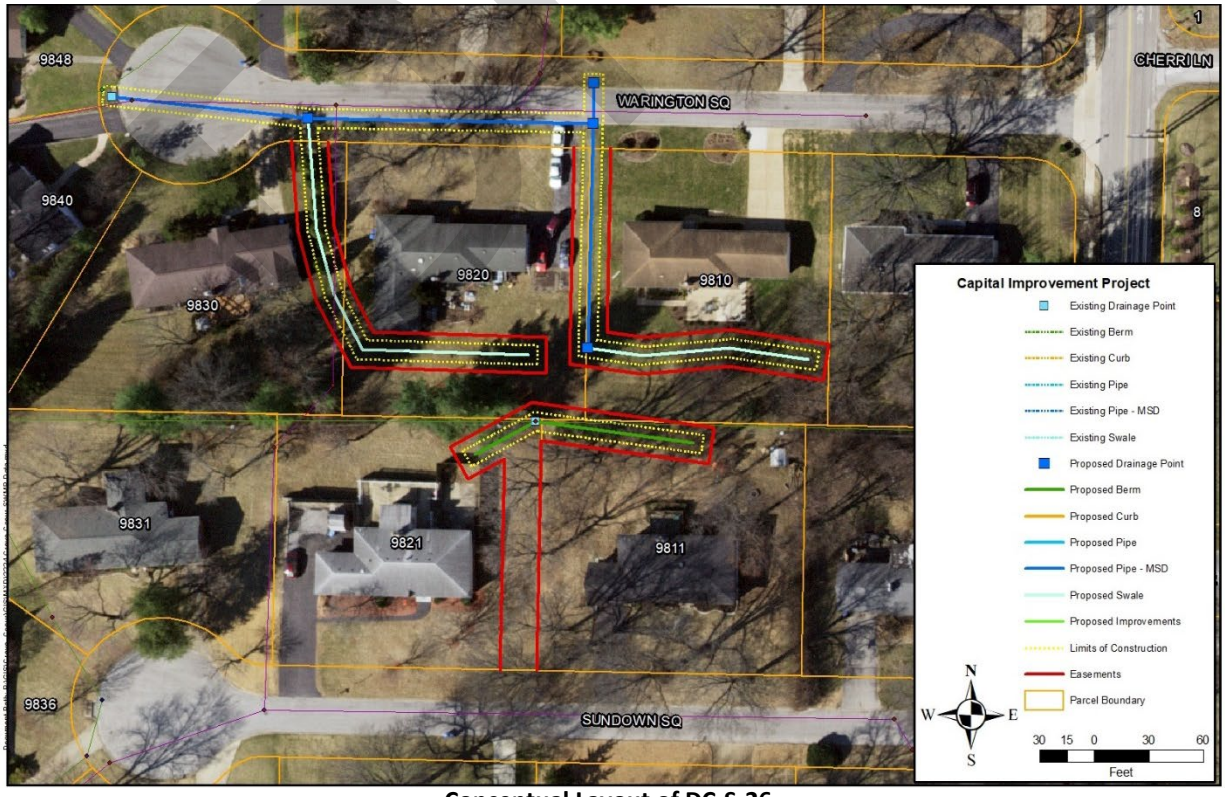
Draft

DC-S-26: Warington Square

Problem description: Yard and structural flooding of properties on south side of Warington Square.

Recommendation: Construct berm w/ swale to inlet 17M3-069D on 9811 and 9821 Sundown Square. Construct swale across 9810 Warington Square to a 2 grate inlet w/ side intake at the west property line then pipe to street and install 2 grate inlet w/ side intake on each side of street then pipe to existing inlet 17M3-080D with a curb inlet that is open on the back side in front of 9830 Warington Square to take flow from a swale along the east side of the house to and across the rear yard of 9820 Warington Square.

Looking east at 9810 Warington Square



Conceptual Layout of DC-S-26

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID: DC-S-26 Warington Square

Project Description: Berm, swales, inlets, and storm sewer to address yard and structural flooding.

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE	0.30	$ 12,000	$ 3,600
Prepare Easement Plat and Scripts	EACH	5	$ 1,500	$ 7,500
Contruction Staking and As-Built Surveying	ACRE	0.30	$ 5,000	$ 1,500
			Subtotal =	$ 12,600
		Contingency =	25%	$ 3,200
		TOTAL OPINION OF SURVEYING COST =		**$ 15,800**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF	25	$ 20	$ 500
Geotechnical Report	LUMP	1	$ 7,000	$ 7,000
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ 7,500
		Contingency =	25%	$ 1,900
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ 9,400**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	100	$ 160	$ 16,000
ROW	HOURS	40	$ 160	$ 6,400
Permitting	HOURS	40	$ 160	$ 6,400
Final Design	HOURS	60	$ 160	$ 9,600
Develop Plans and Construction Documents	HOURS	100	$ 160	$ 16,000
Construction Support	HOURS	60	$ 160	$ 9,600
			$ -	$ -
			Subtotal =	$ 64,000
		Contingency =	25%	$ 16,000
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**$ 80,000**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE	0.1	$ 30,000	$ 3,000
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY	109.40	$ 55	$ 6,000
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA	4	$ 3,500	$ 14,000
Sewer Pipe Small	LF	410	$ 140	$ 57,400
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA	1	$ 2,365	$ 2,400
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	EA		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF	432	$ 15	$ 6,500
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF	1,534	$ 50	$ 76,700
Utility Relocation	LUMP		$ 5,500	$ -
Site Restoration	ACRE	0.3	$ 50,000	$ 15,000
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ 181,000
		Contingency =	30%	$ 54,300
		TOTAL OPINION OF CONSTRUCTION COST =		**$ 235,300**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**$ 340,500**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-26: Warington Square DATE: 11/14/2023

PROJECT LOCATION: 9820 Warington Square, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, inlets, and storm sewer to address yard and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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 (1 lot per parcel affected, 2 lots per intersection impacted, and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-26: Warington Square DATE: 11/14/2023

PROJECT LOCATION: 9820 Warington Square, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, inlets, and storm sewer to address yard and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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	3	195
		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				Y	50	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	3	12		105
		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition	30						30
			TOTAL PROBLEM POINTS						**420**

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-S-26: Warington Square DATE: 11/14/2023

PROJECT LOCATION: 9820 Warington Square, Creve Coeur, MO 63141 PROJECT TYPE: 3

PROJECT DESCRIPTION: Berm, swales, inlets, and storm sewer to address yard and structural flooding.

ENVIRONMENTAL CONSIDERATIONS:

COMMON GROUND:

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		**440**

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

TOTAL COST IN THOUSANDS= **$341**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.29**

Place "X" in one box below:

X	**Creve Coeur Project**
	Project by Others

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Appendix F
Cost and Prioritization Summary

Content:

- Potential Projects Master List
    - See Appendix E for detailed worksheets

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Potential Projects Master List

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Project Number	Project Name	Project Location	Project Description	Project Type (1 - Culverts/Structures, 2 - Bank Stabilization, 3 - Overland Flooding)	Environmental Considerations?	Common Ground?	Project Surveying, Geotechnical, and Engineering Cost	Project Construction Cost	Total Project Cost	Cost/Benefit Ratio
CC-C-16	Villa Hill Lane	12495 Villa Hill Lane, Creve Coeur, MO 63141	Bank stabilization to adress erosion threatening structures along an outside bend of Fernridge Creek.	1			$ 60,600.00	$ 43,400.00	$ 104,000.00	2.28
DC-C-01a	: Deer Creek in Malcolm Terrace Park	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at bridge with associated grade controls. City design plans were advanced to an 80% level prior to putting on hold due to funding.	1	X		$ 46,100.00	$ 445,600.00	$ 491,700.00	1.60
DC-C-18	Alden Lane	9 Alden Lane, Creve Coeur, MO 63141	Bank stabilization, grade control, and swaled to address erosion threatening structures in Monsanto Sunswept Creek and one of its tributaries as well as overland flow issues.	1			$ 69,400.00	$ 142,900.00	$ 212,300.00	1.47
DC-C-02	Beaver Drive Crossing	48 Beaver Drive, Creve Coeur, MO 63141	Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues.	1			$ 173,600.00	$ 344,900.00	$ 518,500.00	1.41
CC-C-29	Royal Manor Drive	12553 Royal Manor Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek as well as an area inlet and swales to convey overland flow.	1	X	X	$ 188,700.00	$ 753,700.00	$ 942,400.00	1.35
DC-C-28	Tealwood Drive	47 Tealwood Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basin, new culvert, wing wall replacement, overland swales, and a new inlet to address erosion and overland flow issues in Pebble Creek and along Tealwood Dr.	1			$ 120,200.00	$ 353,700.00	$ 473,900.00	1.34
CC-C-07	Ferngate Lane	954 Ferngate Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basin, wing walls, and toe walls to address erosion threatening structures along a tributary to Creve Coeur Creek.	1		X	$ 69,100.00	$ 122,100.00	$ 191,200.00	1.09
DC-C-17	10675 Ladue Road	10675 Ladue Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.	1	X		$ 154,000.00	$ 467,700.00	$ 621,700.00	1.07
DC-C-01	Deer Creek in Malcolm Terrace Park	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.	1	X		$ 211,400.00	$ 905,500.00	$ 1,116,900.00	1.01
CC-C-13	North Mason Road	900 North Mason Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion and knickpoints threatening structures in Fernridge Creek.	1			$ 159,300.00	$ 460,200.00	$ 619,500.00	1.00
DC-C-16	Ladue and South Spoede Road	10656 Ladue Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a culvert replacement to address erosion in Monsanto-Sunswept Creek.	1			$ 113,200.00	$ 420,200.00	$ 533,400.00	0.98
DC-C-22	Denny Creek	403 South Lindbergh Boulevard, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Denny Creek.	1			$ 234,400.00	$ 1,526,100.00	$ 1,760,500.00	0.87
DC-C-01 ALT	Deer Creek in Malcolm Terrace Park Alternative	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.	1	X		$ 230,800.00	$ 1,238,000.00	$ 1,468,800.00	0.82
DC-C-15	Chaminade Drive	14 Chaminade Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a pedestrian bridge replacement to address erosion along Monsanto-Sunswept Creek as well as an inlet capacity review to address overland flow issues. The pedestrian bridge is a private structure. The City will evaluate a public/private partnership for this project.	1	X		$ 151,700.00	$ 629,300.00	$ 781,000.00	0.77
CC-C-25	Chasselle and Chamblee Lane	700 Chamblee Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basins and rock armoring to address knickpoints and erosion threatening structures along a tributary to Smith Creek.	1			$ 259,500.00	$ 770,800.00	$ 1,030,300.00	0.75
CC-C-33	Bellington Lane	296 Bellington Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, a stilling basin, and replacing bridge abutments to address erosion in Rosenfelder Creek.	1		X	$ 162,300.00	$ 393,800.00	$ 556,100.00	0.65
CC-C-11	Fernridge Creek at Bellerive Estates Drive	12918 Bellerive Estates Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion along threatening structures Fernridge Creek.	1	X	X	$ 116,900.00	$ 243,500.00	$ 360,400.00	0.63
DC-C-19	Middlebrook Lane	5 Middlebrook Lane, Creve Coeur, MO 63141	Bank stabilization and bridge abutment replacement to address erosion in Monsanto-Sunswept Creek and one of its tributaries.	1			$ 68,400.00	$ 106,000.00	$ 174,400.00	0.37
DC-C-14	East Windrush Creek	1 East Windrush Creek, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a culvert replacement to address erosion threatening structures in a tributary to Windrush Creek.	1			$ 105,400.00	$ 288,600.00	$ 394,000.00	0.37
DC-C-09	281 Magna Carta Drive	281 Magna Carta Drive, Creve Coeur, MO 63141	Step grade control and stilling basin to protect outfall and replace failing grouted riprap structure in Deer Creek.	1		X	$ 69,100.00	$ 164,700.00	$ 233,800.00	0.32
DC-C-24	Sunswept Drive	15 Sunswept Drive, Creve Coeur, MO 63141	Bank stabilization and gabion wall replacement to address erosion threatening structures along Monsanto-Sunswept Creek.	2			$ 106,600.00	$ 371,200.00	$ 477,800.00	1.67
CC-C-23	Oak Hollow Drive	12346 Oak Hollow Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion threatening structures along an upper tributary to Fernridge Creek.	2		X	$ 110,600.00	$ 212,800.00	$ 323,400.00	1.55
DC-C-03	996 East Rue De La Banque Street	996 East Rue De La Banque Street, Creve Coeur, MO 63141	Bank Stabilization and a stilling basin to address knickpoints threatening structures in an upper tributary.	2			$ 67,200.00	$ 128,600.00	$ 195,800.00	1.52
CC-C-12	680 Bellerive Estates Drive	680 Bellerive Estates Drive, Creve Coeur, MO 63141	Bank stabilization to address erosion threatening structures along Fernridge Creek. This structure is located in the floodplain. City Council and Stormwater Committee will review for funding projects for structures located within the floodplain.	2	X	X	$ 98,400.00	$ 68,600.00	$ 167,000.00	1.45
CC-C-26	Chamonix Court	227 Chamonix Court, Creve Coeur, MO 63141	Bank stabilization, grade controls, rock armoring, stilling basin, and a retaining wall to address erosion and knickpoints threatening structures along a tributary to Smith Creek. The City Council and Stormwater Committee will review to determine if City funds will be used for the primarily aesthetic feature.	2		X	$ 162,500.00	$ 469,300.00	$ 631,800.00	1.43
DC-C-08	New Salem Drive and Camfield Square Drive	201 New Salem Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion threatening structures in Deer Creek and one of its tributaries.	2		X	$ 112,300.00	$ 271,600.00	$ 383,900.00	1.33
DC-C-23	10620 Country View Drive	10620 Country View Drive, Creve Coeur, MO 63141	Bank stabilization, grade control, and pipe replacement to address erosion threatening structures along Monsanto-Sunswept Creek in Dr. Phillip Venable Memorial Park. Bridge work will be combined with the planned Venerable Park project.	2			$ 69,300.00	$ 194,500.00	$ 263,800.00	1.13
CC-C-28	2 Chasselle Lane	2 Chasselle Lane, Creve Coeur, MO 63141	Grade control and rock armoring to address bank cutting along Ladue Rd. Work to be done is located in MoDOT ROW. City Council and Stormwater Committee need to evaluate if City funds will be used in MoDOT ROW.	2			$ 50,000.00	$ 56,200.00	$ 106,200.00	1.05
CC-C-01	Ferntop Lane Bank Stabilization	12970 Ferntop Lane, Creve Coeur, MO 63141	Rock armoring to address erosion and grade control at outfall knickpoint.	2		X	$ 66,200.00	$ 48,500.00	$ 114,700.00	1.05
DC-C-04	11572 New London Drive	11572 New London Drive, Creve Coeur, MO 63141	Bank stabilization to address erosion in an unnamed tributary.	2		X	$ 69,600.00	$ 112,300.00	$ 181,900.00	1.04
CC-C-34	Williamsburg Road	14 Williamsburg Road, Creve Coeur, MO 63141	Bank stabilization, grade controls, and rock armoring to address knickpoints and erosion threatening structures along Rosenfelder Creek.	2			$ 110,800.00	$ 174,300.00	$ 285,100.00	0.98
DC-C-11	Brooktrail Court South	257 Brooktrail Court, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address erosion threatening structures in Windrush Creek.	2		X	$ 165,500.00	$ 408,900.00	$ 574,400.00	0.98
DC-C-06	Malcolm Terrace Park	Malcolm Terrace Park, 11370 St Paul Street, Creve Coeur, MO 63141	Bank stabilization to address bank erosion in Deer Creek.	2			$ 74,900.00	$ 73,100.00	$ 148,000.00	0.95
CC-C-06	1009 Fernview Drive	1009 Fernview Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, stilling basins, and rock armoring to address erosion threatening structures along a tributary to Creve Coeur Creek.	2		X	$ 110,600.00	$ 380,300.00	$ 490,900.00	0.95
CC-C-02	Ferntop Lane Outfall Repair	12970 Ferntop Lane, Creve Coeur, MO 63141	Headwall, rock armor, and grade control at existing outfall.	2		X	$ 64,400.00	$ 31,700.00	$ 96,100.00	0.94
CC-C-09	Ambois Drive	13010 Ambois Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to address knickpoints and erosion threatening structures along Fernridge Creek.	2	X	X	$ 122,100.00	$ 352,300.00	$ 474,400.00	0.94

Project Number	Project Name	Project Location	Project Description	Project Type (1 - Culverts/Structures, 2 - Bank Stabilization, 3 - Overland Flooding)	Environmental Considerations?	Common Ground?	Project Surveying, Geotechnical, and Engineering Cost	Project Construction Cost	Total Project Cost	Cost/Benefit Ratio
DC-C-12	Brooktrail Court North	123 Brooktrail Court, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion in Windrush Creek as well as swales to address overland flow issues.	2		X	$ 113,000.00	$ 291,200.00	$ 404,200.00	0.93
CC-C-37	Balcon Estates	24 Balcon Estates, Creve Coeur, MO 63141	Bank stabilization and grade control to address erosion threatening structures along an unnamed tributary to Smith Creek.	2			$ 62,500.00	$ 80,900.00	$ 143,400.00	0.91
DC-C-26	Lindbergh Boulevard	8 Millstone Campus Drive, St. Louis, MO 63146	Bank stabilization, grade control, rock armoring, and a stilling basin to address erosion in an unnamed tributary along Lindbergh Blvd.	2			$ 97,700.00	$ 228,900.00	$ 326,600.00	0.91
DC-C-10	Villa Coublay Drive	44 Villa Coublay Drive, Creve Coeur, MO 63141	Bank stabilization and grade controls to repair erosion in Windrush Creek. Some of the proposed work is in the City of Frontenac. The project will need an intergovernmental agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.	2		X	$ 69,100.00	$ 159,800.00	$ 228,900.00	0.85
CC-C-20	Falaise Drive	571 Falaise Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address knickpoints in Fernridge Creek.	2		X	$ 110,600.00	$ 234,500.00	$ 345,100.00	0.82
CC-C-14	840 Angleterre Drive	840 Angleterre Drive, Creve Coeur, MO 63141	Grade controls with associated bank stabilization to address knickpoints in a tributary to Fernridge Creek.	2			$ 62,700.00	$ 93,300.00	$ 156,000.00	0.79
CC-C-01 ALT	Ferntop Lane Bank Stabilization Alternative	12970 Ferntop Lane, Creve Coeur, MO 63141	Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.	2		X	$ 104,200.00	$ 77,100.00	$ 181,300.00	0.77
CC-C-18	12426 Stratford Ridge Court	12426 Stratford Ridge Court, Creve Coeur, MO 63141	Grade control and stilling basin to address failing grouted riprap in Fernridge Creek.	2		X	$ 66,200.00	$ 65,900.00	$ 132,100.00	0.74
DC-C-27	22 South Tealbrook Drive	22 South Tealbrook Drive, Creve Coeur, MO 63141	Bank stabilization, grade control, and rock armoring to address erosion threatening structures in Pebble Creek. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.	2			$ 66,500.00	$ 183,200.00	$ 249,700.00	0.72
CC-C-30	151 Royal Gate Drive	151 Royal Gate Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion threatening structures along Rosenfelder Creek.	2		X	$ 110,600.00	$ 254,900.00	$ 365,500.00	0.71
CC-C-35	12 Broadview Farm Road	12 Broadview Farm Road, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion in a tributary to Smith Creek.	2		X	$ 107,100.00	$ 236,100.00	$ 343,200.00	0.69
CC-C-04	Autumn Trails Court	13241 Autumn Trails Court, Creve Coeur, MO 63141	Grade control to address a knickpoint in a tributary to Creve Coeur Creek.	2		X	$ 74,500.00	$ 74,000.00	$ 148,500.00	0.62
CC-C-15	Millenium Park	Millenium Park, 2 Barnes West Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion along a tributary to Fernridge Creek in Millenium Park. This project will be combined with future project Millenium Park Phase 2.	2		X	$ 157,200.00	$ 648,200.00	$ 805,400.00	0.59
CC-C-32	Conway Downs Drive	12567 Conway Downs Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and a stilling basin to address erosion in Rosenfelder Creek.	2		X	$ 115,100.00	$ 204,500.00	$ 319,600.00	0.58
CC-C-10	Lampadaire Drive	12961 Lampadaire Drive, Creve Coeur, MO 63141	Grade controls to stabilize knickpoints in Fernridge Creek.	2		X	$ 69,300.00	$ 120,900.00	$ 190,200.00	0.57
CC-C-08	Bellerive Country Club	Bellerive Country Club, 12925 Ladue Road, St. Louis, MO 63141	A series of grade controls where Fernridge Creek confluences with Smith Creek.	2		X	$ 116,100.00	$ 284,400.00	$ 400,500.00	0.56
CC-C-05	Olive Boulevard	13150 Olive Boulevard, Creve Coeur, MO 63141	Bank stabilization and grade controls to address erosion threatening structures along Creve Coeur Creek and one of its tributaries.	2	X	X	$ 177,700.00	$ 716,300.00	$ 894,000.00	0.55
DC-C-21	10694 Country View Drive	10694 Country View Drive, Creve Coeur, MO 63141	Grade control with associated bank stabilization to address erosion along Monsanto-Sunswept Creek.	2			$ 62,500.00	$ 106,100.00	$ 168,600.00	0.55
DC-C-20	Sherwyn Lane	7 Sherwyn Lane, Creve Coeur, MO 63141	Bank stabilization to address erosion threatening structures in a tributary to Monsanto-Sunswept Creek.	2			$ 64,600.00	$ 89,200.00	$ 153,800.00	0.52
DC-C-13	Executive Estates Drive	109 Executive Estates Drive, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address erosion in Windrush Creek as well as a swale to address overland flow issues.	2			$ 164,600.00	$ 416,300.00	$ 580,900.00	0.48
CC-C-31	Boothbay Court	12318 Boothbay Court, Creve Coeur, MO 63141	Grade control with associated bank stabilization to address pipe outfall erosion threatening structures.	2		X	$ 62,500.00	$ 45,500.00	$ 108,000.00	0.46
DC-C-01b	Deer Creek in Malcolm Terrace Park	Malcolm Terrace Park 11370 St Paul Street, Creve Coeur, MO 63141	Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.	2	X		$ 147,500.00	$ 441,200.00	$ 588,700.00	0.46
DC-C-05	Westwood Country Club	Westwood Country Club, 11801 Conway Road, St. Louis, MO 63131	Grade controls and bank stabilization to address bank erosion and knickpoints in Deer Creek and one of its tributaries.	2			$ 317,100.00	$ 1,471,600.00	$ 1,788,700.00	0.44
CC-C-19	Questover Lane	665 Questover Lane, Creve Coeur, MO 63141	Bank stabilization, grade controls, and stilling basins to address erosion in Fernridge Creek.	2		X	$ 122,700.00	$ 491,800.00	$ 614,500.00	0.35
CC-C-03	13105 D'Artagnan Court	13105 D`Artagnan Court, Creve Coeur, MO 63141	Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.	2			$ 157,200.00	$ 383,800.00	$ 541,000.00	0.35
CC-C-27	Montsouris Drive	12365 Montsouris Drive, Creve Coeur, MO 63141	Bank stabilization to address erosion along an unnamed tributary near Montsouris Drive.	2			$ 70,300.00	$ 96,700.00	$ 167,000.00	0.23
CC-C-17	12344 Mulberry Tree Court	12344 Mulberry Tree Court, Creve Coeur, MO 63141	Grade control and stilling basin to address perched outfalls and a scour hole in a tributary to Fernridge Creek.	2		X	$ 62,500.00	$ 118,000.00	$ 180,500.00	0.22
CC-C-36	438 Twin Creek Road	438 Twin Creek Road, Creve Coeur, MO 63141	Bank stabilization to address erosion along Smith Creek.	2			$ 68,400.00	$ 64,000.00	$ 132,400.00	0.22
CC-C-21	Blackheath Court and Country Manor Lane	12230 Blackheath Court, Creve Coeur, MO 63141	Bank stabilization and rock armoring to address erosion in an upper tributary to Fernridge Creek.	2		X	$ 68,400.00	$ 72,300.00	$ 140,700.00	0.22
CC-C-24	17 Chamblee Lane	17 Chamblee Lane, Creve Coeur, MO 63141	Bank stabilization and fill to address sloughing and sinkholes along Smith Creek.	2			$ 62,700.00	$ 46,200.00	$ 108,900.00	0.20
DC-C-07	New Salem Drive	234 New Salem Drive, Creve Coeur, MO 63141	Bank stabilization to address bank erosion in Deer Creek.	2			$ 157,100.00	$ 466,100.00	$ 623,200.00	0.17
CC-C-22	Royal Valley Drive	12182 Royal Valley Drive, Creve Coeur, MO 63141	Grade controls and stilling basins to address knickpoints in Fernridge Creek.	2			$ 78,700.00	$ 160,600.00	$ 239,300.00	0.14
DC-S-03	Woodbridge Manor Road	8 Woodbridge Manor Road, Creve Coeur, MO 63141	Swales and inlet modifications to address street and structural flooding.	3			$ 53,900.00	$ 8,300.00	$ 62,200.00	6.83
CC-S-07	Mason Forest Drive	12574 Mason Forest Drive, Creve Coeur, MO 63141	Swale, slotted manhole, and inlet modifications to address yard, street, and structural flooding.	3			$ 61,300.00	$ 12,100.00	$ 73,400.00	4.69
DC-S-02	18 Sackston Woods Lane	18 Sackston Woods Lane, Creve Coeur, MO 63141	Storm sewer, inlets, and rock swale to address yard flooding.	3			$ 65,300.00	$ 93,300.00	$ 158,600.00	2.08
CC-S-04	Fernpark Drive	1032 Fernpark Drive, Creve Coeur, MO 63141	Swale, yard drain, storm sewer, and curb inlet to address yard and basement flooding.	3			$ 60,300.00	$ 55,400.00	$ 115,700.00	2.07
DC-S-17	Sona Lane	14 Sona Lane, Creve Coeur, MO 63141	Berm, swale, inlets, and storm sewer to address structural flooding and yard erosion.	3			$ 142,000.00	$ 420,700.00	$ 562,700.00	2.00
CC-S-09	252 Bellington Lane	252 Bellington Lane, Creve Coeur, MO 63141	Berm, swale, and inlet modifications to address yard and basement flooding.	3			$ 51,900.00	$ 10,000.00	$ 61,900.00	1.29
DC-S-26	Warington Square	9820 Warington Square, Creve Coeur, MO 63141	Berm, swales, inlets, and storm sewer to address yard and structural flooding.	3			$ 105,200.00	$ 235,300.00	$ 340,500.00	1.29
DC-S-19	308 South Spoede Road	308 South Spoede Road, Creve Coeur, MO 63141	Swale, catch basin, storm sewer, and curb to address structural flooding.	3			$ 68,000.00	$ 35,600.00	$ 103,600.00	1.21
DC-S-22	North Spoede Road & Mission Hills Court	800 North Spoede Road, Creve Coeur, MO 63141	Inlets and storm sewer to address street flooding.	3			$ 46,000.00	$ 25,200.00	$ 71,200.00	1.19
CC-S-05	740 North Mason Road	740 North Mason Road, St. Louis, MO 63141	Reconstructed berm and swale to contain overland flow in the cemetery.	3			$ 96,500.00	$ 42,100.00	$ 138,600.00	1.06
DC-S-09	Pine Manor Drive	8 Pine Manor Drive, Creve Coeur, MO 63141	Trench drain, inlets, inlet modifications, berm, and swales to address street and yard flooding.	3			$ 64,300.00	$ 15,900.00	$ 80,200.00	1.05
DC-S-13	Morwood Lane	53 Morwood Lane, Creve Coeur, MO 63141	Mill asphalt, inlets, berm, manhole, and grading to address seepage and yard flooding.	3			$ 71,200.00	$ 77,600.00	$ 148,800.00	0.94
DC-S-11	554 North Mosley Road	554 North Mosley Road, Creve Coeur, MO 63141	Swale to address yard gully and drainage issues.	3			$ 54,000.00	$ 19,200.00	$ 73,200.00	0.82
DC-S-05	Ladue Meadows	16 Ladue Meadows, Creve Coeur, MO 63141	Inlets and storm sewers to address yard flooding.	3			$ 59,400.00	$ 73,200.00	$ 132,600.00	0.72
CC-S-01	Cuiseaux Court	208 Cuiseaux Court, Creve Coeur, MO 63141	New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.	3			$ 78,500.00	$ 57,100.00	$ 135,600.00	0.70
DC-S-16	Wedgewood Lane	6 Wedgewood Lane, Creve Coeur, MO 63141	Inlets, storm sewer, and swale to address yard ponding.	3			$ 69,000.00	$ 42,500.00	$ 111,500.00	0.63
DC-S-01	Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive	11577 Templar Drive, Creve Coeur, MO 63141	New inlets and regrading pavement to address ponding issues along Magna Carta Drive.	3			$ 75,000.00	$ 94,600.00	$ 169,600.00	0.62
DC-C-29	The Knolls Lane	7 The Knolls Lane, Creve Coeur, MO 63141	Broken curb/drainageway replacement.	3			$ 58,800.00	$ 15,700.00	$ 74,500.00	0.62

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Project Number	Project Name	Project Location	Project Description	Project Type (1 - Culverts/Structures, 2 - Bank Stabilization, 3 - Overland Flooding)	Environmental Considerations?	Common Ground?	Project Surveying, Geotechnical, and Engineering Cost	Project Construction Cost	Total Project Cost	Cost/Benefit Ratio
DC-S-15	Fourwynd Drive	438 Fourwynd Drive, Creve Coeur, MO 63141	Berm, swales, and a culvert replacement to address yard flooding and overland flow erosion.	3			$ 84,300.00	$ 129,600.00	$ 213,900.00	0.61
CC-S-10	12229 Ladue Woods Drive	12229 Ladue Woods Drive, Creve Coeur, MO 63141	Berm to address yard flooding.	3			$ 61,300.00	$ 7,900.00	$ 69,200.00	0.55
CC-S-02	Broadview Farms Subdivision	19 Broadview Farm Road, Creve Coeur, MO 63141	Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.	3			$ 76,600.00	$ 30,800.00	$ 107,400.00	0.52
DC-S-07	East Ladue Estates Drive	57 East Ladue Estates Drive, Creve Coeur, MO 63141	Swale, berm, and underdrain field to address yard ponding.	3			$ 57,800.00	$ 20,400.00	$ 78,200.00	0.51
DC-S-23	6 Spoede Ridge Lane	6 Spoede Ridge Lane, Creve Coeur, MO 63141	Rock channel to address yard flooding.	3			$ 54,000.00	$ 19,800.00	$ 73,800.00	0.49
DC-S-14	Mary Meadows Lane	808 Mary Meadows Lane, Creve Coeur, MO 63141	Berm, swales, inlets, and storm sewer to address flooding and overland flow erosion.	3			$ 73,900.00	$ 92,300.00	$ 166,200.00	0.48
DC-S-25	Haven View Drive	19 Haven View Drive, Creve Coeur, MO 63141	Gutters, inlets and storm sewer to address yard flooding.	3			$ 61,400.00	$ 63,700.00	$ 125,100.00	0.48
DC-S-06	Fairways Circle	541 Fairways Circle, Creve Coeur, MO 63141	Storm sewer, inlets, berm, and swales to address yard flooding.	3			$ 80,000.00	$ 182,300.00	$ 262,300.00	0.48
DC-S-18	3 Oak Park Court	3 Oak Park Court, Creve Coeur, MO 63141	Inlets and storm sewer to address yard erosion.	3			$ 63,200.00	$ 43,800.00	$ 107,000.00	0.47
DC-S-24	7 Quailways Drive	7 Quailways Drive, Creve Coeur, MO 63141	Pipe repairs and retaining wall replacement to address erosion and sinkholes.	3			$ 51,900.00	$ 55,300.00	$ 107,200.00	0.47
CC-S-06	Auburndale Drive	39 Auburndale Drive, Creve Coeur, MO 63141	Shoulder and swale along N Mason Rd to address street flooding.	3			$ 60,300.00	$ 127,500.00	$ 187,800.00	0.43
DC-S-21	Chilton Lane	8 Chilton Lane, Creve Coeur, MO 63141	Erosion control, berms, and swales to address erosion.	3			$ 63,600.00	$ 34,500.00	$ 98,100.00	0.41
DC-S-04	561 Sarah Lane	561 Sarah Lane, Creve Coeur, MO 63141	Profile and mill asphalt to address street ponding.	3			$ 50,900.00	$ 14,900.00	$ 65,800.00	0.38
DC-S-08	121 Mystic Meadows Lane	121 Mystic Meadows Lane, Creve Coeur, MO 63141	Storm sewer extension and inlet to address overland flow erosion.	3			$ 60,500.00	$ 76,800.00	$ 137,300.00	0.33
CC-S-08	228 Falling Leaves Court	228 Falling Leaves Court, Creve Coeur, MO 63141	Drains, curb inlet, and storm sewer to address yard ponding.	3			$ 61,300.00	$ 106,900.00	$ 168,200.00	0.27
CC-S-03	Ferntrails Lane	13096 Ferntrails Lane, Creve Coeur, MO 63141	Berm and swale to shift overland flow away from houses.	3		X	$ 61,500.00	$ 16,800.00	$ 78,300.00	0.26

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Appendix G
Cost Prioritization Methodology

Content:

- Cost Worksheet Template
- Prioritization Worksheet Template
- Prioritization Worksheet Guidance Document
- Public or Private Checklist

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Cost Worksheet Template

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Creve Coeur Watershed Management Plan - Cost Opinion Worksheet

Project ID:

Project Description:

INTUITION & LOGIC

SURVEYING

Description	Unit	Quantity	Unit Cost	Sub Total
Boundary and Topo Surveying	ACRE		$ 12,000	$ -
Prepare Easement Plat and Scripts	EACH		$ 1,500	$ -
Contruction Staking and As-Built Surveying	ACRE		$ 5,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF SURVEYING COST =		**$ -**

GEOTECHNICAL

Description	Unit	Quantity	Unit Cost	Sub Total
Field Borings	LF		$ 20	$ -
Geotechnical Report	LUMP		$ 7,000	$ -
Global Stability Analysis	EACH		$ 1,000	$ -
			Subtotal =	$ -
		Contingency =	25%	$ -
		TOTAL OPINION OF GEOTECHNICAL COST =		**$ -**

ENGINEERING DESIGN AND CONSTRUCTION DOCUMENTS

Description	Unit	Quantity	Unit Cost	Sub Total
Preliminary Design	HOURS	NA	$ 160	#VALUE!
ROW	HOURS	NA	$ 160	#VALUE!
Permitting	HOURS	NA	$ 160	#VALUE!
Final Design	HOURS	NA	$ 160	#VALUE!
Develop Plans and Construction Documents	HOURS	NA	$ 160	#VALUE!
Construction Support	HOURS	NA	$ 160	#VALUE!
			$ -	$ -
			Subtotal =	#VALUE!
		Contingency =	25%	#VALUE!
		TOTAL OPINION OF ENGINEERING AND CONSTRUCTION OBSERVATION COST =		**#VALUE!**

CONSTRUCTION

Description	Unit	Quantity	Unit Cost	Sub Total
Clearing	ACRE		$ 30,000	$ -
Removal of Existing Structures	LUMP		$ 2,000	$ -
Excavation and Embankment in Place	CY		$ 35	$ -
Rock Grade Control	CY		$ 200	$ -
Rock Stilling Basin / Outlet Scour Protection	CY		$ 100	$ -
Rock Toe and Slope Protection	CY		$ 150	$ -
Bank Stabilization	SY		$ 120.00	$ -
Granular Backfill	CY		$ 55	$ -
New Culvert	LF		$ 500.0	$ -
Manhole	LF		$ 625	$ -
Inlet	EA		$ 3,500	$ -
Sewer Pipe Small	LF		$ 140	$ -
Sewer Pipe Medium	LF		$ 220	$ -
Sewer Pipe Large	LF		$ 360	$ -
Connection to Existing Inlet	EA		$ 2,365	$ -
Connection to Existing Manhole	EA		$ 3,130	$ -
Flared End Section Small	Ea		$ 2,580	$ -
Retaining Wall	SF		$ 50	$ -
Berm/Swale	LF		$ 15	$ -
Asphaltic Concrete Pavement	SY		$ 150	$ -
Pavement/Sidewalk Removal & Replacement	SY		$ 100	$ -
Curb - Concrete Rem & Rep	LF		$ 50	$ -
Utility Relocation	LUMP		$ 11,000	$ -
Site Restoration	ACRE		$ 50,000	$ -
			$ -	$ -
Mobilization and Bond	10%	1	$ -	$ -
			Subtotal =	$ -
		Contingency =	30%	$ -
		TOTAL OPINION OF CONSTRUCTION COST =		**$ -**

TOTAL SURVEYING, GEOTECHNICAL, ENGINEERING AND CONSTRUCTION COST OPINION =	**#VALUE!**

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Prioritization Worksheet Template

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Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: _____ DATE: _____

PROJECT LOCATION: _____

PROJECT DESCRIPTION: _____

			PROBLEM SOLVED CATEGORY Note: Problem points are awarded only for those problems solved by the proposed solution.	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. Eligible misc. structures are those that would typically require a building permit to be issued. (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. Eligible misc. structures are those that would typically require a building permit to be issued. (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 (2 lots per intersection impacted and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
			Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
			Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
		1.2.4.	Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
				20		10		5		

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: _____ DATE: _____

PROJECT LOCATION: _____

PROJECT DESCRIPTION: _____

			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the proposed solution.	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. Eligible misc. structures are those that would typically require a building permit to be issued. (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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
		Points for Condition							
			TOTAL PROBLEM POINTS						

Draft

Creve Coeur Watershed Management Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: _____ DATE: _____

PROJECT LOCATION: _____

PROJECT DESCRIPTION: _____

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		
	4.4 Preserves natural resource areas	No. Units				Points per Unit		
	Lakes, Wetlands, etc.		AC			30		
	Natural Corridor (min. 25ft width)		PER 100 LF			10		
	4.5 Conservation Easement		EA			20		
5.0 MISC.	5.1. Ease of Implementation (number of new easements to be acquired)	0 (50 pts)	1-5 (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		

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

TOTAL COST IN THOUSANDS= _____

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

Place "X" in one box below:

☐ **Creve Coeur Project**
☐ **Project by Others**

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Prioritization Worksheet Guidance Document

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Prioritization Worksheet – Guidelines for Use

General

- The prioritization worksheet is three pages long.
- Enter the project name, date, location, and description at the top of each page (it is automatically carried to pages 2 and 3 if using electronically).
    - The environmental considerations section can be used to note if any threatened structures are located in the floodplain or floodway.
    - The common ground section can be used to indicate if a project is located on common ground.
- The worksheet is separated into "Problem Solved Categories" and "Solution Benefit Categories"

Assigning Problem Points (pages 1-2)

Using information collected in the field and from complaint records, determine which of the two main Problem Categories the investigated problem falls under. Problem points are only awarded for those problems solved by the proposed solution.

- If the source of the problem is a stream, use Category 1.0 on the first page to assign the "Problem points".
- If the source of the problem is overland flow or inadequate/non-existent storm sewers, turn to Category 2.0 on the second page to assign the "Problem points".

Category 1.0 (page 1)

Category 1.0 is subdivided into 1.1 Flooding and 1.2 Erosion. If the project only deals with one of these types of problems, go directly to that subcategory and then evaluate each line in light of the problem identified. If the project deals with both types of problems, complete Section 1.1 and Section 1.2.

Every line on this page utilizes three levels of severity to assign points (except line 1.2.2).

- For structure and roadway flooding, the minimum frequency of storm (2-, 15- or 100-year) causing the problem should be computed or estimated. The number of lots affected is then entered under that storm heading.
- For erosion, field measurements should be made to determine the ratio of height of eroded bank divided by distance from nearest habitable structure. The number of lots affected should be entered to the right of the points shown for the appropriate ratio.
- Items in the misc. structures are any structures that would typically require a building permit to be issued. This applies to all misc. structures rating categories within the Prioritization worksheet.
- Category 1.2.3 utilizes the roadway type and length to assign the number of lots. Additional points are added for intersections and undermined/failing bridges or culverts.
    - If the undermined/failing bridges or culverts would cause multiple lots to be cut off in the event of failure, one lot should be added per each lot that will be cut off.
- Category 1.2.4 can be used to assign points based on the buffer width of the threatened natural resource.

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- If the project includes a grade control at an existing knickpoint, then the linear feet protected extends from that point up to the next hard bottomed road crossing or the end of the minimum buffer width, whichever is shorter (one lot is assigned per 250 feet of stream).
    - The benefit length is limited to 250 feet upstream of the project.

Category 2.0 (page 2)

Category 2.0 is used for flooding problems caused by overland flow or inadequate/non- existent storm sewer systems.

- Category 2.1 utilizes the same three levels of severity as Category 1.1, and the storm frequency should be computed or estimated in the same way.
- Erosion caused by overland flow is included as either as 2.2 "moderate risk erosion of miscellaneous structures" or 2.3 "yard erosion".
- Category 2.4 can be used to assign additional points to a problem based on the condition of the existing system. If the condition is unknown, points are assigned based on the age of the system.

Additional things to note under Problem Points:

- Include the address(es) of lots that are assigned points on the line provided under each subcategory.
- The total problem points from pages 1 and 2 are automatically summed at the bottom of page 2 and included in the total benefit points sum at the bottom of page 3 (if entered electronically).

Categories 3-5: Assigning Solution Points (page 3)

After filling out either page 1 or page 2, turn to page 3 to determine if any of the Solution Points can be applied. These points are given to projects whose solution achieves the benefits described in Categories 3-5.

- Category 3.1, reduction of flowrate leaving the site, would most commonly be achieved by the addition of a detention feature. The pre- and post-project peak flowrates are computed to determine the percent of reduction. This percentage is then multiplied by 1000 to obtain the total points awarded. This should only be used where the approximate reduction can be reliably estimated at the preliminary stage.

- Category 3.2 points can be applied when a proposed solution combines several smaller projects (that are not immediately adjacent to one another) into a watershed or subwatershed solution. Enter the number of total projects combined less one: for example, if 3 projects are combined, enter 2 as the number of additional projects.

- Category 4.1 points can be applied if the proposed solution includes any of the water quality features listed. These should only be used if the user has confidence that the feature will not be dropped during final design. For linear treatments, divide the total proposed length by 100 linear feet to obtain the number of units. For treatment areas, enter the number of acres. Round all quantities to the nearest whole number.

Draft

    - Riffle pool complex – If the project includes a grade control at an existing knickpoint, then the linear feet protected extends from that point up to the next hard bottomed road crossing. This applies to perennial streams only.

- Category 4.2 points can be applied if the project eliminates a combined sewer system. A non-regional solution would get 100 points, while a regional solution could get 100 points per project that eliminates a combined sewer system.

- Category 4.3, which addresses inflow into the sanitary system, can be applied where the proposed solution would eliminate the inflow. The total number of locations eliminated is entered by the user.

- Category 4.4 points can be applied if the project is protecting a natural resource area. Multiply the acres of lake, wetland, etc. being protected by 30 points. For natural corridors that have a minimum 25 foot width, divide the total length being protected by 100 linear feet to obtain the number of units.
    - Natural Corridor – If the project includes a grade control at an existing knickpoint, then the linear feet protected extends from that point up to the next hard bottomed road crossing or the end of the minimum 25 ft width, whichever is shorter.

- Category 4.5 points can be applied if conservation easements will be acquired as part of the project.

- Category 5.1 assigns points for projects with fewer easements. The user's best estimate of the number of easements that will be required is used to determine how many points can be awarded. The user must enter the number of points (20, 10 or 5 points) appropriate for the number of easements estimated.

- Category 5.2 allows the user to enter 100 points if the proposed solution will include recreational or educational benefits to the public. The PP writeup should include a description of the benefits that are being provided.

Cost/Benefit Ratio

- When all Problem and Solution Points are assigned, the total benefit points will be summed automatically (if entered electronically).
- Divide the cost estimate for the project by 1,000 and enter it in the worksheet where indicated.
- The cost/benefit ratio will be automatically computed (if entered electronically).

Project Designation

At the bottom of page 3, indicate whether the project is likely to be performed by Creve Coeur or By Others. By others can include funding through the OMCI taxing districts, grant funding, or local funds committed to by residents.

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Public or Private Checklist

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Is a stormwater issue public or private?

If one or more boxes are checked, then a publicly-funded solution might be considered	
Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue?	☐ Check for yes
Does the stormwater issue threaten public or private structures?	☐ Check for yes
Does the stormwater issue threaten public or private roadways?	☐ Check for yes
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	☐ Check for yes
Is the issue caused by an undersized stormwater conveyance infrastructure?	☐ Check for yes
Does the proposed project address regional or systematic channel instability?	☐ Check for yes
Would a solution protect water quality or natural resources?	☐ Check for yes
Was the issue caused by altered upstream conditions?	☐ Check for yes
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	☐ Check for yes
Was the issue caused by inadequate maintenance of a public system?	☐ Check for yes
Will the project improve public safety?	☐ Check for yes
Has the stormwater issue been identified as a monitor project?	☐ Check for yes
Is the focus of the project utility work?	☐ Check for no
Does the work focus on privately-owned infrastructure?	☐ Check for no

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Appendix H
Meeting Notes

Content:

- Stormwater Committee Meeting Notes
- City Council Presentation

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Stormwater Committee Meeting Notes

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INTUITION & LOGIC
16253 Swingley Ridge Road, Suite 100, St. Louis, MO 63017
636.777.3000

MEETING NOTES

DATE: 1-11-23
PROJECT: Creve Coeur Storm Water Master Plan
RE: Stormwater Committee Meeting
TIME: 04:45 pm
LOCATION: Creve Coeur Public Works

ATTENDEES:

Organization	Point of Contact	Phone Number	Email
City of Creve Coeur	Jim Heines	314-872-2538	jheines@crevecoeurmo.gov
City of Creve Coeur	Dione Garson	314-274-2107	dgarson@crevecoeurmo.gov
City of Creve Coeur	Margaret Ries	314-872-2533	mries@crevecoeurmo.gov
Intuition & Logic	Mark Meyer	636-777-3000	mark@ilincworld.com
Intuition & Logic	Tim Dean	636-777-3000	tim@ilincworld.com
Intuition & Logic	Jenna Stombaugh	636-777-3000	jenna.stombaugh@ilincworld.com
EDM	Kurtis Eisenbath	314-335-6905	kle@edm-inc.com
AMPM	Kevin Corwin	636-312-4480	kevinc@askampm.com

Refer to the Stormwater Committee meeting minutes for the full list of stormwater committee members present.

Introductions

Project Overview

- Project Work Plan
  - Tim Reviewed the work plan and project schedule. Tim reviewed the process the design team will use to develop the Storm Water Master Plan.
  - A Storm Water Master Plan webpage will be developed on the City's website. The webpage will be managed by the City and content will be supplied by the design team.

Draft

    - A Link to the stormwater survey and invite to the open house will be the first content.

- Public Engagement
    - We discussed the upcoming open house and format.
    - Open House
        - Open House #1 on 3/22/23
        - Held at the City in Council Chambers
        - PDFs of any boards, presentations, and comments received will be posted to the Storm Water Master Plan Webpage.
        - Develop 1pg handouts with overview of SWMP and contact info
    - Questionnaire
        - Online tool link: https://ampm.mysocialpinpoint.com/creve-coeur-storm-water-master-plan/share/7ea5ee87
            - Add note for clarification: "be sure to click next and fill out the survey to submit all information"

- Stormwater Committee Approved Conceptual Sites
    - Committee approved the 7th site
        - Will likely be a corridor repair instead of a spot repair
    - 7 sites
        1. Magna Carta Drive at Runnymede Drive and at Templar Drive - Storm drain modification and new storm drain(s).
        2. Ferntop Lane - Storm channel erosion (from the 2012 Stormwater Master Plan Projects spreadsheet)
        3. Deer Creek in Malcolm Terrace Park - Creek bank erosion
        4. Cuisseaux Court - Subdivision drainage
        5. Beaver Drive - Aging culvert beneath the
        6. Broadview Farm - Road drainage throughout the subdivision
        7. 10105 Dartagnan - Creek erosion in back yard.

Other Items

The above is an accurate and complete representation of the major conversations and decisions to the best of my knowledge. If there are corrections or revisions, please send them to me in writing at tim@ilincworld.com at your earliest convenience.

Best Regards,

Tim Dean, PE, CFM, LEED® AP

Draft

Principal
Intuition & Logic Engineering, Inc.

Draft

AGENDA
CITY OF CREVE COEUR
STORMWATER COMMITTEE
300 N NEW BALLAS RD
JUNE 14, 2023
4:45 PM

I. CALL TO ORDER

II. ROLL CALL

III. APPROVAL OF AGENDA

IV. NEW BUSINESS

1. **Intuition & Logic: Presentation and Committee Feedback**

V. APPROVAL OF MINUTES

2. **Stormwater Committee Meeting, May 10th Minutes (Draft) Summary:**

VI. BUSINESS FROM STAFF

VII. COMMENTS FROM THE PUBLIC

VIII. NEXT MEETING DATE

IX. ADJOURNMENT

Draft

Posted by: _____

Date/Time posted: _____

If you need special accommodations to attend a meeting, services may be arranged by contacting the Office of the City Administrator in advance.

MINUTES
CITY OF CREVE COEUR
STORMWATER COMMITTEE
300 N NEW BALLAS RD
MAY 10, 2023
4:45 PM

I. CALL TO ORDER

The meeting was called to order at 4:45 PM.

II. ROLL CALL

The Stormwater Committee members that were in attendance were Richard Kutta, Bernard Feldman, Patrick Brown, Samantha Davies, Mary Helen Gerst, and Kathy Rizzo.
City Council member Tim Carney was in attendance.
Also in attendance was City Public Works Director, Jim Heines, and Civil Engineer, Dione Garson.
Quorum was achieved.

III. APPROVAL OF AGENDA

Sam Davies made a motion for the approval of the agenda. Bernard Feldman was the second. All in favor.

IV. APPROVAL OF MINUTES

1. April 17th, 2023 Minutes (Draft)

Kathy Rizzo made a motion for the approval of April 17th, 2023 minutes. Patrick Brown was the second. All in favor.

V. UNFINISHED BUSINESS

2. Cost-Share Program Discussion

Dione Garson thanked the committee for filling out a Google Form to make comments and suggestions for the Cost-Share Program. The committee reviewed the responses to the items for consideration for the cost-share program.
The committee wants to follow City policy on obtaining bids based on the cost-estimate of the project for the cost-share program.
The committee discussed including projects that are problem-solving run off from new construction. The committee will accommodate off-site water as best as possible. Dick Kutta asked if there are civil matters between residents, should the committee get involved at all with regards to the cost-share program? The committee discussed if there is active litigation and whether or not the committee would get involved? The committee decided they would not get involved. Dick Kutta suggested putting that as a question on the application.

Draft

Dione Garson posed the question "Can HOA's use funding to do routine maintenance required by MSD?" to the committee.The committee proposed adding that to the application by asking to provide documentation with MSD regarding maintenance agreements and/or annual reports.
The committee discussed how to score the applications that will be submitted. A rubric was suggested to be created to score applications.
The committee discussed that if cisterns were to be allowed in the program, they should be underground cisterns.
The committee discussed putting a question on the application that asks "is the project part of the Deer Creek Watershed Alliance?".
The stormwater committee will not provide solutions to stormwater concerns, but will tell the applicant if a solution that is provided will not work.
Live staking could be an alternative suggestion for projects that may not qualify for the cost-share program.

VI. BUSINESS FROM STAFF

Dione Garson provided an update on City Stormwater Projects.
Alden Lane: There is a bid opening on May 31. Construction should take place in early July.
Hibler Road: The easement documents are ready. City staff will be meeting with residents shortly. Construction should begin in February.
Hibler Woods Drain: The contract was awarded to Spencer Contracting. Construction is to begin after Ladue Estates construction.
Dielmann Recreation Drainage: They have received final plans from HR Green. They are meeting with staff to determine the start date. It is ready to go to bid.
Golf Course Aeration: They are waiting for the final plan set.
Tarrytown: They are expecting to receive easement documents soon. Construction should start in November.

3. Watershed Management Plan Update

Intuition and Logic (I&L) staff are actively calling homeowners who reported stormwater issues. I&L submitted report sections for City staff to review. There are 105 streambank additions by I&L to the reporting site. I&L provided guidance and examples of public verses private criteria and City Staff is reviewing. I&L are creating materials for Open House #2.
Types of Reported Issues: House flooding 23, Property Flooding 78, Street Flooding

24, Streambank Erosion 152.
Property flooding is the most reported issue, not including the 105 streambank issues added by I&L.
Residents are continuing to report issues. Since the last stormwater committee meeting we have had 20 additional reported issues. There are 256 identified issues. Next week's open house meeting is to wrap up data collection. The staff is hopeful to have a report by I&L by January 2024 to be able to use it to develop the CIP.
Next meeting for Watershed Management Plan with I&L is an Open House on Wednesday, May 17th from 6:00-7:30PM.

4. Arbor Day Update

Dione Garson and Bernard Feldman had a booth at Arbor Day to create awareness about the stormwater management plan. No stormwater issues were reported. No one filled out the survey to report a stormwater issue. There was some interest in learning about the Watershed Management Plan. Flyers were given to residents that provided information about the stormwater management plan and it provided the date of Open House #2.

VII. COMMENTS FROM THE PUBLIC

No comments at this time.

VIII. NEXT MEETING DATE

The next stormwater committee meeting will be on Wednesday, June 14th.

IX. ADJOURNMENT

A motion to adjourn was made by Kathy Rizzo and seconded by Bernard Feldman. All in favor. Adjournment at 6:24PM.

Draft

Is a stormwater issue public or private?	
If one or more boxes are checked, then a publicly-funded solution might be considered	
Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue?	
Does the stormwater issue threaten public or private structures?	
Does the stormwater issue threaten public or private roadways?	
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	
Is the issue caused by an undersized stormwater conveyance infrastructure?	
Does the proposed project address regional or systematic channel instability?	
Would a solution protect water quality or natural resources?	
Was the issue caused by altered upstream conditions?	
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	
Was the issue caused by inadequate maintenance of a public system?	
Will the project improve public safety?	
Has the stormwater issue been identified as a monitor project?	
Is the focus of the project utility work?	
Does the work focus on privately-owned infrastructure?	

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City of Creve Coeur
Building Division

When a Permit is Needed

The permit process is one of the most important parts of the building code and often the most misunderstood by homeowners, building owners and property managers. Requiring permits and inspections is the only way a building department can ensure alterations to a building, meet *minimum* requirements for safety, health and energy conservation. Performing work that does not meet these basic requirements could become an unfortunate and expensive disclosure issue for owners and can compromise needed coverage from their home and building insurance carrier. Ensuring the safety of our homes and businesses should be a priority for everyone.

The following projects require a city permit:

- Basement Finish
- Bathroom Remodel
- Carport Conversion
- Commercial Alteration
- Commercial Building Door Hardware
- Commercial Signs
- Commercial Tenant Finish
- Deck/Balcony/Porch (Even If Only Decking or Guardrails Are Being Replaced)
- Driveway Apron Replacement
- Emergency Generators
- Fences
- Fire/Water Damage Repair
- Fireplaces (Indoor or Outdoor)
- Foundation Repair
- Furnace/AC Equipment Replacement (Installed by a St. Louis County Licensed Mechanical Contractor)
- Garage Addition
- Gazebo/Pergola
- Grading, Filling or Excavating an Area 2,000 Square Feet or Greater
- Hot Tub
- House Demolition
- Interior Construction
- Kitchen Remodel (depends on project scope)
- New Commercial Building
- New Home
- New Stairs (Interior or Exterior)
- Outdoor Fire pits
- Outdoor Sports Court
- Patios That Include Exterior Stairs or Outdoor Fireplaces
- Pool House / Cabana
- Radon Mitigation
- Re-Roofing Commercial Buildings
- Retaining Walls over 48" height
- Room Addition
- Skylights
- Solar Panel Systems
- Sump Pump Pit & Drain Tile
- Permanent Swimming Pool (New)
- Permanent Swimming Pool (Repairs)
- Swimming Pool Demolition
- On-ground Storable Swimming Pool (deeper than 24")
- Utility Shed

NOTE: All remodeling in multi-story, multi-family buildings (condominiums and apartment buildings) requires a Building Permit to be issued by the City. The City wants to ensure that this remodeling will not void the 1 hour fire resistance rating of floors, ceilings and walls that are required to separate one dwelling unit from another.

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The following projects do *not* require a city permit:

- Children's play structures
- Guttering & downspouts
- Install siding (unless wall studs or sheathing are damaged)
- Landscaping
- Minor repairs or drywall patching
- Paint house
- Political signs
- Re-roofing homes and townhomes (unless rafters or trusses are damaged)
- Tuck pointing exterior masonry veneers
- Replacement of windows or doors on existing structures without opening modifications.
- Replacement of cabinets or countertops in same location when project does not include any framing, electric or plumbing work

NOTE: St. Louis County will need to issue an ELECTRICAL PERMIT or a PLUMBING PERMIT to a licensed electrician or licensed plumber for any new electrical or plumbing work, including but not limited to:

- New electrical service panel
- New electrical boxes and wiring
- Replace water heater
- Low-voltage home security system
- Adding new circuits
- Resetting/relocating plumbing fixtures
- Lawn Irrigation System
- Replacement or rearrangement of supply pipes, waste pipes, soil pipes or vent pipes

Important Note:

These lists are *not* all inclusive. For questions about when you may need a building permit:
Please contact the Creve Coeur Building Division at (314) 872-2500

Please contact the St. Louis County Department of Public Works for any questions regarding:
Electrical Permit (314) 615-7082
Plumbing Permit (314) 615-7137

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City Council Presentation

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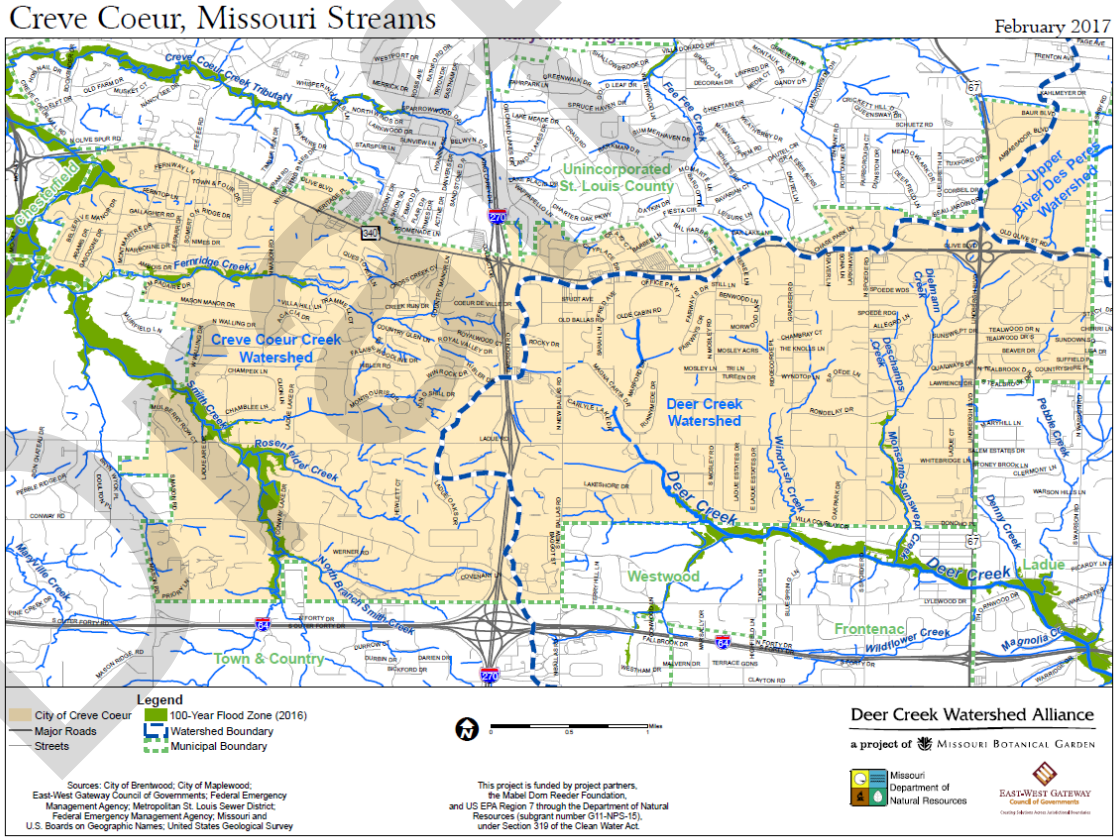
INTUITION & LOGIC EDM AM:PM

Watershed Master Planning

- City Planning Effort
- Previous Efforts
  - 1999 Stormwater Evaluation Report
  - 2010 Stormwater Questionnaire
  - 2012 Stormwater Master Plan Update
- Overall Goals
  - Updated Master Plan
  - Integrate Public Input
  - Develop Prioritization Ranking Methodology



Watershed Management Plan

Goals & Objectives

Goal - Develop planning tools and capital improvement projects to address water quality, stream stability, and stormwater infrastructure and drainage issues.

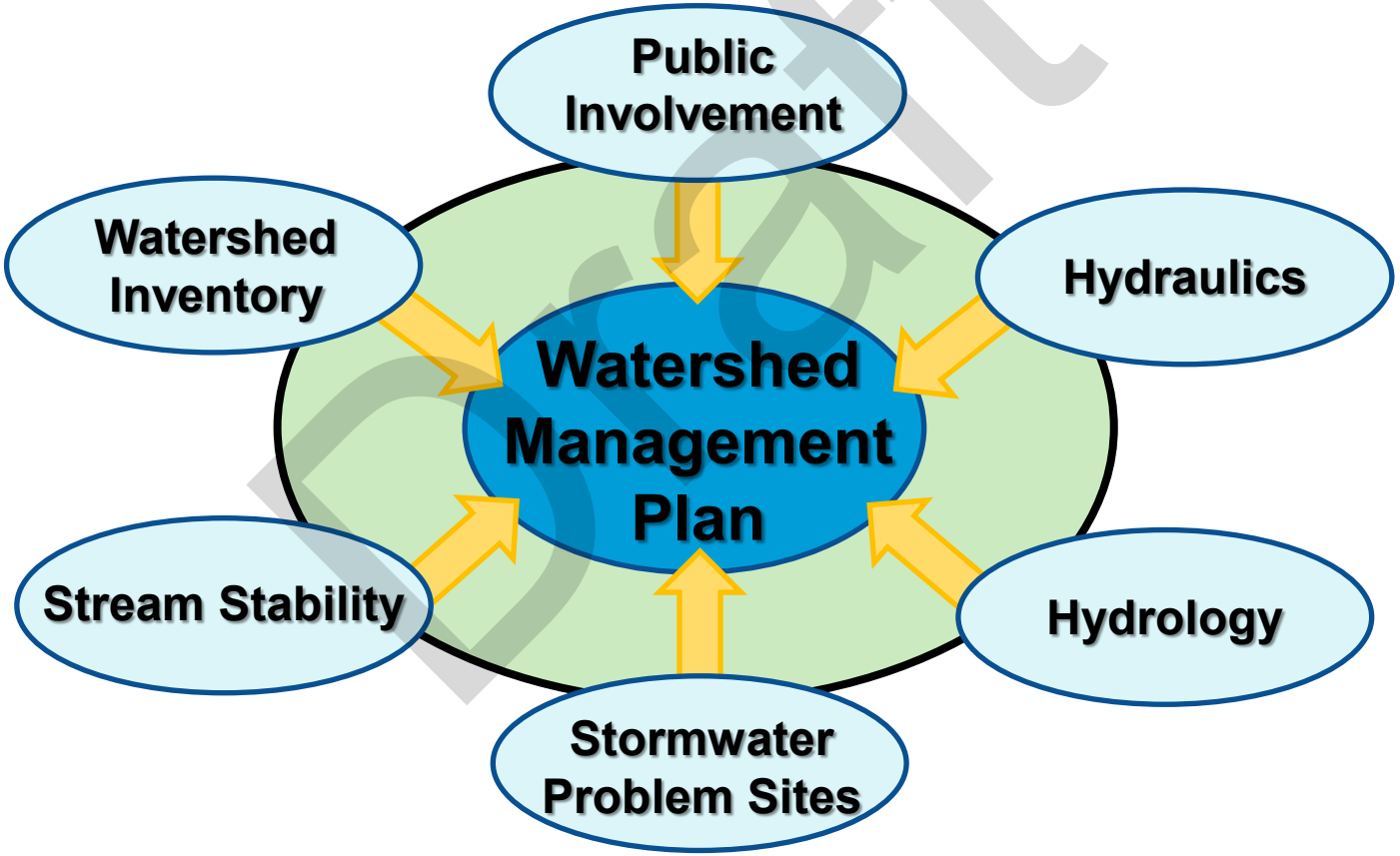
Study Objectives

- Maintain a proactive public involvement process
- Identify needed Capital Improvement Projects (CIPs) for stormwater issues
- Quantify existing hydrologic and hydraulic data
- Map stream corridors
- Evaluate stormwater problem sites
- Develop prioritization ranking method
- Develop software to assist the City in planning and budgeting for projects to maximize benefit of City residents throughout the five-year planning timeframes of the Capital Improvement Program (CIP)

Draft

Watershed Management Plan

Major Study Components



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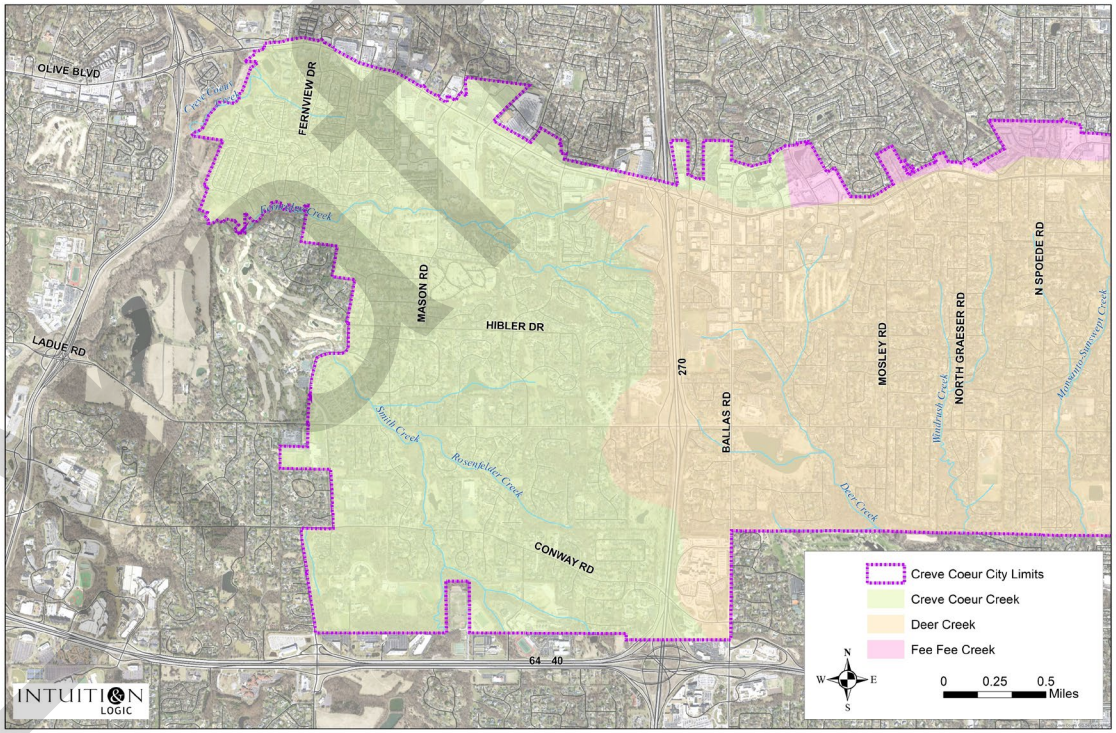
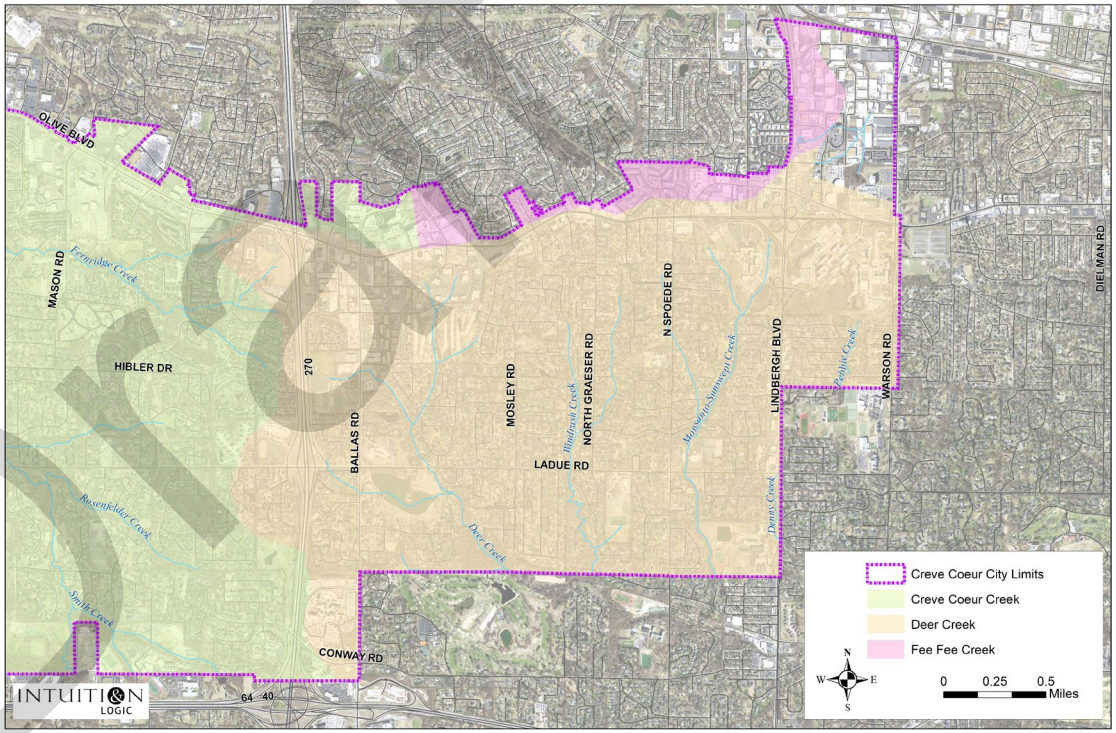
Creve Coeur Creek Watershed Study Area

- 27 Square Miles Watershed
- 4.4 Square Miles Channel Condition Assessment Study Area



Deer Creek Watershed Study Area

- 37.7 Square Miles Watershed
- 5.1 Square Miles Channel Condition Assessment Study Area



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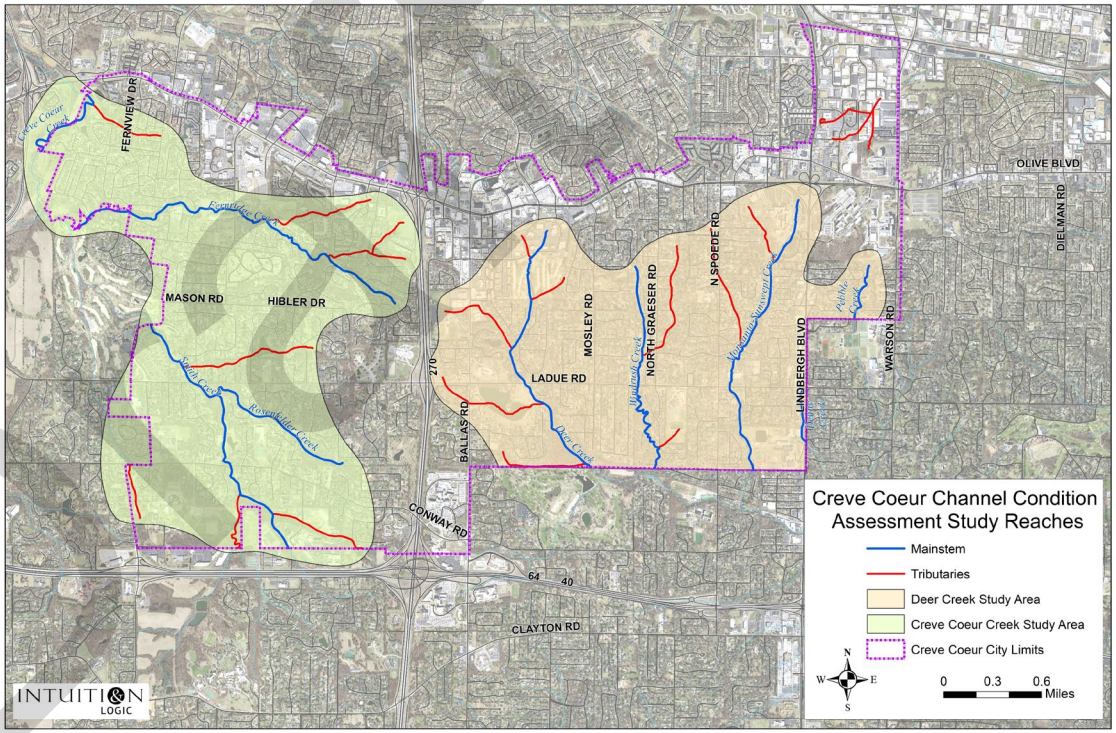
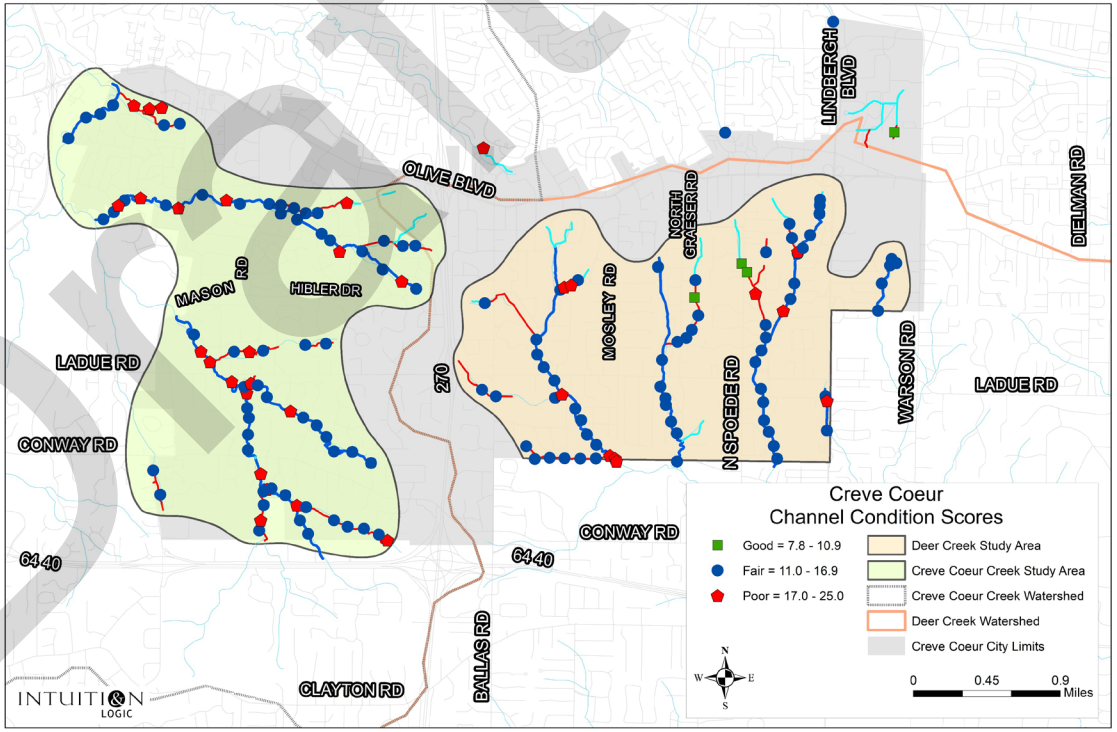
Channel Condition Assessment

- 9.5 Square Miles Study Area
- Over 20 miles of stream field observation
  - Creve Coeur Creek
  - Fernridge Creek
  - Smith Creek
  - Rosenfelder Creek
  - Deer Creek
  - Windrush Creek
  - Monsanto-Sunswept Creek
  - Pebble Creek
  - Denny Creek



Channel Condition Assessment Results

- 159 Total Channel Condition Data Points Taken
- 77 Points in the Deer Creek Watershed
  - Average Channel Condition Score of 14.1 (Fair)
- 82 Points in the Creve Coeur Creek Watershed
  - Average Channel Condition Score of 15.5 (Fair)



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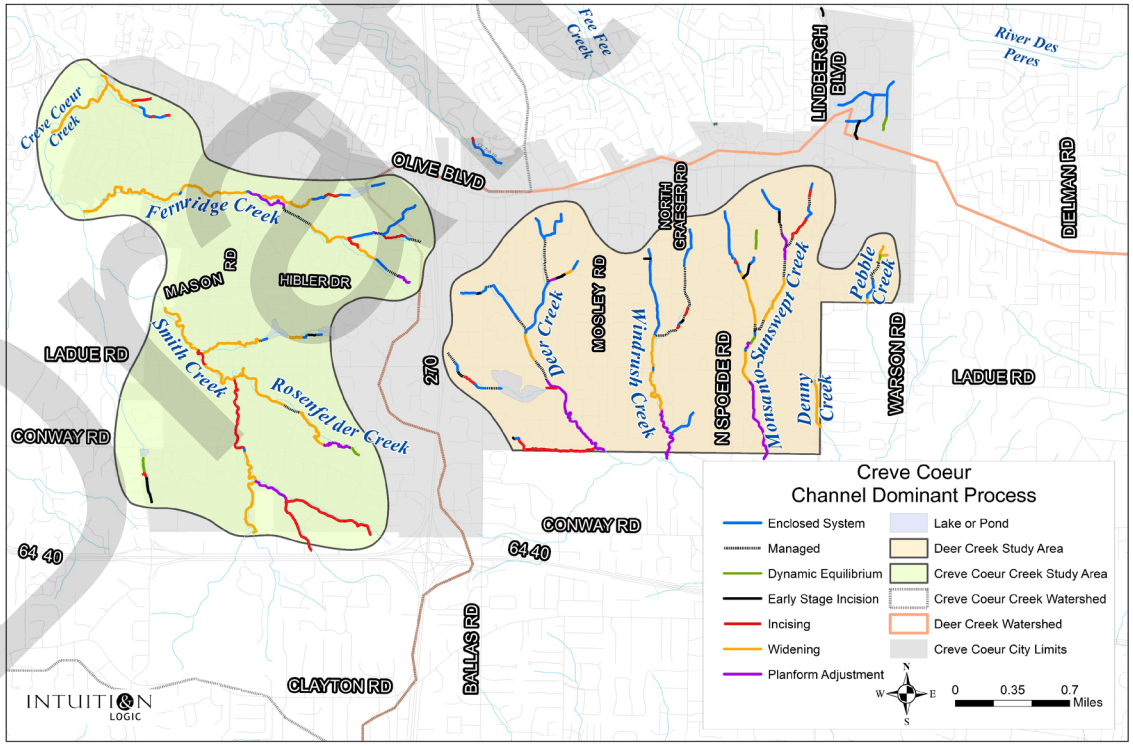
Channel Dominant Process Results

- Deer Creek Watershed
  - 29 Mainstem Reaches
  - 32 Tributary Reaches
  - Mainly Widening with some Planform Adjustment at the downstream limits
- Creve Coeur Creek Watershed
  - 24 Mainstem Reaches
  - 25 Tributary Reaches
  - Mainly Widening



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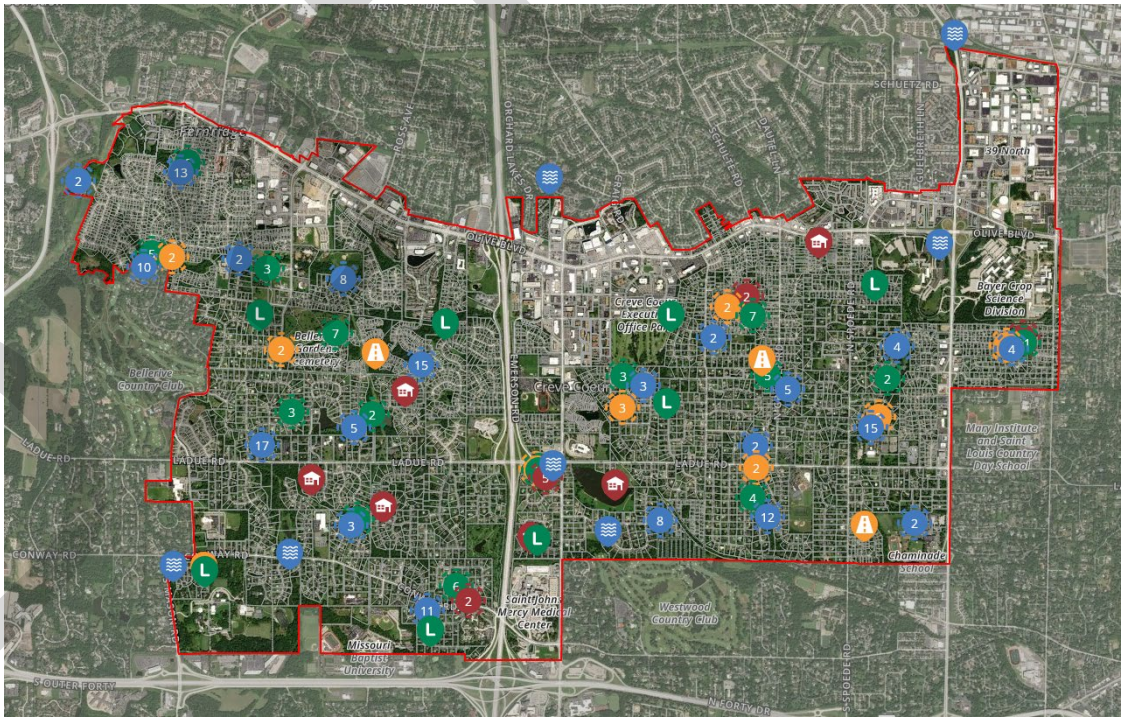
Stormwater Problem Site Investigation

- Based on past problems received by the City and online survey responses
- Thank you for all for participating in the online survey!! A total of 172 responses were received
  - 23 Home Flooding
  - 73 Property Flooding
  - 52 Streambank Erosion
  - 24 Street Flooding



- Stormwater problem sites and field identified issues were grouped into 129 potential problem areas

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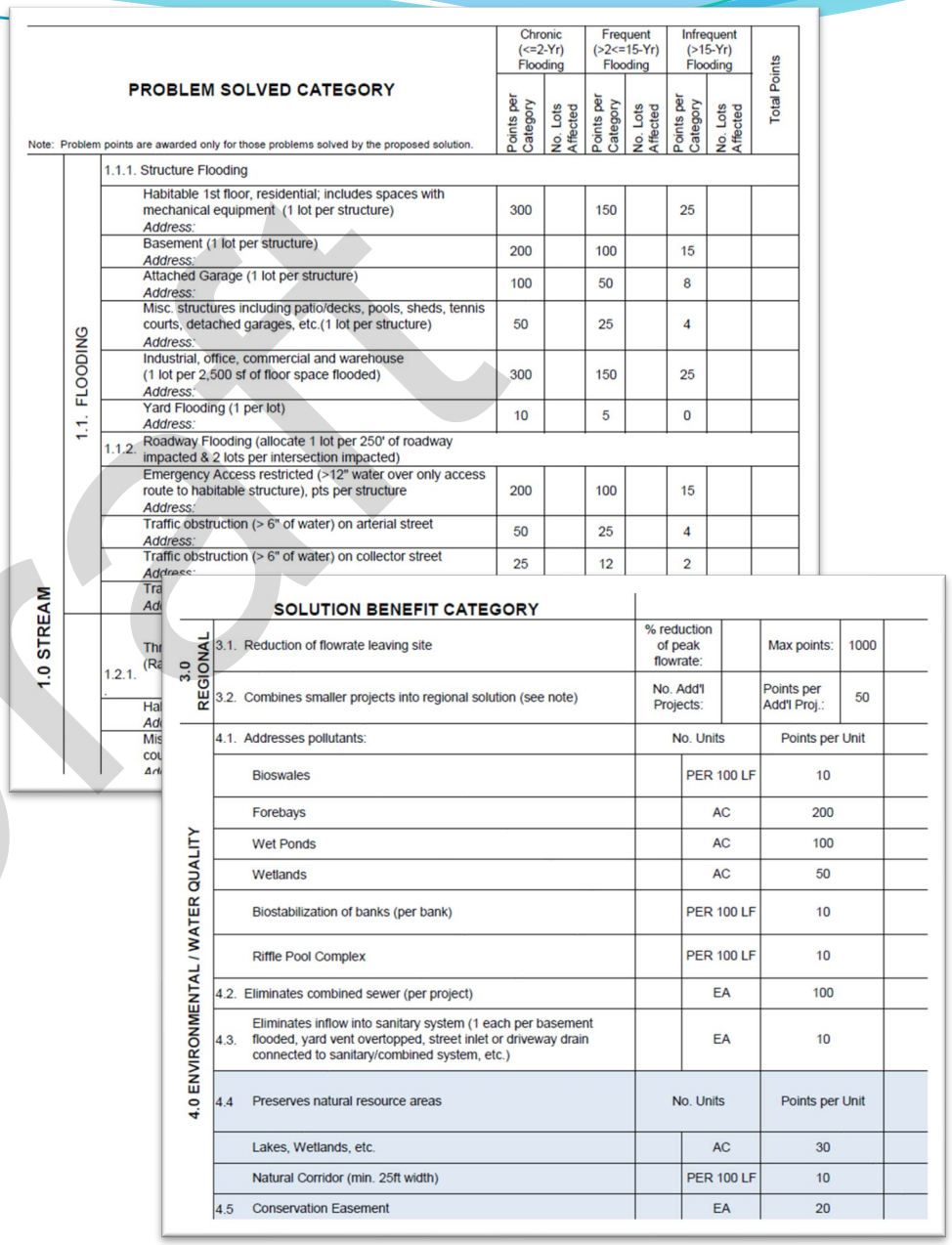
Prioritization Ranking Methodology

- Problem Solved Categories
  - Stream Flooding and Erosion
  - Storm Sewer/Overland Flow Flooding, Erosion, and Condition
- Solution Benefit Categories
  - Regional
  - Environmental/Water Quality
  - Ease of Implementation
  - Recreational/Educational Use
- Benefit/Cost Ratio



PROBLEM SOLVED CATEGORY

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

			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		
		Tra… *Ad…*							
		1.2.1. Thr… (Ra…							
		Hal… *Ad…*							
		Mis… cou… *Ad…*							

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		
	4.4 Preserves natural resource areas	No. Units		Points per Unit		
	Lakes, Wetlands, etc.		AC	30		
	Natural Corridor (min. 25ft width)		PER 100 LF	10		
	4.5 Conservation Easement		EA	20		

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Prioritization Ranking System & Guidance Document

Based on MSD's ranking system

I&L made slight modifications for Creve Coeur including:

- Changing the lengths on item 1.2.3 to allow more points for critical road sections
- Expanding item 1.2.3 to more directly account for erosion threats to roadways and bridges
- Added 1.2.4 for threats to Natural Resources
- Modified 2.4 from Age to condition of existing system (pipes, culverts, etc.)
- Added 4.4 for preservation of Natural Resources
- Added 4.5 for Conservation Easements

Draft

Potential Projects

- City Project Criteria will determine what problem areas are eligible.
- Not every City identified issue will result in a City-funded project
- After the Watershed Management Plan is completed in January, new stormwater issues may develop. The City will then rank these newly identified issues using the same methodology, and these new issues may score higher than previously identified issues.
- Projects need to be approved by the Stormwater Committee and the City Council before receiving City funding. Being at the top of the ranking list alone does not guarantee the issue will be addressed by a City-funded solution.

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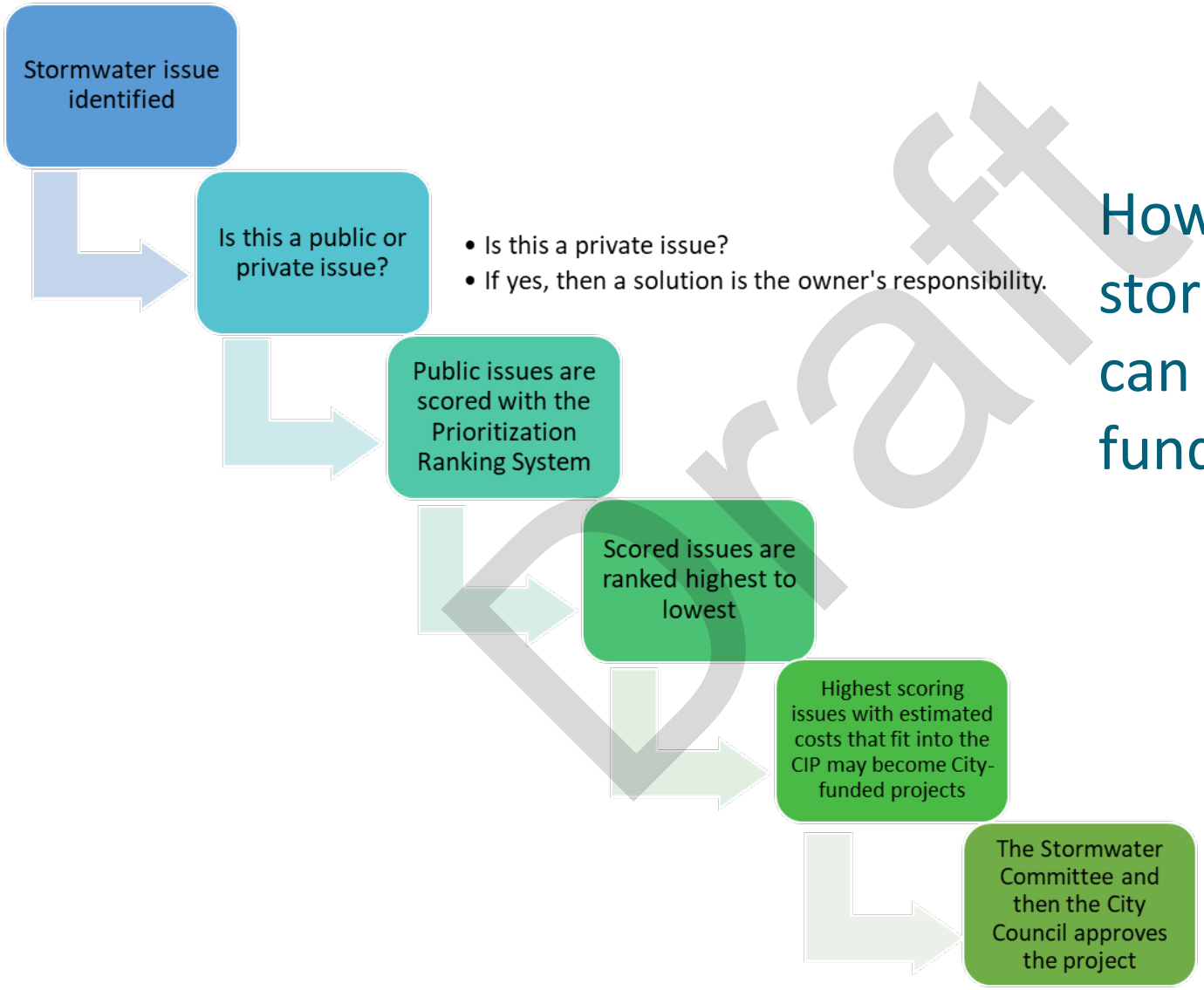
How identified stormwater issues can become City-funded projects



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Criteria for public funding consideration

If an identified issue checks one or more of the boxes, then the project might will be scored with the Prioritization Ranking System.

Is a stormwater issue public or private?	
If one or more boxes are checked, then a publicly-funded solution might be considered	
Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue?	☐ Check for yes
Does the stormwater issue threaten public or private structures?	☐ Check for yes
Does the stormwater issue threaten public or private roadways?	☐ Check for yes
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	☐ Check for yes
Is the issue caused by an undersized stormwater conveyance infrastructure?	☐ Check for yes
Does the proposed project address regional or systematic channel instability?	☐ Check for yes
Would a solution protect water quality or natural resources?	☐ Check for yes
Was the issue caused by altered upstream conditions?	☐ Check for yes
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	☐ Check for yes
Was the issue caused by inadequate maintenance of a public system?	☐ Check for yes
Will the project improve public safety?	☐ Check for yes
Has the stormwater issue been identified as a monitor project?	☐ Check for yes
Is the focus of the project utility work?	☐ Check for no
Does the work focus on privately-owned infrastructure?	☐ Check for no

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Next Steps

- Complete Development of Project Criteria.
- Evaluate potential problem areas using the City's criteria for stormwater project eligibility.
- For each project, conceptual designs will be developed and the projects will be ranked using the prioritization ranking methodology.
- CIP planning software will be developed to assist the City in future planning and budgeting for projects.
- Open House #3 will present the identified Capital Improvement Projects! We hope you join us!

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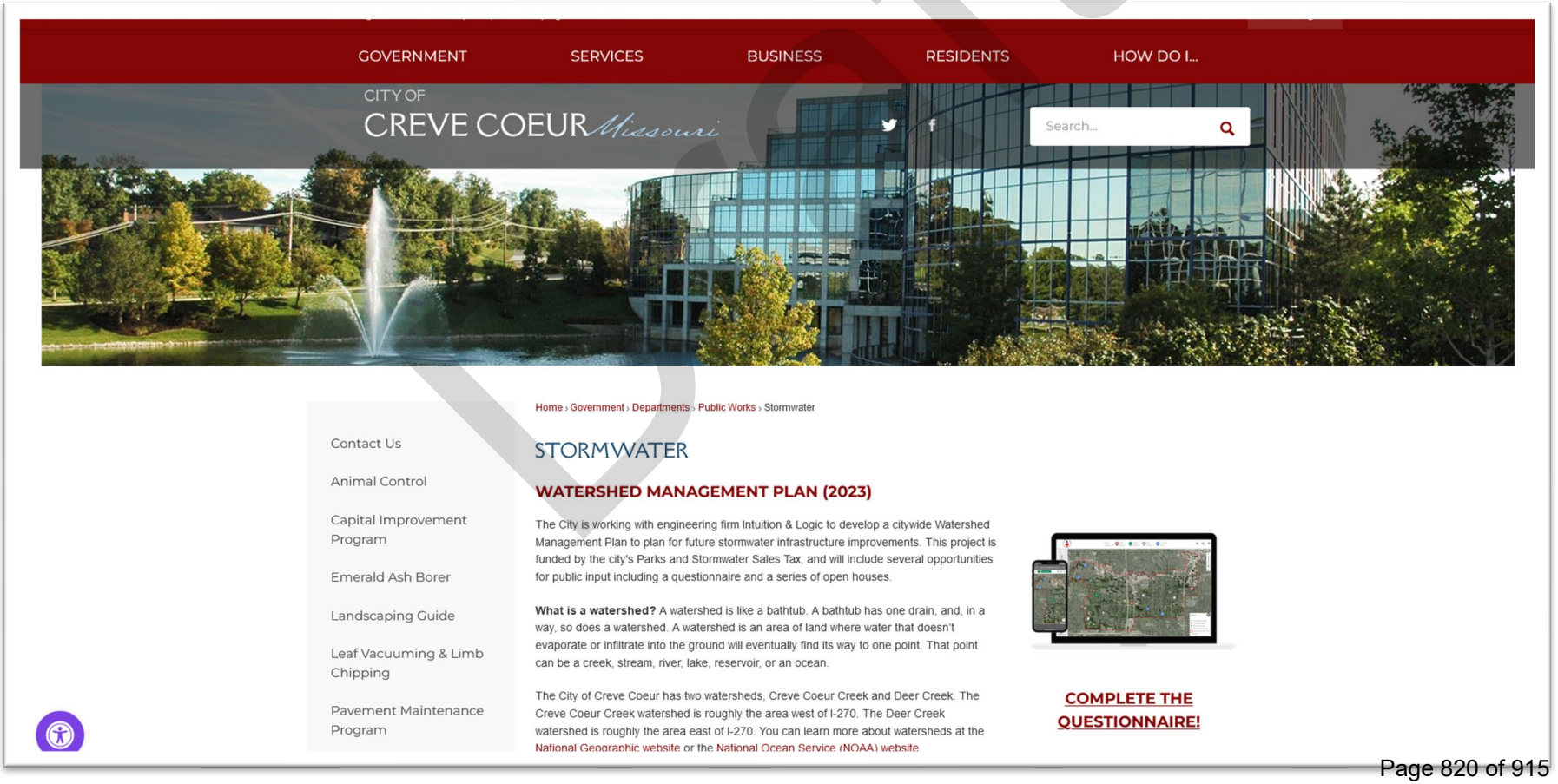
Watershed Management Plan

Project Websites

https://www.crevecoeurmo.gov/stormwater



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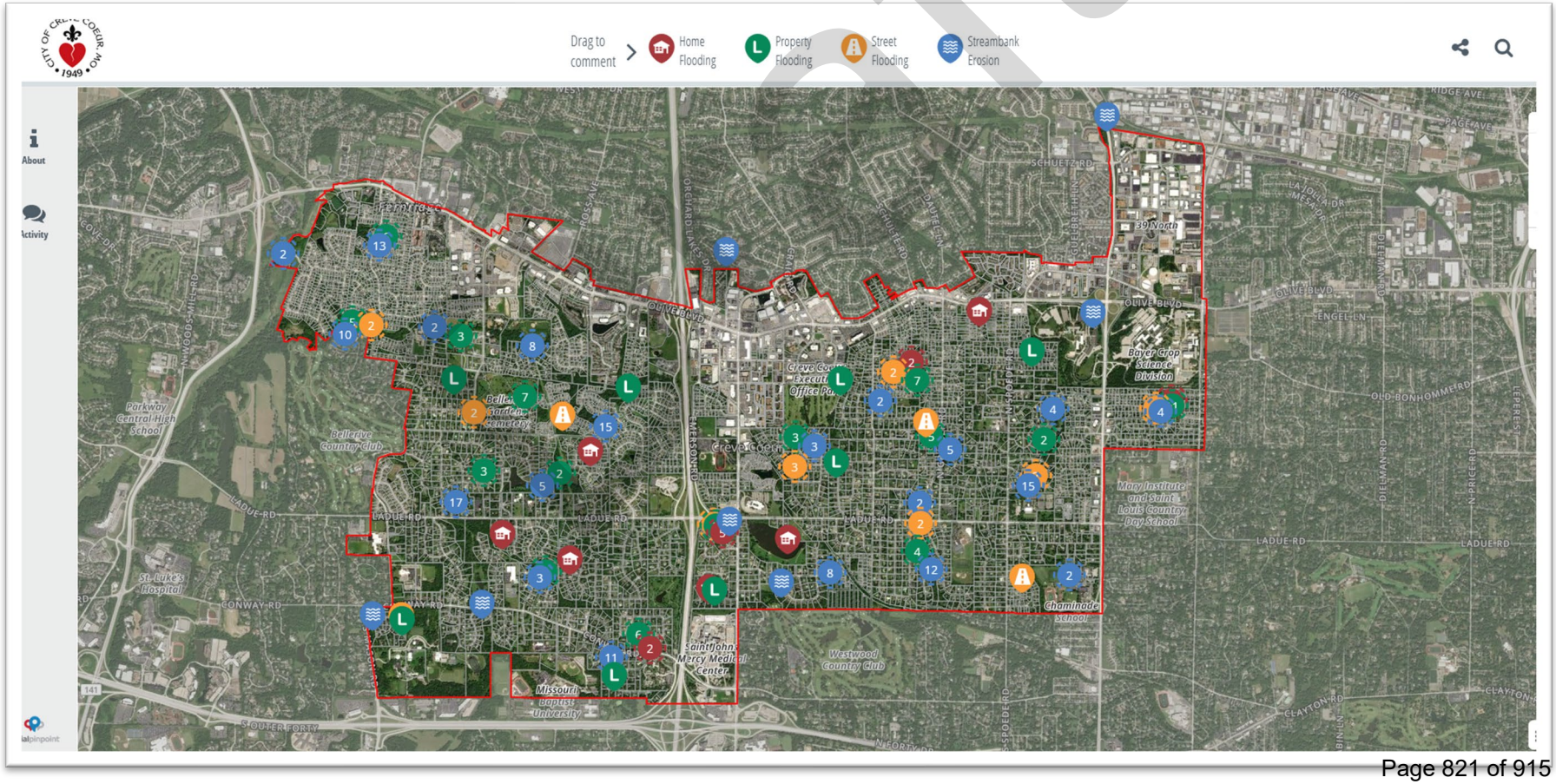
Watershed Management Plan

Project Websites

https://ampm.mysocialpinpoint.com/creve-coeur-storm-water-master-plan#/



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Appendix B
Public Participation Materials

Content:

- Questionnaire
- City Newsletters
- Open House #1 Materials
- Open House #2 Materials
- Open House #3 Materials
- Open House #4 Materials

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Questionnaire

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CITY OF CREVE COEUR
2023 STORM WATER QUESTIONNAIRE

This questionnaire may be filled out online at :

1. Has storm water entered your home in the past? If so, how has water entered your home? (Note: if you're experiencing a basement backup, this is likely a sanitary backup. Please contact MSD.) **(Circle as many as apply.)**
   - A. No storm water has entered my home.
   - B. Leaks in walls or floor.
   - C. Windows or window wells.
   - D. Doors.

2. Has flooding been a problem around your property, but not in the house? **(Circle as many as apply.)**
   - A. No flooding around my home or property.
   - B. Flooding is in the yard with little or no damage.
   - C. Ponding or standing water remains in lawn area more than 24 hours.
   - D. Damage occurs to lawn, trees, or fence.
   - E. Other:

3. Where does the flood water come from? **(Circle as many as apply.)**
   - A. No flooding around my home or property.
   - B. Overflow from creek/swale.
   - C. Overflow from storm drain.
   - D. Flow from neighbor's yard.
   - E. Ponding in yard.
   - F. Other:

4. How many times have you experienced flooding problems at this location in the last three years? **(Circle one.)**
   - A. Flooding is not a problem.
   - B. One time.
   - C. Two times.
   - D. Three times.
   - E. More than three times.

5. Has Creek Bank or Drainage Swale erosion been a problem on your property? **(Circle Location)**

   Creek Bank Drainage Swale

   (Circle one)
   - A. No erosion problem on my property.
   - B. Erosion with little or no damage.
   - C. Erosion that damaged lawn, trees, or fences.
   - D. Erosion will soon damage building(s).

6. Do you know of an area with consistent street flooding in the City?

   No. Yes. (If yes, please note the nearest intersection.)

   _____And_____

   (street name) (street name)

   Can you briefly describe the problem?

   _____

Please use the space below for additional comments: _____

_____

_____

Please provide your name and contact information so that the City may contact you for clarification or for additional information about a problem reported.

*Name: _____ *E-mail: _____

*Phone Number: _____

What is your address, so that the City may better understand the location of any problems reported?

*Address: _____

Thank you for taking the time to complete the City's Storm Water Questionnaire. This information will aid the City as it develops an update to its Storm Water Master Plan. Please note by returning this form you are granting permission for Representatives of the City and its contractors to access this property for inspection and evaluation purposes. Thank You

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City Newsletters

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City of Creve Coeur Newsletter
the heart of community & commerce
February 2023

Council Considers Ballot Measure to Implement Additional Sales Tax on Adult-Use Marijuana

The City Council is considering an ordinance to place Proposition M on the April 4, 2023, ballot for voter consideration. At the time of this writing, a second reading and final vote of the ordinance was scheduled for the January 23 City Council meeting.

The Missouri Constitution allows municipalities to impose an additional sales tax of up to 3% on retail sales of adult-use marijuana with voter approval. If approved by a majority of voters, the sales tax revenue would be dedicated to supporting public safety in Creve Coeur. The additional 3% sales tax would not apply to medicinal marijuana retail sales.

In response to the amendment to Missouri's Constitution approved by voters on November 8, 2022, the Planning and Zoning Commission is reviewing a text amendment to allow recreational marijuana uses in appropriate zoning districts. These marijuana uses include cultivation, manufacturing, and testing facilities, as well as dispensaries. The City Council is expected to consider the text amendment on February 13, or at a later meeting upon receiving a recommendation by the Planning and Zoning Commission.

Proposed language for the ballot:

Proposition M

Shall the City of Creve Coeur be authorized to impose an additional sales tax for the limited purpose of public safety in an amount not to exceed three percent on all tangible personal property retail sales of adult use marijuana sold in the City?

☐ Yes ☐ No

Building Division Provides Progress Update After Implementing Task Force Recommendations

In late 2021, the Building Division implemented several improvements to make the building permitting process more efficient and user friendly. The improvements were implemented at the recommendation of the Building Permit Task Force, established in 2020 to identify opportunities for improvement within the Building Division.

After reviewing areas of concern gathered from survey data and public input, the Task Force recommended several improvements to streamline the permitting process, including amendments to the building code, policy changes and new permitting software. Since taking steps to implement these recommendations, the Building Division has received positive feedback from both residents and contractors about the updated process and policies.

Building Code Amendments – In fall of 2021, the City adopted several amendments to the building code to make Creve Coeur

(Continues on page 3)

This Issue

Page 2
Mayor's Column
Elected Officials
Resident ID Cards
Page 3
Building Division Update
Stormwater Questionnaire
Page 4
Street Light Program
Election Judges
Coffee with the Mayor
Page 5
Employee of the Year
Business Awards
Council Actions
Page 6
Recreation
Page 7
Arbor Day
Page 8
City Calendar
Heart to Heart Run

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Building Division Update *(Continued from page 1)*

consistent with the building code requirements in St. Louis County and consistent with the 2015 International Residential Code as published.

User-Friendly Policy Changes – The Building Division has implemented several new policies to make the permitting process more accommodating and streamlined for residents and contractors, such as no longer charging a penalty fee for every failed inspection, assigning the same inspector throughout a project when possible, and only requiring a final inspection for fences.

New Permitting Software – The City has acquired new software to improve the efficiency and service of the Building Division, another recommendation of the Building Permit Task Force. The new software will allow applicants to submit permit applications, schedule inspections, and view the status of permits and inspections online. The City is currently building the system with our vendor and anticipates it will be available for public use later this year.

Improve Public Perception – The City continues to conduct permit close-out surveys to measure satisfaction among applicants. Survey results show a noticeable increase in satisfaction levels during the past year, which is likely a direct reflection of the code amendments and policy changes made in late 2021.

BUILDING CODE AMENDMENTS – *ADOPTED SEPTEMBER 2021*

1. Interior Doors – There is no minimum size requirement for interior doors. *Previously, the Building Code required a minimum door size of 2'8" except for bathrooms and closets.*
2. Emergency Escape Windows in Basement – Emergency escapes/rescue windows are only required when a new sleeping room is created in the basement. *Previously, they were required upon creation of any space in the basement, such as an office or family room.*
3. Retaining Walls – Residential retaining walls under 48 inches do not require a building permit. *Previously, retaining walls over 30 inches required a permit.*
4. Smoke Detectors – Upgrades during home renovation may be hardwired or battery powered with Wi-Fi interconnectivity. *Previously, hardwired smoke detectors were required when home renovations triggered an upgrade.*
5. Window & Door Replacement – A building permit is not required when the framing is not altered. *Previously, all window and door replacements required a building permit.*

BUILDING DIVISION SURVEY QUESTIONS *A permit close-out survey is sent to the applicant once the project is completed.*	**RESIDENTIAL SURVEY** *% of "Strongly Agree" and "Agree" Responses*			**COMMERCIAL SURVEY** *% of "Strongly Agree" and "Agree" Responses*		
	2021		**2022**	**2021**		**2022**
The office staff was courteous.	88%	+3	91%	82%	+10	92%
The plan review comments were clear and concise.	78%	+12	90%	73%	+19	92%
The Building Inspector was professional.	86%	+5	91%	81%	+7	88%
The Building Inspector was helpful.	74%	+12	86%	72%	+12	84%
The building inspection process was satisfactory.	73%	+11	84%	72%	-1	71%

The above data was presented to the City Council in November 2022 as part of a one-year update from the Building Division. Survey responses represent data collected from January 1–September 30 from applicants following the close-out of building permits.

Help the City Identify Stormwater Issues by Completing the Online Stormwater Questionnaire *(Coming Soon!)*

The City has recently begun the process of developing a citywide Watershed Management Plan in order to plan for future stormwater infrastructure improvements. This process will include several opportunities for public input including a questionnaire and a series of open houses.

Through the online questionnaire, residents can mark stormwater problems they've seen or experienced on a map to help the city identify and prioritize future projects. The more information gathered, the more effective the Watershed Management Plan will be at delivering solutions that could reduce flood risks and help protect homes, yards, streams and streets.

The questionnaire will be available on the City's website starting mid-February at: www.crevecoeurmo.gov/stormwater

Alternatively, individuals who wish to complete the questionnaire over the phone may call 314-872-2533 for staff assistance when the survey opens mid-February.

This project is funded by the City's Parks and Stormwater Sales Tax.

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ARBOR DAY CELEBRATION & ART CONTEST

Sunday, April 30, 2023

Navya Gupta, Grades 3-5, Arbor Day 2022

Sarah Waldron, Middle School, Arbor Day 2022

Celebrate Arbor Day on Sunday, April 30, in Millennium Park with a plant giveaway, activities for kids, educational displays, tree planting demonstration and more! Entries to the all-ages art contest will be on display inside of Tappmeyer Homestead.

ART CONTEST ENTRY RULES

All entries:

- Not to exceed 9" x 12" (no canvas, please)
- Must be any two-dimensional medium: pencil, water color, crayon, marker, oil, photo, digital design, etc.
- Theme: Nature Around Us (any aspect of nature is acceptable)
- Must list artist's name, category, address and phone number on the back of the art piece

SUBMISSION DEADLINE MARCH 24, 2023

Submit to Janet Rueschhoff, City of Creve Coeur
300 N. New Ballas Road, Creve Coeur, MO 63141

Participation ribbons for all entries. Winners will have artwork displayed at the Creve Coeur Government Center for one month; all other artwork can be picked up following the event between 3:00 and 3:30 p.m.

With the exception of winning pieces, any artwork not picked up at the end of the show will be available for pick up at the Government Center until May 31. **Artwork will not be returned by mail.**

★ WWW.CREVECOEURMO.GOV/ARBORDAY ★

award categories PRE-K to KINDERGARTEN | GRADE 1 to GRADE 2 | GRADE 3 to GRADE 5 | MIDDLE SCHOOL | HIGH SCHOOL | ADULT | SENIOR (65+)

educational displays ★ *tree planting demonstration* ★ *activities for kids* ★ *free sapling giveaway*

Information:
Janet Rueschhoff, (314) 872-2511
jrueschhoff@crevecoeurmo.gov

Sunday, April 30, 2023
1:00 to 3:00 PM

TAPPMEYER HOMESTEAD, MILLENNIUM PARK
2 BARNES WEST DRIVE
CREVE COEUR, MO 63141

Presented by the Horticulture, Ecology & Beautification Committee, Arts Committee, Parks & Historic Preservation Committee, and Energy & Environment Committee

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City of Creve Coeur Newsletter
the heart of community & commerce
March 2023

Citizens to Vote on Proposition M on Tuesday, April 4

Creve Coeur Proposition M

On April 4, 2023, Creve Coeur citizens will vote on Proposition M, an additional 3% sales tax on adult use (recreational) marijuana. If approved by a majority of voters, the sales tax revenue will be dedicated to supporting public safety in Creve Coeur. Medical marijuana is exempt from the proposed tax.

Proposed language for **Proposition M**

Shall the City of Creve Coeur be authorized to impose an additional sales tax for the limited purpose of public safety in an amount not to exceed three percent on all tangible personal property retail sales of adult use marijuana sold in the City?

☐ Yes ☐ No

For more information, visit **www.crevecoeurmo.gov/PropM**.

Fast Facts About Creve Coeur's **Proposition M**

- Imposes an additional 3% sales tax on adult use (recreational) marijuana.
- Revenue will be dedicated to public safety in Creve Coeur.
- Applies to dispensaries in Creve Coeur only. Two dispensaries are currently located in Creve Coeur.
- Does not apply to medical marijuana.
- The 3% sales tax on adult use marijuana would be in addition to the 6% state tax on recreational marijuana and all other applicable sales tax in place.

This Issue

Page 2
Mayor's Column
Elected Officials
Favorite Restaurant Award
Page 3
Council Actions
K9 Frizbi's Instagram
Team Tappmeyer Volunteers
Page 4-5
Meet the Candidates
Election Sign Regulations
Municipal Election Notice
Page 6
Recreation
Arbor Day Celebration
Page 7
Heart to Heart Run
Planning Updates
Leaf and Limb Schedule
Page 8
City Calendar
Capital Improvement Program

Residents Invited to Watershed Management Open House

Wednesday, March 22, 2023 • 6:30–8:00 p.m. • Creve Coeur Government Center

The City is working with engineering firm Intuition & Logic to develop a citywide Watershed Management Plan to plan for future stormwater infrastructure improvements. As part of the planning process, residents are invited to attend an upcoming Watershed Management Open House to share stormwater concerns with staff and learn more about the development of the Watershed Management Plan.

The open house is on Wednesday, March 22, at 6:30–8:00 p.m. at the Creve Coeur Government Center, 300 N. New Ballas Rd. This will be the first of a series of open houses to collect feedback and update residents on the progress of the plan as it develops. The more information that residents share about stormwater issues, the better the plan will be at pointing to solutions that will help protect homes, roads and creeks.

During the next couple of months, residents can also expect to see City staff and Intuition & Logic engineers visiting known stormwater issue sites and walking creeks and streams in order to gather additional information for the Watershed Management Plan. This project is funded by the City's Parks and Stormwater Sales Tax. For the latest information, visit **www.crevecoeurmo.gov/Stormwater**.

Complete the online questionnaire & report existing stormwater problem sites on an interactive map at: www.crevecoeurmo.gov/stormwater

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City of Creve Coeur Newsletter
the heart of community & commerce
April 2023

Residents Encouraged to Report Stormwater Issues for the Citywide Watershed Management Plan

As the development of the city's Watershed Management Plan is underway, residents are encouraged to complete the stormwater questionnaire to report existing problem sites within the city using the interactive reporting tool. Through the tool, residents can mark on a map where the problem site is located, as well as see problem sites reported by others.

Stormwater issues reported may include home flooding, property flooding, street flooding or streambank erosion. The more information gathered through the tool, the more effective the Watershed Management Plan will be at helping the city identify and prioritize future stormwater projects. Residents may report issues now through June 1, 2023.

The City is working with engineering firm Intuition & Logic to develop a citywide Watershed Management Plan. The first project open house was held in March to collect feedback and update residents on the progress of the plan. A second open house will be scheduled for the spring.

Complete the online questionnaire & report existing stormwater problem sites on an interactive map at: www.crevecoeurmo.gov/stormwater

City staff and Intuition & Logic engineers will continue to visit known stormwater issue sites in order to gather additional information for the plan. This project is funded by the City's Parks and Stormwater Sales Tax. For the latest information, visit **www.crevecoeurmo.gov/Stormwater**.

This Issue

Page 2
Mayor's Column
Elected Officials
Favorite Restaurant Voting

Recreation Guide

Pages 3
Venable Park Call for Artists
Council Actions
Planning Updates

Page 4
City Calendar
Proposition M

IN THIS ISSUE :

GET READY FOR SUMMER WITH OUR

SUMMER RECREATION GUIDE!

Capital Improvement Program Public Hearing

Monday, April 10, 2023 • 7:00 p.m. • Creve Coeur Government Center • 300 N. New Ballas Rd.

The City Council will host a public hearing at 7:00 p.m. on Monday, April 10, 2023. The subject of the public hearing will be the proposed Capital Improvement Program (CIP) for fiscal years 2024-2028.

The CIP includes design, construction, and management of improvements to the City's facilities, parks, streets, sidewalks, stormwater infrastructure, and equipment. Examples of capital improvements include street repaving, repairs and replacement of playgrounds, new snow plows and creek bank stabilization. The primary funding sources of the CIP are the capital improvement sales tax, the parks and stormwater sales tax, grants, and transfers from the general fund.

The CIP process includes:

- Input from residents, elected and appointed officials and city staff
- Preparation of the draft CIP by city staff
- Review of the CIP by the Planning & Zoning Commission, Finance Committee and the City Council
- A public hearing
- Final adoption by the City Council

Please visit **www.crevecoeurmo.gov/CIP** for more information, including the latest CIP documents.

Draft

City of Creve Coeur Newsletter
the heart of community & commerce
May 2023

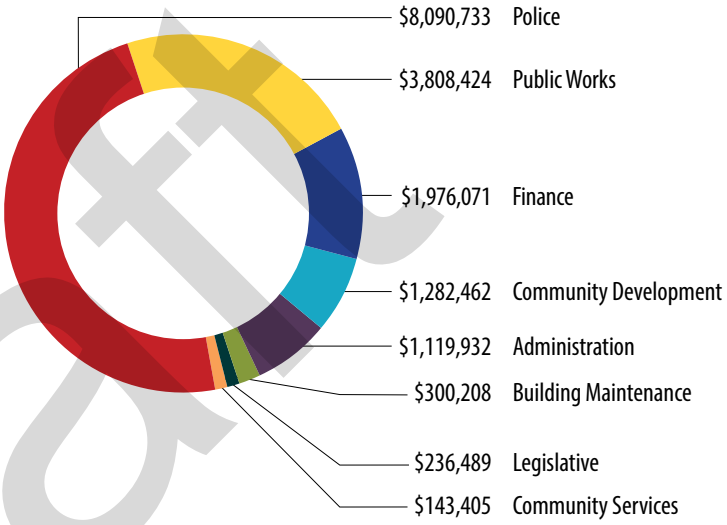
Council Reviewing Proposed Fiscal Year 2024 Budget

The City Council is currently reviewing the proposed budget for Fiscal Year 2024 (FY24), which begins July 1, 2023. In developing the annual budget, city staff rely upon a variety of planning documents, including the city's Strategic Plan, Comprehensive Plan, the five-year Capital Improvement Plan, and the Parks and Recreation Master Plan. The budget is guided by the principles of maintaining high service levels, responding to the needs of residents and businesses, preserving long-term financial stability and providing for well-planned capital investment to preserve infrastructure and facilities.

General Fund

The city's General Fund relies heavily on Intergovernmental Revenues, including sales tax (47% of revenues) and utility licenses (36% of revenues). General Fund revenues are expected to increase 1.3% compared to projected revenues for FY23. This increase is primarily due to an increase in sales tax and increase in utility tax rates. General Fund expenditures are projected to increase 7.4% compared to projected expenditures for FY23 to $16,957,724. This increase is primarily due to personnel and benefit costs, in addition to a large number of full-time position vacancies in FY23. Personnel services comprise approximately 70% of the General Fund Budget.

FY24 General Fund Expenditures by Department



(Continues on page 4)

This Issue

Page 2
Mayor's Column
Elected Officials
Pavement Maintenance Program
Page 3
Council Corner
Little Art Gallery
Watershed Management Plan
Document Shred Event
Page 4
Proposed FY24 Budget
Venable Playground Closure
Page 5
Planning Updates
GFOA Award
Page 6
Recreation
Page 7
Officer of the Year
Council Actions
Page 8
City Calendar
Holiday Trash Schedule
Heart to Heart Run/Walk

City Enters Agreement with Great Rivers Greenway

The City Council recently approved a cooperation agreement with Great Rivers Greenway and other partners to develop a preliminary design of the 39 North Greenway. Adopted by the City in 2020, the 39 North Greenway Plan provides a vision for connectivity as well as access to the Centennial Greenway for Creve Coeur businesses and residents.

Under the agreement, the City will contribute $33,750 toward the project design, and the other partners will cover the remaining funds for a total design cost of $300,000. The proposed greenway segments in Creve Coeur would run through the 39 North Innovation District. Once completed, the preliminary design will be used to seek funding for construction, which is projected for 2025-2027.

Draft

WARD 3
Council Corner

Sari Neudorf & David Z. Hoffman

The month of May and Millennium Park are in full bloom.

Kudos to members of the Horticulture, Ecology and Beautification (HEB) Committee and Committee Chair Mara Berry for another successful Creve Coeur Arbor Day on April 30, 2023. The annual event at Millennium Park was well attended, as always, especially this year with the addition of the musical performance by Babaloo Music & Fun. We also want to recognize all of the amazing artists of all ages who participated in the Arbor Day art contest. The winning pieces are currently on display at the Government Center. Come check them out!

And speaking of beautification in our community, keep an eye out for the new Sculptures on the Move at LaVerne Collins Park and in front of Cold Stone Creamery on Olive Boulevard. The Sculpture on the Move program is a statewide art-on-loan program with nearly two dozen participating Missouri cities. Through the program, the Arts Committee selects new sculptures to add to the city's rotating public art collection for a two-year term.

Next time you visit Millennium Park, take a minute to peruse the Little Art Gallery located next to the Little Free Library. The artists' works will surprise you.

City staff is currently working with engineering firm Intuition & Logic and the Stormwater Committee to gather information from residents to develop a citywide Watershed Management Plan. The next open house is on Wednesday, May 17, from 6:00-7:30 p.m. at the Creve Coeur Government Center.

Stay safe and let us know what we can do for you.

Sari & David

Draft

WELCOME TO THE LITTLE ART GALLERY OF CREVE COEUR!

Little Art Galleries are a free art exchange. Our motto is **"take art, leave art, love art!"** You are encouraged to take home and keep any piece of art you like, or leave a creation of your own for someone else to take home. This Little Art Gallery is located near the entrance of Millennium Park (2 Barnes West Drive) and is brought to you by the Creve Coeur Arts Committee of the City of Creve Coeur.

WATERSHED MANAGEMENT PLAN OPEN HOUSE #2

Wednesday, May 17 • 6:00-7:30 p.m.
Creve Coeur Government Center

Stop by to learn more about the Watershed Management Plan, the scoring system and data collected so far.

www.crevecoeurmo.gov/stormwater

DOCUMENT SHRED EVENT

Saturday, July 22, 2023 • 9:00A–12:00P
Congregation Temple Israel • 1 Rabbi Alvan D Rubin Dr.

City of Creve Coeur Newsletter
the heart of community & commerce
June 2023

Creve Coeur Ice Arena Prepares for Refrigeration System Replacement

In order to maintain the ice arena's aging facility and replace the outdated refrigerant, the facility will require a significant investment in the near future. The ice arena currently uses a refrigerant (R-22) that is no longer produced, environmentally unfriendly and expensive to replace. The City recently commissioned a study to evaluate options for replacing the system, which has been in place since the 2003 renovation and expansion of the ice arena. The study recommended replacement of the existing system with a new ammonia-based refrigeration system. Ammonia is a widely used refrigeration system for ice arenas.

City staff will make a bid recommendation for this project to the City Council at the regular meeting on June 26. Construction is tentatively scheduled for summer and fall 2024. At that time, the ice rink will be closed for up to four weeks as the temporary ice plant system is installed. The temporary system will allow the ice rink to remain operational during the switchover project.

The City was recently awarded $525,000 in grant funding from the Municipal Park Grant Commission to switch over the ice arena's aging refrigeration system to a new system. The City has also dedicated $1.9 million in American Rescue Plan Act (ARPA) funds to the project. The total project cost is estimated as $2.4 million.

Tips for Managing Mosquitos in Your Neighborhood

Mosquitoes plague us with their whines and itchy bites, as well as with the serious and life-threatening diseases they transmit to humans and other animals.

St. Louis County Vector Control provides mosquito mitigation for the City of Creve Coeur on an as needed basis. Mosquito control is primarily targeted through larviciding areas of ponding water where mosquitoes like to lay their eggs. Sites found to contain larvae are treated with an appropriate EPA-registered larvicide. Mosquito spraying (also known as adulticiding) is used as a last resort.

The most effective way to control mosquitoes in your backyard is to eliminate breeding sites: standing water in clogged gutters, old tires, flowerpots, ditches, and so on. Do not allow water to accumulate in places such as flower pot saucers and pet dishes for more than two days. Change the water in bird baths at least once per week. Use a repellent, such as one containing DEET. Mosquitoes are not strong fliers, so breezy places and breezy weather conditions will have fewer mosquitoes.

Residents who are experiencing problems with mosquitoes may submit a service request at **www.crevecoeurmo.gov/servicerequest** or contact the Public Works Department at 314-872-2533 to report the problem area. City staff will investigate and follow up with St. Louis County Vector Control on appropriate mosquito mitigation measures.

This Issue

Page 2
Mayor's Column
Elected Officials
Sculpture on the Move
Page 3
Council Corner
Tappmeyer Homestead Events
Document Shred Event
Page 4
Pool Barrier Regulations
Council Actions
FY24 Budget Public Hearing
Page 5
Out-of-Town Residence Check
New Planning Signs
Planning Updates
Page 6
Recreation
Page 7
Police Department Graduation
Arbor Day Celebration
Page 8
City Calendar
Yard Waste Disposal Tips

Draft

Creve Coeur Lieutenant Graduates from Northwestern University's Staff and Command Program

The Creve Coeur Police Department is pleased to announce the recent graduation of Lieutenant Jonathan McIntosh from the School of Police Staff and Command (SPSC) at Northwestern University. Lieutenant Jonathan McIntosh has successfully completed the 10-week Staff and Command program held in Maryland Heights.

This program, which was implemented by the Center for Public Safety in 1983, has graduated over 30,000 students both nationally and internationally. Lieutenant Jonathan McIntosh was a student in SPSC Class #541 which accommodated a total of 40 students for the 10-week period.

The School of Police Staff and Command provides upper-level college instruction on topics including leadership, human resources, employee relations, organizational behavior, applied statistics, planning and policy development, budgeting and resource allocation.

The Center for Public Safety was established at Northwestern University in 1936 with the specific goal of expanding university-based education and training for the Law Enforcement Community. Since its inception, the Center has broadened its original objective and now provides a variety of courses and programs in the area of police training, management training, and executive development.

Lt. Jon McIntosh and Chief Jeffrey Hartman

Arbor Day Celebration

On Sunday, April 30, the community celebrated Arbor Day this year with a variety of fun, family-friendly activities in Millennium Park.

Visitors admired the display of art contest entries inside of Tappmeyer Homestead.

Babaloo Music & Fun got the party started with an interactive performance the kids loved!

Kids learned about rain gardens at the informational booth for the city's Watershed Management Plan.

Mayor Robert Hoffman and Horticulture, Ecology and Beautification Committee Vice Chair Claire Chosid demonstrated how to properly plant a tree.

Throughout the event, attendees of all ages visited the various educational booths hosted by the Wild Ones, Forest ReLeaf, St. Louis Audubon Society, and several City committees.

Draft

City of Creve Coeur Newsletter
the heart of community & commerce
July 2023

Creve Coeur Explores Sister City Partnership Proposal

The City of Creve Coeur is exploring a Sister City partnership with Cesson-Sévigné, a suburb of Rennes, France. The goal of the Sister City partnership is to build person-to-person connections, create global relationships and promote citizen diplomacy.

Mayor Robert Hoffman and Jean-Pierre Savignac, Mayor of Cesson-Sévigné, have met virtually to discuss the variety of ways both cities can engage their communities in a Sister City relationship, starting with a pen pal program between high school students. The City of Creve Coeur and the City of Cesson-Sévigné may explore additional ways to partner with each other in the future, such as with art and culture exchanges, student exchanges, or sports tournaments.

Creve Coeur and Cesson-Sévigné share many similarities, making it a prime candidate for a Sister City partnership. The cities have similar populations in a metropolitan area, offer many parks, green spaces and public art, are located near major universities, and are home to robust business and research institutions including agriculture and technology industries.

If you would like to get involved with the Sister City Program, please contact Kellie Henke, City Clerk, at **khenke@crevecoeurmo.gov** or 314-872-2517.

What is a sister city? A sister city is a long-term partnership between two communities in two countries. A relationship is officially recognized after the highest elected or appointed official from both communities sign off on an agreement to become sister cities.

Each sister city organization is independent and pursues the activities and thematic areas that are important to them and their community including municipal, business, trade, educational, and cultural exchanges and projects with their sister city. Sister city partnerships can include representatives from nonprofits, municipal governments, the private sector, and other civic organizations—as well as involvement from community volunteers.

City Council Considers Changes in Pension Benefits

The City Council has been reviewing several potential changes to the City's employee retirement plan for the last several months. These changes include:

- Modifying the City's Employee Retirement Plan (Legacy) Plan to include cost of living adjustments (COLA) for current retirees and terminated vested Plan participants. Retirees will receive an increase of 0.75% for each year of retirement since 2002, and an increase of 0.5% annually moving forward; the City has not provided a COLA to retirees since 2002.
- Freezing and transferring administration of the Legacy Plan to the Missouri Local Government Employees Retirement System (LAGERS). This will reduce the city's fiduciary liability associated with managing a city retirement plan, which was closed to new members in 2006.
- Moving the remaining 23 active employees from the Legacy Plan to LAGERS.
- Upgrading the current LAGERS LT-8(65) Plan to the LAGERS L6 Plan. This upgrade will provide a more competitive benefit level to facilitate employee retention and recruitment.

All of these changes and cost statements are included in the Notice of Proposed Pension Changes per Section 105.675 RSMO, available on the City's website. Legislation regarding these changes is tentatively scheduled to be considered by the City Council at its July 24 meeting.

For more information, contact Lori Obermoeller, Director of Finance, at **lobermoeller@crevecoeurmo.gov** or 314-872-2519.

This Issue

Page 2
Mayor's Column
Elected Officials
Coffee with the Mayor
Page 3
Council Corner
Venable Park Memorial
Page 4
Business Award Winners
Page 5
Planning Updates
Council Actions
Watershed Management Plan
Page 6
Recreation
Page 7
Heart to Heart Run Photos
Crime Prevention Events
Page 8
City Calendar
Dead Tree Removal
Holiday Trash Schedule

Draft

Planning Updates *as of June 9, 2023*

Planning and Zoning Commission Approves Amendment to Comprehensive Plan

On June 5, 2023, after several months of study, the Planning and Zoning Commission approved an amendment to the City's comprehensive plan. The amendments were necessary due to the sale and potential redevelopment of the former Bayer West campus, comprising of approximately 96 acres located on the west side of Lindbergh Boulevard, south of Olive Boulevard within the 575-acre 39 North AgTech District. The City's existing comprehensive plan, Creve Coeur 2030, was adopted by the Creve Coeur Planning and Zoning Commission in March 2017. The 39 North Master Plan was adopted in June 2017 as a component of the City's comprehensive plan. The approved amendments put forth new goals and objectives and provide recommendations for the future redevelopment of the former Bayer West campus. The development of a comprehensive plan and any amendments to the adopted plan are a function of the Planning and Zoning Commission. City Council approval is not required. To view the comprehensive plan amendments, please visit the Planning Division website and select the Comprehensive Plan section or visit **www.crevecoeurmo.gov/CompPlan**.

*Planning and Zoning Commission meetings are held on the first and third Monday of the month at 6:00 p.m. in the Council Chambers at the Creve Coeur Government Center, 300 N. New Ballas Rd. For more information, please visit **www.crevecoeurmo.gov/CurrentPlanning**.*

Council Actions *from May 22 and June 12, 2023*

- Ord. No. 5839 amending Section 635.020 of the Municipal Code to establish incentives to bury overhead utility lines
- Ord. No. 5840 approving an intergovernmental master agreement and related computer-aided dispatching services exhibit between the City of Creve Coeur and the REJIS Commission
- Resolution No. 1643 authorizing a contract with DEKA Service for replacement of the Dielmann East HVAC system for a total of $119,879
- Resolution No. 1644 authorizing an agreement for economic development services with the 39 North AgTech Innovation District
- Resolution No. 1645 authorizing an agreement with Kimco USA Inc. under a cooperative purchasing agreement for the purchase of a stainless-steel conveyor for $82,242.95
- Ord. No. 5841 amending the personnel policy and procedures manual of the City of Creve Coeur and amending related ordinances
- Resolution No. 1646 in support of reimbursement of First Bank for a portion of costs incurred for burial of electric transmission lines along Olive Boulevard at the First Bank location
- Resolution No. 1647 authorizing a contract with Two Alpha Contracting, LLC, for the Alden Lane Stormwater Improvements Project for $57,144
- Resolution No. 1648 endorsing Saint Louis County's Grant Program for the city's waste reduction efforts

Watershed Management Plan Underway

Over 280 stormwater issues have been reported or identified.

The City continues to work with engineering firm Intuition & Logic to develop a citywide Watershed Management Plan. Funded by the parks and stormwater sales tax, this plan will act as a guide for future stormwater infrastructure improvements.

What's been done so far? The data collection phase has been completed and included site visits to known stormwater issue sites, as well as public input. Residents were encouraged to complete the online questionnaire and mark their stormwater problems on the map-based reporting tool to help city staff identify areas of concern. Additionally, two open houses have been held so far, allowing residents to talk to staff face-to-face. At the most recent open house, attendees learned more about the plan's progress, including the channel condition scoring matrix and prioritization ranking that will be used to quantify the risks of identified stormwater issues. If you missed an open house, you can find the presentation materials on the City's website.

What's next? Using the data collected, stormwater issues will be ranked with the prioritization ranking system. Two additional open houses will be scheduled for fall and winter to provide residents opportunities to learn more about the plan's progress. Once the Watershed Management Plan is completed, some of the projects with the highest prioritization ranking system scores may be included in the Capital Improvement Program.

Watershed Management Plan Timeline

Spring 2023

- ☑ Open House #1
- ☑ Channel condition assessments
- ☑ Residents report known stormwater issues to the online map-based tool
- ☑ Open House #2

Summer 2023

- ☑ Data collection phase is complete
- ○ Identified stormwater issues are scored and ranked with the Prioritization Ranking System

Fall 2023

- ○ Open House #3
- ○ Begin implementation of budgeting software to help the City maximize benefits from stormwater funds

Winter 2023

- ○ Open House #4
- ○ Watershed Management Planning complete

Learn more at: **www.crevecoeurmo.gov/Stormwater**

Draft

City of Creve Coeur Newsletter
the heart of community & commerce
September 2023

Millennium Park Renovation Project Begins

Millennium Park, the city's busiest park located at 2 Barnes West Drive, is undergoing a significant renovation beginning after Labor Day weekend. Funded by the Parks and Stormwater Sales Tax, this $2.5 million project will feature a new playground that is 1.6 times larger than the existing playground area and a new splash pad that is 2.5 times larger than the existing splash pad area.

The new expanded playground will have a nature theme and include play structures for ages 2-5 and ages 5-12, as well as swings, a climbing structure, and inclusive and independent play features.

The nature theme will continue into the new expanded splash pad. The play area will include bubblers, arches and buckets—all enclosed by a fence. Additional renovations will include the construction of a bandstand for summer concerts and other events, site drainage improvements and the creation of a new entry plaza.

This project is phase 1 of a multi-phase project included in the Millennium Park Master Plan. The City Council adopted the Millennium Park Master Plan in 2021, following months of review and input from Creve Coeur residents, City staff and park stakeholders. The plan builds upon the general recommendations of the Creve Coeur Parks Master Plan adopted in 2019.

(Continued on page 5)

This Issue

Page 2
Mayor's Column
Elected Officials
Street Tree Planting Program
Page 3
Council Corner
Council Actions
Upcoming Town Halls
Page 4
Planning Updates
Holiday Trash Schedule
Page 5
Planning Updates Cont.
Watershed Management Plan
Millennium Park Cont.
Page 6
Recreation
Page 7
Crime Prevention Events
Deer Bow Hunting Season
Page 8
City Calendar
Grow Solar St. Louis

We Want to Hear From You! Submit Your Comments on the Venable Park Commemorative Artwork Proposals

The Venable Park Memorial Jury has selected three finalists to develop concept proposals for commemorative artwork to be installed in Dr. H. Phillip Venable Memorial Park. The three concept proposals will be available for public review and comment from **September 15 through October 15, 2023**.

During this time, informational display boards will be available at the Creve Coeur Government Center lobby between Monday–Friday, 8:00 a.m.–5:00 p.m., and at the Dielmann Recreation Complex any day of the week, 8:00 a.m.–5:00 p.m. The same information will also be available online for public review and comment.

In March, a call for artists was published seeking an artist or artist team to create a site-specific commemorative artwork for Venable Park that engages visitors in the Venable family's story and the legacy of racial residential segregation. The Venable Park Memorial Jury reviewed the submitted artist qualifications and narrowed down the selection to three finalists to develop concept proposals for public review.

Comments collected during the public review period will be shared with the Venable Park Memorial Jury, who will then make a final recommendation to the City Council. The final decision on which proposal to select will be made by the end of the calendar year, with installation anticipated for 2024.

For updates on this project, visit **www.crevecoeurmo.gov/Venable**.

DRAFT

Planning Updates *(Continued)* *as of August 15, 2023*

The following applications were submitted for review by the Planning and Zoning Commission with a public hearing scheduled for Monday, September 18, 2023. The first reading by City Council could occur on September 26 with possible approval on October 9th or at a later meeting upon receiving a recommendation by the Planning and Zoning Commission.

Text Amendment to the Zoning Regulations Regarding Short Term Rentals

Jason Jaggi, Director of Community Development, on behalf of the City of Creve Coeur, has submitted an application for text amendments to Section 405.450.C of the Zoning Ordinance which regulates short term rentals. The Court of Appeals for the 5th Circuit if the United States recently held that a residency requirement for owners of residential properties desiring to engage in short term rentals unconstitutionally interferes with interstate commerce. The City of Creve Coeur's short term rental ordinance presently contains such a restriction and now must be amended for conformity with federal law.

Text Amendment to the Zoning Regulations Regarding the Procedures for the Review of Conditional Use Permits

Jason Jaggi, Director of Community Development, on behalf of the City of Creve Coeur, has submitted an application for text amendments to Section 405.1070 of the Zoning Ordinance which provides the procedures for consideration of applications for Conditional Use Permits by the City Council. The amendments are proposed to refine the procedures regarding these types of applications, including additional procedures when Conditional Use Permits are disapproved by the City Council.

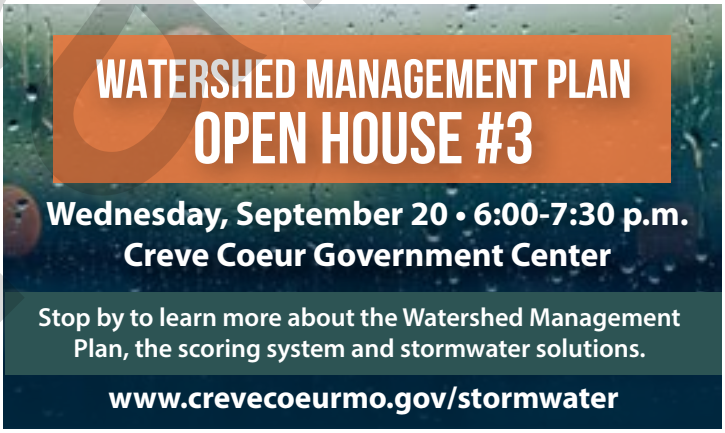
Planning and Zoning Commission meetings are held on the first and third Monday of the month at 6:00 p.m. in the Council Chambers at the Creve Coeur Government Center, 300 N. New Ballas Rd. For more information, please visit **www.crevecoeurmo.gov/currentplanning**.

You're Invited: Join Us for the Next Watershed Management Plan Open House

The City continues to work with engineering firm Intuition & Logic to develop a citywide Watershed Management Plan. Funded by the Parks and Stormwater Sales Tax, this plan will act as a guide for future stormwater infrastructure improvements.

Residents are invited to attend the next open house on Wednesday, September 20, 2023, from 6:00-7:30 p.m. in the Multipurpose Room of the Creve Coeur Government Center at 300 N. New Ballas Rd. At this meeting, residents will learn about possible solutions for stormwater issues identified in Phase I and have an opportunity to talk with the engineering team.

Once the Watershed Management Plan is completed, projects with high prioritization ranking system scores will be included in the Capital Improvement Program.



(Continued from page 1)

Millennium Park Renovation

Construction is scheduled to begin after Labor Day and completed in summer 2024. During construction, the playground, splash pad, pavilion, Tappmeyer Homestead, and west portion of the walking path in Millennium Park **will be closed**. The soccer fields, park restrooms, and walking path east of the construction area will remain open.

Updates on this project will be posted on the City's website at **www.crevecoeurmo.gov/PropC**.

This rendering of the new Millennium Park splash pad shows the features inside the play area. Additional planned features, such as fencing and seating, are not pictured here but will be included in the final design.

Draft

City of Creve Coeur Newsletter
the heart of community & commerce
November 2023

City Implements Stormwater Management Cost-Share Program

Homeowners looking for financial assistance to help resolve a stormwater issue may be eligible for funding through the City's new cost-share program.

The City Council recently approved the establishment of a new Stormwater Management Cost-Share Program for Creve Coeur residents. The goal of the program is to help neighborhoods and individual homeowners solve stormwater issues that are unlikely to be addressed by a City-funded project or receive funding from existing programs.

The program will have two categories: neighborhoods and individual homeowners. The neighborhoods category will help subdivisions maintain the capacity and performance of stormwater detention basins. The individual homeowner category will help individual homeowners maintain existing stormwater maintenance installation or install small projects like rain gardens or bioswales.

The program will be funded by the Parks and Stormwater Sales Tax. The first year of the program will be the pilot phase with project funding limited to $60,000. Through the program, neighborhoods and individual homeowners who have their applications approved will be reimbursed 50% of total cost, up to the maximum limits for each program category.

Funding Summary for Pilot Phase		
	Neighborhoods	Individual Homeowners
Total Funding	$40,000	$20,000
# Projects	2	5
Max. Funding Per Project	$20,000	$4,000

Applications for the pilot phase of the Stormwater Management Cost-Share Program are due Thursday, January 11, 2024. Submitted applications will be reviewed, scored and presented to the Stormwater Committee for consideration. The Stormwater Committee's recommended projects will be presented to the City Council for final approval. Learn more about the program and how to apply at **www.crevecoeurmo.gov/Stormwater**.

This Issue

Page 2
Mayor's Column
Elected Officials
Proclamation Presentation
Page 3
Council Corner
Winter Coat Drive
Upcoming Town Halls
Page 4
Parks & Stormwater Update
Citizen of the Year
Page 5
Sewer Lateral Repair Program
Council Actions
Page 6
Recreation
Planning Updates
Filing for 2024 Election
Page 7
Creve Coeur Night Out
Impact of Solar
Page 8
City Calendar
Holiday Trash Schedule
Leaf Collection Schedule

City Council Approves Reimbursement Increase for Sewer Lateral Repair Program

As of October 1, 2023, the sewer lateral reimbursement through the Sewer Lateral Repair Program has increased from 50% to 70%, with a maximum City contribution of $7,500.

The Sewer Lateral Fund was established in 1999 with voter approval, with the purpose of promoting public health and welfare by facilitating prompt repairs to private sanitary sewer lines. Through the program, residents can apply for partial reimbursement of their expenses for sewer lateral repairs. The program is funded by an annual $28 fee per single-family residence in Creve Coeur.

For the past several years, the number of reimbursement requests has leveled off, allowing revenues to exceed expenditures. As a result, the City has seen a significant increase in the sewer lateral fund balance. After reviewing the sewer lateral fund with City staff at a recent City Council meeting, the City Council voted to approve an increase in the reimbursement percentage to 70% so that more funds may be allocated toward reimbursing residents for costly sewer lateral repairs.

(Continued on pg. 5)

Draft

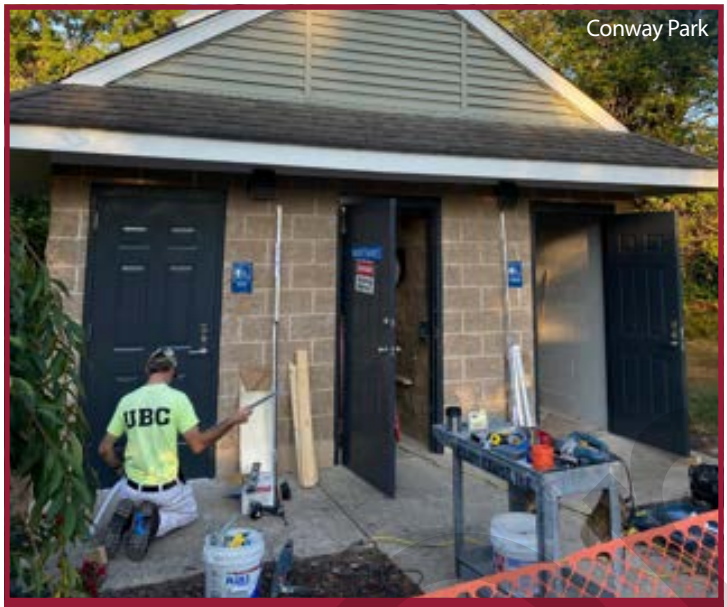
Update on Parks and Stormwater Improvement Projects Underway

The following projects are funded by the Parks and Stormwater Sales Tax. Learn more at **www.crevecoeurmo.gov/PropC**.

Millennium Park

Millennium Park Renovation Project

Since the $2.5 million renovation of Millennium Park began mid-September, the playground and splash pad have been removed and site grading is underway. Next steps will include the installation of storm and sanitary sewer lines, followed by laying the foundation for the expanded playground and splash pad. The restrooms and pavilion will get a fresh coat of paint before the winter weather arrives. The entire project will be completed during summer 2024.



Conway Park

Restroom Renovation at Conway Park and Malcolm Terrace Park

The restrooms at Conway Park and Malcolm Terrace Park are undergoing renovation to convert them from seasonal to year-round restrooms. Previously closed during winter, these restrooms will reopen in early November and will now remain open year round. Portable restrooms are available for park visitors in the meantime as the project wraps up.

Open House #3

Watershed Management Plan

The citywide Watershed Management Plan is entering the final stage of development following several months of public input, data collection and evaluation. Once completed, the plan will act as a guide for future stormwater infrastructure improvements.

The fourth and final open house will be Wednesday, December 13, where staff and consultant engineers will be present to discuss a summary of issues reported and the scores for each public stormwater issue. Stormwater issues with higher Prioritization Ranking Scores are more likely to have a publicly-funded solution. All materials presented during the open houses are also available on the City's website at **www.crevecoeurmo.gov/Stormwater**.

WATERSHED MANAGEMENT PLAN OPEN HOUSE #4
Wednesday, December 13, 2023 • 6:00–7:30 p.m.
Creve Coeur Government Center, 300 N. New Ballas Rd.

CITIZEN OF THE YEAR

Do you know someone who has contributed to the community in a way that goes above and beyond? The City is seeking nominations for the Citizen of the Year 2023 award, recognizing an individual who has made outstanding contributions to Creve Coeur.

Nominations Due November 8, 2023

Submit your nomination at: **www.crevecoeurmo.gov/CitizenOfTheYear**

Draft

City of Creve Coeur Newsletter
the heart of community & commerce
December 2023

Rezoning Application Approved for Former Bayer West Campus Property

The City Council voted to approve an application to change the zoning of the former Bayer West campus to PMD-Planned Mixed Use Development District at the meeting on October 23, 2023. The Site Concept Plan and Phase One Site Development Plan for the development, referred to as Olia Village, were approved for the 96-acre property as Ordinance 5682.

In approving the project, the City Council made several changes to the proposed development standards, including restricting certain uses, limiting the height of parking garages, and requiring extra greenspace for portions of the development that are closest to existing residential areas. Prior to review by the City Council, the Planning and Zoning Commission held three public hearings for the application. The Planning and Zoning Commission recommended approval, subject to several conditions, at its meeting on Monday, October 2.

The developer has submitted a request for economic incentives to assist with certain extraordinary costs associated with the project. These incentives include property tax abatement, sales tax exemption on certain construction materials, and creation of Community Improvement and Transportation Development Districts. On November 13, Ordinance 5682 was amended to clarify that no site improvement permits would be issued until Council action is taken on the incentive request. City Council review of the requested incentives is projected to occur over the next several weeks.

This Issue

Page 2
Mayor's Column
Elected Officials
Subdivision Trustee Meeting
Page 3
Council Corner
Watershed Management Plan
Stormwater Cost-Share Program
Page 4
Capital Improvement Program
Planning Updates
Page 5
Business Awards Nominations
2024 Election Filing
Council Actions
Page 6
Recreation
Real vs. Artificial Christmas Trees
Page 7
Crime Prevention
Holiday Trash Schedule
Page 8
City Calendar
City Boundary Map
Leaf Collection Schedule

Creve Coeur Sergeant Receives 2023 Outstanding Crisis Intervention Team Officer Award

Sergeant Nicole Martin was recognized with the 2023 Outstanding Crisis Intervention Team (CIT) Officer Award by the St. Louis Area CIT Coordinating Council on November 9, 2023. This award recognizes an officer's exemplary dedication and service to those experiencing a mental health crisis.

This past spring, Creve Coeur officers responded to the intersection of Olive Boulevard and I-270 for a report of a suicidal person. Upon arrival, Sergeant Martin directed officers to shut down the interstate and began to calmly talk to the individual experiencing a mental health crisis. Sergeant Martin was eventually able to de-escalate the situation and encouraged the person to move away from the ledge, who was then transported to a hospital for psychological evaluation and treatment. Through her crisis intervention and de-escalation skills, Sergeant Martin was able to avert a potential tragedy.

The CIT program is a national model aimed to promote more effective interactions among law enforcement, mental health care providers, individuals with mental illnesses, their families and communities. As a result, those individuals in crisis will not be unnecessarily arrested because of behavior related to their illness but will instead be afforded access to emergency, inpatient and community-based mental health treatment services. Certified Crisis Intervention Team (CIT) officers are able to skillfully interact with persons in crisis using de-escalation techniques that increase the overall chances of a safe and effective outcome.

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WARD 1
Council Corner

Heather Silverman & Mark Manlin

Now that the year is winding down, it's a great opportunity to look back at 2023. One of the largest and most significant projects/proposals in the city's history, Olia Village, came to the city this year. This project, situated on what was previously the Bayer West campus, is on 96 acres at the corner of Olive Boulevard and Lindbergh Boulevard. As their marketing information states, "The bustling main street of Olia Village will feature a unique collage of boutique shops and popular retailers to appeal to a wide variety of shoppers in a pedestrian-friendly environment. A grocery store, multiple hotels, restaurants, as well as many more retailers will help make Olia Village a destination shopping experience."

To date, the City Council has approved the rezoning for this project and phase 1, which includes grading and the installation of the infrastructure. The developer has submitted a request to the city for various economic incentives to help cover the cost of certain extraordinary expenses associated with completing the project. These incentives include property tax abatement and sales tax exemption on construction materials, and creation of community improvement and transportation development districts. The city has engaged a consultant, PGAV, to assist in the review of this request. The City Council will be considering this issue in the coming weeks and months, but Olia Village is certain to make a big impression on our city and region in the coming years.

The City of Creve Coeur is also in the process of creating a park master plan to evaluate the needs and develop a plan for improvements in Dr. H. Phillip Venable Memorial Park, including commemorative artwork honoring Dr. Venable. The draft master plan and three concept proposals for the commemorative artwork were available for public review September 15 through October 15, 2023. Comments collected during the public review period were shared with the Venable Park Memorial Jury, who will then make a final recommendation to the City Council. The final decision on which proposal to select will be made by the end of the calendar year, with installation anticipated for 2025.

Stay warm and safe over the winter months!!

Heather & Mark

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WATERSHED MANAGEMENT PLAN
OPEN HOUSE #4

Wednesday, December 13, 2023
6:00-7:30 p.m.
Creve Coeur Government Center
300 N. New Ballas Rd.

Join us for the final open house where staff and consultant engineers will be present to discuss a summary of issues reported and the scores for each public stormwater issue.

www.crevecoeurmo.gov/stormwater

Residents and Neighborhoods Encouraged to Apply for the **Stormwater Management Cost-Share Program**

The new Stormwater Management Cost-Share Program was established to help neighborhoods and individual homeowners in Creve Coeur solve stormwater issues that are unlikely to be addressed by a City-funded project or receive funding from existing programs.

The program has two categories: neighborhoods and individual homeowners. The neighborhoods category will help subdivisions maintain the capacity and performance of stormwater detention basins. The individual homeowner category will help individual homeowners maintain existing stormwater maintenance installation or install small projects like rain gardens or bioswales. Through the program funded by the Parks and Stormwater Sales Tax, neighborhoods and individual homeowners who have their applications approved will be reimbursed 50% of total cost, up to the maximum limits for each program category.

Applications for the pilot phase of the Stormwater Management Cost-Share Program are due Thursday, January 11, 2024. Submitted applications will be reviewed, scored and presented to the Stormwater Committee for consideration. The Stormwater Committee's recommended projects will be presented to the City Council for final approval. Learn more about the program and how to apply at **www.crevecoeurmo.gov/Stormwater**.

City of Creve Coeur Newsletter
the heart of community & commerce
January 2024

City Honors Citizens of the Year 2023

The Creve Coeur City Council recognized Mike Karasick and Ted Armstrong as Citizens of the Year 2023 for their dedication and service to the community at the annual Appreciation Event on Tuesday, December 5, at the Creve Coeur Government Center. Mayor Robert Hoffman presented the award to Karasick and Armstrong during the event honoring all city volunteers and members of the city's boards, committees and commissions.

"Mike and Ted both have extensive experience in the financial sector and have brought invaluable expertise to the Employee Pension Fund Board," said Mayor Hoffman. "Under their leadership, the board has successfully tackled numerous complex issues and challenges during the past year."

During their tenure on the Employee Pension Fund Board, Karasick and Armstrong have been instrumental in taking actions to protect the city's fiduciary interests. These actions include lowering the interest earnings assumption for the Legacy Pension Plan from 7% to 6.75% in 2019—and then from 6.75% to 6% in 2022.

The Employee Pension Fund Board has also reviewed and analyzed a proposal to transition the City's Legacy Pension Plan to Missouri LAGERS, the statewide municipal retirement plan. This transition to LAGERS is nearing completion, resulting in reduced long-term fiduciary liability to the city, peace of mind to retirees and a more competitive benefit to attract and retain great employees.

Mayor Robert Hoffman (center) presents the 2023 Citizen of the Year Awards to Mike Karasick (left) and Ted Armstrong (right).

In addition, a one-time lump sum option was initiated by the Employee Pension Board for participants who had separated from service with a vested accrued benefit, thereby reducing the fund's liability.

Karasick was appointed to the Employee Pension Fund Board of Trustees in 2016 and has served as Chair since 2020. Armstrong currently serves as the Vice Chair of the Employee Pension Fund Board of Trustees; he has also served on the Finance Committee from 2007 to 2011 and was reappointed in 2019.

City Staff Explores Options for Lake School House

City staff is working on developing the Lake School Park Master Plan based on the recommendations of the Creve Coeur Parks Master Plan adopted in 2019. Located at 581 Coeur De Ville Road, Lake School Park is home to three tennis courts, a soccer field, and the historic Lake School House.

Lake School House is in need of structural, costly repairs and has been closed to the public for many years. These necessary repairs to restore the building with historically accurate alterations is estimated to cost $350,000. One option under consideration is to donate the building to a local historical group. The Chesterfield Historic and Landmark Preservation Committee and the City of Chesterfield have expressed interest in taking possession of the Lake School House and are currently looking into the possibility of relocating the building.

If no historical groups are interested, then City staff has recommended the Lake School House be demolished due to the high cost of repairs and ongoing maintenance. Demolition of the building would allow more space for parking to accommodate the possible expansion of the tennis and pickleball courts, in addition to a playground and walking trail.

This Issue

Page 2
Council Actions
Elected Officials
2024 Business Awards
Special Insert
Popular Annual Financial Report
Page 3
Pedestrian Safety
Recreation
Page 4
City Calendar
Mid-Winter Limb Chipping
Subdivision Trustee Meeting
Stormwater Cost-Share Program
Capital Improvement Program

Draft

City of
CREVE COEUR
300 N. New Ballas Road
Creve Coeur, MO 63141-7501

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January Calendar

1	City Offices Closed - New Year's Day	
2	Planning & Zoning Commission - Canceled	
4	Coffee with the Mayor	7:30A
8	City Council Work Session	6:00P
	City Council Meeting	7:00P
10	Stormwater Committee	4:45P
	Parks & Historic Preservation Committee	5:00P
	11400 Olde Cabin Rd.	
	Annual Subdivision Trustee Meeting	6:30P
15	City Offices Closed - Martin Luther King Jr. Day	
16	Economic Development Committee	8:00A
	Planning & Zoning Commission	6:00P
17	Horticulture, Ecology & Beautification Committee	4:30P
	Energy & Environment Committee	5:30P
18	Board of Adjustment	4:00P
22	City Council Work Session	6:00P
	City Council Meeting	7:00P
30	Finance Committee	4:00P
31	Arts Committee	6:00P

February Calendar

1	Coffee with the Mayor	7:30A
5	Planning & Zoning Commission	6:00P
12	City Council Work Session	6:00P
	City Council Meeting	7:00P
14	Parks & Historic Preservation Committee	5:00P
	11400 Olde Cabin Rd.	

Public meetings may be held either online or in person at the Creve Coeur Government Center, unless otherwise specified. Please check the meeting's agenda posted on the City's website for the most up-to-date information at: www.crevecoeurmo.gov

Mid-Winter Limb Chipping

Public Works crews will make one pass through the city to chip limbs placed at the curb beginning on **Monday, January 29.** This start date is weather dependent, and the program may be suspended at any time due to inclement weather. To guarantee pick up, please have your limbs at the curb by 7:00 a.m. the morning of January 29. To qualify, limbs must be:

- Placed by the curb (not in the street),
- At least 3 feet long, between 0.5 and 3 inches in diameter,
- Less than 300 cubic feet per pick up (e.g., 10' wide x 5' tall x 6' deep).
- Limbs only (no leaves, evergreens, vines, bamboo, root balls or thorns)

Sign up for updates at **www.crevecoeurmo.gov/SignUp**.

MARK YOUR CALENDAR:

JAN 10

Annual Subdivision Trustee Meeting

Subdivision trustees are invited to attend the annual subdivision trustee meeting hosted by the City of Creve Coeur on Wednesday, January 10, 2024, at 6:30 p.m. at Creve Coeur Government Center, 300 N. New Ballas Rd. This meeting is open to the public.

JAN 11

Applications Due for Stormwater Management Cost-Share Program

Individual homeowners and neighborhoods looking for financial assistance to help resolve a stormwater issue may be eligible for funding through the City's new cost-share program. Applications are due Thursday, January 11, 2024. Learn more at **www.crevecoeurmo.gov/Stormwater**.

JAN 26

Submit Your Project Idea for the Capital Improvement Program

The City maintains a five-year outlook of its capital improvements through the Capital Improvement Program (CIP) and is seeking input from the community on future projects. Submitted project ideas are due by Friday, January 26, 2024. Learn more at www.crevecoeurmo.gov/CIP.

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Open House #1

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Watershed Management Plan

1

Watershed Master Planning

- City Planning Effort
- Previous Efforts
  - 1999 Stormwater Evaluation Report
  - 2010 Stormwater Questionnaire
  - 2012 Stormwater Master Plan Update
- Overall Goals
  - Updated Master Plan
  - Integrate Public Input
  - Develop Prioritization Ranking Methodology

2

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Watershed Management Plan
Goals & Objectives

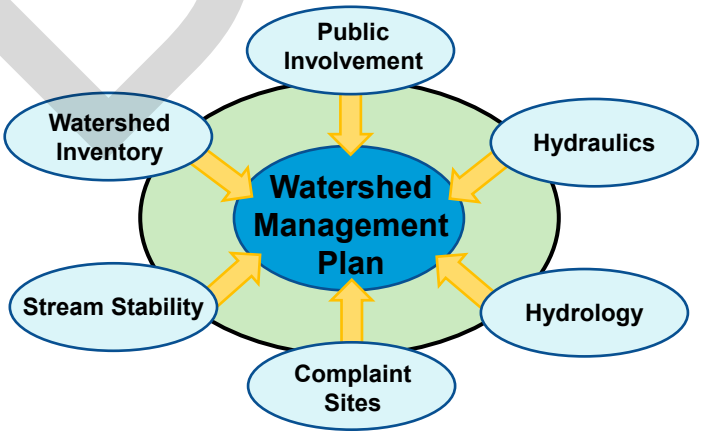
Goal - Develop planning tools and capital improvement projects to address water quality, stream stability, and stormwater infrastructure and drainage issues.

Study Objectives

- Maintain a proactive public involvement process
- Identify needed Capital Improvement Projects (CIPs) for stormwater issues
- Quantify existing hydrologic and hydraulic data
- Map stream corridors
- Evaluate complaint sites
- Develop prioritization ranking method

3

Watershed Management Plan
Major Study Components



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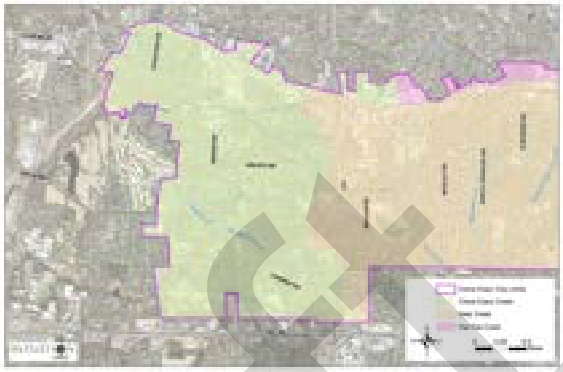
Creve Coeur Creek Watershed Study Area

- 27 Square Miles Watershed
- 4.4 Square Miles Study Area



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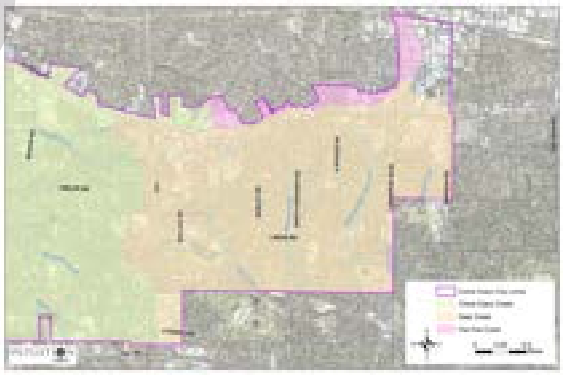
Deer Creek Watershed Study Area

- 37.7 Square Miles Watershed
- 5.1 Square Miles Study Area



6

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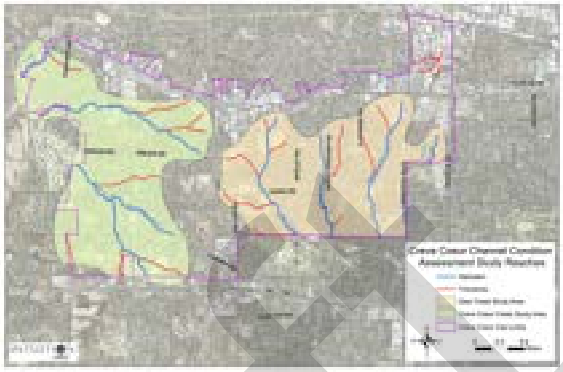
Channel Condition Assessment

- 9.5 Square Miles Study Area
- Over 20 miles of stream field observation
  - Creve Coeur Creek
  - Fernridge Creek
  - Smith Creek
  - Rosenfelder Creek
  - Deer Creek
  - Windrush Creek
  - Monsanto-Sunswept Creek
  - Pebble Creek
  - Denny Creek



7

Complaint Site Investigation

- Based on past complaints received by the City and online survey complaints
- Field visits
  - Verify problem
  - Determine scope
  - Develop potential solutions

- Not every complaint investigated may turn into a project.

8

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Prioritization Ranking Methodology

- Problem Categories
  - Stream Flooding and Erosion
  - Storm Sewer/Overland Flow Flooding, Erosion, and Condition
- Solution Categories
  - Regional
  - Environmental/Water Quality
  - Ease of Implementation
  - Recreational/Educational Use
- Benefit/Cost Ratio

9

Watershed Management Plan

Project Websites

https://www.crevecoeurmo.gov/stormwater

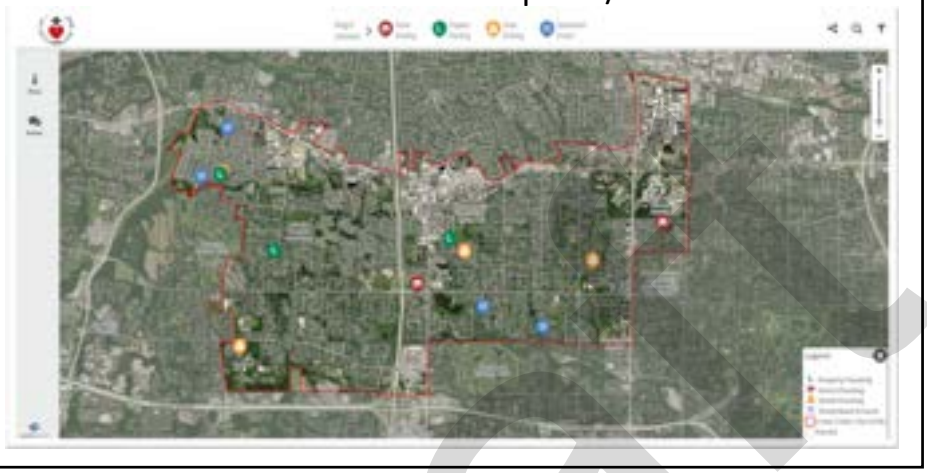
10

Draft

Watershed Management Plan

Project Websites

https://ampm.mysocialpinpoint.com/creve-coeur-storm-water-master-plan#/



11

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Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DATE:

PROJECT LOCATION:

PROJECT DESCRIPTION:

PROBLEM CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
1.0 STREAM								
1.1. FLOODING	1.1.1. Structure Flooding							
	Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) *Address:*	300		150		25		
	Basement (1 lot per structure) *Address:*	200		100		15		
	Attached Garage (1 lot per structure) *Address:*	100		50		8		
	Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50		25		4		
	Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) *Address:*	300		150		25		
	Yard Flooding (1 per lot) *Address:*	10		5		0		
	1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
	Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure *Address:*	200		100		15		
	Traffic obstruction (> 6" of water) on arterial street *Address:*	50		25		4		
	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 (2 lots per intersection impacted and 2 lots for undermined/failing bridges or culverts)	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: (1 lot per 50' of roadway) *Address:*	75		50		12		
	Collector Road: (1 lot per 100' of roadway) *Address:*	35		25		6		
	Residential Road: (1 lot per 250' of roadway) *Address:*	20		12		3		
	1.2.4. Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft		
		20		10		5		

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DATE:

PROJECT LOCATION:

PROJECT DESCRIPTION:

PROBLEM CATEGORY, CONT.		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	Condition of Existing System (if condition unknown, assign points based on age: Poor >50yrs, Fair 26-50 years, Good <25 years)	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
	Points for Condition							
		TOTAL PROBLEM POINTS						

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DATE:

PROJECT LOCATION:

PROJECT DESCRIPTION:

SOLUTION 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		
	4.4 Preserves natural resource areas	No. Units		Points per Unit		
	Lakes, Wetlands, etc.		AC	30		
	Natural Corridor (min. 25ft width)		PER 100 LF	10		
	4.5 Conservation Easement		EA	20		
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		

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

TOTAL COST IN THOUSANDS=

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

Place "X" in one box below:

☐ **Creve Coeur Project**
☐ **Project by Others**

DRAFT

Channel Condition Scoring Matrix
(Adapted from Johnson et al 1999)

	Stability Indicator	Good (1)	Fair (2)	Poor (3)
1	Bank soil texture and coherence per Uniform Soil Classification using the visual-manual procedures (ASTM D 2488-00)	Cohesive materials, clay (CL), silty clay (CL-ML), massive limestone, continuous concrete, clay loam (ML-CL), silty clay loam (ML-CL), thinly bed limestone	Sandy clay (SC), sandy loam (SM), fractured thinly bedded limestone	Non-cohesive materials, shale in bank, (SM), (SP), (SW), (GC), (GM), (GP), (GW)
2	Average bank slope angle as measured where obvious breaks in slope create a top of bank and toe of slope	Slopes ≤ 2H:1V on one or occasionally both banks	Slopes from 2H:1V to1.7H:1V common on one or both banks	Slopes steeper than to1.7H:1V on one or both banks
3	Average bank height as measured from the lowest point in the channel cross section to the top of bank	Less than 6 feet	Greater than 6 and less than 12 feet	Greater than 12 feet
4	Vegetative bank protection	Wide to medium band (≥ the width of the riparian buffer) of woody vegetation with 70-90% plant density and cover. Majority are hardwood, deciduous trees with well-developed understory layer, minimal root exposure	Narrow band (>20 feet up to the buffer width) of woody vegetation, poor species diversity, 50-70% plant density, most vegetation on top of bank and not extending onto bank slope, some trees leaning over bank, root exposure common	Thin or no band (20 feet or less) of woody vegetation, poor health, monoculture, many trees leaning over bank, extensive root exposure, turf grass to edge of bank
5	Bank cutting	Little to some evident along channel bends and at prominent constrictions, some raw banks up to 4 foot	Significant and frequent. Cut banks 4 feet high. Root mat overhangs common.	Almost continuous cut banks, some over 4 feet high. Undercut trees with sod-rootmat overhangs common. Bank failures frequent
6	Mass wasting (wedge or slide slope failure)	Little to some evidence of slight or infrequent mass wasting, past events healed over with vegetation. Channel width relatively uniform with only slight scalloping	Evidence of frequent and significant mass wasting events. Indications that higher flows aggravated undercutting and bank wasting. Channel width irregular with bank scalloping evident	Frequent and extensive mass wasting evident. Tension cracks, massive undercutting and bank slumping are considerable. Highly irregular channel width.
7	Bar development	Bar width is less than ¼ of the channel width at low flow, well-consolidated, vegetated and composed of coarse bed material to slight recent growth of bar as indicated by absence of vegetation on part of bar	Bar widths ¼ to ½ of channel width at low flow with freshly deposited sand to small cobbles with sparse vegetation	Bar widths greater than ½ the channel width at low flow. Bars are composed of extensive deposits of finer bed material with little vegetation
8	Debris jam potential	Slight – small amounts of debris in channel. Small jams could form	Moderate – noticeable debris of all sizes present	Significant – moderate to heavy accumulations of debris apparent
9	Obstructions, flow deflectors and sediment traps	Negligible to few or small obstructions present causing secondary currents and minor bank and bottom erosion but no major influence on meander bend	Moderately frequent and occasionally unstable obstructions, noticeable erosion of channel. Considerable sediment accumulation behind obstructions	Frequent and unstable causing continual shift of sediment and flow
10	Channel bed material consolidation and armoring	Massive competent to thinly bed limestone, continuous concrete, hard clay, moderately consolidated with some overlapping. Assorted sizes of particles, tightly packed and overlapped, possibly imbricated. Small % of particles < 4mm	Shale in bed, soft silty clay, little consolidation of particles, no apparent overlap, moderate % of particles < 4mm	Silt, weathered, thinly bedded, fractured shale, high slaking potential, very poorly consolidated, high % of material < 4mm
11	Percentage of channel cross section constriction	< 25% of average cross section area	26-50% of average cross section area	> 50% of average cross section area
12	Sediment movement	Little to no loose sediment	Scour and/or deposition, some loose sediment	Near continuous scour and/or deposition and/or loose sediment
13	Sinuosity (ratio of the channel length to valley length) channel length = longitudinal profile survey length	1.2 ≤ Sinuosity ≤ 1.4	1.1<Sinuosity <1.2	Sinuosity <1.1 or >1.4

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STREAM DOMINANT PROCESS

Stable

- Channel is healthy
- Bed and bank materials balanced with erosive forces
- Permanent woody vegetation near the water line
- ***No erosion hazards***

Incision

- Down cutting liberates sediment
- Trees falling and sliding into channel
- Bank failures begin
- ***Significant erosion hazards in this phase***

Widening

- Widespread bank failures
- Significant sediment loads generated
- ***Significant erosion hazard in this phase***

Planform Adjustment

- Active bank scour opposite channel bar formations
- Bank failures at the outside of bends
- Alternating pattern of scour and deposition
- ***Significant erosion hazard in this phase***

Managed Swale

Early Stage Incision

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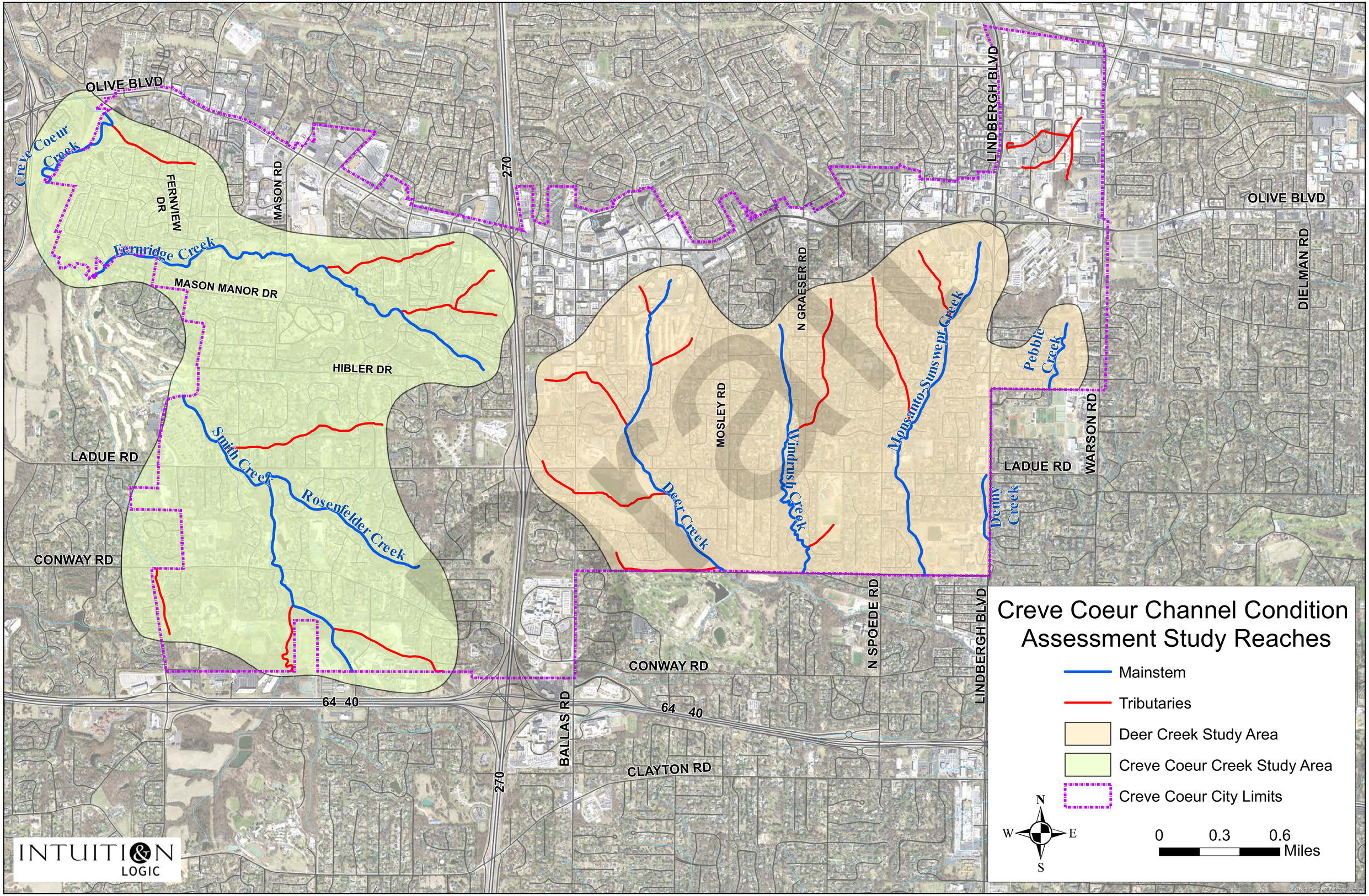

OLIVE BLVD
Creve Coeur Creek
FERNVIEW DR
MASON RD
270
LINDBERGH BLVD
OLIVE BLVD
DIELMAN RD
Fernridge Creek
MASON MANOR DR
HIBLER DR
N GRAESER RD
MOSLEY RD
Monsanto-Sunswept Creek
Pebble Creek
WARSON RD
LADUE RD
Smith Creek
Rosenfelder Creek
Deer Creek
Windrush Creek
Denny Creek
CONWAY RD
N SPOEDE RD
LINDBERGH BLVD
64 40
BALLAS RD
CONWAY RD
64 40
CLAYTON RD
270
INTUITION & LOGIC
Creve Coeur Channel Condition Assessment Study Reaches
Mainstem
Tributaries
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur City Limits
N
W
E
S
0
0.3
0.6
Miles
St. Louis County GIS Service Center

OLIVE BLVD
Creve Coeur Creek
FERNVIEW DR
MASON RD
270
Fernridge Creek
MASON MANOR DR
HIBLER DR
MOSLEY RD
N GRAESER RD
LINDBERGH BLVD
OLIVE BLVD
Monsanto-Sunswept Creek
Pebble Creek
LADUE RD
Smith Creek
Rosenfelder Creek
Deer Creek
Windrush Creek
Denny Creek
WARSON RD
CONWAY RD
N SPOEDE RD
LINDBERGH BLVD
64 40
BALLAS RD
CONWAY RD
64 40
CLAYTON RD
270

Legend

- Home Flooding
- Property Flooding
- Street Flooding
- Streambank Erosion
- Streams
- Parcel Limits
- Creve Coeur City Limits

N
W E
S

0 0.25 0.5 Miles

INTUITION & LOGIC

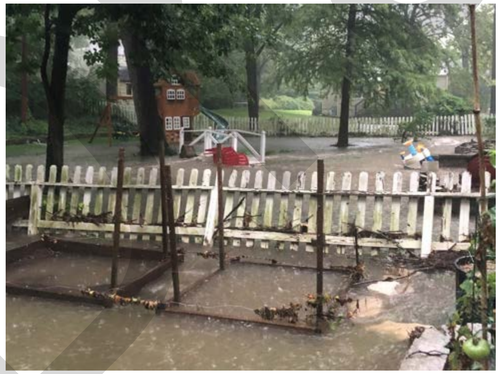
STORMWATER ISSUE SPECTRUM

LOW → HIGH

NUISANCE DRAINAGE ISSUES

MINOR YARD FLOODING

MAJOR YARD FLOODING



STREET FLOODING

STRUCTURAL FLOODING & FAILURES

Open House #2

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DEPARTMENT OF PUBLIC WORKS
STAFF MEMORANDUM

DATE: May 22, 2023

TO: Jim Heines, Director of Public Works

FROM: Dione Garson, P.E., Civil Engineer

SUBJECT: Open House #2
Watershed Management Plan

The second Watershed Management Open House was held on Wednesday, May 17, 2023 from 6:00 PM to 7:30 PM. Approximately fifteen residents attended the event.

Presentation
Tim Dean from Institution & Logic (I&L) started the night with a Power Point presentation that gave residents an overview of Watershed Management Plan that included information about:

- The planning process and study components
- The plan's goals and objectives
- The channel condition assessment findings
- Stormwater issues data collection
- Analysis of problem areas
- Prioritization ranking methodology
- How projects will be identified for possible inclusion in the Capital Improvement Program (CIP)
- Systematic data trends
    - As expected, creeks with late stage incision had a more reported issues such as fallen trees
    - Widening and planform reaches have a higher likelihood of reports of yard retreat

Questions from residents
After the presentations, residents asked the following questions:

Question:
If a stormwater issue was identified in one of the City's past watershed planning efforts, how will that impact the ranking for the 2023 Watershed Management Plan?

Answer:
The ranking system strives to identify projects that will be the best use of City funds.

When a stormwater issue was first identified is not considered in scoring or ranking in the current Watershed Management Plan's Prioritization Ranking System. Scoring considers severity (risk), frequency, costs, and benefits.

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The scoring system is intended to be applied consistently over time. Individual scores reflect the evaluation of the stormwater issue at a given point in time. Over time, conditions may change. If the severity, frequency, costs, or benefits associated with a stormwater issue change over time then the score will be reevaluated. Similarly, ranking depends on the scores of all identified projects at any given time. As scores change so may the ranking of potential CIP projects.

The City is establishing criteria for distinguishing and defining the difference between public and private projects. This criteria will be used to determine which public stormwater issues will be included for consideration as possible projects for the CIP.

Question:
What is an example of a severe problem that would score highly and likely become a City-funded project?

Answer:
Examples of stormwater problems that will have a high risk component and therefore have a higher likelihood of having a City-funded solution:

- Habitable first floor flooding
- Basement flooding
- Emergency access roadway flooding

Examples of stormwater problems that will have a low risk component and are less likely to have a City-funded solution:

- Yard flooding
- Less than six inches of water on a residential street
- Flooding on miscellaneous structures such as tennis courts, patios, pools, and decks.

In addition to cost and benefit, the scoring also considers frequency. Stormwater issues with higher frequency have greater scores than the same type of issues that occur less frequency.

Question:
If a stormwater problem is determined to be a private project and/or the prioritization ranking is low and the project is unlikely to receive City funding, what help will be available to homeowners?

Answer:
The Stormwater Committee is working on developing a grant cost-share program. Currently, the committee is in the process of determining what types of projects may be eligible for funding and the scoring criteria that will be used evaluate and rank applications.

If the proposed cost-share program is approved by City Council, the program would reimburse residents a percentage of the cost of the design and construction of private stormwater management improvements.

Not all applications will be funded. If the total sum of requests for reimbursement is greater than the available funds, only the highest scoring projects will receive funding. The Stormwater Committee will score applications and approve funding.

The City's reimbursement cost-sharing program will likely have a structure similar to the Deer Creek Watershed Alliance Rainscaping Program, the City of Ladue's Cost Share Program, and Town & Country's Cost Share Program.

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Information stations
Residents could explore at their own pace stations staffed by engineers from Intuition & Logic and EDM. Stations educated and informed residents about:

- Stormwater issues identified in the data collection process (mapped)
- Project areas identified by I&L (mapped). Potential problem areas are groupings of individual problem areas that are:
    - Similar in nature
    - Likely to have a related solution
    - Benefit from coincident construction access
- Prioritization ranking scoring
- Spectrum of stormwater issues from most severe to nuisance
- Channel condition assessment scoring matrix
- Channel condition assessment scores (mapped)
- Stream dominant processes educational board showing the difference between stable, incision, widening, and planform adjustment

Next steps
Residents will be able to report stormwater issues to the Social PinPoint site until the end of 2023. Only issues reported before June 1, 2023 will be included in the Watershed Management Plan report. Issues reported after June 1, 2023 will be investigated by City staff, given a prioritization ranking score, and then considered for possible inclusion in the next CIP.

The second phase of the Watershed Management Plan will focus on the prioritization of improvements with the goal to develop the CIP masterplan. Work will include:

- Ranking identified stormwater issues
- Developing CIP project quantities and costs
- Generating CIP project sheets
- Creating the Capital Program & Project Management (PPM) System (AM:PM is the subcontractor with the expertise in this area)
- Conduct a review of City ordinances

Open House #3
The third open house will be scheduled in late August or September. At this event, residents will have an opportunity to:

- Review project locations and offer feedback
- Learn about the prioritization ranking scores

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Watershed Management Plan

1

Watershed Master Planning

- City Planning Effort
- Previous Efforts
  - 1999 Stormwater Evaluation Report
  - 2010 Stormwater Questionnaire
  - 2012 Stormwater Master Plan Update
- Overall Goals
  - Updated Master Plan
  - Integrate Public Input
  - Develop Prioritization Ranking Methodology

2

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Watershed Management Plan
Goals & Objectives

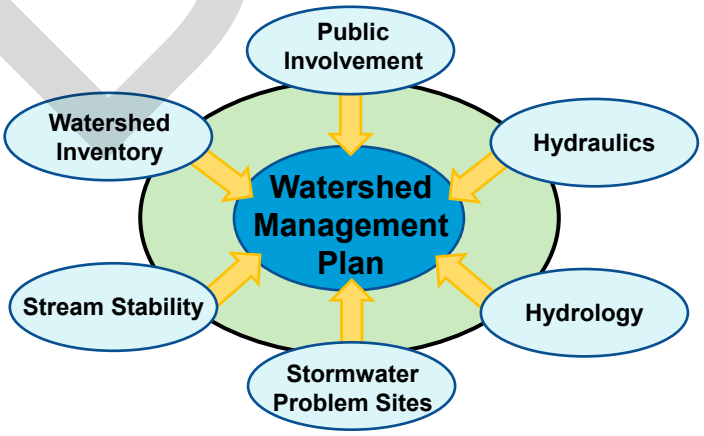
Goal - Develop planning tools and capital improvement projects to address water quality, stream stability, and stormwater infrastructure and drainage issues.

Study Objectives

- Maintain a proactive public involvement process
- Identify needed Capital Improvement Projects (CIPs) for stormwater issues
- Quantify existing hydrologic and hydraulic data
- Map stream corridors
- Evaluate stormwater problem sites
- Develop prioritization ranking method
- Develop software to assist the City in planning and budgeting for projects to maximize benefit of City residents throughout the five-year planning timeframes of the Capital Improvement Program (CIP)

3

Watershed Management Plan
Major Study Components



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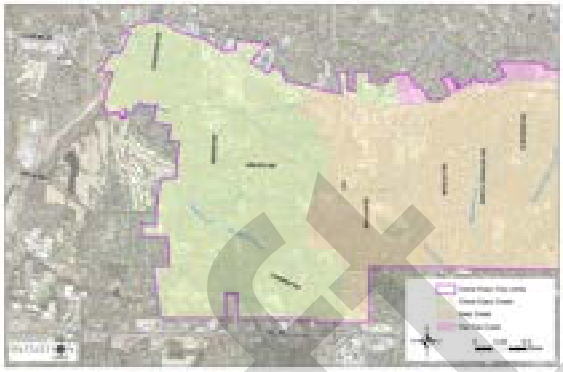
Creve Coeur Creek Watershed Study Area

- 27 Square Miles Watershed
- 4.4 Square Miles Channel Condition Assessment Study Area



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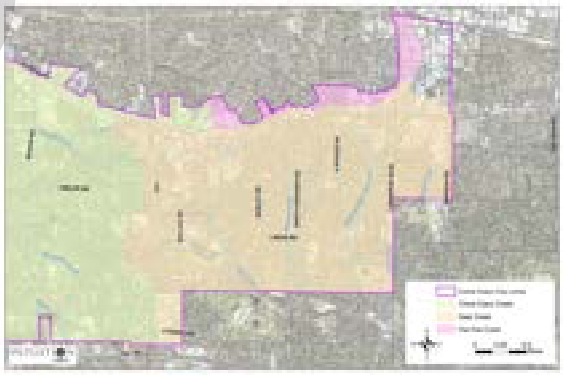
Deer Creek Watershed Study Area

- 37.7 Square Miles Watershed
- 5.1 Square Miles Channel Condition Assessment Study Area



6

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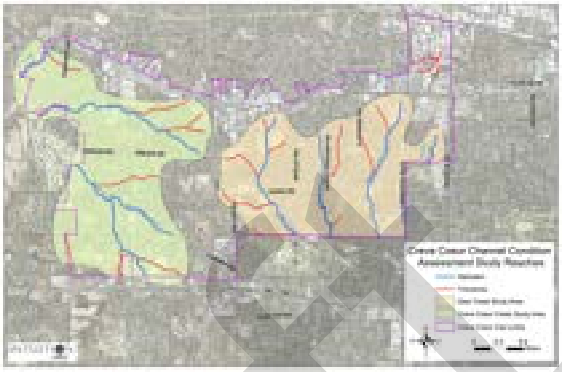
Channel Condition Assessment

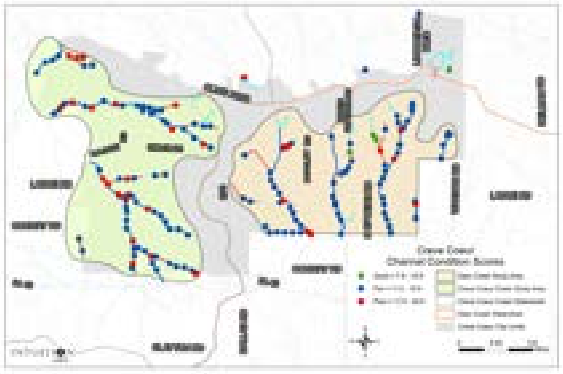
- 9.5 Square Miles Study Area
- Over 20 miles of stream field observation
  - Creve Coeur Creek
  - Fernridge Creek
  - Smith Creek
  - Rosenfelder Creek
  - Deer Creek
  - Windrush Creek
  - Monsanto-Sunswept Creek
  - Pebble Creek
  - Denny Creek



7

Channel Condition Assessment Results

- 159 Total Channel Condition Data Points Taken
- 77 Points in the Deer Creek Watershed
  - Average Channel Condition Score of 14.1 (Fair)
- 82 Points in the Creve Coeur Creek Watershed
  - Average Channel Condition Score of 15.5 (Fair)



8

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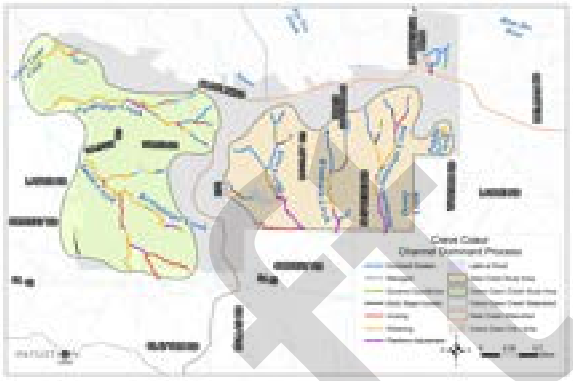
Channel Dominant Process Results

- Deer Creek Watershed
  - 29 Mainstem Reaches
  - 32 Tributary Reaches
  - Mainly Widening with some Planform Adjustment at the downstream limits
- Creve Coeur Creek Watershed
  - 24 Mainstem Reaches
  - 25 Tributary Reaches
  - Mainly Widening



9

Stormwater Problem Site Investigation

- Based on past problems received by the City and online survey responses
- Thank you for all for participating in the online survey!! A total of 172 responses were received
  - 23 Home Flooding
  - 73 Property Flooding
  - 52 Streambank Erosion
  - 24 Street Flooding
- Stormwater problem sites and field identified issues were grouped into 129 potential problem areas

10

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Prioritization Ranking Methodology

- Problem Solved Categories
  - Stream Flooding and Erosion
  - Storm Sewer/Overland Flow Flooding, Erosion, and Condition
- Solution Benefit Categories
  - Regional
  - Environmental/Water Quality
  - Ease of Implementation
  - Recreational/Educational Use
- Benefit/Cost Ratio

11

Prioritization Ranking System & Guidance Document

Based on MSD's ranking system

I&L made slight modifications for Creve Coeur including:

- Changing the lengths on item 1.2.3 to allow more points for critical road sections
- Expanding item 1.2.3 to more directly account for erosion threats to roadways and bridges
- Added 1.2.4 for threats to Natural Resources
- Modified 2.4 from Age to condition of existing system (pipes, culverts, etc.)
- Added 4.4 for preservation of Natural Resources
- Added 4.5 for Conservation Easements

12

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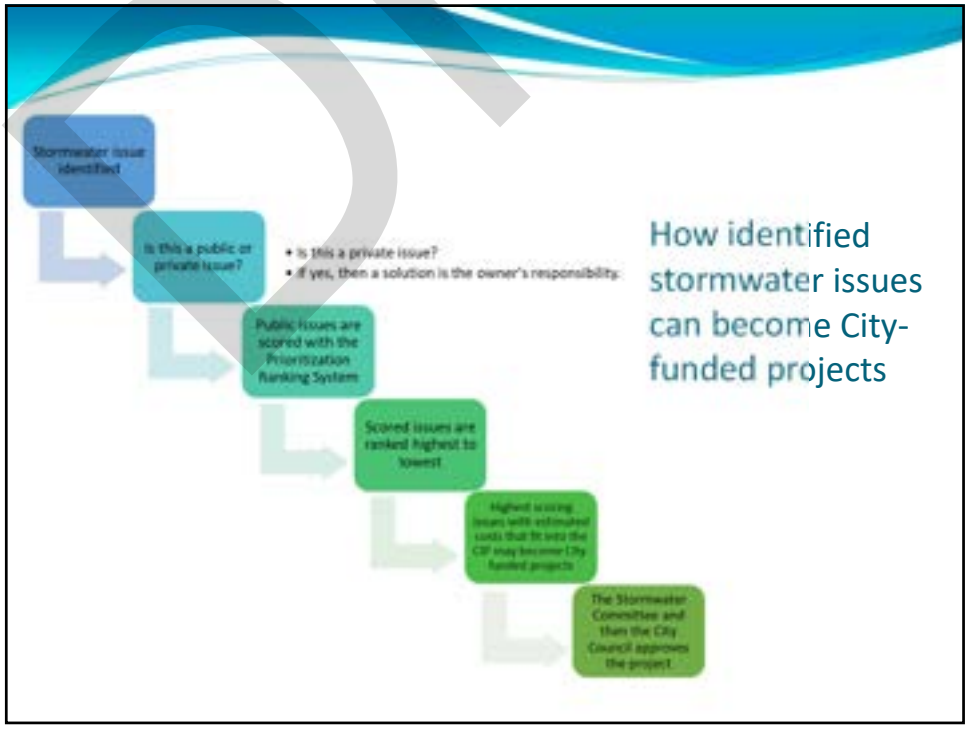
Potential Projects

- City Project Criteria will determine what problem areas are eligible.
- Not every City identified issue will result in a City-funded project
- After the Watershed Management Plan is completed in January, new stormwater issues may develop. The City will then rank these newly identified issues using the same methodology, and these new issues may score higher than previously identified issues.
- Projects need to be approved by the Stormwater Committee and the City Council before receiving City funding. Being at the top of the ranking list alone does not guarantee the issue will be addressed by a City-funded solution.

13



14

Criteria for public funding consideration

If an identified issue checks one or more of the boxes, then the project might will be scored with the Prioritization Ranking System.

Is a stormwater issue public or private?

If one or more boxes are checked, then a publicly-funded solution might be considered

Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue?	☐ Check for yes
Does the stormwater issue threaten public or private structures?	☐ Check for yes
Does the stormwater issue threaten public or private roadways?	☐ Check for yes
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	☐ Check for yes
Is the issue caused by an undersized stormwater conveyance infrastructure?	☐ Check for yes
Does the proposed project address regional or systematic channel instability?	☐ Check for yes
Would a solution protect water quality or natural resources?	☐ Check for yes
Was the issue caused by altered upstream conditions?	☐ Check for yes
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	☐ Check for yes
Was the issue caused by inadequate maintenance of a public system?	☐ Check for yes
Will the project improve public safety?	☐ Check for yes
Has the stormwater issue been identified as a monitor project?	☐ Check for yes
Is the focus of the project utility work?	☐ Check for yes
Does the work focus on privately-owned infrastructure?	☐ Check for yes

15

Next Steps

- Complete Development of Project Criteria.
- Evaluate potential problem areas using the City's criteria for stormwater project eligibility.
- For each project, conceptual designs will be developed and the projects will be ranked using the prioritization ranking methodology.
- CIP planning software will be developed to assist the City in future planning and budgeting for projects.
- Open House #3 will present the identified Capital Improvement Projects! We hope you join us!

16

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Watershed Management Plan

Project Websites

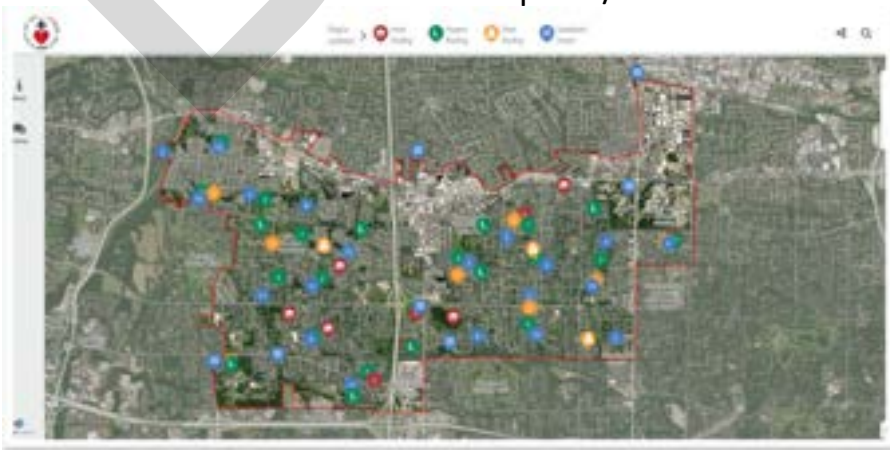
https://www.crevecoeurmo.gov/stormwater

17

Watershed Management Plan

Project Websites

https://ampm.mysocialpinpoint.com/creve-coeur-storm-water-master-plan#/



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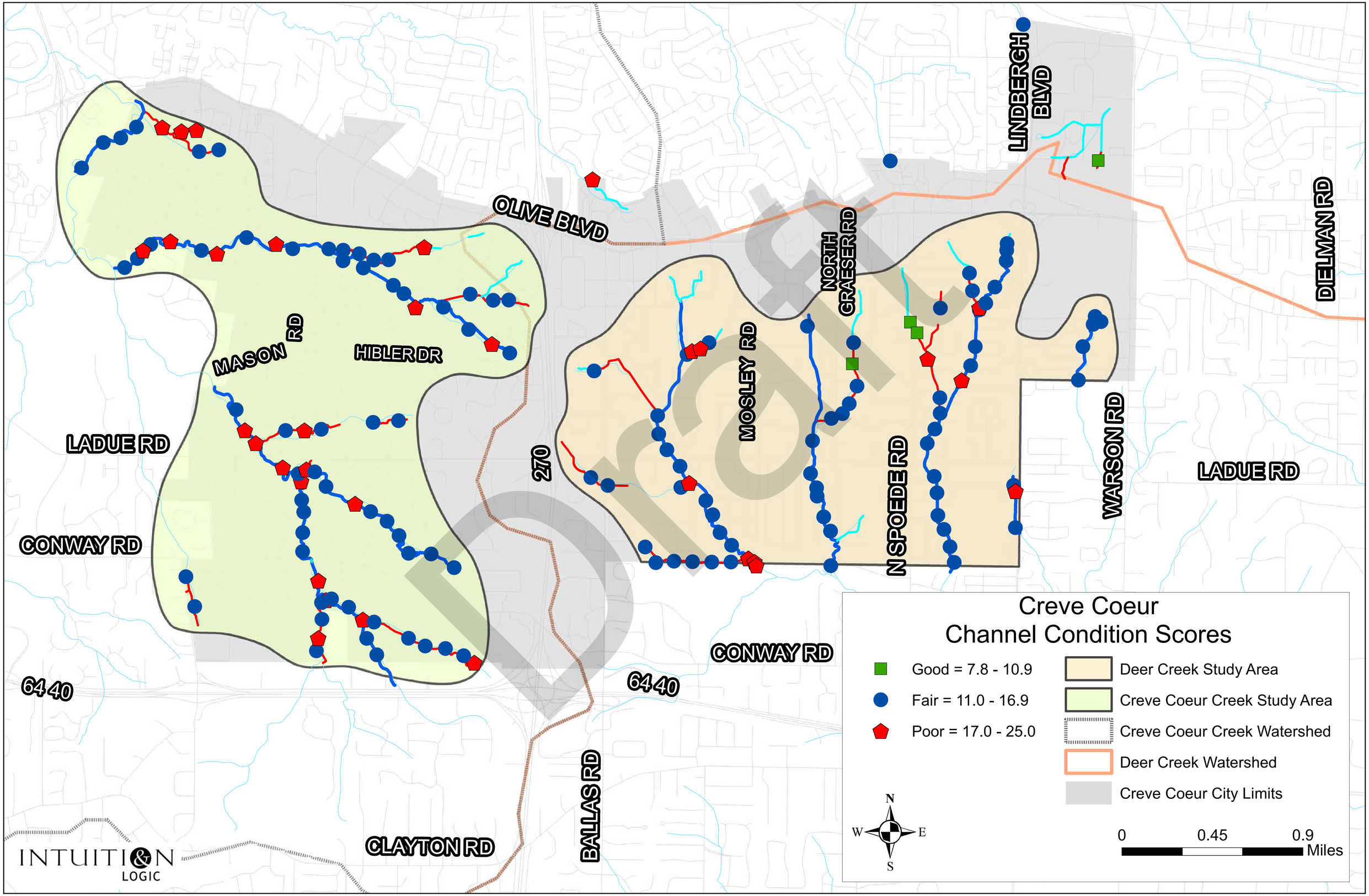
LINDBERGH BLVD
DIELMAN RD
OLIVE BLVD
NORTH CRAESER RD
MOSLEY RD
N SPOEDE RD
WARSON RD
LADUE RD
MASON RD
HIBLER DR
LADUE RD
CONWAY RD
270
64 40
CONWAY RD
64 40
BALLAS RD
CLAYTON RD
Creve Coeur
Channel Condition Scores
Good = 7.8 - 10.9
Fair = 11.0 - 16.9
Poor = 17.0 - 25.0
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
N
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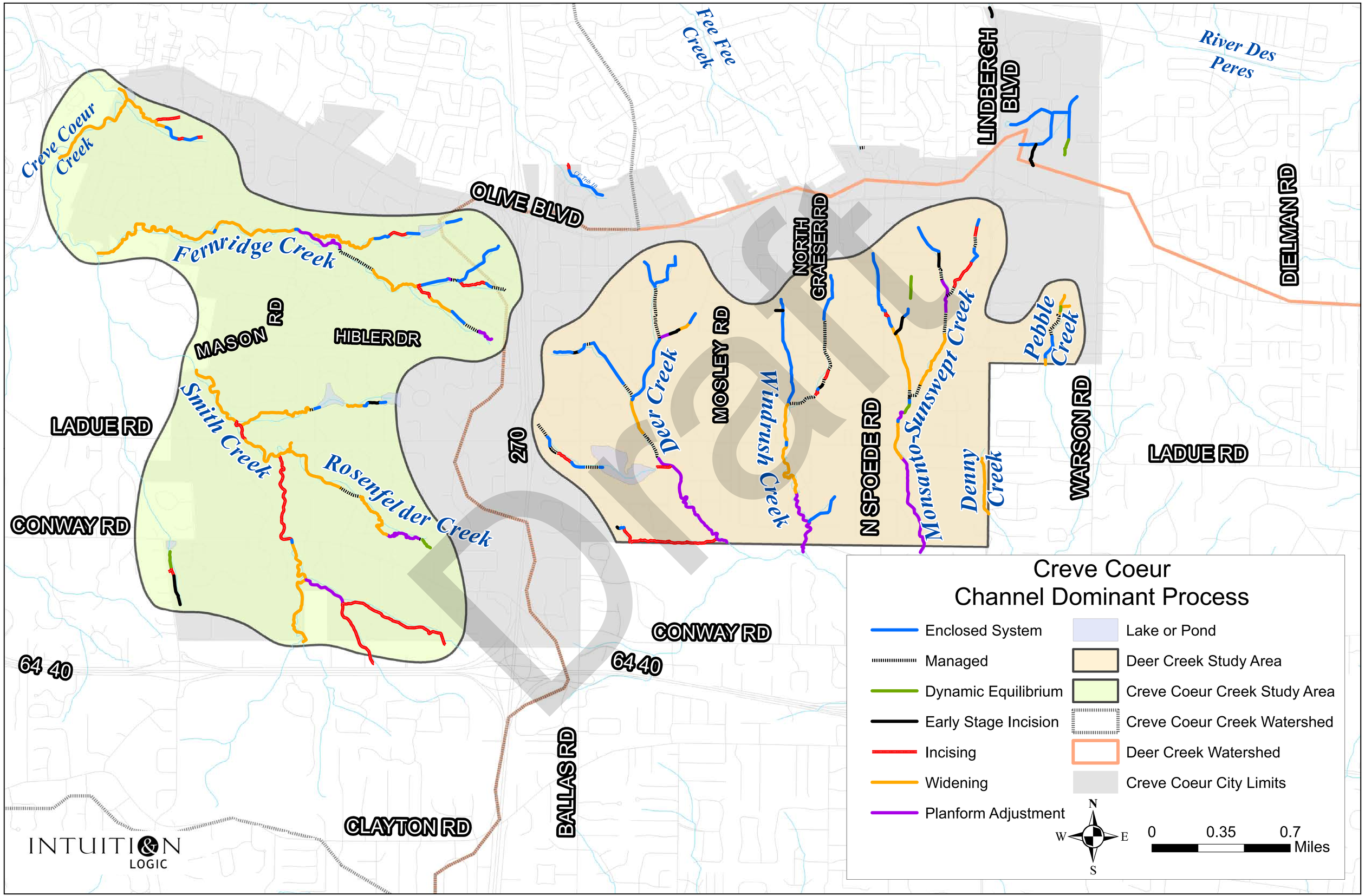
0.45
0.9
Miles
INTUITION LOGIC


Creve Coeur Creek
Fernridge Creek
Smith Creek
Rosenfelder Creek
Fee Fee Creek
River Des Peres
Deer Creek
Windtrush Creek
Monsanto-Sunswept Creek
Denny Creek
Pebble Creek
OLIVE BLVD
LINDBERGH BLVD
DIELMAN RD
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WARSON RD
MASON RD
HIBLER DR
LADUE RD
CONWAY RD
CLAYTON RD
BALLAS RD
270
64 40
Creve Coeur
Channel Dominant Process
Enclosed System
Managed
Dynamic Equilibrium
Early Stage Incision
Incising
Widening
Planform Adjustment
Lake or Pond
Deer Creek Study Area
Creve Coeur Creek Study Area
Creve Coeur Creek Watershed
Deer Creek Watershed
Creve Coeur City Limits
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INTUITION & LOGIC

OLIVE BLVD
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Creve Coeur Creek
FERNVIEW DR
MASON RD
Ferntridge Creek
MASON MANOR DR
HIBLER DR
MOSLEY RD
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Monsanto-Sunswept Creek
Pebble Creek
LADUE RD
LADUE RD
Smith Creek
Rosenfelder Creek
Deer Creek
Windrush Creek
Denny Creek
N SPOEDE RD
WARSON RD
CONWAY RD
CONWAY RD
64 40
64 40
BALLAS RD
CLAYTON RD
270

Legend

- 23 Home Flooding Reports
- 73 Property Flooding Reports
- 52 Streambank Erosion Reports
- 24 Street Flooding Reports
- 105 I&L Field Identified Issues
- Streams
- Parcel Limits
- Creve Coeur City Limits

N
W E
S

0 0.25 0.5 Miles

INTUITION & LOGIC

OLIVE BLVD
Creve Coeur Creek
FERNVIEW DR
MASON RD
270
Fernridge Creek
MASON MANOR DR
HIBLER DR
LINDBERGH BLVD
OLIVE BLVD
MOSLEY RD
N GRAESER RD
Monsanto-Sunswept Creek
Pebble Creek
LADUE RD
Smith Creek
Rosenfelder Creek
Deer Creek
Wildrush Creek
N SPOEDE RD
Denny Creek
WARSON RD
CONWAY RD
64 40
BALLAS RD
CONWAY RD
64 40
CLAYTON RD
270

Legend

- Home Flooding
- Property Flooding
- Streambank Erosion
- Street Flooding
- I&L Field Identified Issues
- Streams
- Parcel Limits
- Problem Areas
- Creve Coeur City Limits

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W E
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0 0.25 0.5 Miles

INTUITION & LOGIC

Open House #3

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Project CC-27: Fabius Dr

Problem Description: In an upper tributary to Fernridge Creek between Oak Hollow Dr and Woodline Dr several issues were reported as follows. Erosion along the ROW threatening the pavement and ROW. Erosion along the ROW threatening the utility structures downsetting in the common ground (GLM Fabius 3/1). The affected parcels are private.

Recommendation: Stabilize the ROW along Oak Hollow Dr and install grade controls at the lower tributary confluences.

Conceptual Layout of CC-27

Project CC-26: Mason Forest

Problem description: Yard flooding at 412534 Mason Forest Drive and 4416 Hilton Woods Court due to past grading and adjacent runoff. Street and structural flooding at 352822 Mason Forest Drive which may be partially due to flow bypassing inlets.

Recommendation: Construct swale in the rear of 412534 and install a manhole with a skirted cover over the existing storm sewer. Open all four sides of inlet 1795-B132. Modify other inlets as needed to minimize bypass and increase inlet capacity.

Special Considerations: Hydraulic analysis of storm sewer system is needed that accounts for potential bypass at inlets and inlet capacity. Analysis should include culvert at Hilton Road and the open channel on 412414 Mason Forest Drive. Initial analysis shows adequate capacity of 36" pipe at 412414.

Conceptual Layout of CC-26

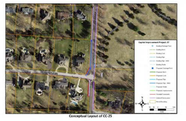
Project CC-25: Auriumdale

Problem description: Street flooding on North Mason Road at Auriumdale Drive.

Recommendation: Construct shoulder and swale on both sides of the road from North Walling Drive to Mason Forest Drive. Construct a 6" curb cut and swale from the north hallway to North Walling Drive from existing inlet 1795-B132. Overlay North Mason Road with a better defined cross slope and possibly adjust the street profile.

Special Considerations: Be the east side south of Auriumdale Drive grading may limit inlets sit over the existing storm sewer. North of Auriumdale Drive on the east side a curb maybe needed due to the adjacent sidewalk and the elevation difference between the street pavement and the sidewalk.

East side of North Mason Road



Conceptual Layout of CC-25

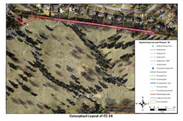
Project CC-24: Hiram Cemetery

Problem description: Houses on the south side of Villa Hill Lane sit lower than the cemetery to the south. The majority of the cemetery has a swale and berm along the property line and being a cemetery has little stormwater area.

Recommendation: Construct or reconstruct the berm and swale along the north property line. Swale should be reinforced with Ironsand SharpTrack. Construct berm around existing inlet 1795-D032.

Special Considerations: Recommendation is for surface flow, for groundwater and wet spots days after rains an underdrain system is recommended for those property owners that have this issue.

Eroded berm at inlet



Conceptual Layout of CC-24

Project CC-23: Royal Valley Dr

Problem Description: In Fernridge Creek between Royal Valley Dr and Hiram Ct several issues were observed as follows. Erosion along the ROW threatening the rear lot of 12192 Royal Valley Dr. Perched outfall and erosion threatening residential fence in the rear lot of 12186 Royal Valley Dr. Knickpoint and pipe section failure at the upstream end of the channel. The affected parcels are private.

Recommendation: Install a step-grade control and stilling basin in the rear lot of 12192 Royal Valley Dr. Install a step grade control at the perched outfall. Install a step grade control and stilling basin at the upstream end of the channel.

Threatened fence

Conceptual Layout of CC-23

Project CC-22: Blackhoofs Ct and Country Manor Ln

Problem Description: In an upper tributary to Fernridge Creek erosion was observed along the ROW in the rear lot of 12205 Country Manor Lane and 12291 Country Manor Lane was also reported. The affected parcels are private.

Recommendation: Stabilize the ROW and rock armor the pipe outfall.

Project CC-21: Fabius Dr

Problem Description: In Fernridge Creek between Cross Creek Dr and Royal Valley Dr several issues were observed as follows. Erosion along the ROW threatening the downstream of Cross Creek Dr. Knickpoint caused by an exposed utility line. Knickpoint at the upstream outfall. The affected parcels are private.

Recommendation: Install step grade controls at the knickpoints downstream of Cross Creek Dr and a stilling basin at the outfall. Install a step grade control at the exposed utility line. Install a step grade control and stilling basin at the upstream outfall.

Cross Creek Dr Outfall

Exposed Utility Line

Conceptual Layout of CC-21

Project CC-20: Quosseer Ln

Problem Description: In Fernridge Creek between Quosseer Ln and Prairie Forest Dr several issues were observed as follows. Erosion along the ROW at the Stratford Ridge Ct. Exposed utility pipe, failing grade riprap, and an undermined abutment at the 66in Quosseer Ln driveway crossing. Undermined outfall at 12288 Wildsworth Terrace Ct. Knickpoint at the outfall of the detention basin at 12340 Wildsworth Terrace Ct. Knickpoint at the confluence of 12481 Wildsworth Terrace Ct. Knickpoint and perched concrete culvert at the southeast of 12380 Wildsworth Terrace Ct. Knickpoint along tributary south of Prairie Forest Dr and a scour hole at the outfall. The affected parcels are private.

Recommendation: Install a grade control at the knickpoint behind 12402 Stratford Ridge Ct. Stabilize the exposed utility pipe and install a grade control at the outlet to protect the manhole and utility pedestal and rock armor the outfall swale. Install a step grade control at the knickpoint southeast of 12380 Wildsworth Terrace Ct. Install a step grade control and stilling basin downstream of the knickpoint at the outfall of the detention basin. Install a grade control and stilling basin at the tributary knickpoint and outfall.

Bridge abutment

Exposed manhole and pipe

Conceptual Layout of CC-20

Project CC-19: 12426 Stratford Ridge Ct

Problem Description: In Fernridge Creek behind 12426 Stratford Ridge Ct failing rore mat and gravel riprap was observed. The affected parcels are private.

Recommendation: Install a grade control and stilling basin.

Failing rore mat

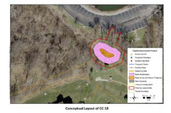
Conceptual Layout of CC-19

Project CC-18: 12344 Mulberry Tree Ct

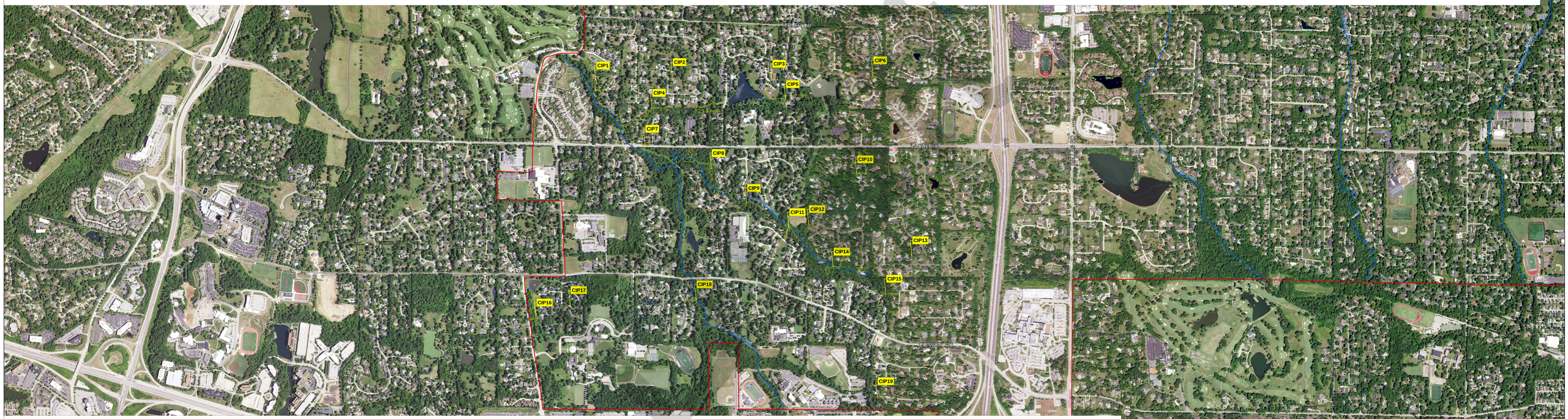
Problem Description: In a tributary to Fernridge Creek south of Lighthouse Way 6in bank perched outfalls and a 24in perched outfall were observed. The affected parcels are private.

Recommendation: Install a step-grade control and stilling basin.

Threatened fence



Conceptual Layout of CC-18



Project CC-12: 212 Bellington Lane

Problem description: Yard and basement flooding at 4252 Bellington Lane due to flow from uphill properties.

Recommendation: Construct a berm and swale with underdrain to intercept the flow from the south and direct it to the street to the west. Swap out an existing inlet grate with a dome inlet grate to minimize clogging.

Note drawing

Project CC-13: 12225 Ladue Woods Drive

Problem description: Yard flooding at 912229 Ladue Woods Drive.

Recommendation: Construct berm to intercept flow from hillside that is flowing towards the east end of the house.

Special Considerations: Need additional information from Metro Owner not home during field visit. Yard drains to main flow path through property that is blocked by the pool.

Yard drain uphill of pool

Project CC-14: Conway Holmes Cir

Problem description: In Rosenbilder Creek between Conway Holmes Cir and Hewlett Ct multiple issues were observed as follows. There is a perched pipe with fallen segments located east of 12311 Conway Holmes Cir. Additionally, a concrete headwall with a pipe outlet is located in the tributary north of 300 Bel Arbor Ln. There is erosion along an outside bend threatening concrete headwall on the west. At 257 Bellington Ln, the embankment forming a concrete headwall with a pipe outlet at 12288 Conway Holmes Cir and 257 Hewlett Ct is failing. A bridge attachments, a knickpoint downstream of the bridge, and erosion along the RDB upstream of the bridge, which is undermining the abutments of 288 Hewlett Ct. The affected parcels are private.

Recommendation: Install a grade control at the perched pipe. Stabilize the LDB at the tributary confluence and install a grade control at the knickpoint. Stabilize the outside RDB outside bend and replace the fence. Replace the failing pedestrian bridge abutments, install a step grade control and stilling basin, and stabilize the RDB upstream of the bridge. Install two step grade controls at the knickpoint southwest of 296 Hewlett Ct.

Obstacle bend erosion

Pedestrian bridge

Conceptual Layout of CC-14

Project CC-15: Williamsburg

Problem Description: There is bank erosion along Rosenbilder Creek threatening the fence and pool in rear lot of 332 Cairo Grove Ln along with a 2 ½ knickpoint there is also erosion in the northwest corner of 32 Broadview Farm Rd where a concrete headwall was recently drained. The affected parcels are private.

Recommendation: Stabilize the LDB along the rear lot of 332 Cairo Grove Ln and install a step grade control at the knickpoint. Rock armor the outfall at stage two and install a grade control at the confluence.

Threatened fence and pool

Conceptual Layout of CC-15

Project CC-16: 12 Broadview Farm Rd

Problem Description: Several knickpoints were observed along a tributary to Green Creek which runs parallel to S Mount Rd. Bank mass wasting was seen along the rear lot of 28 Broadview Farm Rd. The affected parcel is private.

Recommendation: Install step grade controls at the knickpoints and a grade control at the upstream end of the incision to halt it. Stabilize the bank along the rear lot of 28 Broadview Farm Rd.

Bank mass wasting

Conceptual Layout of CC-16

Project CC-17: Broadview Farms Subdivision

Problem description: Water ponds along the northeast #18, #19, #21 and #22 Broadview Farms Rd. All of these properties have a history of basement flooding, even with a 24" #22 that drains the area. A curb inlet (CI) uphill has significant bypass potential and the curb along the east side of Broadview Farms Rd. has the potential to be overtopped allowing additional flow to this area.

Recommendation: Har the water ponding along the curb, mill and overlay the street and adjust the pavement slope to drain across the street. At #1 Broadview Farms Rd., reset the CI top and reconstruct the curb along Broadview Farms Rd.

Special Considerations: Concrete should be considered in lieu of asphalt to provide a more precise grade and cross slope on the street to ensure proper drainage. The hydraulic grade line for the storm sewer downstream of the FES needs to be checked to ensure water isn't backing up into this area. A check valve in the adjacent MH on the pool should be considered.

Ponding at end of driveway

Conceptual Layout of CC-17

Project CC-18: 435 Twin Creek Rd

Problem Description: In Sarah Creek behind 418 Twin Creek Rd erosion was reported along the LDB. The affected parcels are private.

Recommendation: Stabilize the LDB.

LDB Erosion

Conceptual Layout of CC-18

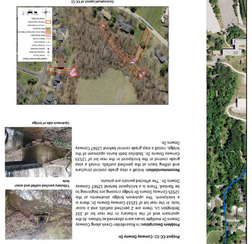
Project CC-19: Ratson Estates

Problem Description: In the unnamed tributary along Ratson Estates ravine along the RDB is threatening the driveway of 24 Ratson Estates. The affected parcels are private.

Recommendation: Stabilize the RDB and install a grade control.

Trees Threatening driveway

Conceptual Layout of CC-19



Project CC-C-1: Conway Towne Ln

Problem Description: Severe erosion was reported in the ravine along the LDB of Conway Towne Ln. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Severe erosion

Upstream view of ravine

Project CC-D: 20 Bamboo Ct

Problem Description: In an unnamed tributary to Bamboo Creek erosion was reported in the ravine along the LDB of 20 Bamboo Ct. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-E: 151 Hall Gate Dr

Problem Description: In Bamboo Creek between 151 Hall Gate Dr and 147 Hall Gate Dr there is a significant ravine with erosion on the LDB and RDB. Flow is a sequence of six knickpoints with the largest being a 2.5' drop. Flow is also concentrated at the outlet of a concrete headwall at 147 Hall Gate Dr. There is a sequence of six knickpoints with the largest being a 2.5' drop. Flow is also concentrated at the outlet of a concrete headwall at 147 Hall Gate Dr.

Recommendation: Install a grade control at the knickpoint and stabilize the LDB and RDB.

Erosion

Upstream view of ravine

Project CC-F: Hall Gate Dr

Problem Description: In Bamboo Creek between 1250 Hall Gate Dr and 1247 Hall Gate Dr there is a significant ravine with erosion on the LDB and RDB. Flow is a sequence of six knickpoints with the largest being a 2.5' drop. Flow is also concentrated at the outlet of a concrete headwall at 1247 Hall Gate Dr.

Recommendation: Install a grade control and stabilize the LDB and RDB.

Erosion

Upstream view of ravine

Project CC-G: Ladue Horton Watkins

Problem Description: Severe erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Severe erosion

Upstream view of ravine

Project CC-H: Conway Towne Ln

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of 1250 Conway Towne Ln. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-I: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-J: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-K: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-L: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Project CC-M: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-N: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-O: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-P: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-Q: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-R: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-S: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-T: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-U: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-V: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-W: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-X: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-Y: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-Z: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AA: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AB: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AC: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AD: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AE: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AF: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AG: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AH: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AI: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AJ: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AK: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AL: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AM: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AN: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AO: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AP: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AQ: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AR: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AS: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AT: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AU: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AV: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AW: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AX: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AY: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-AZ: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BA: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BB: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BC: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BD: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BE: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BF: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BG: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BH: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BI: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BJ: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BK: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BL: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BM: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BN: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BO: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BP: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BQ: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BR: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BS: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BT: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BU: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BV: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BW: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Ladue Horton Watkins. The affected parcels are private.

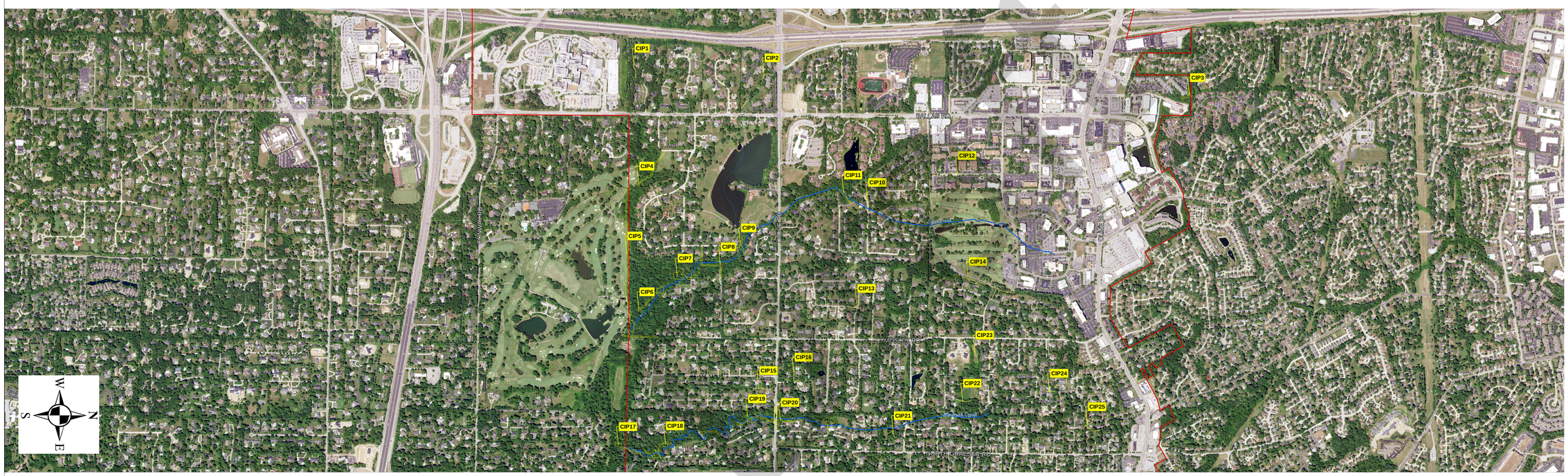
Recommendation: Install a grade control and stabilize the LDB.

Erosion

Upstream view of ravine

Project CC-BX: Ladue Horton Watkins

Problem Description: In a tributary to Bamboo Creek erosion was reported in the ravine along the LDB of Lad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CIP25
Bridle Path
Mossberry Drive
Mossberry Court
Mossberry Crescent
Mossberry Road
Mossberry Trail
Wetland Crossing
Wetland Crossing Road
Wetland Crossing Trail
Wetland Crossing Way
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Whitmuir Creek
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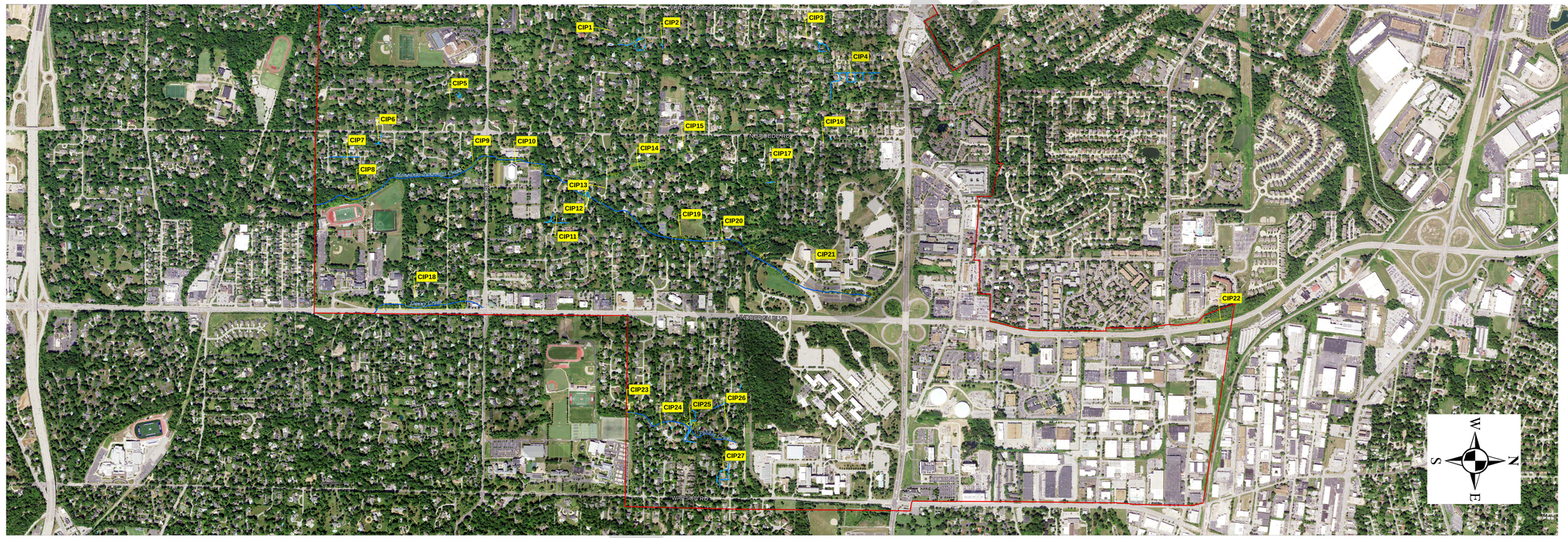
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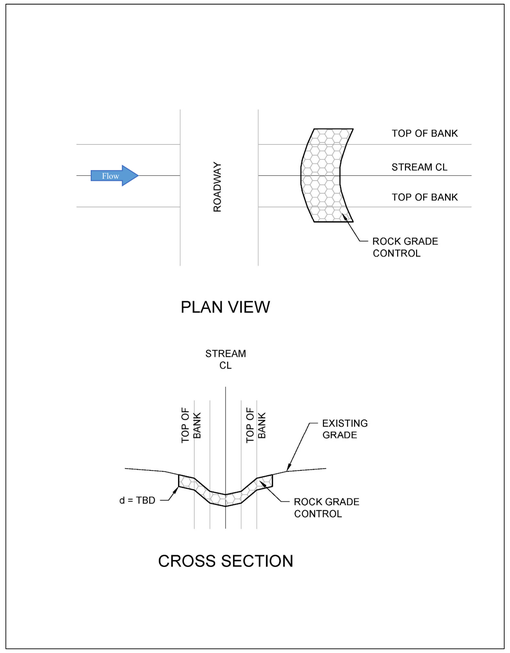
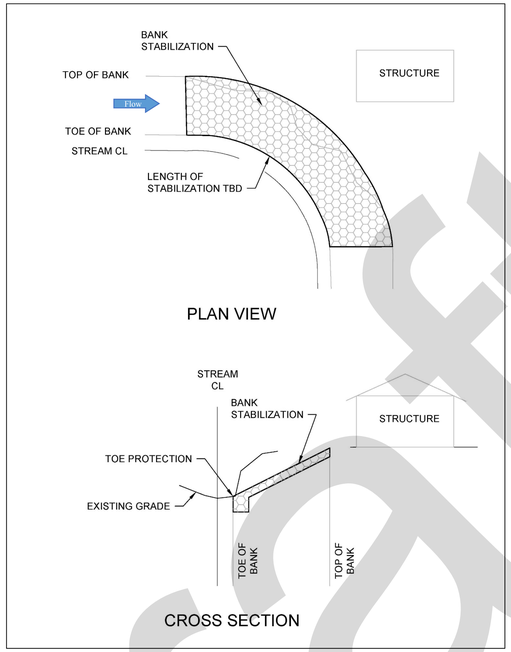
Wilmington Drive
Wilmington Drive
Wilmington Drive

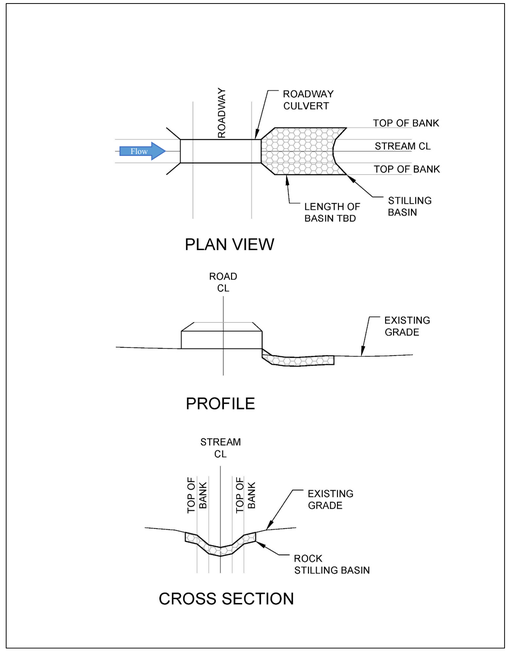
Grade Control Detail



Bank Stabilization Detail



Rock Armor and Scour Protection Detail



Draft

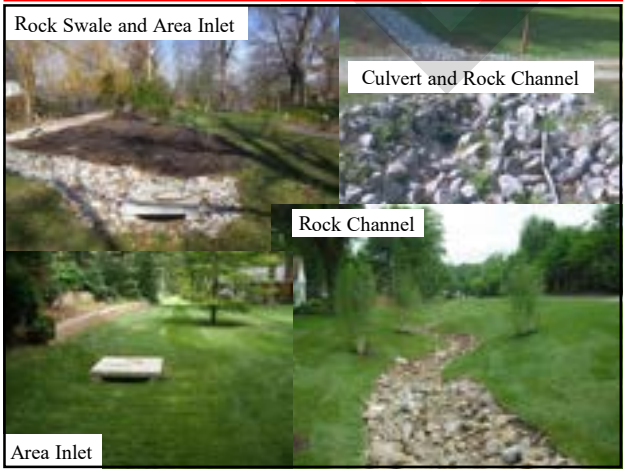
SWALES AND BERMS

RAIN GARDENS

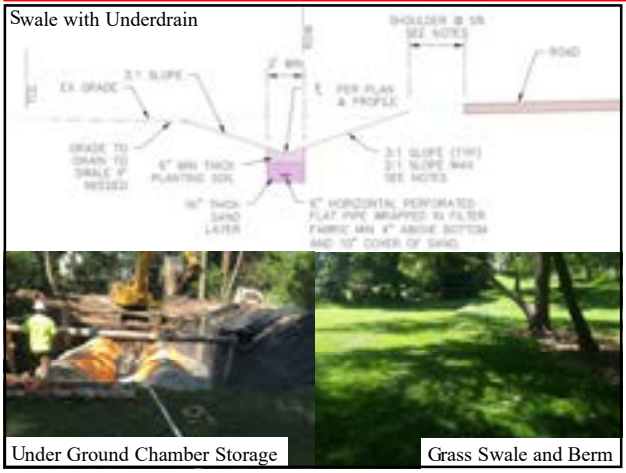
YARD DRAINS AND DRIVEWAYS

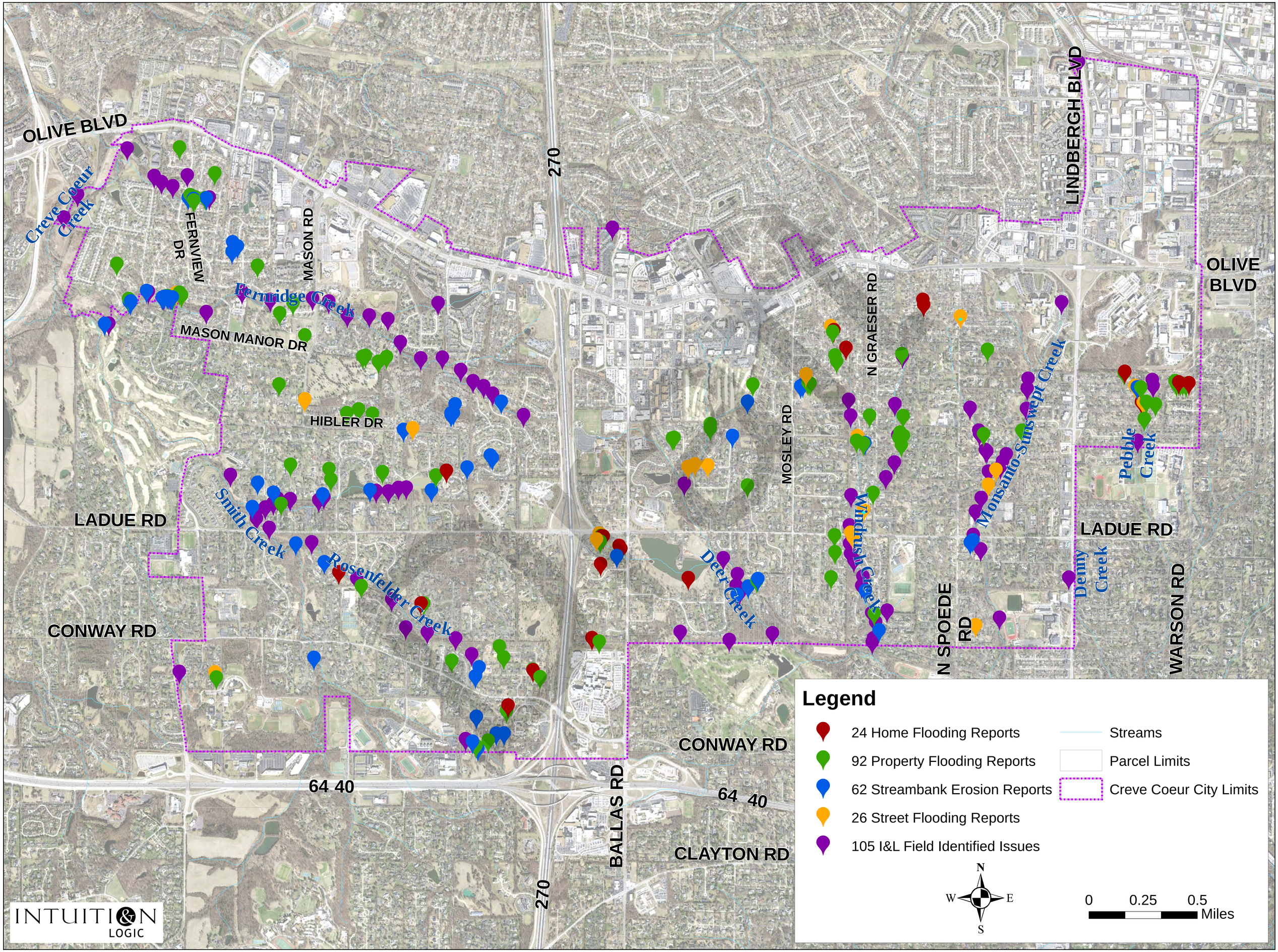
STREET INLETS AND STORM SEWERS

ROCK SWALES AND AREA INLETS



GRASS SWALES AND UNDERGROUND STORAGE




OLIVE BLVD
Creve Coeur Creek
FERNVIEW DR
MASON RD
270
Ferguson Creek
MASON MANOR DR
HIBLER DR
LINDBERGH BLVD
OLIVE BLVD
N GRAESER RD
MOSLEY RD
Monsanto-Sunswept Creek
Pebble Creek
LADUE RD
Denny Creek
WARSON RD
N SPOEDE RD
Windrush Creek
Deer Creek
Smith Creek
Rosenfelder Creek
CONWAY RD
64 40
BALLAS RD
CLAYTON RD
INTUITION LOGIC
Legend
24 Home Flooding Reports
92 Property Flooding Reports
62 Streambank Erosion Reports
26 Street Flooding Reports
105 I&L Field Identified Issues
Streams
Parcel Limits
Creve Coeur City Limits
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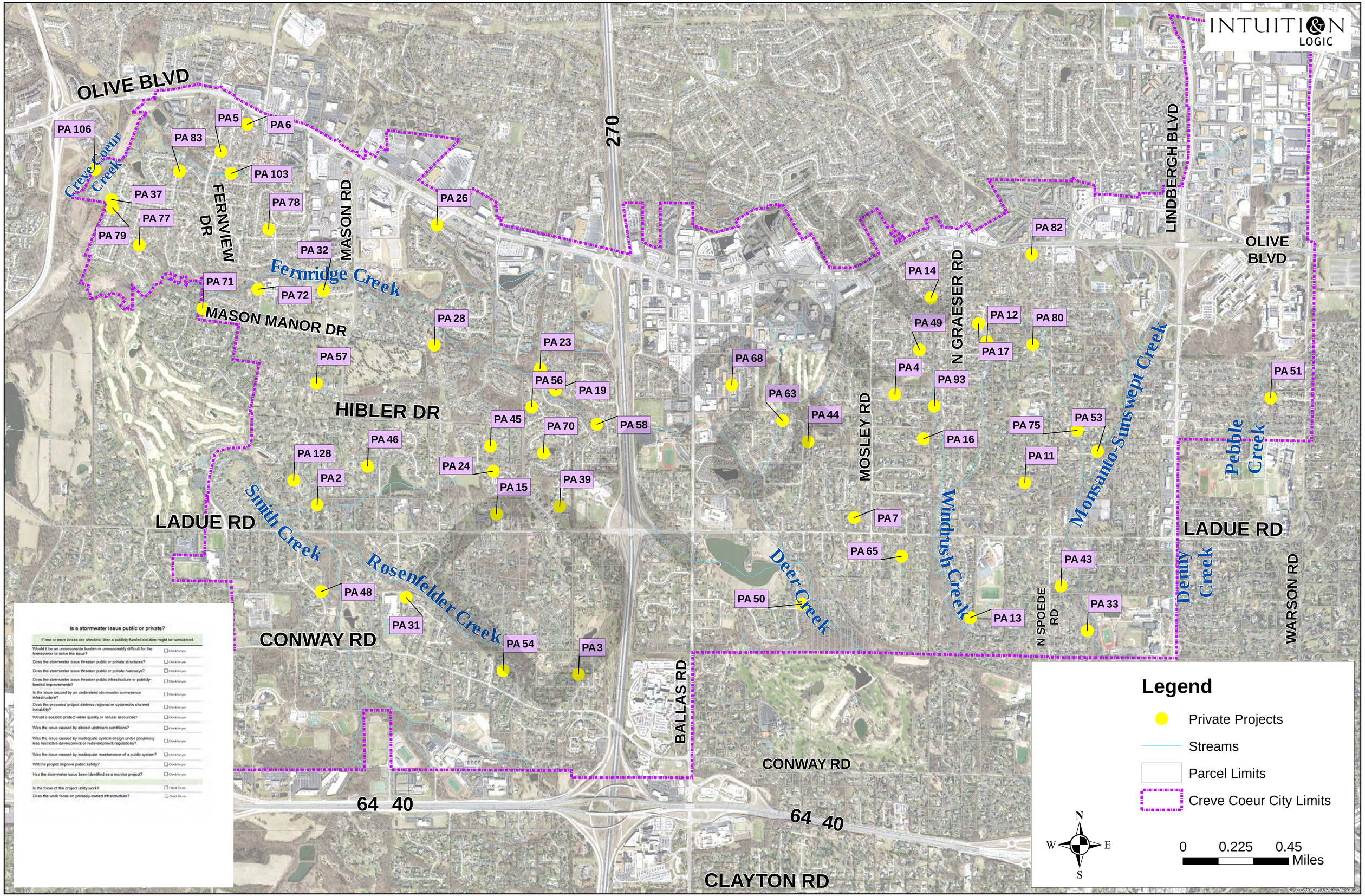

Is a stormwater issue public or private?

If one or more boxes are checked, then a publicly-funded solution might be considered

Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue?	☐ Check for yes
Does the stormwater issue threaten public or private structures?	☐ Check for yes
Does the stormwater issue threaten public or private roadways?	☐ Check for yes
Does the stormwater issue threaten public infrastructure or publicly-funded improvements?	☐ Check for yes
Is the issue caused by an undersized stormwater conveyance infrastructure?	☐ Check for yes
Does the proposed project address regional or systematic channel instability?	☐ Check for yes
Would a solution protect water quality or natural resources?	☐ Check for yes
Was the issue caused by altered upstream conditions?	☐ Check for yes
Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations?	☐ Check for yes
Was the issue caused by inadequate maintenance of a public system?	☐ Check for yes
Will the project improve public safety?	☐ Check for yes
Has the stormwater issue been identified as a monitor project?	☐ Check for yes
Is the focus of the project utility work?	☐ Check for no
Does the work focus on privately-owned infrastructure?	☐ Check for no

Legend

- Private Projects
- Streams
- Parcel Limits
- Creve Coeur City Limits

N W E S

0 0.225 0.45 Miles

St. Louis County GIS Service Center

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2	116 WEXLER MANOR CT	Property Flooding	We are concerned about the run-off from ladue lake. In a hard rain it floods chasselle and at least four yards - including ours.	Private	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
3	20 WILLIAMSBURG RD	Property Flooding	Area between this home and the home to the east floods during heavy rains. Stormwater sewer between the homes is not able to move it away. Water comes down the hill from the area above the home to the east.	Private	N	N	N	N	?	N	N	N	?	N	N	N	N	N
	21 WILLIAMSBURG RD	Property Flooding	The run off from the rain water in the backyard has become a deeper chasm (1ft depth). The neighbor that backs up to the property has tried to create a leaf barrier to provide ground cover.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	38 Williamsburg Rd	Standing water between the homeowner's and the neighbor's home.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	40 WILLIAMSBURG RD	Property Flooding	Ponding in yard from neighbor yard	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	43 WILLIAMSBURG RD	Property Flooding	When rains, water floods the property and floods basement as a result	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	43 WILLIAMSBURG RD	Home Flooding	House floods when bad rains / storms															
4	16+ Mosley Acres Dr	Asphalt overlay of concrete street has reduced gutter capacity and resulted in erosion behind the curb		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5	1020 & 1028 Fernview Dr	Yard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
6	12921 Fernway Ln	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
7	104 Ladue Meadows Ln	Erosion in yard and near street inlet	Needs Site Visit (KLE)	Private & MSD	N - for yard erosion	N	N	N	N	N	N	N	N	N	N	N	N	N

Draft

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11	10835 Rondelay Dr	Channel erosion upstream of inlet in backyard, asphalt overlay has reduced the gutter capacity causing creek erosion		Private & MSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
12	10921 CHALET CT	Property Flooding	Backyard flooding in heavy rain.	Private - Cost Share	N - If problem can be solved with grading the yard. Y - If solution is to add an MSD inlet in the yard or redirect flow uphill to existing inlets.	N	N	N	N?	N	N	N	N	N	N	N	N	N
	531 Chalet Ct	The homeowner reports spending approximately $60,000 trying to solve stormwater issues.	Any remaining issues result of deficent design or improperly installed system. Proper grading and installation of system could solve issue.	Private	n	?house?	n	n	N?	N	N	N	N	N	N	N	N	y
	10921 Chalet Ct		Sinkhole near area inlet	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
13	248 Brooktrail Ct		Sinkholes around inlet structure	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
14	11076 Graeser Ln	Yard flooding from runoff from Graser Ln		Monitor	N - If viable solution is grading yard and adding a speed bump to driveway. Y - If solution needed is street inlet upstream of driveway.	N	N	N	N	N	N	N	N	N	N	N	N	N
15	111 Worthington Oaks	Failing MSD structure on a neighboring site		MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
16	11205 Tureen Dr	Yard erosion		Private	N	N	N	N	N	N	N	N	N	Y - For issue at inlet.	N	N	N	N
17	12 Wedgewood	Erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N

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19	12121 & 12135 Royal Valley Dr	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	12234 Royal Valley Dr	Dry detention maintenance. The HOA also asked what, if anything, could be done to reduce flows coming from other subdivisions and 270.		Private	N - May need professional advice	N	N	N	N	N	Y?	N	N	N	N	N	N	Y
	12234 ROYAL VALLEY DR	Streambank Erosion	Erosion near the MSD stand pipe and the drain channel has been an issue for many years. HOA maintenance has only fixed erosion for a few short years.	Private	N	N	N	N	N	N	N	N		N	N	N	N	N
	12233 Royal Valley Dr		Sinkholes around curb inlet across the street	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
23	12318 Halsgame Ln	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
24	12365 MONTSOURIS DR	Home Flooding	Ponding occurs in the yard every time it rains. In addition, every time it rains the basement leaks/flood depending on the amount of rain that occurs. MSD was contacted and they said the sewer system near the residence cannot handle more than 3 in of rain, however, the house leaks/floods and the yard ponds every time it rains. There is also a creek in the behind the house.	Private	N	N	N	N	N?	N	N	N	N	N	N	N	N	N
	12372 MONTSOURIS DR	Property Flooding	Drainage area between the two ponds/lakes overflows during heavy rains into the surrounding yards. Also causes excessive rise in receiving pond/lake.	Private - Cost Share	Y - However HOA maybe responsible for lake outfall	N	N	N	N	N	N	N	N	N	N	N	N	N
26	12503 Questover Lane	Concerns about standing water and minor erosion within the condo complex.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
28	12502 TRAMMELL CT	Property Flooding	Water typically pools heavily during storms through this area. Ground remains moist for long periods after storms have ceased.	Private														
31	12643 CONWAY DOWNS DR	Property Flooding	Whenever it rains, a pool of water forms in the far corner of my property. There is a creek on the other side of our fence. I am concerned about the mosquitoes breeding in this standing water.	Private	n	N	N	N	N	N	N	N	N	N	N	N	N	N

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32	12721 CREEKSIDE VIEW DR	Property Flooding	The area behind our home floods during heavy rains. The water comes up from a drain pipe or overflow from Fernridge Creek. In addition, a new subdivision (Duever Estates) is being built to the north and we are concerned that this will make the flooding worse. https://crevecoeurmo.portal.civicclerk.com/event/7234/overview	Natural Floodplain Area														
	12739 CREEKSIDE VIEW DR	Property Flooding	The common ground north of our home floods during heavy rains. Some of this comes from Fernridge Creek via a 12" rain pipe or from the creek overflowing its banks. A sub division (Duever Estates) is planned on the North side of Fernridge Creek and we are concerned that this will make the flooding worse.https://civicclerk.blob.core.windows.net/stream/CREVECOEURMO/604f5ec7-9be7-45de-9a05-a30753403b2c.pdf?sv=2021-10-04&st=2023-03-23T00%3A36%3A07Z&se=2024-03-23T00%3A41%3A07Z&sr=b&sp=r&sig=WKJlBRjA															
	801 N MASON RD	Property Flooding	During heavy rains the four 4-way drains are unable to handle the storm water running off our neighbors ponds and property. It has dislodged the rip-rap several times in the last 3 years. The board believes it would be helpful if our neighbor (Steven Leiber) would take measures to slow down the water before it leaves his property.	Private - Cost Share	N - Alternatives to the rock are available that the HOA could install from the property line to the inlets.	N	N	N	N	N	N	N	N	N	N	N	N	N
33	16 Chaminade	Street runoff causing erosion on his property.		Private	N	N	N		N	N	N	N	N	N	N	N	N	N
37	13210 Autumn Trails	Erosion in backyard		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
39	174 Belle Maison Ct	Stormwater flows from 178 Belle Maison Ct		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
43	2 Spoede Acres St	Runoff from surrounding area causes ponding and erosion	Install berm along west property line so inlet intercepts water, regrade yard for ponding issues and potentially have MSD swap out solid manhole cover for slotted cover and lower the frame if needed.	Private	n	N	N	N	N	N	N	N	N	N	N	N	N	N

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44	201 & 434 Runnymede Dr	Resident is concerned about runoff created by 237 Runnymede addition project		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	434 Runnymede Dr	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	450 RUNNYMEDE DR	Streambank Erosion	Lac du bois subdivision and others which have retaining basins: In several of these subdivisions the shoreline of these water retention "ponds" is eroding badly. These subdivisions need both management and perhaps financial assistance in order to avoid retention dike failure and damage to roadways	Private	N	N	N	N	N	N	Y	N		N	N	N	N	Y
45	219 Hibler Oaks	Backyard erosion		Private - Cost Share	N - If solution is permanent erosion control Y - If solution is extension of storm sewer	N	N	N	N	N	N	N	N	N	N	N	N	N
46	220 CLION LN	Property Flooding	heavy streams in the back yard with rains;	Monitor	Y - Regional solution needed if warranted.	N	N	N	N	N	N	N	N	N	N	N	N	N
	230 Clion Ln	Concerns about roadside drainage		Monitor	Y	N	Y	N	?	N	N	N	?	N	N	N	N	N
	Clion Lane & Ladue Lake Dr	Gully erosion and ponding in multiple back yards.		Private - Cost Share	Y - Regional solution needed if warranted.	N	N	N	N	N	N	N	N	N	N	N	N	N
	225 LADUE LAKE DR	Property Flooding	Extensive flooding on west side of lot coming from the north with moderate to heavy rain.	Private - Cost Share	Y - Regional solution needed if warranted.	N	N	N	N	N	N	N	N	N	N	N	N	N
48	240 Laduemount Dr	Creek erosion		Private	N	N	N	N	N	N	N	N		N	N	N	N	N
49	25 MORWOOD LN	Property Flooding	Yard floods during almost every rain event. Excessive water flowing on south side of yard. North side water ponds, City wanted to install an inlet in the 1990s or 1980s between 23 and 25 in the back, but the previous owner of 23 would not allow the work to proceed.	Monitor	Y - If pipe is a solution would likely cross property lines	N	N	N	N	N	N	N	N	N	N	N	N	N
50	258 NEW SALEM DR	Streambank Erosion	Resident report to the City: Streambank erosion	Private	n-Currently working with contractor to fix	N	N	N	N	Y	Y	N	N	N	N	N	N	Y
51	49 Beaver Dr	The homeowner is concerned about water ponding in the front yard.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
53	7 Middlebrook Ln		Erosion threatening shed (relocate shed)	Private	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y

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54	307 Cabin Grove	Sheet flows from an uphill neighbor causing erosion		Private	N - Erosion control with shade tolerant ground cover and proper grading of yard.	N	N	N	N	N	N	N	N	N	N	N	N	N
	307 CABIN GROVE LN	Property Flooding	storm water runs from the property located on Windsor Oaks Drive and accumulates in the backyard of the property.	Monitor	Y - Issue not on complaintants property	N	N	N	N	N	N	N	N	N	N	N	N	N
56	359 Country Glen	Concerns about creekside backyard erosion.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
57	36 AUBURNDALE DR	Property Flooding	Property flooding due to rain not flowing to storm drain east to west but down through yards southern direction	Private	N - grading can solve issue on the property	N	N	N	N	N	N	N	N	N	N	N	N	N
58	373 Hibler Ct	Existing concrete cannel is undersized		Private	Y	N	N	N	Y	N	N	N	N	N	N	N	N	N
63	477 MARFORD DR	Property Flooding	During and after rain, water pools up in this back corner of the yard	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	482 STAINES CT	Property Flooding	Our backyard turns into a river during heavy rain. We live where the creek was supposedly buried many years ago, but now all the water just runs above ground where the creek should have been.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
65	5 Ladue Estates	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	55 E LADUE ESTATES DR	Property Flooding	Water pools & runs over wall onto sidewalk.	Private	Y - If wall is public or issue is water on the sidewalk N - If wall is private	N	N	N	N	N	N	N	N	N	Y	N	N	N
68	561 Sarah Ln	Ponding on Sarah Ln and in front of garage doors. Garages are downgrade from road.		Public/Private	N - for onsite issues Y - for street ponding	Y	N	N	N	N	N	N	N	N	N	N	N	Y - For on-site issues
70	12228 WINROCK DR	Streambank Erosion	Resident reports that the conveyance channel to the detention basin has been receiving more flows than it did in the past. As a result, the channel has widened, trees have fallen, and the sides of the channel have eroded.	Private	Y	N	N	N	N	N	Y	N	N	N	N	N	N	N
	12228 WINROCK DR	Streambank Erosion	A culvert conveying street stormwater daylights here with open surface draining towards as MSD stand pipe, however there is standing water.	Private	Y	N	N	N	N	N	Y	N	N	N	N	N	N	N

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71	625 Lampadaire Dr	Yard erosion		Private - Cost Share	N- If permanent erosion control is a viable option	N	N	N	N	N	N	N	N	N	N	N	N	N
72	667 Rue De Fleur Dr	Ponding in common area near the creek		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
75	7 SHERWYN LN	Property Flooding	The resident reports flows from neighbor's driveway entering a swale near the property line. Flows from the swale enter the creek on this property, and erosion is seen on the path from the swale to the creek.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
77	741 GASCOGNE DR	Property Flooding	Gullies have developed near the sewer that was installed (approx 15 years ago) that water collects in and doesn't fully drain. Ground needs to be regraded for better drainage.	Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
78	753 TIMBER RUN DR	Streambank Erosion	CMP is collapsed and causing bank/yard erosion and erosion of the pond banks. Pipe may be collapsed causing surcharge of manhole, runs into pond and causes erosion Erosion is contaminating waters with mud too. Ground is eroding through the trees to the sewer. That's water runoff from the backyards up the street.	MSD	Y	N	N	N	Y	N	Y	N	N	Y	N	N	Y	N
79	761 Turrentine Trail	Stormwater creating an approximate four-foot wide stream as it passes through the homeowner's yard. Homeowner wants to know if this is how the yards were designed to convey water.		Monitor	N	N	N	N	N	N	N	N	N	N	N	N	N	N
80	77 Colonial Hills Dr	Backyard erosion		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
82	859 Larkin Ave	Yard ponding		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N
83	920 Bellerive Manor Dr	Failing French drain and improperly directed downspouts.		Private	N	N	N	N	N	N	N	N	N	N	N	N	N	N

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Project Number	Address	Reported Issue	Notes	Public/Private	Would it be an unreasonable burden or unreasonably difficult for the homeowner to solve the issue? (Y/N)	Does the stormwater issue threaten public or private structures? (Y/N)	Does the stormwater issue threaten public or private roadways? (Y/N)	Does the stormwater issue threaten public infrastructure or publicly-funded improvements? (Y/N)	Is the issue caused by an undersized stormwater conveyance infrastructure? (Y/N)	Does the proposed project address regional or systematic channel instability? (Y/N)	Would a solution protect water quality or natural resources? (Y/N)	Was the issue caused by altered upstream conditions? (Y/N)	Was the issue caused by inadequate system design under previously less restrictive development or redevelopment regulations? (Y/N)	Was the issue caused by inadequate maintenance of a public system? (Y/N)	Will the project improve public safety? (Y/N)	Has the stormwater issue been identified as a monitor project? (Y/N)	Is the focus of the project utility work? (Y/N)	Does the work focus on privately-owned infrastructure? (Y/N)
93	455 Ridgecorde Pl		Inlet in rear yard completely covered and property owner mentioned that it gets bypassed during storms	MSD	Y	N	N	Y	N	N	N	N	N	N	N	N	Y	N
	9 Mosley Acres Dr		Sinkholes near/around area inlet															
103	946 FERNGATE LN	Property Flooding	Standing water in backyard in heavy rain	Private	N	N	N	N	N	N	N	N		N	N	N	N	Y
106	1070 Toreador Dr		Potential cso, has active flow	Private	Y	N	N	Y	N	N	Y	N		N	Y	N	Y	N
128	215 CHASSELLE LN	Streambank Erosion	Im not sure if this is considered stream bank erosion but after storms our drinking water tastes very bad. Undrinkable. We go weeks experiencing a bad smell/taste from the water. We have to resort to drinking bottled water during these times. We have contacted the water company a few times regarding this issue. They even sent someone out to test the water at one point. They never found undesirable levels, but the issue still persists after the storms.	Private	N	N	N	N	N	N	N	N	N	N	N	N	Y	N

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Open House #4

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Watershed Management Plan

1

Watershed Master Planning

- City Planning Effort
- Previous Efforts
  - 1999 Stormwater Evaluation Report
  - 2010 Stormwater Questionnaire
  - 2012 Stormwater Master Plan Update
- Overall Goals
  - Updated Master Plan
  - Integrate Public Input
  - Develop Prioritization Ranking Methodology

2

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Watershed Management Plan
Goals & Objectives

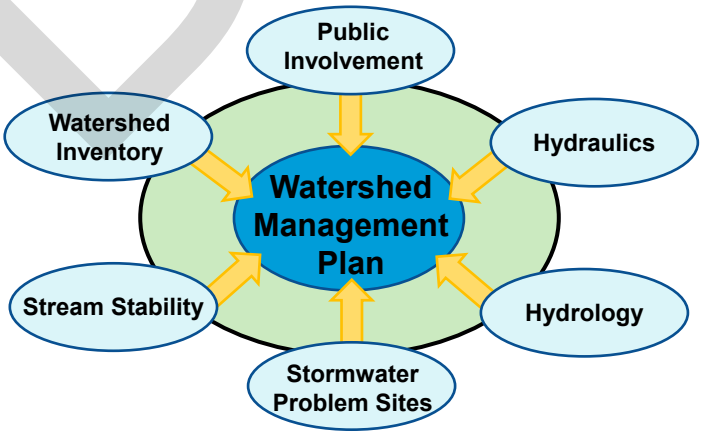
Goal - Develop planning tools and capital improvement projects to address water quality, stream stability, and stormwater infrastructure and drainage issues.

Study Objectives

- Maintain a proactive public involvement process
- Identify needed Capital Improvement Projects (CIPs) for stormwater issues
- Quantify existing hydrologic and hydraulic data
- Map stream corridors
- Evaluate stormwater problem sites
- Develop prioritization ranking method

3

Watershed Management Plan
Major Study Components



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Watershed Management Plan
Benefits

- Engineering-based tool to guide the City in choosing projects for the Stormwater program
- Maximize benefits to residents
- Reduction of risks to public safety, public health, and damage to public infrastructure and private property
- Allows the City to secure grant funding
  - More funding allows the City to complete more projects in a shorter period of time

5

Watershed Management Plan Overview
Phases

- Phase: Identify stormwater issues
- Phase 2: Review identified issues
- Phase 3: Categorize issues

The planning process – in all phases – has been collaborative, transparent, and inclusive

6

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Phase 1 – Identify Stormwater Issues

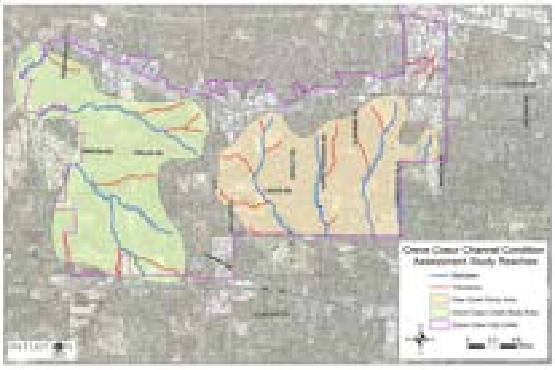
- Issues reported on Social Pinpoint. (A total of 407 responses were received)
  - 216 erosion and channel related
  - 191 flooding issues
  - 24 Home Flooding
  - 87 Property Flooding
  - 60 Streambank Erosion
  - 26 Street Flooding

- Historical information provided by the City
- Open House events for residents to provide information about known stormwater issues

7

Phase 1 – Identify Stormwater Issues

- Engineers conducted channel condition assessments
  - Over 22 miles of stream field observation
  - Methodical, engineering-based assessment system
  - Consistent Scoring
- I&L has completed 53 watershed management plans
- I&L and EDM have assessed over 1,000 miles of creeks and streams (boots on the ground)



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Phase 2 – Review Identified Issues

- Review and Group issues
  - 407 reported issues
  - Grouped into 132 problem areas
- Conduct Site Visits at all locations
- Complete Desktop Review
  - Historical info
  - FEMA maps
  - MSD Databases
- Develop Solutions
- Create Cost Estimates

9

Phase 3 – Categorize Issues

- Public vs. Private checklist
  - Public Input/Feedback
    - Stormwater Committee
    - Residents
    - Open House Events
  - Review and Categorize Projects
    - 132 problem areas became
    - 53 Private issues
    - 102 Public Projects

Is a stormwater issue public or private?

10

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Phase 3 – Categorize Issues

- Residents who want to solve their private stormwater issues may receive funding assistance from the City's new Stormwater Management Cost Share Program
- The Deer Creek Watershed Alliance and MSD also have grant opportunities for individual homeowners

11

Phase 3 – Categorize Issues

- Prioritization Ranking System
  - Based on MSD's system
    - An established, widely-used scoring system in our area
    - Solid engineering basis
    - Aligning with MSD helps with possible future funding opportunities
    - City tailored the system to Creve Coeur
  - This ranking system was consistently applied to all identified issues across the City
  - The system will be consistently applied moving forward to score issues that will come up in the future
  - Every project has an equal chance of becoming a public project because it is scored under the same system
- **<u>Higher scores do not guarantee that an issue will have a publicly-funded solution</u>**

12

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Phase 3 – Categorize Issues

- Adjustments from MSD
  - Flooding and Erosion threats to Structures. Eligible structures are ones that would typically require a building permit.
  - Threatened Roadway – weighting factor for type of roadway (heavily traveled road versus lightly used side streets)
  - Threats to Natural Resources (parks, wetlands, continuous woods, etc.)
  - Condition of existing stormwater system.
  - Preservation of natural resources
  - Conservation Easements
  - Ease of implementation

13

Phase 3 – Categorize Issues

- Prioritization Ranking System
  - Projects are scored based on risks, benefits, and estimated costs
    - Higher risks can earn higher scores – for example: structural flooding scores higher than yard erosion
    - Scores are not based on the number of years a problem has existed
  - Priority is Structural Flooding and Public Safety Issues.
  - Followed by Highest Benefit
    - More affected residents, higher score
  - The system is a guide and decision-making tool, not a guarantee a project will be completed
  - Re-Scoring only if site conditions have changed

14

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Phase 3 – Categorize Issues

- Project Categories:

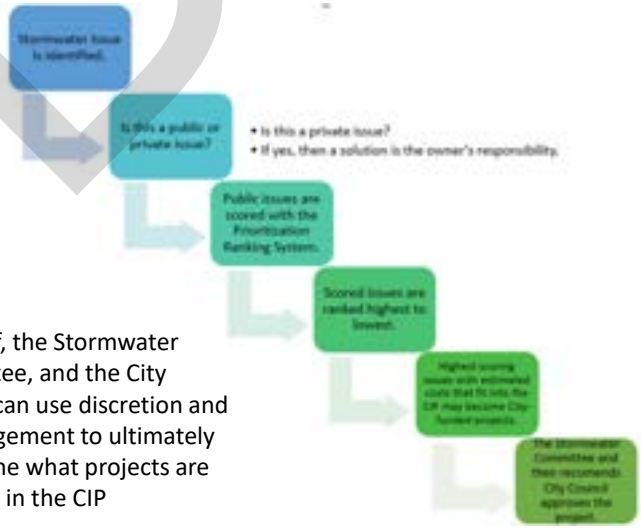
1. Structures/Culverts

2. Bank Stabilization

3. Overland Flooding

15

How identified stormwater issues can become City-funded projects



- City staff, the Stormwater Committee, and the City Council can use discretion and best judgement to ultimately determine what projects are included in the CIP

16

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Phase 3 Program Results

Project Type	Quantity	Cost (in millions)
1. Structures/Culverts	20	$12.6
2. Bank Stabilization	48	$16.7
3. Overland Flooding	34	$4.6
Program Totals	**102**	**$33.9**

1. Structures/Culverts

2. Bank Stabilization

3. Overland Flooding

17

Next Steps

Stormwater Management Plan

- The report will be finalized and presented to Council for review and adoption.
- Tentative City Council work session to review the draft report is anticipated to be held on February 26th.
- Possible adoption by City Council near the end of April.

Implementation

- The ranking of identified issues will be used by City Staff, the Stormwater Committee, and City Council to select and approve projects
- Projects will be listed in the City's Capital Improvement Program, a five-year financial planning tool that directs how the City's budget is used
- New stormwater issues will be reviewed, ranked, and added to the list as needed. (Residents should continue to report stormwater issues.)
- The City intends to refresh the list and plan in about five years.

18

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Thank You!!!

- Thank you all for your participation in the process and support of the half-cent sales tax
- Before the sales tax, the City generally did not have the funds needed to address many stormwater issues
- The City was putting out fires – responding not planning
- Thanks to the tax, the City now has the ability to plan and proactively solve problems
- The Watershed Management Plan gives us a clear, thoroughly-researched, fact-and-engineering-based, methodical, consistent, and impartial guide for shaping the City's Stormwater Program

19

Questions?

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20

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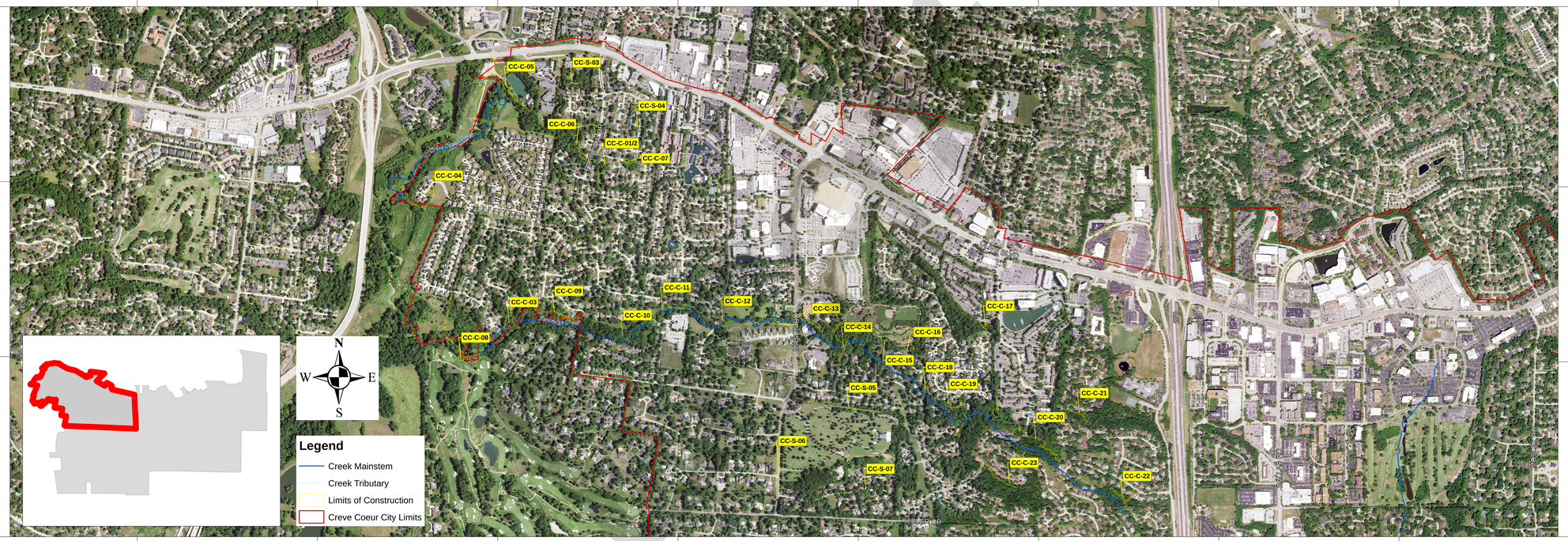

CC-C-05
CC-S-03
CC-S-04
CC-C-06
CC-C-01/2
CC-C-07
CC-C-04
CC-C-09
CC-C-11
CC-C-12
CC-C-03
CC-C-10
CC-C-13
CC-C-14
CC-C-16
CC-C-17
CC-C-08
CC-C-15
CC-C-18
CC-C-19
CC-S-05
CC-C-21
CC-C-20
CC-S-06
CC-C-23
CC-S-07
CC-C-22
Coeur d'Alene Lake Drive
Hilltop Drive
Hilltop Drive
Hilltop

CC-C-01 202 Bellington Lane

Problem description: Yard and basement flooding at 202 Bellington Lane due to flow from upstream properties.

Recommendation: Construct a berm and swale with underdrain to intercept the flow from the south and direct it to the street to the west. Swap out an existing 4-inch pipe with a dome inlet grate to minimize clogging.

Existing Lawn

Conceptual Layout of CC-0-01

CC-C-02 12229 Ladue Woods Drive

Problem description: Yard flooding at 12229 Ladue Woods Drive.

Recommendation: Construct berm to intercept flow from hillside that is flowing towards the east end of the house.

Special Considerations: Need additional information from Owner on home during field visit. Yard drains to main flow path through property that is blocked by the pool.

Yard drains uphill of pool

Conceptual Layout of CC-0-02

CC-C-03 Bellington Lane

Problem Description: At Rosenfelder Creek between Conway Holmes Circle and Hewlett Court multiple issues were observed as follows. There is a perched pipe with fallen segments located east of 12311 Conway Holmes Circle, a knickpoint to the tributary confluence with Creek, and a knickpoint to the tributary north of 1321 Bell Arbor Lane. There is erosion along an outside bend threatening the foundation of the rear wall of 297 Bellington Lane. The pedestrian bridge crossing perched Creek in Lots 296 and 297 Hewlett Court is failing with the left bridge abutment failing bridge abutments, a knickpoint downstream of the bridge, and erosion along the RDB upstream of the bridge. There is a knickpoint southwest of 298 Hewlett Court. The affected parcels are private.

Recommendation: Install a grade control at the perched pipe. Stabilize the LDB at the tributary confluence and install a grade control at the knickpoint. Stabilize the eroding RDB outside bend and replace the fence. Replace the failing pedestrian bridge abutments, install a step grade control and stilling basin, and stabilize the RDB upstream of the bridge. Install two step grade controls at the knickpoint southeast of 296 Hewlett Court.

Eroded bank erosion

Pedestrian bridge

Conceptual Layout of CC-0-03

CC-C-04 Williamsburg Road

Problem Description: There a bank erosion along Rosenfelder Creek threatening the fence and pool in rear lot of 302 Cabin Grove Lane along with a 2 ft knickpoint. There is also erosion in the northwest corner of 30 Williamsburg Road threatening the rear fence and shed. The affected parcels are private.

Recommendation: Stabilize the LDB along the rear lot of 302 Cabin Grove Lane and install a step grade control at the knickpoint. Rock armor the outfall of large vary and install a grade control at the confluence.

Threatened fence and pool

Conceptual Layout of CC-0-04

CC-C-05 12 Broadview Farm Road

Problem Description: Several knickpoints were observed along a tributary to Smith Creek which runs parallel to South Warson Road. Bank mass wasting was seen along the rear lot of 29 Broadview Farm Road. The affected parcels are private.

Recommendation: Install step grade controls at the knickpoints and a grade control at the upstream end of the incision to halt it. Stabilize the bank along the rear lot of 29 Broadview Farm Road.

Bank mass wasting

Conceptual Layout of CC-0-05

CC-C-02, 03 Broadview Farms Subdivision

Problem description: Water ponds along the northrear lot, 18, 21, and 22 Broadview Farms Road. At 3 Broadview Farms Road, there is a 24" CMP that drains to a drain with a 24" RCP that drains to the area. A curb inlet (CI) uphill has significant bypass potential and the curb along the east side of Broadview Farms Road, has the potential to be overtopped allowing additional flow to this area.

Recommendation: For the water ponding along the curb, infill and overlay the street and adjust the pavement slope to drain across the street. At 3 Broadview Farms Road, reset the CI top and reconstruct the curb along Broadview Farms Road.

Special Considerations: Concrete should be considered in lieu of asphalt to provide a more precise grade and cross slope on the street to ensure proper drainage. The hydraulic grade line for the storm sewer downstream of the FES needs to be checked to ensure water isn't backing up into this area. A check valve in the adjacent MH on the pipe should be considered.

Flooding at end of driveway

Conceptual Layout of CC-0-02

CC-C-06 438 Twin Creek Road

Problem Description: In Smith Creek behind 438 Twin Creek Road erosion was reported along the LDB. The affected parcels are private.

Recommendation: Stabilize the LDB.

LDB Erosion

Conceptual Layout of CC-C-06

CC-C-01 Baloise Estates

Problem Description: In the unnamed tributary along Baloise Estates occur along the RDB is threatening the driveway of 24 Baloise Estates. The affected parcels are private.

Recommendation: Stabilize the RDB and install a grade control.

Scour Broadening driveway

Conceptual Layout of CC-C-01

CC-C-07 Chesterton Lane

Problem Description: There is trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 37 Chesterton Lane. Also in the backyard of 36 Lake Lane, there is a perched pipe with undermining. Additionally, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 36 Lake Lane.

Recommendation: Remove the trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 37 Chesterton Lane. Also in the backyard of 36 Lake Lane, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 36 Lake Lane.

Bank sloughing and undercut

Conceptual Layout of CC-C-07

CC-C-08 Hillbert Drive

Problem Description: Trees growing in LDB of unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court are destroying the bank. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Recommendation: Remove the trees destroying bank on the LDB of the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Bank sloughing and undercut

Conceptual Layout of CC-C-08

CC-C-09 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-09

CC-C-10 Ladue Crossing

Problem Description: There is trees causing a headcut in the unnamed tributary to Smith Creek behind 1 Ladue Crossing Court. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Remove the trees causing a headcut in the unnamed tributary to Smith Creek behind 1 Ladue Crossing Court. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-10

CC-C-11 Bellefond Court

Problem Description: In an unnamed tributary to Smith Creek behind 1 Bellefond Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Bellefond Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Bellefond Court.

Undercut pipe

Conceptual Layout of CC-C-11

CC-C-12 Ladue Crossing

Problem Description: In an unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-12

CC-C-13 Ladue Crossing

Problem Description: In an unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-13

CC-C-14 Ladue Crossing

Problem Description: In an unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-14

CC-C-15 Bellefond Court

Problem Description: In an unnamed tributary to Smith Creek behind 1 Bellefond Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Bellefond Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Bellefond Court.

Undercut pipe

Conceptual Layout of CC-C-15

CC-C-16 Ladue Crossing

Problem Description: In an unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-16

CC-C-17 Chesterton Lane

Problem Description: There is trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 37 Chesterton Lane. Also in the backyard of 36 Lake Lane, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 36 Lake Lane.

Recommendation: Remove the trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 37 Chesterton Lane. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 36 Lake Lane.

Bank sloughing and undercut

Conceptual Layout of CC-C-17

CC-C-18 Ladue Crossing

Problem Description: In the unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-18

CC-C-19 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-19

CC-C-20 Hillbert Drive

Problem Description: In the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court, there is trees destroying the bank. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Recommendation: Remove the trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Undercut pipe

Conceptual Layout of CC-C-20

CC-C-21 Bellefond Court

Problem Description: In an unnamed tributary to Smith Creek behind 1 Bellefond Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Bellefond Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Bellefond Court.

Undercut pipe

Conceptual Layout of CC-C-21

CC-C-22 Ladue Crossing

Problem Description: In an unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-22

CC-C-23 Ladue Crossing

Problem Description: In an unnamed tributary to Smith Creek behind 1 Ladue Crossing Court, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Recommendation: Install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Ladue Crossing Court.

Undercut pipe

Conceptual Layout of CC-C-23

CC-C-24 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-24

CC-C-25 Hillbert Drive

Problem Description: In the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court, there is trees destroying the bank. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Recommendation: Remove the trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Undercut pipe

Conceptual Layout of CC-C-25

CC-C-26 Hillbert Drive

Problem Description: In the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court, there is trees destroying the bank. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Recommendation: Remove the trees destroying bank on the RDB of the unnamed tributary to Smith Creek behind 2 Hillbert Drive and 1 Hillbert Court. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Hillbert Court.

Undercut pipe

Conceptual Layout of CC-C-26

CC-C-27 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-27

CC-C-28 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-28

CC-C-29 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-29

CC-C-30 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-30

CC-C-31 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-31

CC-C-32 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-32

CC-C-33 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-33

CC-C-34 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-34

CC-C-35 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-35

CC-C-36 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-36

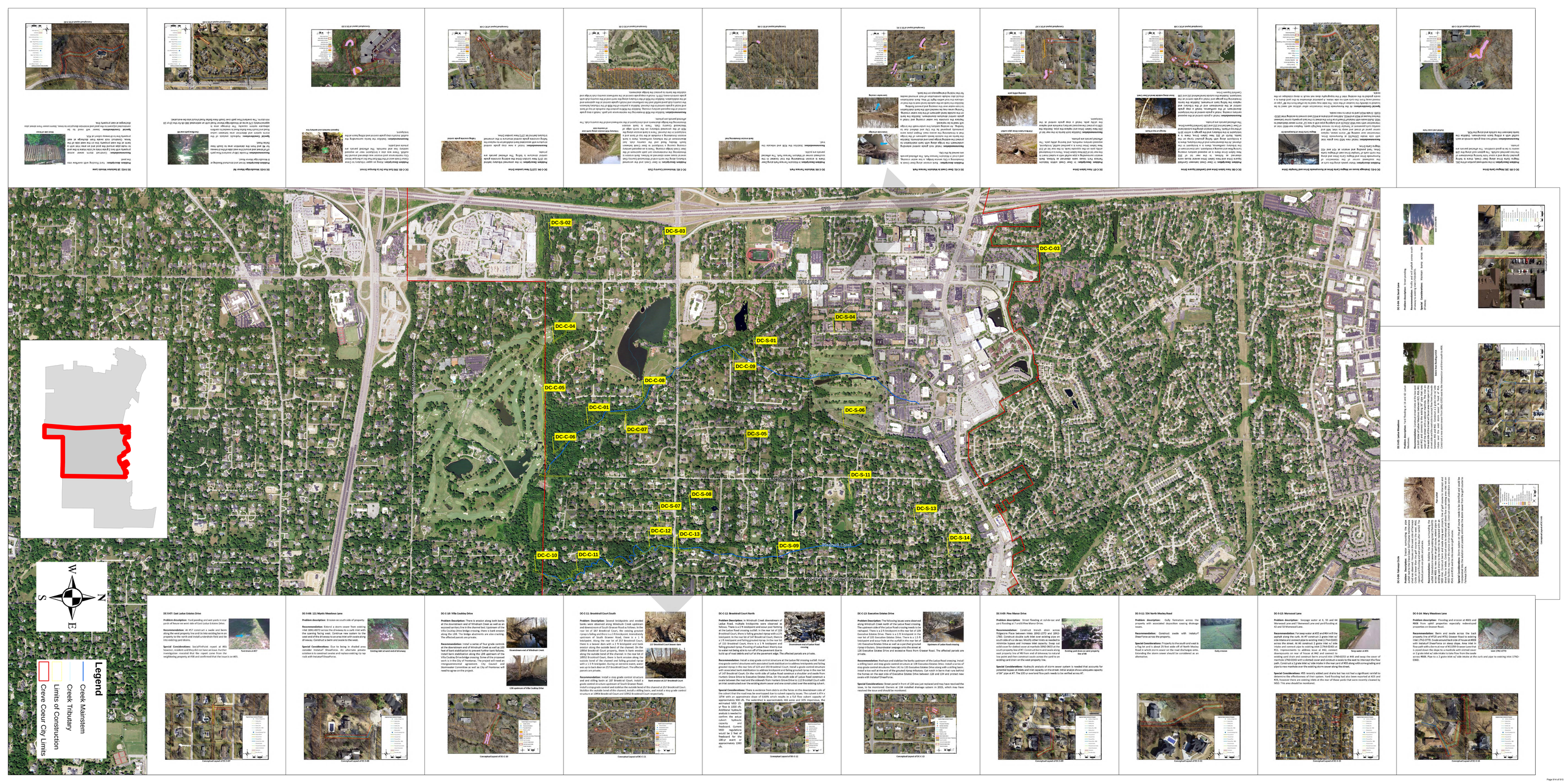
CC-C-37 Faber Road

Problem Description: In the unnamed tributary along Faber Road erosion was observed along the RDB threatening the rear fence of 1 Faber Road. Also, there is a perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Recommendation: Stabilize the RDB in between the two pipes. Also, install a rock chute to fix the perched pipe with undermining at the outlet of the pipe in the backyard of 1 Faber Road.

Eroded bank

Conceptual Layout of CC-C-37



DC-S-01: Dan Ladue Estates Drive

Problem Description: Yard flooding and wet yards in rear yards of house on west side of East Ladue Estates Drive.

Recommendation: At #57, construct a swale and berm along the west property line and tie into existing berm on property to the north and install underdrain (6in) and tie into existing yard drains.

Special Considerations: Securaflo/Hood request at 483; however, resident said they did not have an issue. Further investigation revealed that the report came from the neighboring property at #58 and confirmed that the issue is on #65.

Yard drains at #57

Conceptual Layout of DC-S-01

DC-S-02: 12 Mystic Meadows Lane

Problem Description: Erosion on south side of property.

Recommendation: Extend a storm sewer from existing inlet 18N1455T3 across the driveway to a curb inlet with the opening facing west. Continue new system to the west and if the driveway to an area inlet with swale along driveway. Construct a berm and swale to the west.

Special Considerations: Due to living in shaded area consider Instalcell Sheetforce. An alternate private solution is to construct swales and replace existing rip rap rock with Instalcell Sheetforce.

Existing inlet at west end of driveway

Conceptual Layout of DC-S-02

DC-S-03: Villa Cadiz Drive

Problem Description: There is erosion along both banks at the downstream end of Windrush Creek as well as an exposed sanitary line in the channel bed. Upstream of the Villa Cadiz Drive bridge crossing, there is bank erosion along the left bank. The improvements are also reaching the affected parcels are private.

Recommendation: Install a series of four grade control at the downstream end of Windrush Creek as well as 25 feet of bank stabilization to prevent further bank failure, install bank stabilization along the 12ft upstream of the Villa Cadiz Drive bridge crossing. Some of the proposed work is located on City property and will require a non-conventional agreement. City Council and Stormwater Committee as well as City of Frontenac will need to agree on the project.

Downstream end of Windrush Creek

12ft upstream of Villa Cadiz Drive

Conceptual Layout of DC-S-03

DC-S-04: Brookfield Court South

Problem Description: Several knickpoints and eroded banks were observed along Windrush Creek upstream and downstream of South Graeser Road as follows. In the rear lot of 307 Brookfield Court, the existing grouted channel has failed and is causing bank erosion and a 2 ft knickpoint. In the rear lot of 297 Brookfield Court, there is a 2 ft knickpoint. Along the rear lot of 257 Brookfield Court, there is a large bank failure on the left bank of the creek and a 3 ft knickpoint. On the outside bend of the channel, on the 10854 Brookfield Court property, there is bank erosion along the left bank of the channel. In the rear lot of 10852 Brookfield Court, there is bank erosion along the left bank of the channel and a 3 ft knickpoint. Along with a 1.5 ft knickpoint. During an extreme event, water was up to back door on 257 Brookfield Court. The affected parcels are private.

Recommendation: Install a step grade control structure and stilling basin at 307 Brookfield Court, Install a grade control structure upstream of South Graeser Road. Install a step grade control and stilling basin at the rear of the channel at 257 Brookfield Court, Stabilize the outside bend of the channel, install a stilling basin, and install a step grade control structure at 10854 Brookfield Court and 10852 Brookfield Court respectively.

237 Brookfield Court Eastern Side

Bank erosion at 237 Brookfield Court

Conceptual Layout of DC-C-13

DC-C-12: Brookfield Court North

Problem Description: In Windrush Creek downstream of Ladue Road, multiple knickpoints were observed as follows. There is a 2 ft knickpoint in the rear lot of 10 Windrush Court. There is a 2 ft knickpoint in the rear lot of 128 Brookfield Court. There is a 2 ft knickpoint in the rear lot of 129 Brookfield Court. There is a 2 ft knickpoint in the rear lot of 139 Brookfield Court, there is a 1 ft knickpoint and failing grouted riprap. In the rear lot of 149 Brookfield Court, there is a 2 ft knickpoint and failing grouted riprap. Flooding of Ladue Road. Morris Ave. to water not being able to run off of the pavement due to build up of road debris and turf on the pavement edge. The affected parcels are private.

Recommendation: Install a step grade control structure at the Ladue Rd crossing outfall. Install step grade control structures with associated bank stabilization to address knickpoints and failing grouted riprap in the rear lots of 129 and 159 Brookfield Court. Install a grade control structure with associated bank stabilization to address knickpoint and failing grouted riprap in the rear lot of 149 Brookfield Court. On the north side of Ladue Road construct a shoulder and swale from the rear lot of 10 Windrush Court to the rear lot of 128 Brookfield Court to convey runoff that overtops Ladue Road between the rear of the sidewalk from Hunters Grove Drive to 128 Brookfield Court with an inlet constructed over the existing storm sewer and one constructed over the existing culvert.

Special Considerations: There is existing storm drain in the house on the downstream side of the culvert that the road must be overtopped due to current capacity issues. The culvert is 87'x 19"W with an approximate slope of 0.60% which results in a full flow culvert capacity of approximately 900 cfs. The watershed is approximately 466 acres and 30% impervious, the

Downstream end of Ladue Road crossing

Conceptual Layout of DC-C-12

DC-C-13: Executive Estates Drive

Problem Description: The following issues were observed along Windrush Creek north of the Ladue Road crossing. The upstream end of the Ladue Road crossing needs to be reshaped. There is a 2 ft knickpoint in the rear lot of 105 Executive Estates Drive. There is a 2 ft knickpoint in the rear lot of 115 Executive Estates Drive. There is a 1.5 ft knickpoint and scour hole at the outfall in the rear lot of 141 Executive Estates Drive as well as a perched grouted riprap tributary. Groundwater seepage onto the street at 139 Executive Estates Drive and excessive flows from Graeser Road. The affected parcels are private.

Recommendation: Reshape and stabilize the banks upstream of the Ladue Road crossing. Install a stilling basin and step grade control structure at 129 Executive Estates Drive. Install a series of step grade control structures from 141 to 135 Executive Estates Drive along with a stilling basin. Install a low wall at the end of the grouted riprap tributary. Cut roads in berm line behind the homes on the east side of Executive Estates Drive between 126 and 134 and protect new swale with Instalcell Sheetforce.

Special Considerations: Street panel in front of 124 was just retracted and may have resolved the issue, to be monitored. Owners at 134 installed drainage system in 2020, which may have resolved the issue and should be monitored.

Upstream of Ladue Road crossing

Conceptual Layout of DC-C-13

DC-C-01: Pine Manor Drive

Problem description: Street flooding at cul-de-sac and yard flooding at 7 and 8 Pine Manor Drive.

Recommendation: Construct trench drain across Ridgecrest Place between Hinkel (2372) and Gilfred (2760). Construct double curb inlet on west side of cul-de-sac. Modify other inlets as needed to maintain flow to the new inlet. Install 12in RCP storm sewer to connect cover at manhole 18N2146D3 at the south property line of 7 Construct berm and swale along east property line of #8 to work with existing 12in RCP at low point and then construct swale across the yard to an existing yard drain on the west property line.

Special Considerations: Hydraulic analysis of storm sewer system is needed that accounts for proposed bypass at Hinkel and road capacity on the street. Initial analysis shows adequate capacity of 84" pipe at #7. The 100-yr overland flow path needs to be verified across #7.

Existing yard drain on west property line of #8

Conceptual Layout of DC-S-01

DC-S-11: 234 North Mackay Road

Problem description: Gully formation across the property with associated deposition causing drainage issues.

Recommendation: Construct swale with Instalcell SheetForce across the property.

Special Considerations: Property to the south and east is a flag lot and is about 25 feet wide off of North Mackay Road in which storm sewer on the road discharges onto. Extending the storm sewer should be considered as an alternative.

Gully erosion

Conceptual Layout of DC-S-11

DC-S-12: Morwood Lane

Problem description: Seepage water at 6, 10 and 64 Morwood Lane and 7 Benwood Lane and yard flooding at 47 and 54 Morwood Lane.

Recommendation: For seep water at #25 and #64 mill the asphalt along the curb. At #7 construct 2 grate inlet w/ side inlets and connect pipe to existing inlet (17N4-0160) at #11. For seep water at #47 and #54 mill the asphalt 10 inches and connect pipe to existing inlet (17N4-0160) at #11. Improvements to address issue at #42, connect downspouts on rear of house at #42 and connect to existing yard drain and construct berm around inlet 17N4-0250 at #46 and swap the cover of inlet 17N4-0250 to a grate inlet and construct a swale to the existing inlet on the north side of the path. Construct a 2 grate inlet w/ side inlets in the rear yard of #53 along with curb tying and pipe to new manhole over the existing storm sewer along the street.

Special Considerations: #58 recently added yard drains but has not had a significant rainfall to test the improvements. Improvements to the storm sewer system were completed at #29, however heavy rainfall is causing water at the rear of these yards that were recently cleaned by MSD. This area should be monitored.

Seep water at #25

Conceptual Layout of DC-S-12

DC-S-04: Mary Meadows Lane

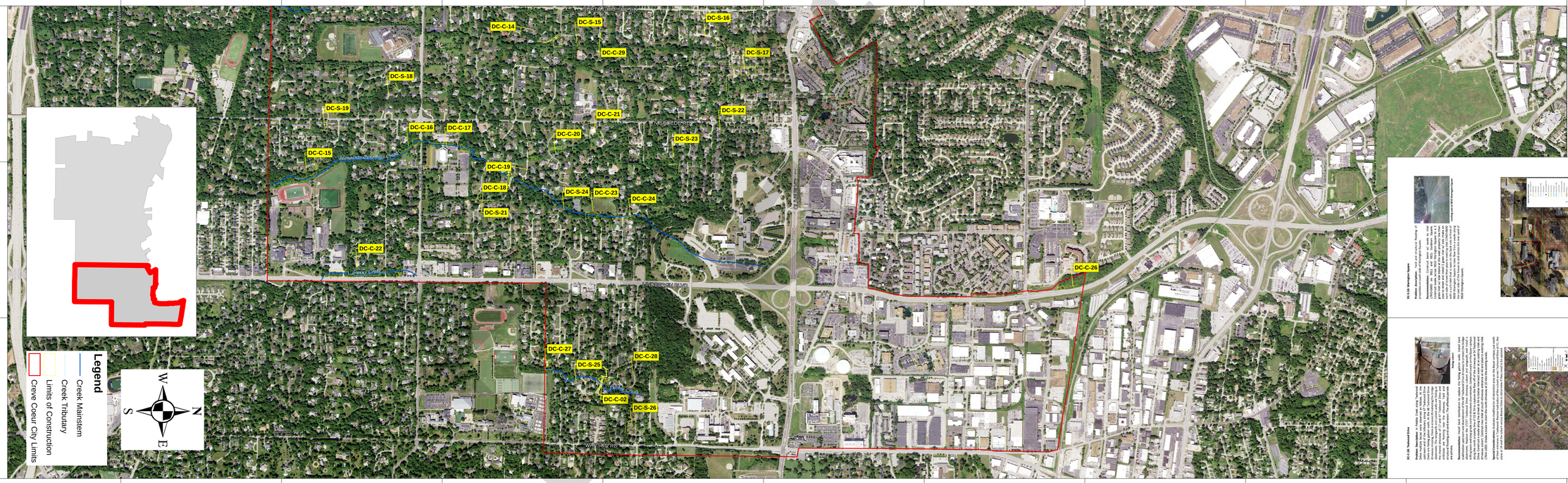
Problem description: Flooding and erosion at #800 and #808 from uphill properties especially redeveloped properties on Graeser Road.

Recommendation: Berm and swale across the back property line of #725 and #751 Graeser Road to existing inlet 17N2-0770. Swale around back side of house at #808 to existing inlet 17N2-0770 and install 12in RCP storm sewer to inlet and connect pipe to existing inlet (17N4-0160) at #11. Improvements to address issue at #42, connect downspouts on rear of house at #42 and connect to existing yard drain and construct berm around inlet 17N4-0250 at #46 and swap the cover of inlet 17N4-0250 to a grate inlet and construct a swale to the existing inlet on the north side of the path. Construct a 2 grate inlet w/ side inlets in the rear yard of #53 along with curb tying and pipe to new manhole over the existing storm sewer along the street.

Special Considerations: #58 recently added yard drains but has not had a significant rainfall to test the improvements. Improvements to the storm sewer system were completed at #29, however heavy rainfall is causing water at the rear of these yards that were recently cleaned by MSD. This area should be monitored.

Storm 17N2-0770

Conceptual Layout of DC-S-13



DC-C-01 10099 Country View Drive

Problem Description: In Monarchs-Sunswept Creek downstream of the culvert crossing Country View Drive, failing grouted riprap and bank erosion threatening the fence along the property line of 10084 Country View Drive was observed. The affected parcels are private.

Recommendation: Install a step grade control structure to replace the failing grouted riprap. Stabilize the banks on either side of the channel.

Failing grouted riprap

Bank erosion threatening fence

Conceptual Layout of DC-C-01

DC-S-02 North Spoede Road & Mission Hills Court

Problem Description: Street flooding near this intersection.

Recommendation: Construct 2 grate inlets w/ curb intake on north side of Mission Hills Court approximately 50 feet east of North Spoede Road and connect to existing storm sewer with a manhole with a solid lid cover.

Special Considerations: Hydraulic analysis of storm sewer system is needed that accounts for potential bypass at inlets and inlet capacity on the street and review spread if additional inlets are warranted on North Spoede Road.

Conceptual Layout of DC-S-02

DC-S-03 4 Spoede Ridge Lane

Problem Description: Water backs up onto 19 Spoede Hills Drive potentially due to erosion from construction at 4 Ridges Lane sitting in channel.

Recommendation: Construct better defined rock channel on 0 Spoede Ridge Lane and 4 Ridge's Lane.

Inlet in channel

Conceptual Layout of DC-S-03

DC-C-22 Denny Creek

Problem Description: In Denny Creek along Lindbergh Boulevard multiple issues were observed as follows. Upstream of the Lindbergh Boulevard crossing, erosion was observed along the riverbank and 20ft wingwall, undermining the concrete slab. Along the 4th fence, erosion was observed along both banks. There was a 1ft knickpoint upstream of the southern entrance and Whitebridge Lane, erosion was observed. Multiple trees were also observed towards the upstream end of the reach on the ROW. Between the northern entrance and Whitebridge Lane, erosion was observed along the 120 linear feet of riverbank threatening the roadway and two utility poles. Tension cracks were seen forming near the sidewalk and along the top of bank. Two knickpoints were also observed in the channel upstream of the footbridge. Along the 5th fence, a 2ft knickpoint and sinkhole was observed along with erosion threatening the wingwalls and roadway. At the upstream end of Denny Creek, a perched outfall and knickpoint were observed. The affected parcels are private.

Recommendation: Stabilize the c26 upstream of the Lindbergh Boulevard crossing. Stabilize both banks between the church entrances and install grade controls at the knickpoints. Stabilize the c28 between the northern church entrance and Whitebridge Lane. Stabilize the RDB upstream of the northern entrance and install two step grade controls. Stabilize the RDB downstream of Whitebridge Lane and install a step grade control and stilling basin. Stabilize both banks at the upstream end of Denny Creek and install a grade control.

Left erosion between church entrances

Conceptual Layout of DC-C-22

DC-S-23 7 Southwyck Drive

Problem Description: Erosion, sinkholes and failing retaining wall.

Recommendation: Impact pipe from existing inlets in rear yard for potential cause of sinkholes. Make necessary repairs. Replace retaining wall.

Failing retaining wall

Conceptual Layout of DC-S-23

DC-C-23 10620 Country View Drive

Problem Description: Within Dr. Phillip Venable Memorial Park multiple issues were observed along Monarchs-Sunswept Creek as follows. Behind 435 Deadybrook Drive there is a 3 ft knickpoint, failing grouted riprap, and gabion baskets. Behind 433 Deadybrook Drive there is a 2 ft knickpoint, failing grouted riprap, and gabion baskets. Behind 429 Deadybrook Drive, the grouted riprap structure protecting the pipe outfall is failing. The affected parcels are private and public.

Recommendation: Install a step grade control structure and bank stabilization to replace the failing gabions and retaining wall. Install bank stabilization along the private property line of 429 Deadybrook Drive to replace the failing grouted riprap. Bridge work will be combined with the planned Monarchs Park project.

Failing gabions and retaining wall

Failing grouted riprap

Conceptual Layout of DC-C-23

DC-C-24 Sunswept Drive

Problem Description: Along Sunswept Drive multiple issues were observed along Monarchs-Sunswept Creek as follows. Along the driveway of 18 Sunswept Drive there is a failing gabion wall. Where the creek crosses 15 Sunswept Drive there is a 3 ft knickpoint, failing riprap, and failing gabion baskets. Where the creek crosses 11 Sunswept Drive there is a 2 ft knickpoint, failing grouted riprap, and gabion baskets. Along the concrete below the pipe outfall in the culvert. Replace the gabion wall along 0 Sunswept Drive.

18 Sunswept Drive gabion wall

15 Sunswept Drive erosion

Conceptual Layout of DC-C-24

DC-C-25 Lindbergh Boulevard

Problem Description: In the unnamed tributary along the Lindbergh Boulevard ROW, an asphalt swale conveying drainage from the roadway is failing and being bypassed causing bank erosion. At the downstream end of the asphalt swale, a concrete swale is undermined. The issues are contained within Lindbergh Boulevard ROW.

Recommendation: Replace the asphalt swale and stabilize the banks. Install a stilling basin and step grade control structure at the downstream end of the tributary.

Failing asphalt swale

Undersized and scour hole

Conceptual Layout of DC-C-25

DC-C-27-.22 South Textbrook Drive

Problem Description: In Pebble Creek there is bank erosion present at the outfall and along the rear lot of 22 South Textbrook Drive. The affected parcels are private.

Recommendation: Install a step grade control structure, stabilize both banks, and armor the drainage channel. The property is partially located in the City of Ladue. An intergovernmental agreement will be needed for this project.

Outfall

Bank erosion along rear lot of 22 South Textbrook Drive

Conceptual Layout of DC-C-27

DC-S-25 Haven View Drive

Problem description: Curb and gutters have been filled in due to pavement overlay and flows overtop curb and flows onto 19 Haven View Drive.

Recommendation: Mill out gutters and construct three 2 yard inlet w/ side intake on south side of the street. One to connect to manhole 17543-0003 on the southeast, one to connect to manhole 17543-0004 on the south and one in front of 4749 to connect to the 17543-0002.

Special Considerations: The inlet in front of #19 could be connected directly to the 72"x72" box culvert that traverses #19.

Haven View Drive

Conceptual Layout of DC-S-25

DC-C-26 Beaver Drive Crossing

Problem Description: The downstream end of the Pebble Creek culvert under Beaver Drive has rusted out and the north headwall has undermined where the culvert is crossing and there is a limited amount of cover over the culvert. The culvert is 6'-0" wide x 4'-0" tall and is 70'-0" long. The downstream end of the culvert have rusted out and are failing. In the project vicinity, there is structural flooding at 17 Beaver Drive and 40 Beaver Drive and bank erosion at 0 Beaver Drive and 0 Pebble Creek Drive and is owned by the City. Along the south property line of 10 Teakwood Drive, there is an active incision. Valleylawn mowing up the previously stabilized tributary and undermining the grade control. There is also gully erosion along the stabilized berm. Additionally, along the west edge of 40 Beaver Drive, there is undermining at the end of the culvert is beginning to undermine the grouted riprap channel and culvert headwall.

Recommendation: Remove and replace the culvert with a two-stage culvert to maintain sediment continuity. Raise the road section to provide additional cover over the pipes. Install a grade control structure downstream of the culvert to protect the culvert outlet. Stabilize the banks with modular block retaining wall and bank stabilization on the upstream approach to protect the culvert entrance.

At 27 Beaver Drive, construct an MSD area inlet to replace the existing inlet in the northwest corner of the parcel and pipe to a new inlet at the low point along the curb at the east end of the driveway. Construct a 2 yard inlet w/ curb intake on the south side of Beaver Drive at the new inlet and wrap the berm around the inlet. Pipe down the driveway to a 2 grate inlet w/ manhole at the east end of the driveway, then continue down Beaver Drive to a 2 grate inlet w/ manhole on the south side of the intersection, and then pipe to the channel on the downstream end of the culvert. Extend the curb near this inlet along the south side of the road to the end of the cul-de-sac. Also, construct a curb on the north side of the street. From the culvert to the end of the cul-de-sac, and overtop the curb along the west side of the driveway.

Special Considerations: A berm may be needed at the end of the driveway at 40 Beaver Drive may be a viable alternative. This work should be considered to occur with the replacement of the culvert at 40 Beaver Drive.

Downstream end of culvert

Upstream end of culvert

Conceptual Layout of DC-C-26