



**AGENDA
CITY OF CREVE COEUR
STORMWATER COMMITTEE
NOVEMBER 8, 2023
4:45 PM**

CALL TO ORDER

ROLL CALL

APPROVAL OF AGENDA

APPROVAL OF MINUTES

1. Minutes - October 11, 2023 (DRAFT)

UNFINISHED BUSINESS

2. Watershed Management Cost-Share Program: Application Review Sub-Committee Nominations
3. Watershed Management Plan Ranking of Conceptual Projects
4. Restoration Policy

BUSINESS FROM STAFF

COMMENTS FROM THE GENERAL PUBLIC

NEXT MEETING DATE

**Watershed Management Plan Open House #4
Wednesday, December 13, 2023 from 6:00 - 7:30 PM**

ADJOURNMENT

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
OCTOBER 11, 2023
4:45 PM**

I. CALL TO ORDER

The meeting was called to order at 4:49PM.

II. ROLL CALL

Committee Members in attendance:

Committee Chair Dick Kutta

Committee Vice Chair Bernard Feldman

Committee Member Samantha Davies

Committee Member Mary Helen Gerst

Committee Member Bryan Pearl

Committee Member Kathleen Rizzo

Others Present: City Council Liaison Tim Carney, Director of Public Works Jim Heines, Assistant Director of Public Works/City Engineer Steven Berecz, Civil Engineer Dione Garson, and Administrative Services Associate Margaret Ries.

III. APPROVAL OF AGENDA

A motion to approve the agenda was made by Bryan Pearl, and seconded by Bernard Feldman. All were in favor. The Motion passed.

RESULT: Agenda Approval

MOVER: Pearl

SECONDER: Feldman

AYES: Richard Kutta, Bernard Feldman, Samantha Davies, Mary Helen Gerst, Bryan Pearl, Kathleen Rizzo

NAYS: None

IV. APPROVAL OF MINUTES

1. Minutes - August 16, 2023 (DRAFT)

A motion was made by Kathleen Rizzo to approve the August 16, 2023 minutes and seconded by Bernard Feldman. All were in favor. The motion passed.

RESULT: Approval of August 16, 2023 Minutes

MOVER: Rizzo

SECONDER: Feldman

AYES: Richard Kutta, Bernard Feldman, Samantha Davies, Mary Helen Gerst, Bryan Pearl, Kathleen Rizzo

NAYS: None



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V. UNFINISHED BUSINESS

2. Cost-Share Program Update

The cost-share program was approved by City Council to become a program. The program will have \$60,000 funded for the pilot year. The amount for the category for subdivisions upped to \$40,000 total, funding two projects up to \$20,000 each. The individual homeowner's category remains with the total of \$20,000, funding 5 projects up to \$4,000 each. City staff hopes to have the website and applications live within a week. The deadline for applications is January 11, 2024. At the next meeting, the committee and staff can discuss members who would like to form a subcommittee to review and score the applications with staff. The information about the cost-share program will be sent out to residents via social media, City website, and the newsletter. It could also be discussed during coffee with the Mayor. At the council meeting where the program was approved, City Council Representative Joe Martinich requested that the committee discussed possible options for subdivisions that are unable to afford the upfront cost of a project. The committee will discuss it later on, once the pilot phase of the program has begun to determine what options there may be.

VI. NEW BUSINESS

3. Impervious Surface Requirements

Richard Kutta asked the committee to discuss impervious surface requirements. University City has been working on adding impervious surface requirements and Richard brought copies of what they are considering to the committee. Dick asked what is in City ordinances regarding impervious surface requirements. City of Creve Coeur Chapter 425 has Stormwater Regulations. It applies to all land disturbance and residential permits for all: new homes, swimming pools, and detached garages. Any site improvement or building addition with a temporary or permanent land disturbance of 2,000 square feet or more. Exemption of Chapter 425 are building permits for entirely interior work; lots less than 1/4 acre; planting, trimming, pruning, or removal of trees, shrubs, grass, weeds, vegetation, ground cover, or other plant materials when actions are part of maintenance. The rule considers all phases of a project. There can be no change for neighbors to the 15 - year, 20 minute event. No adverse effects means that proposed changes will not change the volume, direction, velocity, or intensity of



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stormwater runoff for adjoining properties for the design storm. Design storm is the 15 - year rainfall intensity for duration of 20 minutes. Calculations use table 4-2 of MSD regulations. The more impervious area added, the more detention will be required. Dick asked if in regards to runoff driveways are not considered? Jim Heines replied that the City of Creve Coeur only has a permit for the ROW portion of the driveway. Dick asked the committee to think about what has been discussed and if they would like to investigate it further or determine if changes need to be made. Ordinance review is included in the Watershed Management Plan's scope of work. City staff will share with Tim Dean from Intuition & Logic to look at the ordinance review for driveways and to consider impervious surface requirements.

VII. BUSINESS FROM STAFF

Dione Garson asked the committee to consider what will the City's policy be for projects in the flood plain? Will the City fund floodproofing projects in the flood plain? What about erosion control to protect individual homes in the flood plain? Should the City fund stream bank protection and stabilization projects in the floodplain? Dione suggested to discuss this in a future meeting. She suggested having a City policy regarding what the City would and would not do in the flood plain. It may take several meetings to determine what to recommend. It will be helpful to use the costs from Intuition & Logic to determine what type of policy the committee may want to recommend.

4. Stormwater Management Plan - Open House #3

The third open house for the Stormwater Management Plan was well attended. Ten people signed the attendance sheet. However, there were close to 20 people that attended. Intuition & Logic staff (IL) met with residents. The EDM subcontractor was there as well to answer questions about the write-ups. All information from the open house is on the City website under the stormwater tab under open house #3. Open House #4 is expected to be sometime in the winter, either later November or early December. EDM and IL are developing costs to plug into the ranking system to the the values. The only sites that go through the cost-estimate are the sites that were determined public. There are 130 sites that will be going through the scoring process. The last step will be the ranking of all the projects. IL will be using the most cost effective solution in determining the cost of each project. The final report is expected around the same time as developing the CIP in order to draft the projected projects.



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5. Project Updates

Dione Garson presented updates on the current stormwater projects.

Alden Lane: There were issues with unknown abandoned Missouri American Water pipe. Previously the abandoned pipe was identified, not the active pipe. The active pipe will be relocated tentatively on Monday, October 16, 2023. Work will continue as soon as the pipe is relocated.

Dielman Rec Center: Construction has begun and is expected to be completed by mid-November. Work includes: installing two trench drains to manage flows in the east parking lot and near the golf cart garage, installing pipe and new manholes to convey parking lot flows to an existing manhole, and gutter and roof work on the west side of the building.

S New Ballas and Tarrytown: Revising JSPs to include residents' request for site restoration, bid documents should be ready to advertise within the next few weeks. Construction will likely begin after the winter holidays. The police department has agreed to use drones for pre and post construction photos to be able to see progress throughout the whole project.

City's site restoration policy: City staff proposed the City develop a policy for site restoration. At the start of easement discussions, residents will have a clear understanding of what the City will and will not do for site restoration. A clear policy will help ensure more equality and a sense of fairness among homeowners. Dione asked the committee to take a look at the draft memo by the next meeting.

Hibler Road Drainage Improvements: Revised plan set back from HRGreen. City staff will review after Tarrytown, Alden Lane, and Dielmann Recreation Center projects require less attention.

VIII. COMMENTS FROM THE GENERAL PUBLIC

Residents, Margie & Ralph Wasielewski reside at 13105 Dartagnan. They presented photos to the committee regarding an incision on their property. They stated that they have been impressed with Intuition and Logic and their transparency. They have heard varying things regarding their property. They would like to know when their project will be done. They heard it was on the next batch to be done. Mr. & Mrs. Wasielewski asked, "when do you project that to be taking place?". Dione Garson wanted to clarify that their property is not on the next batch of projects to be in the CIP. They are on the list of projects that Intuition and Logic (I&L) and EDM evaluated first, their evaluation will



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determine if it is public or private, their property is a public project, then they will score it and associate a cost with it which will give a final value and that value will be compared to other projects. There is absolutely no guarantee, that because their address was evaluated early, that you will be in the next CIP. We want to have a procedure for evaluating sites by a third party so that everybody in the City across the City knows that everybody's sites are being evaluated by the same criteria and has the exact equal chance of becoming a CIP project or not based on the risk and benefit and the cost. Ralph wanted to make sure that they are on the list. Jim Heines replied you are on the list of projects to be scored. Mr. Wasielewski wanted to make sure there was a consideration for safety on the point scale. Jim Heines replied that the scoring rubric accounts for safety. Mr. Wasielewski wanted to ensure that his property is scored correctly because the stormwater issue at their property impacts other properties as well. Jim Heines replied that there is a factor for other properties impacted when scoring. Bernard Feldman added that once all the properties are scored it will be reported, presented, and available to the public. Mrs. Wasielewski asked if public projects took priority over private. Jim Heines replied that there are 130 projects deemed as public projects. In addition, there are 40 projects that are private projects. The City will not fund the 40 projects that are private projects. However, those 40 private projects could apply for the cost-share program. Of the 130 public projects, Mr. & Mrs. Wasielewski's property is one of those public projects. Mrs. Wasielewski asked when will we know the ranking? Jim Heines replied that the rankings and scores will be presented at the next open house. City staff will publish the date to encourage residents to attend. City staff are anticipating the next open house will be at the end of November or early December. Mrs. Wasielewski asked once a project is ranked when it will take place? Jim Heines replied that stormwater is slow. The design phase could take a year before getting into the construction phase. It could be two years before a project is under construction. Mrs. Wasielewski asked "If we are at the bottom of the list. Is there any recourse?". She stated that Tim Dean from I&L eluded that their property was at the top. Jim Heines stated that we have not started ranking yet. Jim Heines wanted to clarify that their property was one of 7 conceptual sites that was evaluated early, not on the list to promote design. The ranking is still being put together and will be presented at the next open house. They are finalizing the cost to benefit ratio. Of the seven sites that were evaluated early, those remaining projects that are not escalated to the design phase will roll back into the management plan to be ranked with the rest of the projects. Mrs. Wasielewski asked if there was an appeal process. That has not been discussed yet. There is not an appeal process at this time. One has not been done with the committee. It would have to be discussed with the committee. Sam Davies stated that



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there were a lot of streams and other properties that had similar incisions to their property and the number of properties with similar incisions stood out to her. Bernard Feldman stated that residents are always welcome to the committee meetings and always welcome to speak and the committee will listen to their concerns. He assured Mr. & Mrs. Wasielewski that the committee is trying to be as fair as possible.

6. Gary & Diane Gannon - 13006 Ambois Dr

Gary & Diane Gannon who reside at 13006 sent information to the committee for review that was attached to the agenda packet.

IX. NEXT MEETING DATE

X. ADJOURNMENT

A motion was made by Sam Davies to adjourn the meeting, and seconded by Kathy Rizzo. All were in favor. The motion passed. The meeting adjourned at 6:18PM.

RESULT: Adjournment

MOVER: Davies

SECONDER: Rizzo

AYES: Richard Kutta, Bernard Feldman, Samantha Davies, Mary Helen Gerst, Bryan Pearl, Kathleen Rizzo

NAYS: None



DEPARTMENT OF PUBLIC WORKS STAFF MEMORANDUM

DATE: November 6, 2023

TO: Stormwater Committee

FROM: Dione Garson, P.E., Civil Engineer

SUBJECT: Conceptual Sites – Prioritization Ranking Scores and Proposed Projects

The Watershed Management Plan is scheduled to be completed by January 2024. To help move projects forward into design phase before the completion of the plan, the Stormwater Committee selected and approved the following sites for early evaluation:

- Broadview Farms Subdivision
- Beaver Drive
- Magana Carta Dive at Runnymede Drive and Templar Drive
- Ferntop Lane
- Cuiseaux Court
- Deer Creek in Malcolm Terrace Park
- Fernridge Creek near D’Artagnan Court

Intuition & Logic and EDM staff visited each of the sites, evaluated the stormwater issues, and ranked the issues with the Prioritization Ranking System that will be used to score all possible public projects identified under the Watershed Management Plan.

The table on the next page list the names of possible projects along with a brief description of the proposed solution.

List of conceptual sites with project identifiers and descriptions

Project Name	Project Description
DC-C-02: Beaver Drive Crossing Alternative	Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream.
DC-S-01 Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive	New inlets and regrading pavement to address ponding issues along Magna Carta Drive.
DC-C-02: Beaver Drive Crossing	Culvert replacement with associated grade control, bank stabilization, and a retaining wall downstream.
CC-C-01: Ferntop Lane Bank Stabilization	Rock armoring to address erosion and grade control at outfall knickpoint.
CC-C-01: Ferntop Lane Bank Stabilization Alternative	Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.
CC-S-01 Cuiseaux Court	New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.
CC-C-02: Ferntop Lane Outfall Repair	Headwall, rock armor, and grade control at existing outfall.
DC-C-01a: Deer Creek in Malcolm Terrace Park	Bank Stabilization to address erosion at bridge with associated grade controls.
DC-C-01: Deer Creek in Malcolm Terrace Park	Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.
DC-C-01: Deer Creek in Malcolm Terrace Park Alternative	Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.
DC-C-01b: Deer Creek in Malcolm Terrace Park	Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.
CC-S-02 Broadview Farms Subdivision	Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.
CC-C-03: 13105 D'Artagnan Court	Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

The next table shows the engineer's estimate of probable costs and the cost/benefit ratio (Prioritization Ranking Score) for each possible project.

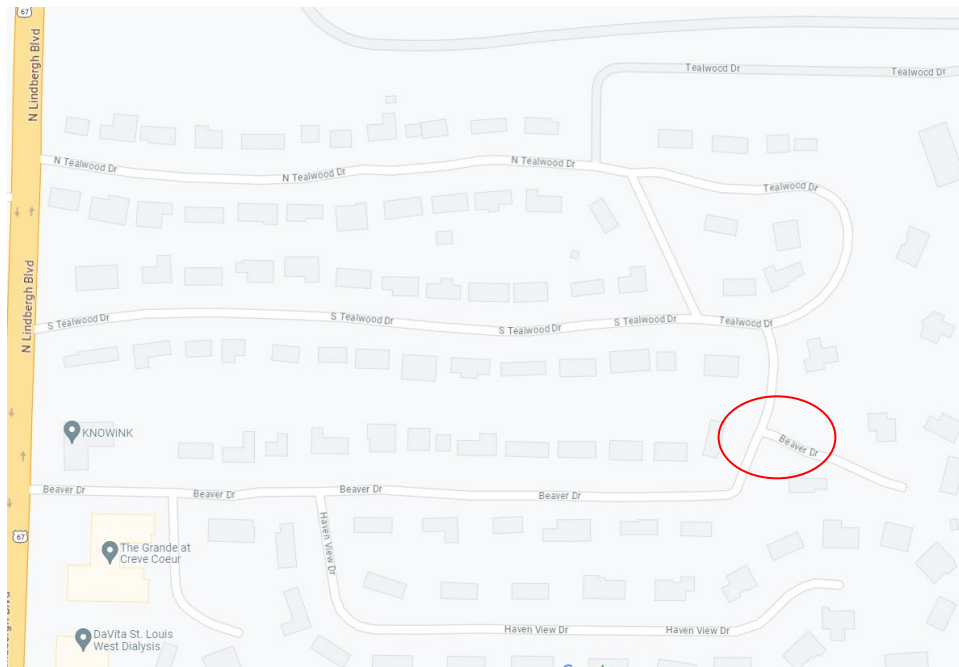
Project Name	Project Cost	Cost/Benefit Ratio
DC-C-02: Beaver Drive Crossing Alternative	\$284,700	1.19
DC-C-02: Beaver Drive Crossing	\$227,400	0.92
CC-C-01: Ferntop Lane Bank Stabilization	\$148,700	0.81
CC-C-01: Ferntop Lane Bank Stabilization Alternative	\$181,300	0.77
CC-S-01 Cuiseaux Court	\$135,300	0.70
CC-C-02: Ferntop Lane Outfall Repair	\$130,100	0.69
DC-C-01a: Deer Creek in Malcolm Terrace Park	\$591,600	0.67
DC-C-01: Deer Creek in Malcolm Terrace Park	\$1,119,200	0.65
DC-S-01 Drainage Issues on Magna Carta Drive at Runnymede Drive and Templar Drive	\$102,700	0.63
DC-C-01: Deer Creek in Malcolm Terrace Park Alternative	\$1,471,000	0.60
DC-C-01b: Deer Creek in Malcolm Terrace Park	\$580,800	0.59
CC-S-02 Broadview Farms Subdivision	\$107,400	0.52
Ferntop One Project	\$311,000	0.45
CC-C-03: 13105 D'Artagnan Court	\$541,000	0.26
Totals	Low: \$1,984,200	5.21
	High: \$3,310,700	5.24

Available funding for FY2024 and FY2025 through the Capital Improvement Program (CIP).

Total available stormwater funding for FY2024 & FY2025	
Implementation of the Watershed Management Plan	\$500,000
Stormwater Conceptual Plans (Design)	\$150,000
Additional funds from Deer Creek Operation Maintenance Construction Improvement (OMCI) District	\$472,105
Total available stormwater funding FY2024 & FY2025	\$1,122,105

Staff recommendations

The highest scoring conceptual site is Beaver Drive Crossing Alternative (Project DC-C-02). See the map below for the project location.



The corrugated metal pipe culvert for the Pebble Creek crossing at Beaver Drive is in poor condition (see photo below) and the roadway above the pipe is cracking and is less than recommended roadway thickness. The poor condition of the culvert and roadway above the pipe creates public safety risks. Additionally, if the culvert collapses, vehicular access to the homes east of the culvert will be lost.



Photo of the downstream end of the culvert

Additional stormwater issues reported near the roadway culvert

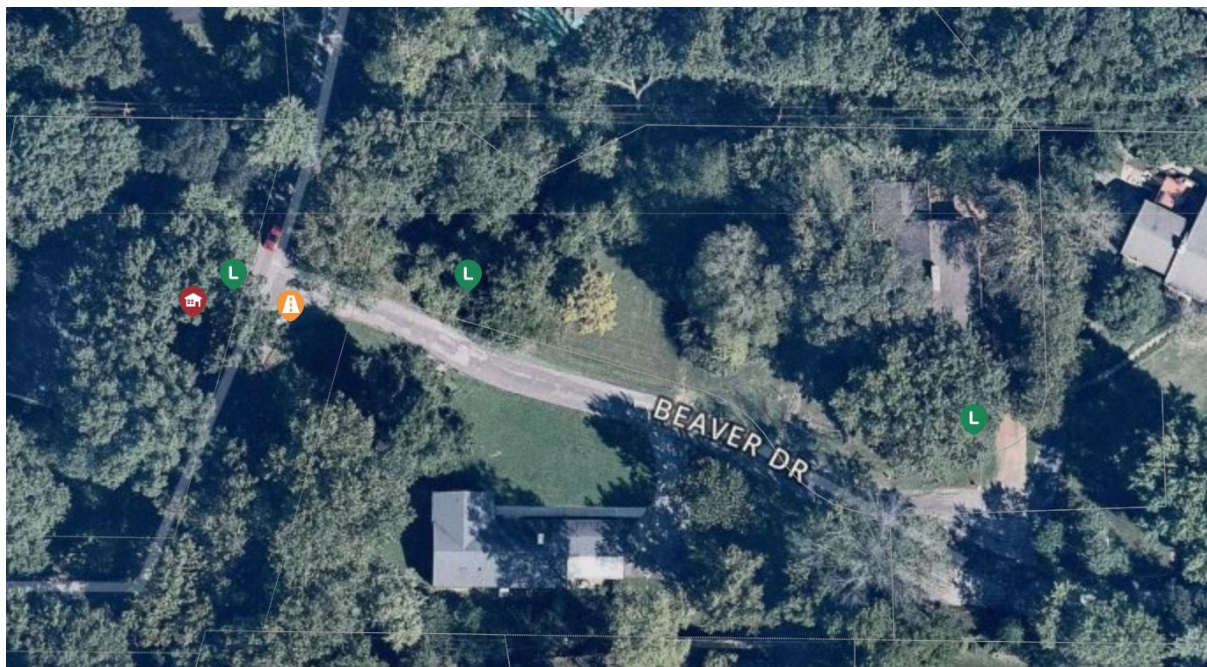
During the first phase of the Watershed Management Plan, residents reported stormwater issues on the map-based online tool, Social PinPoint, by dropping icons at the location of the stormwater issue. The image below shows stormwater issues that were reported near the Beaver Drive culvert.

- The red home icon represents a report of home flooding.
- The green L icon represents a report of property flooding.
- The orange road icon represents a report of street flooding.

Residents provided the following details about the stormwater issues:

- The home flooding refers to stormwater that enters the garage at 27 Beaver Drive.
- Property flooding issues include yard flooding and erosion.
- The reported roadway issue described surface flows not draining to the creek and remaining on the roadway.

These issues were unknown when the Stormwater Committee chose Beaver Drive Crossing as a conceptual site.



Structural flooding issues rank highly in the Prioritization Ranking System. Beyond the ranking system, City staff believes that mitigating structural flooding (excluding homes within the Federal Emergency Management Agency (FEMA) one-percent probability floodplain) should be a top priority of the City's Stormwater Management Program.

City staff recommends that the selection of projects for the Capital Improvement Project should consider the benefits of geographically grouping projects. Grouping projects could:

- Help maximize the City's stormwater budget. By having one project that can address multiple issues at the same time, the City is likely to realize cost savings. Addressing multiple stormwater issues at the same time with one project means one design contract, one construction mobilization cost, and other economies of scale.
- Minimize disruptions to residents by addressing a multiple stormwater issues at one time with one construction phase.
- Improve the stormwater management effectiveness of City projects. If the City addresses only one stormwater issues without addressing adjacent issues like structural, roadway, property flooding, then unaddressed stormwater issues may impede the effectiveness of the City-funded project. Residents may feel frustrated that the project did not adequately address the reported stormwater issues in their neighborhood.

For the reasons listed above, City staff recommends expanding the scope of the Beaver Drive Crossing to also address the issues reported by residents. Intuition & Logic describes the expanded work in Project DC-C-XX (alternatives A & B), which is attached in this packet.

Alternative DC-C-XX A includes:

- Culvert replacement
- Associated grade control
- Bank stabilization
- Downstream retaining wall
- Addressing structural flooding at 27 Beaver Drive
- Addressing erosion issues at 41 Beaver Drive

DC-C-XX B adds the following to the above scope of work:

- Upstream tributary stabilization
- Downstream stabilization of undermined grouted riprap

Project Name	Project Cost	Cost/Benefit Ratio
DC-C-XX A: Beaver Drive Crossing	\$461,000	1.30
DC-C-XX B: Beaver Drive Crossing	\$518,500	1.16

This project is within the Deer Creek Watershed and may be approved for MSD OMCI funding.

Staff recommendation – DC-C-XX B: Beaver Drive Crossing

Staff recommends DC-C-XX B: Beaver Drive Crossing. If the upstream tributary stabilization and downstream stabilization of undermined grouted riprap are not addressed under this project, it is unlikely that the work will be completed in the near future. Completing the work as part of this project allows the City to benefit from the cost effectiveness of having one design contract, one mobilization cost, and other economies of scale to address multiple stormwater issues in one localized area.

The following table shows the impact to the CIP if DC-C-XX B moves into the design phase in FY2024 and construction in FY2025.

Impacts to the CIP of approving DC-C-XX B	
Total available stormwater funding FY2024 & FY2025 (excluding OMCI)	\$650,000
DC-C-XX B	(\$518,500)
Deer Creek Watershed OMCI funds that will be available in FY2024	\$472,105
Remaining stormwater funding for FY2024 & FY2025	\$603,605

At this time, Staff does not recommend moving forward with projects scoring less than 1.0. Conceptual site projects not moving into design phase will be included in the overall City-wide ranking and may move into design in FY2024 depending on scores relative to other possible projects. The complete list of Prioritization Ranking Scores will be available in December, 2023.

The following pages of this packet include:

- A map showing the location of the conceptual sites
- Project descriptions for each site
- Prioritization Ranking Scoring

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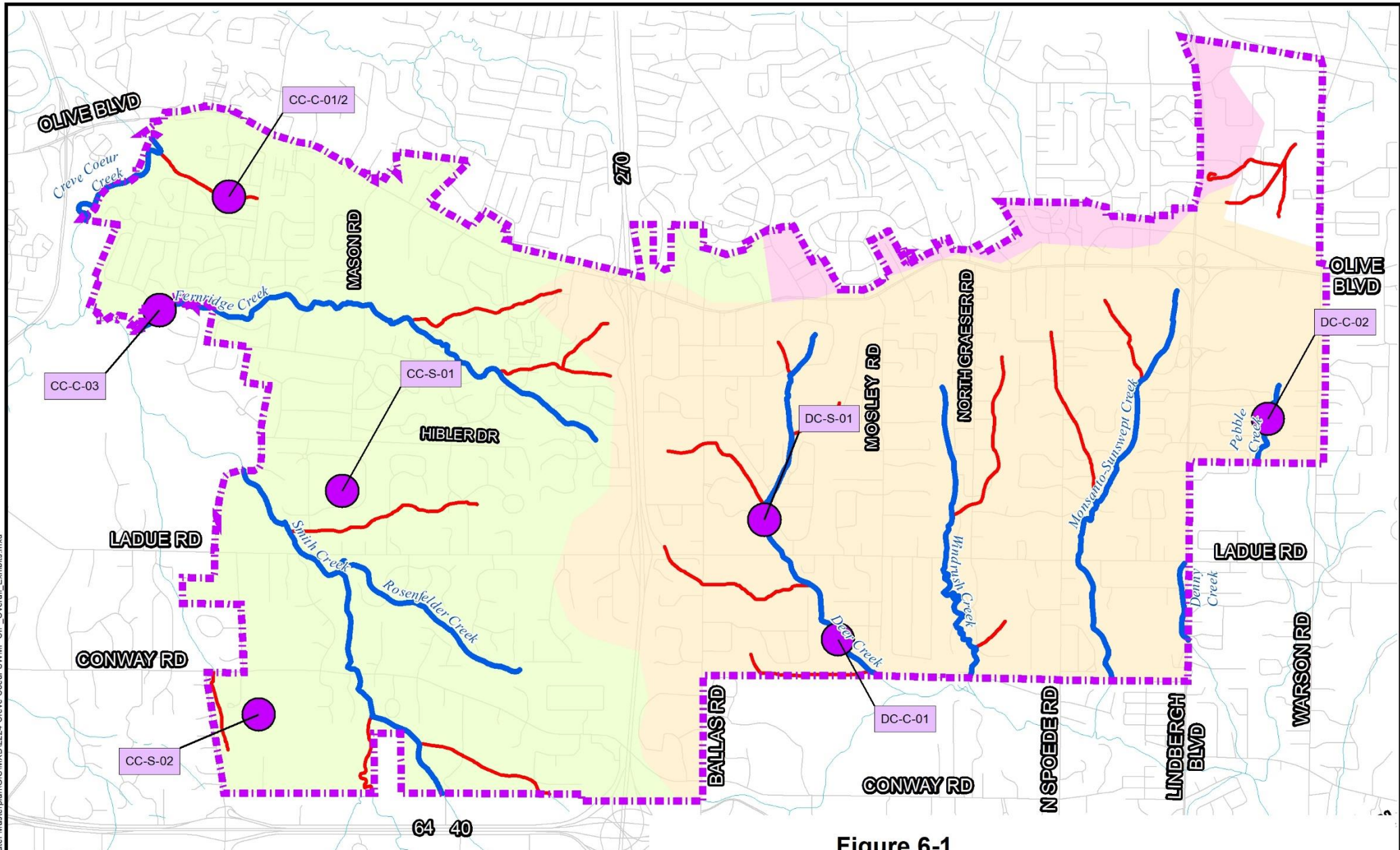
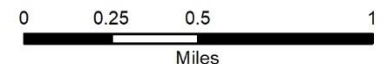


Figure 6-1
Stormwater Committee Approved CIPs

-  CIPs
-  Creve Coeur Creek Watershed
-  Mainstem
-  Deer Creek Watershed
-  Tributaries
-  Fee Fee Creek Watershed
-  Creve Coeur City Limits
-  Streams



Project DC-C-02: Beaver Drive Crossing

Estimated Project Cost: \$227,400

Cost/Benefit Ratio: 0.92

Estimated Alternative Project Cost: \$284,700

Cost/Benefit Ratio: 1.19

Problem Description: The downstream end of the Pebble Creek culvert that runs under Beaver Drive has rusted out and the culvert is undermined. The road above the culvert is cracking and there is a small amount of cover over the pipe. Downstream of the culvert, a portion of the gabion walls along the left descending bank has rusted out and the section is failing. There are Two parcels are affected. Although the street is private, it has been maintained by the City.



Downstream end of culvert

Recommendation: To maintain sediment continuity, remove and replace the culvert with a two-stage culvert. 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 left descending bank.

Water Quality Alternative Recommendations: Instead of installing a retaining wall, stabilize the bank using biostabilized slope techniques and layback the bank. Combine this project with the adjacent bank stabilization (downstream) and tributary stabilization (upstream) projects to minimize mobilization and disturbance.



Conceptual Layout of DC-C-02

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-02: Beaver Drive Crossing Alternative

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream.

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
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)						
		Habitable structures, residential (1 lot per structure) Address: 48 Beaver Drive	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	300		200		50	1
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend	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)						
		Arterial Road: (1 lot per 50' of roadway) Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Collector Road: (1 lot per 100' of roadway) Address:	75		50		12	
		Residential Road: (1 lot per 250' of roadway) Address: Beaver Drive	35		25		6	
		Threatening Natural Resources (parks, wetlands, wooded areas, etc.)	20	5	12		3	
			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: DC-C-02: Beaver Drive Crossing Alternative

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream.

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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			
Note: Problem points are awarded only for those problems solved by the proposed solution.										
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) Points for Condition				Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
				30						30
				TOTAL PROBLEM POINTS						190

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-02: Beaver Drive Crossing Alternative

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream.

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
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	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						150
TOTAL BENEFIT POINTS						340

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=

1.19

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-02: Beaver Drive Crossing

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control, bank stabilization, and a retaining wall downstream.

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points		
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected			
Note: Problem points are awarded only for those problems solved by the proposed solution.										
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25			
		Basement (1 lot per structure) Address:	200		100		15			
		Attached Garage (1 lot per structure) Address:	100		50		8			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25			
		Yard Flooding (1 per lot) Address:	10		5		0			
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)								
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15			
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4			
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2			
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1			
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)								
		Habitable structures, residential (1 lot per structure) Address: 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)								
		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	4	12		3		80	
		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: DC-C-02: Beaver Drive Crossing

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control, bank stabilization, and a retaining wall downstream.

	2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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				
			Note: Problem points are awarded only for those problems solved by the proposed solution.									
			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									170

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-02: Beaver Drive Crossing

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control, bank stabilization, and a retaining wall downstream.

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						210

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

TOTAL COST IN THOUSANDS=

\$227

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

0.92

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

6.XX DC-C-XX: 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.

In the project vicinity, there is structural flooding at #27 Beaver Drive and yard erosion at #41 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.

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 replace with a new modular block wall on the left descending bank. Use 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 above the wall at the west end of the driveway. Construct a swale with a berm from the end of the driveway at #25 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 Dr and continue the curb along the west side of the driveway.

Water Quality Alternative Recommendations: Instead of a retaining wall, 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



Figure 6-XX: Downstream end of culvert



Figure 6-XX: Incision at Grade Control

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.

A berm instead of a curb along the driveway at #45 Beaver Dr may be a viable alternative. This work should be considered to occur with the replacement of the culvert at #45 Beaver Dr.



Conceptual Layout of DC-XX



Conceptual Layout of DC-XX - ALT

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-XX: Beaver Drive Crossing Recommendation A

DATE: 11/2/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for those problems solved by the proposed solution.									
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	0	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	0	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	0	5		1		
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)							
		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)							
		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	5	12		3		100
		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: DC-C-XX: Beaver Drive Crossing Recommendation A

DATE: 11/2/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT.										Total Points
		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						
		Points per Category	No. Lots Affected	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	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	1	6		1		10					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5						
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20						
2.3. Yard Erosion (1 per lot) Address:	No. Lots:		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											340	

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-XX: Beaver Drive Crossing Recommendation A

DATE: 11/2/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues

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							600

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

TOTAL COST IN THOUSANDS=

\$461

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

1.30

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-XX: Beaver Drive Crossing Recommendation B

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for those problems solved by the proposed solution.									
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	0	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	0	5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2		
		Traffic obstruction (> 6" of water) on residential street Address:	10	0	5		1		
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)							
		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)							
		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	5	12		3		100
		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: DC-C-XX: Beaver Drive Crossing Recommendation B

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues

	2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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					
			Note: Problem points are awarded only for those problems solved by the proposed solution.										
			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	1	6		1				10	
			Ponding (per ponding area) Address:	No. Ponds:				Points/pond:		5			
			2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:				Points/lot:		20			
			2.3. Yard Erosion (1 per lot) Address:	No. Lots:		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) Points for Condition	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)					
				30						30			
			TOTAL PROBLEM POINTS										340

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-XX: Beaver Drive Crossing Recommendation B

DATE: 7/31/2023

PROJECT LOCATION: Beaver Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Culvert replacement with associated grade control and bank stabilization combined with bank stabilization sites upstream and downstream. Plus address nearby issues

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						600

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=

1.16

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Project CC-C-01: Ferntop Lane Bank Stabilization

Estimated Project Cost: \$148,700

Cost/Benefit Ratio: 0.81

Estimated Alternative Project Cost: \$181,300

Cost/Benefit Ratio: 0.77

Problem description: An existing pipe outfall is perched and is being actively undermined. 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.

Recommendation: The recommendation is to construct a step grade control at the upstream outfall and stabilize the existing concrete pad with a toewall. The bank can be stabilized by laying back the slope and by adding both rock toe protection and rock-armored slope protection.



Figure 6-16: Knickpoint at outfall

Water Quality Alternative Recommendations: This recommendation includes the use of a vegetated biostabilization technique for the bank stabilization approach. It is also recommended to extend the project from the outfall stabilization limits downstream to the inlet of the culvert under Fernview Drive on the RDB slope. It's also recommended that this project include the outfall repair project for MSD-owned infrastructure that is located within the bank stabilization limits.



Conceptual Layout of CC-C-01



Conceptual Layout of CC-C-01 Alternative

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint.

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure) Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address: 12970 Ferntop Ln	300		200		50	1
		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) Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		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: CC-C-01: Ferntop Lane Bank Stabilization

DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint.

		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	PROBLEM SOLVED CATEGORY, CONT.						
		Note: Problem points are awarded only for those problems solved by the proposed solution.						
		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	

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint.

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= \$149

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= 0.81

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points		
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected			
Note: Problem points are awarded only for those problems solved by the proposed solution.										
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25			
		Basement (1 lot per structure) Address:	200		100		15			
		Attached Garage (1 lot per structure) Address:	100		50		8			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25			
		Yard Flooding (1 per lot) Address:	10		5		0			
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)								
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15			
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4			
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2			
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1			
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)								
		Habitable structures, residential (1 lot per structure) Address: 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)								
		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: CC-C-01: Ferntop Lane Bank Stabilization Alternative

DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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	
		Note: Problem points are awarded only for those problems solved by the proposed solution.								
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) Points for Condition				Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
				TOTAL PROBLEM POINTS						80

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

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:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)						
		Habitable structures, residential (1 lot per structure) Address: 12970 Ferntop Ln	300		200		50	1
		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)						
		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: CC-C-01: Ferntop Lane Bank Stabilization Alternative

DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

		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	PROBLEM SOLVED CATEGORY, CONT.							
		Note: Problem points are awarded only for those problems solved by the proposed solution.							
		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	

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Rock armoring to address erosion and grade control at outfall knickpoint as well as bank stabilization along rear yards.

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=

\$311

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

0.45

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Project CC-S-01: Cuiseaux Court
Estimated Project Cost: \$135,300
Cost/Benefit Ratio: 0.70

Problem description: Runoff naturally drains onto 208 Cuiseaux Court from the rear yards of homes on Cuiseaux Court and Clion Lane, north of 208 Cuiseaux Court. The house and pool at 208 Cuiseaux Court altered the natural drainage path. The driveway on the north side of the house partially blocks the drainage path to the street.

Recommendation: Install a MSD 2GIw/SI east of the driveway along the property line and pipe to the existing storm sewer along the street at a new manhole.



Drainage pathway

Special Considerations: Pn 216 Cuiseaux Court, the root zone of trees, in particular a large Pin Oak, will need to be considered in determining the location of the proinlet and pipe.



Figure 6-13: Conceptual Layout of CC-S-01

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:

CC-S-01 Cuiseaux Court

DATE:

7/31/2023

PROJECT LOCATION:

Cuiseaux Ct, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

PROBLEM SOLVED CATEGORY			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.									
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		

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:

CC-S-01 Cuiseaux Court

DATE:

7/31/2023

PROJECT LOCATION:

Cuiseaux Ct, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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		
		Note: Problem points are awarded only for those problems solved by the proposed solution.									
		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) Points for Condition		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)					
		30						30			
				TOTAL PROBLEM POINTS					75		
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	
LITY	4.1. Addresses pollutants:			No. Units			Points per Unit				
	Bioswales					PER 100 LF		10			
	Forebays					AC		200			
	Wet Ponds					AC		100			

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:

CC-S-01 Cuiseaux Court

DATE:

7/31/2023

PROJECT LOCATION:

Cuiseaux Ct, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

New inlet and pipe to existing storm sewer to convey runoff from the rear lots of Cuiseaux Court.

4.0 ENVIRONMENTAL / WATER QUALITY	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=

\$135

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

0.70

Place "X" in one box below:

X

Creve Coeur Project

Project by Others

Project CC-C-02: Ferntop Lane Outfall Repair
Estimated Project Cost: \$130,100
Cost/Benefit Ratio: 0.69

Problem description: The existing storm sewer outfall in the rear yard of 12970 Ferntop Lane is being undermined and eroded on both sides. MSD replaced/extended the outfall in 2022; however, a headwall was not built as part of this construction project. The affected outfall is owned by MSD and the parcels are private.

Recommendation: The recommendation is to construct a pipe headwall/toewall, rock armor the bank around the pipe, and add scour protection at the outfall.

Water Quality Alternative Recommendations: For the alternative, it is recommended to combine this project with adjacent bank stabilization work. No other water quality alternatives are recommended for this project.



Figure 6-19: Outfall



Figure 6-20: Conceptual Layout of CC-C-02

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Headwall, rock armor, and grade control at existing outfall.

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)						
		Habitable structures, residential (1 lot per structure) Address: 12970 Ferntop Ln	300		200		50	1
		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)						
		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: CC-C-02: Ferntop Lane Outfall Repair

DATE: 7/31/2023

PROJECT LOCATION: 12970 Ferntop Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Headwall, rock armor, and grade control at existing outfall.

	2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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					
Note: Problem points are awarded only for those problems solved by the proposed solution.													
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 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) Points for Condition	Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)					
				TOTAL PROBLEM POINTS									60

Creve Coeur Stormwater Master 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 Ln, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Headwall, rock armor, and grade control at existing outfall.

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=

\$130

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

0.69

Place "X" in one box below:

☐ Creve Coeur Project
☒ Project by Others

Project DC-C-01: Deer Creek in Malcolm Terrace Park
Estimated Project Cost: \$1,119,200
Cost/Benefit Ratio: 0.65

Estimated Alternative Project Cost: \$1,471,000
Cost/Benefit Ratio: 0.60

Problem description: Bank erosion along Deer Creek is threatening the City's service bridge, a low water crossing, and a trail in Malcolm Terrace Park. The affected parcels are owned by the City.

Recommendation: To protect the existing bridge piers and abutments, install bank stabilization and rock grade control that would extend underneath the bridge. To protect the access road, stabilize the banks on the outside bends upstream of the bridge. To complete this work, an existing MSD sanitary line that runs underneath the bridge will need to be replaced. Additionally, the recommendation is to replace the concrete low water crossing and install a grade control structure downstream plus 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.

It is also recommended that this project include stabilization of 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.

Project plans for replacing the bridge and stabilizing the channel were previously prepared by the City. Construction was delayed, and the plans were shelved due to a lack of available funding.

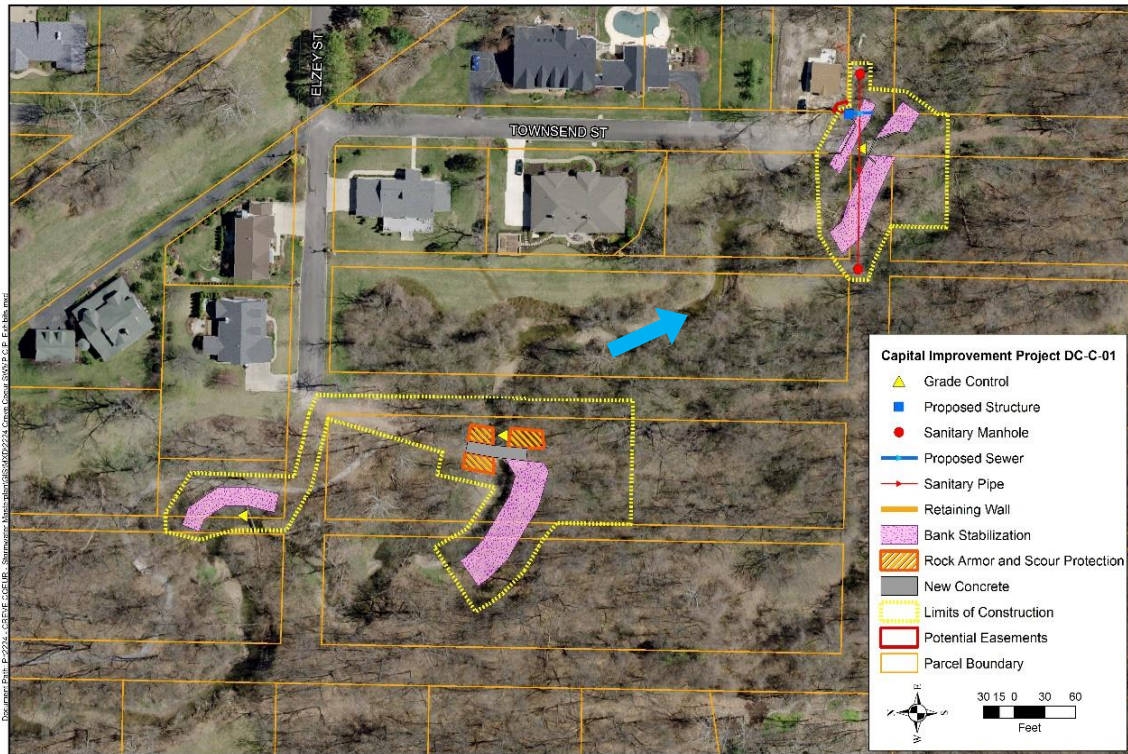
Water Quality Alternative Recommendations: This recommendation goes beyond the project limits shown to stabilize both banks upstream of the bridge and extend the stabilization upstream to address the leaning utility pole. At the trail, Deer Creek is beginning to form an oxbow cutoff. To prevent the cutoff from occurring and sending a new round of incision through the channel, the recommendation is to rock-arm the cutoff point. This recommendation would only be implemented if the bank stabilization option is selected because if the cutoff is armored the bend will continue to grow.



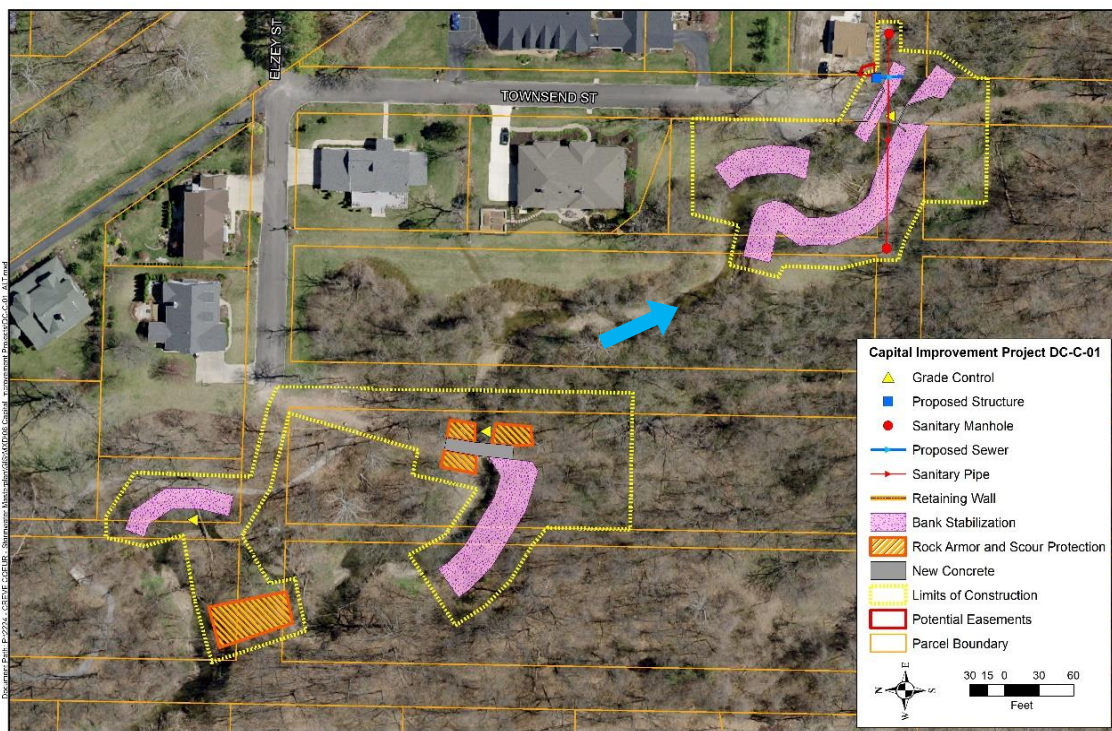
Figure 6-5: Underside of bridge



Figure 6-7: Outside bank next to trail



Conceptual Layout of DC-C-01



Conceptual Layout of DC-C-01 Alternative

Creve Coeur Stormwater Master 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 St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
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)						
		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)						
		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	11	12		3	220
		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	6	10		5	1

Creve Coeur Stormwater Master 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 St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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	
		Note: Problem points are awarded only for those problems solved by the proposed solution.								
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) Points for Condition				Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
				30						30
				TOTAL PROBLEM POINTS						385

Creve Coeur Stormwater Master 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 St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge, low water crossing and trail with associated grade controls and a low water crossing replacement.

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	3	PER 100 LF		10		30
	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	PER 100 LF		10		40
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							340
TOTAL BENEFIT POINTS							725

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

TOTAL COST IN THOUSANDS=

\$1,119

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

0.65

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master 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 St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
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)						
		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)						
		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	14	12		3	280
		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	9	10		5	1

Creve Coeur Stormwater Master 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 St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.

	2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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		
PROBLEM SOLVED CATEGORY, CONT.										
Note: Problem points are awarded only for those problems solved by the proposed solution.										
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							505

Creve Coeur Stormwater Master 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 St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge and low water crossing with associated grade controls, low water crossing replacement, and trail relocation.

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	4	PER 100 LF		10		40
	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	PER 100 LF		10		50
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							380
TOTAL BENEFIT POINTS							885

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

TOTAL COST IN THOUSANDS=

\$1,471

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

0.60

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-01a: Malcolm Terrace Park -- Bridge Fix Only
PROJECT LOCATION: Malcolm Terrace Park 11370 St Paul St, Creve Coeur, MO 63141
PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge with associated grade controls.

DATE: 7/31/2023

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

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-01a: Malcolm Terrace Park -- Bridge Fix Only
PROJECT LOCATION: Malcolm Terrace Park 11370 St Paul St, Creve Coeur, MO 63141
PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge with associated grade controls.

DATE: 7/31/2023

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT.										Total Points
		Chronic (<=2-Yr) Flooding			Frequent (>2<=15-Yr) Flooding			Infrequent (>15-Yr) Flooding				
		Points per Category	No. Lots Affected	Points	Points per Category	No. Lots Affected	Points	Points per Category	No. Lots Affected	Points		
		Note: Problem points are awarded only for those problems solved by the proposed solution.										
		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						215			

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-01a: Malcolm Terrace Park -- Bridge Fix Only
PROJECT LOCATION: Malcolm Terrace Park 11370 St Paul St, Creve Coeur, MO 63141
PROJECT DESCRIPTION: Bank Stabilization to address erosion at bridge with associated grade controls.

DATE: 7/31/2023

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	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)	2	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	
TOTAL SOLUTION POINTS						180
TOTAL BENEFIT POINTS						395

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

TOTAL COST IN THOUSANDS=

\$592

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

0.67

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-01b: Malcolm Terrace Park Low Water Crossing

DATE: 7/31/2023

PROJECT LOCATION: Malcolm Terrace Park 11370 St Paul St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.								
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)						
		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)						
		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.)						
			Buffer Width >50 ft		Buffer Width 25 - 50 ft		Buffer Width <25 ft	
			20	2	10		5	40

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-01b: Malcolm Terrace Park Low Water Crossing

DATE: 7/31/2023

PROJECT LOCATION: Malcolm Terrace Park 11370 St Paul St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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	
		Note: Problem points are awarded only for those problems solved by the proposed solution.								
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) Points for Condition				Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)		
										0
				TOTAL PROBLEM POINTS						130

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: DC-C-01b: Malcolm Terrace Park Low Water Crossing

DATE: 7/31/2023

PROJECT LOCATION: Malcolm Terrace Park 11370 St Paul St, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank Stabilization to address erosion at low water crossing with associated grade controls and a low water crossing replacement.

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)	2	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	50					50
	5.2. Recreational/Educational	Yes = 100 No = 0 pts			Yes		100
TOTAL SOLUTION POINTS							210
TOTAL BENEFIT POINTS							340

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=

0.59

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others

Project DC-S-01: Drainage Issues on Magna Carta Drive at Runnymede Drive at Templar Drive

Estimated Project Cost: \$102,700

Cost/Benefit Ratio: 0.63

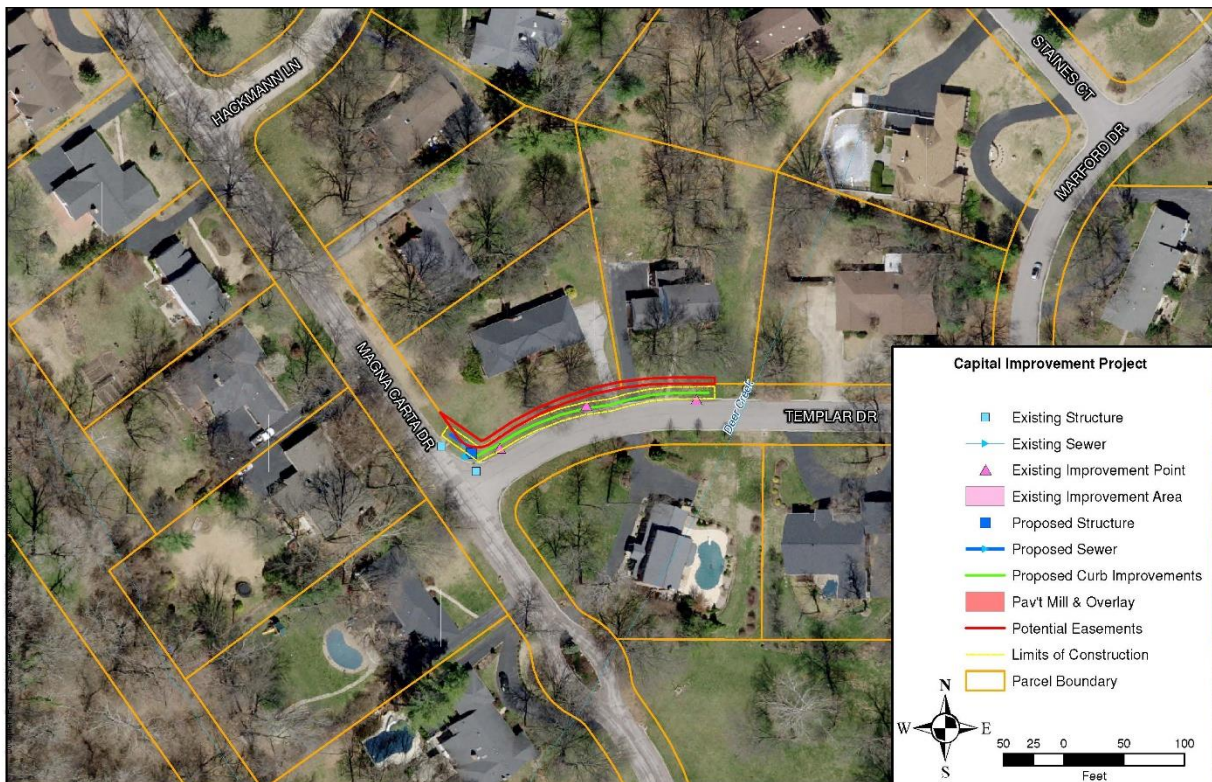
Problem description: Water ponds along the curb at the southwest corner of the intersection of Runnymede Drive and Magna Carta Drive and also along the north curb of Templar Drive east of Magna Carta Drive.

Recommendation: Install new Metropolitan St. Louis Sewer District (MSD) two-grate inlet with side intake (2GIw/SI) at the Runnymede Drive intersection over the existing MSD 48-inch storm sewer. Replace the corner panel of the street and warp it so that runoff flows to the inlet. Remove high and low spots in the roadway by milling and overlaying the curb pavement at Templar Drive. Replace the non-MSD inlet at the intersection with new MSD 2GIw/SI and outgoing pipe with a new 12-inch storm sewer. After construction, dedicated the upgraded stormwater conveyance system to MSD.

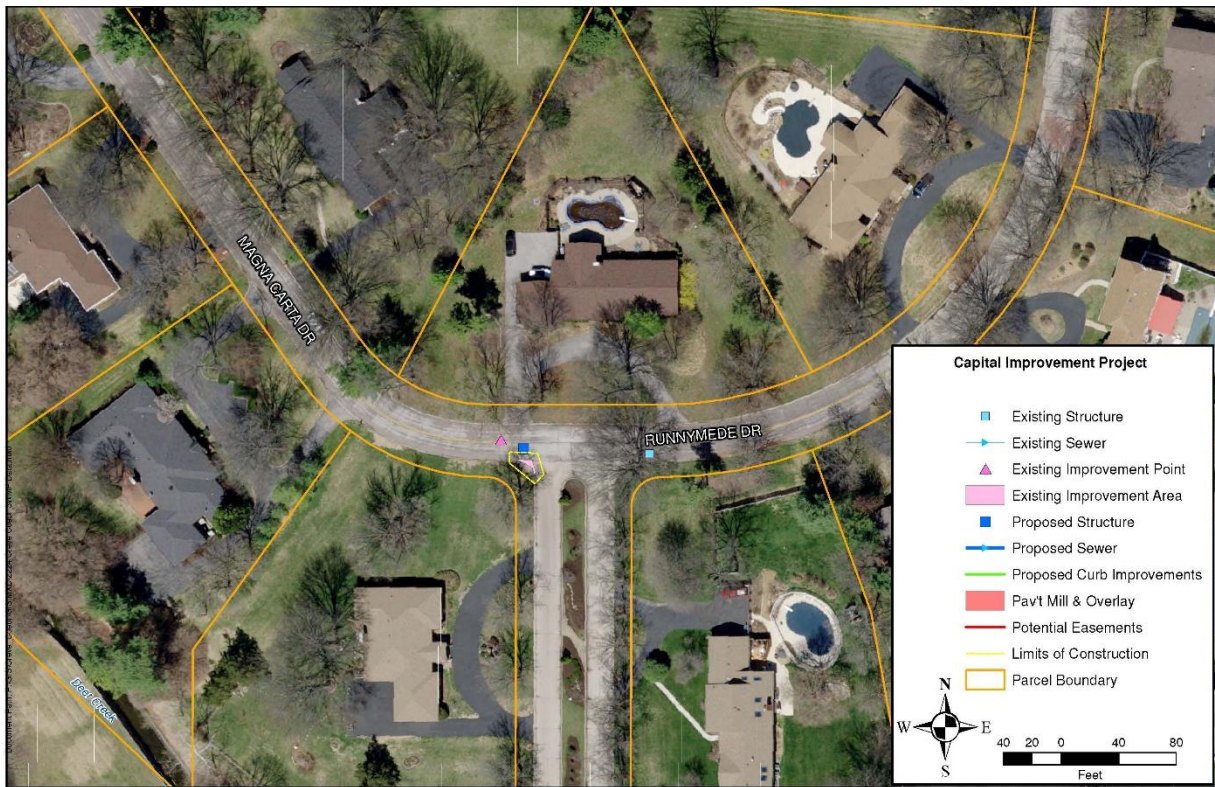


Magna Carta Drive at Runnymede Dr

Special Considerations: At the Runnymede Drive intersection, the location of the new stormwater inlet cannot be determined until other utilities are located. The new proposed stormwater inlet may need to be offset from the 48-inch pipe or moved away from the curb. If the inlet is moved away from the curb, it will have no side intake.



Conceptual Layout of DC-S-01 (Intersection with Templar Drive)



Conceptual Layout of DC-S-01 (Intersection with Runnymede Drive)

Creve Coeur Stormwater Master 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:

7/31/2023

PROJECT LOCATION:

Magna Carta Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

broke

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for those problems solved by the proposed solution.									
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	

Creve Coeur Stormwater Master 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

PROJECT LOCATION:

Magna Carta Dr, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

DATE:

7/31/2023

broke

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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				
		Note: Problem points are awarded only for those problems solved by the proposed solution.									
		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:		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) Points for Condition			Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)				
			30						30		
				TOTAL PROBLEM POINTS					45		
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:		0	Points per Add'l Proj.:	50	
	4.1. Addresses pollutants:					No. Units		Points per Unit			
	Bioswales						PER 100 LF		10		
	Forebays						AC		200		

Creve Coeur Stormwater Master 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: 7/31/2023

PROJECT LOCATION: Magna Carta Dr, Creve Coeur, MO 63141

broke

PROJECT DESCRIPTION: New inlets and regrading pavement to address ponding issues along Magna Carta Drive.

4.0 ENVIRONMENTAL / WATER QUALITY	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							65

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

TOTAL COST IN THOUSANDS=

\$103

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

0.63

Place "X" in one box below:

X

Creve Coeur Project

Project by Others

Project CC-S-02: Broadview Farms Subdivision
Estimated Project Cost: \$107,400
Cost/Benefit Ratio: 0.52

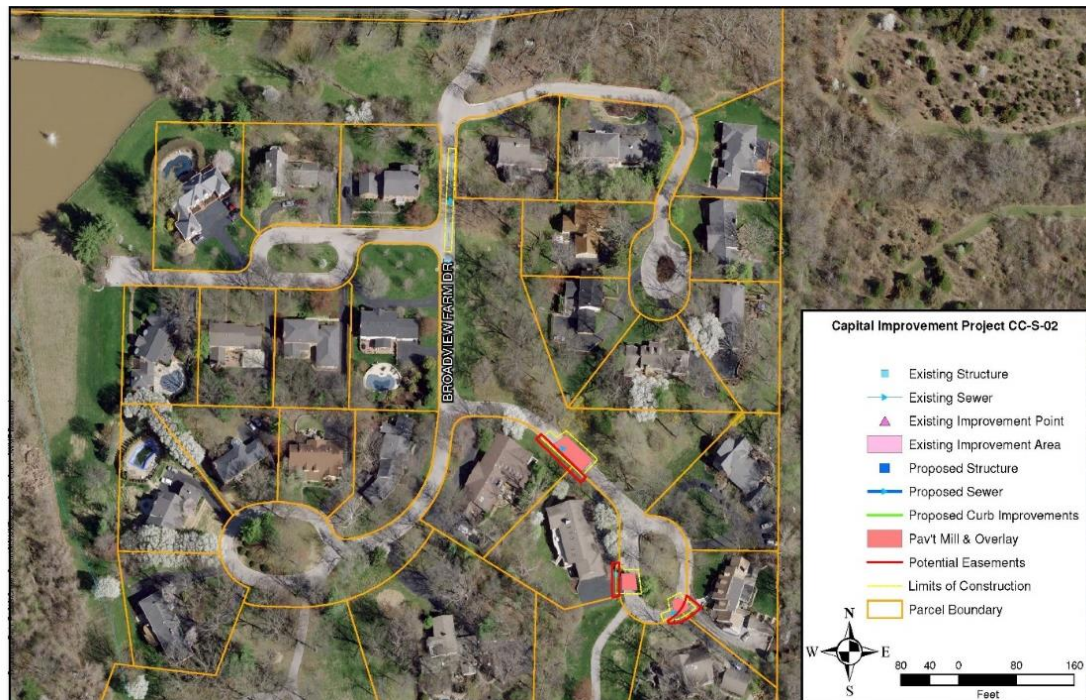
Problem description: Water ponds along the curb near 18, 19, 21, and 22 Broadview Farms Road. At 1 Broadview Farms Road, water ponds in the side yard even with a 24-inch flared end section (FES) that drains the area. A Curb Inlet (CI) uphill has significant bypass potential. The curb along the east side of Broadview Farms Road has the potential to be overtopped allowing additional flow to this area.

Recommendation: For the water ponding along the curb, the recommendation is to mill and overlay the street and adjust the pavement slope so that runoff drains across the street. At 1 Broadview Farms Road, the recommendation is to reset the CI top and reconstruct the curb along Broadview Farms Road.



Pooling at end of driveway

Special Considerations: To ensure proper drainage, concrete should be considered in lieu of asphalt because concrete will provide a more precise grade and cross slope on the street. The hydraulic grade line for the storm sewer downstream of the FES needs to be checked to ensure that water is not backing up into this area. A check valve in the adjacent inlet on the pipe should also be considered.



Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:

CC-S-02 Broadview Farms Subdivision

DATE:

7/31/2023

PROJECT LOCATION:

Broadview Farm Rd, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

PROBLEM SOLVED CATEGORY			Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for those problems solved by the proposed solution.									
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		

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME:

CC-S-02 Broadview Farms Subdivision

DATE:

7/31/2023

PROJECT LOCATION:

Broadview Farm Rd, Creve Coeur, MO 63141

PROJECT DESCRIPTION:

Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED 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				
		Note: Problem points are awarded only for those problems solved by the proposed solution.									
		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) Points for Condition		Poor >125% of Design Life (30 pts)		Fair 75-125% of Design Life (15 pts)		Good <75% of Design Life (0 pts)					
				15				15			
				TOTAL PROBLEM POINTS					36		
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:		0	Points per Add'l Proj.:		50		
LITY	4.1. Addresses pollutants:			No. Units		Points per Unit					
	Bioswales			PER 100 LF		10					
	Forebays			AC		200					
	Wet Ponds			AC		100					

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: CC-S-02 Broadview Farms Subdivision

DATE: 7/31/2023

PROJECT LOCATION: Broadview Farm Rd, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Overlay street, adjust pavement slope, reset curb inlet, and reconstruct curb to address ponding along Broadview Farm Rd.

4.0 ENVIRONMENTAL / WATER QUALITY	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:

☒	Creve Coeur Project
☐	Project by Others

Project CC-C-03: 13105 D'Artagnan Court
Estimated Project Cost: \$541,000
Cost/Benefit Ratio: 0.26

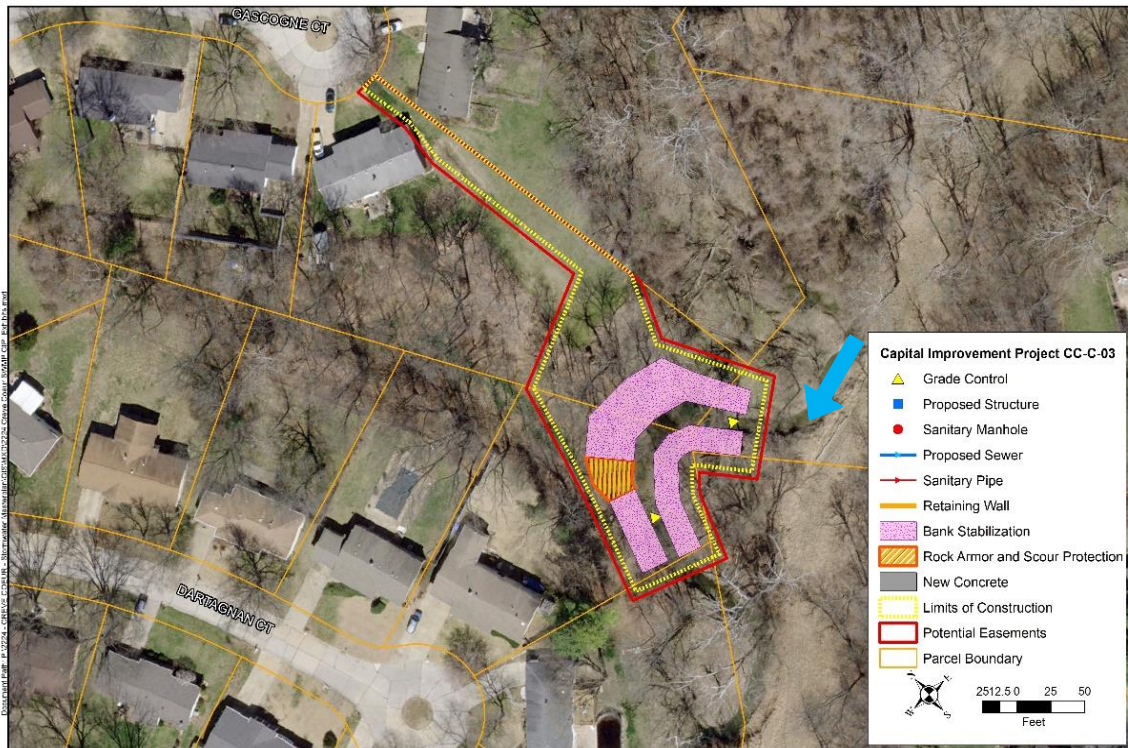
Problem description: Bank erosion is evident along Fernridge Creek in the rear lot of 13105 D'Artagnan Court. At this location, bank heights range from 6 to 12 feet, and the erosion is on the outside of an advancing bend. A structure that does not require a building permit (a tree house) is near the top of bank. A large drainage swale enters the channel on the outside of the bend and is incising at the confluence. Affected parcels are private.



Figure 6-21: Outside bend erosion

Recommendation: The recommendation is to 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 also where the rock swale drains into the creek.

Water Quality Alternative Recommendations: The alternative recommendation is to 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

Creve Coeur Stormwater Master 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 Ct, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

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

Creve Coeur Stormwater Master 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 Ct, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

	2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	
PROBLEM SOLVED CATEGORY, CONT.									
Note: Problem points are awarded only for those problems solved by the proposed solution.									
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

Creve Coeur Stormwater Master Plan Prioritization System
Revised Benefit Points Allocation Schedule

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DATE: 7/31/2023

PROJECT LOCATION: 13105 D'Artagnan Ct, Creve Coeur, MO 63141

PROJECT DESCRIPTION: Bank stabilization to address erosion with rock swale to convey subdivision drainage with associated grade controls.

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	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)	2	PER 100 LF	10		20	
5.0 MISC.	4.5 Conservation Easement		EA	20			
	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							100
TOTAL BENEFIT POINTS							140

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=

0.26

Place "X" in one box below:

☒ Creve Coeur Project
☐ Project by Others



DEPARTMENT OF PUBLIC WORKS STAFF MEMORANDUM

DATE: October 6, 2023
TO: Stormwater Committee
FROM: Dione Garson, P.E., Civil Engineer
SUBJECT: Restoration and Easement Policy for Stormwater Program Projects

The following outlines the City's policy for restoring sites after the completion of City-funded stormwater projects. The goal of having a defined policy is to ensure that projects are consistently and equitably managed. With a restoration policy:

- Individual homeowners can feel assured that the restoration items on their site are the same or similar to restoration that has been or will be performed for other homeowners.
- Residents across the City can feel confident that funding for stormwater projects is not being spent excessively to disproportionately benefit on any one homeowner.

Projects that benefit primarily individual homeowners

One examples of a City-funded project that benefits primarily individual homeowners is streambank stabilization and restoration.

- Streambank stabilization and restoration projects can have some benefits to downstream residents such as:
 - Water quality improvements.
 - Reduction in erosion.
- The primary beneficiary, however, is the individual homeowner because these project may:
 - Protect privately-owned structures from flooding or being damaged from erosion.
 - Prevent or slow the widening of the creek along the sections of creek on the homeowner's lot.
 - Keep banks within private property limits more stable.
 - Enhance the appears of the property with a natural solution that incorporates up to hundreds of livestakes and plants.
 - Removal of invasive species such as honeysuckle during the clearing and grubbing phase of construction.

The City's restoration policy for projects that benefit primarily individual homeowners:

Trees

- For each twelve-inch diameter or larger tree that is removed within the limits of construction, one new tree will be planted.
- Replacement trees will have a one-year warranty.
- Evergreen replacement trees will be six to eight feet tall planted.
- Deciduous trees will be two-inch caliper.
- Invasive species will not be planted as replacement trees.

Irrigation systems

- Irrigation system components within the limits of construction will be repaired if damaged and if the components are not within the right-of-way.
 - Irrigation systems within the right-of-way will not be repaired. Before construction, if the homeowner marks the location of the irrigation system components within the right-of-way, the contractor will move the components outside the right-of-way.
 - Irrigation systems will not be extended beyond existing limits.

Cleaning

- Restoration will not include:
 - Power washing homes.
 - Washing of windows or vehicles.

Pavement removal and replacement

- Existing asphalt driveways and paved surfaces will be replaced with asphalt.
 - Existing asphalt pavements will be saw cut before removals.
 - Replacement asphalt pavement shall be three-inch minimum thickness with four-inches compacted one-inch minus subgrade.
- Existing concrete driveways and paved surfaces will be replaced with concrete.
 - For residential driveways, six-inch minimum thickness placed on four-inches of compacted one-inch minus subgrade with expansion joint material separating slabs and the driveway from the back of curb.
 - Replacement is slab-to-slab, full slab replacement joint-to-joint.
 - If a driveway is non-standard, the City will pay for the cost of replacing a standard material and the homeowner will pay the difference.
- Pavement work will be done to St. Louis County standards.
- The homeowner may choose to have areas outside the construction limits repaved.
 - The homeowner will work directly with the contractor for the additional work.
 - The contractor will honor the line-item cost in the City's contract.

Grass

- Sod will be the standard replacement for grass that is disturbed within construction limits.
- As a substitution for sod, homeowners may choose to have wild flower, native seed mix sown with a straw cover.
 - Plantings and maintenance of the native planting areas must remain in compliance with the following sections of City of Creve Coeur City Code Chapter 220 Weeds and Vegetation:
 - Sections 220.020 Use of Native Plant Communities As An Alternative in Urban Landscape Design.
 - Section 220.020 High Weeds, High Grass and Rank Vegetable Growth Prohibited.
 - Section 220.030 Exemptions To Height Restrictions.
- The contractor will be responsible for the sod for the first three months.
 - If the sod fails within the three-month establishment period, then the contractor will replace the sod and the three-month establishment period resets.
 - Sod will only be replaced during recommended growing seasons and temperatures.

Projects that benefit the broader community and cause a hardship for a homeowner

Examples of projects that benefit the broader community and cause a hardship for a homeowner:

- If the stormwater problem is not primarily on the homeowner's site but the solution requires the permanent installation of stormwater management features such as an outfall or inlet structure on the homeowner's property outside of the right-of-way.
- Stormwater projects that solve issues beyond the homeowner's property but require detention on the homeowner's site.

When the homeowner will have a permanent hardship because of an improvement that primarily or mainly benefits other homeowners or the public, then additional restoration items may be added to the project's contract. The value of the additional restoration items may depend on the severity of the hardship and the impact of the solution on the homeowner's property.

Examples of additional restoration items may include:

- Evergreens that are taller than six-to-eight feet planted.
- Deciduous trees with a caliper greater than two inches.
- Replacing more than one tree for each mature tree that is removed.
- Additional landscaping to conceal stormwater features.
 - Additional landscaping cannot interfere with performance of stormwater management features.
 - Additional landscaping cannot include invasive species.

Extreme hardship on projects with great public benefit

In cases of extreme hardship, the City may offer payment for a permanent or temporary construction easement. Payments will require the approval of the City Administrator and the City Council.