Capital Improvements/Trans Trust Authority
AGENDA

Monday, January 8, 2024
4:00 PM
Council Chambers
201 E. Broadway, Excelsior Springs, MO 64024

NOTICE OF OPEN MEETING

Notice is hereby given that the **Excelsior Springs Capital Improvements/Trans Trust** will conduct a meeting at 4:00 PM on Monday, January 8, 2024 in the Hall of Waters Building, Council Chambers, 201 E. Broadway, Excelsior Springs, MO 64024.

AGENDA

January 8, 2024

1. Call to Order
    a. Pledge of Allegiance
    b. Roll Call

2. Approval: Meeting Minutes of December 11, 2023
3. Approval: Capital Improvement Financials through December of 2023
4. Approval: Request to Replenish Building Maintenance Fund
5. Approval: Fishing River Watershed Project 2
6. Approval: Industrial Roadway Improvements
7. Approval: Transportation Trust Financials from July to December of 2023
8. Approval: Trans Trust Budget for Fiscal Year 2024
9. Comments
10. Adjourn

Representatives of the news media may obtain copies of this notice by contacting the City Manager's Office, 201 E. Broadway, Excelsior Springs, MO 64024 (816)630-0752.

Date and time posted: Thursday, January 4, 2024 at 3:15pm

City Council Meetings
Capital Improvements Authority Meeting - 1/8/2024

To: Authority Members
From:
Date
RE: Approval: Meeting Minutes of December 11, 2023

ATTACHMENTS:

Description	Type	Upload Date
12/11/23 CIP/TT Meeting Minutes	Cover Memo	1/4/2024

Capital Improvements/Transportation Trust Authority
Minutes of Regular Meeting
December 11, 2023 | 4:00 pm | Council Chambers

1. **Roll Call:**
   Present: Mayor Mark Spohn, Laurie Gehrt, Jason Cole, Lyndsey Baxter, Stephen Stubbs, Mary Lou Greim, and Mike Edwards.
   Absent: None.

   Also Present: City Manager Molly McGovern, Fire Chief Joe Maddick, Assistant Public Works Director Brent Bishop, Sharon Donat (Excelsior Standard), Economic Development Director Melinda Mehaffy, and Authority Secretary Susan Conyers.

2. **Approval –Meeting Minutes of September 11, 2023:** Stephen Stubbs motioned to approve the September 11, 2023 meeting minutes; Mary Lou Greim seconded. All in favor; motion approved.

3. **Approval – Capital Improvements Financials through November of 2023:** Molly McGovern, City Manager briefed the Authority of the Capital Improvements Budget Spreadsheets through November of 2023. Laurie Gehrt motioned to approve the Capital Improvements Financials presented through November of 2023; Mary Lou Greim seconded.
   Roll Call of Votes: Ayes – Stephen Stubbs, Jason Cole, Laurie Gehrt, Lyndsey Baxter, Mike Edwards, Mary Lou Greim, and Mayor Mark Spohn. Nays – None. All in favor; motion approved.

4. **Approval – Request of Funds for Fire Department Training Facility:** Joseph Maddick, Fire Chief briefed the Authority of the request to of $200,000 to fund the Fire Department Training Facility Project. Lyndsey Baxter asked if the shipping containers were allowed by ordinance. Melinda Mehaffy stated City Code allows for the Conex containers to be used since they do not have a vehicle component. Lyndsey Baxter also asked if this was eligible as a Capital Improvements expense or if it should be paid for by the Public Safety Sales Tax. Chief Maddick and Molly McGovern stated PSST has been used and maxed out for salaries and rolling stock of vehicles. The Authority asked if any grants were available and discussed funding sources, partnerships and revenue sources. The Authority asked about Fire Fighter training requirements and what structures other crews use, and if this facility could be rented out to others. Chief Maddick intends for others to be able to use the facility for a fee and that if the project was outsourced, it would cost $1.2 Million in comparison to the $200,000 to do it in house. Lyndsey Baxter asked if a more detailed budget could be provided. Mike Edwards stated he doesn't expect that from the department when the Authority usually only receives estimates from engineers and contractors and not hard numbers on other projects. The Authority discussed that the training facility would help with competency and retention. Mike Edwards motioned to approve the request of $200,000.00 for the Fire Training Facility; Stephen Stubbs seconded.
   Roll Call of Votes: Ayes – Laurie Gehrt, Jason Cole, Mary Lou Greim, Mike Edwards, Stephen Stubbs, and Mayor Mark Spohn. Nays – Lyndsey Baxter. Motion approved.

5. **Approval – Request for Approval of 2023 Amended Trans Trust Budget:** Brent Bishop, Assistant Public Works Director briefed the Authority of the request for approval of amending the 2023 Transportation Trust Budget to include the Lamp Rynearson Task Order in the amount of $53,300.00. This will allow Lamp Rynearson to identify the scope of work for the 2024 Streetscape Maintenance Project using the information from the Stantec Report which rated each street's pavement condition. Stephen Stubbs motioned to approve the request of $53,300.00 for the Lamp

Rynearson Task Order to cover the increase to the 2024 Streetscape Maintenance Project; Mary Lou Greim seconded.
Roll Call of Votes: Ayes – Mike Edwards, Lyndsey Baxter, Mary Lou Greim, Stephen Stubbs, Laurie Gehrt, Jason Cole, and Mayor Mark Spohn. Nays – None. All in favor; motion approved.

6. **Comments:** Mary Lou Greim thanked city staff and all the workers. Stephen Stubbs and Laurie Gehrt wished everyone happy holidays.

7. **Adjourn:** Stephen Stubbs motioned to adjourn; Laurie Gehrt seconded. All in favor; motion approved. The meeting adjourned at 5:00 pm. The next meeting is scheduled for Monday, January 8, 2024 at 4:00 pm.

_____ Susan Conyers, Authority Secretary

City Manager
Capital Improvements Authority Meeting - 1/8/2024

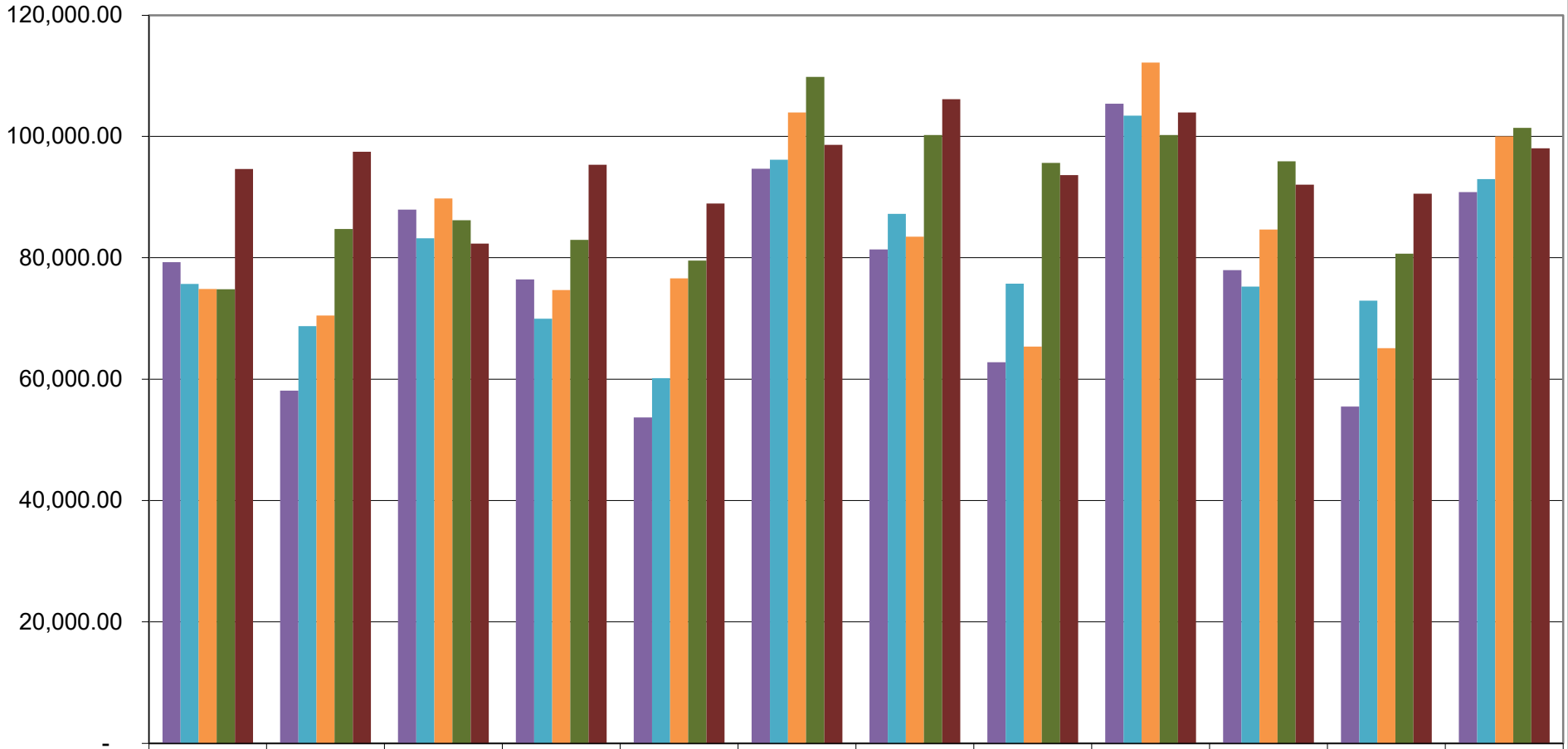
To:	Authority Members
From:	Molly McGovern, City Manager
Date	1/3/2024
RE:	Approval: Capital Improvement Financials through December of 2023

Molly McGovern, City Manager

ATTACHMENTS:

Description	Type	Upload Date
Graph	Cover Memo	1/3/2024
Financial 12 2023	Cover Memo	1/3/2024
Planning	Cover Memo	1/3/2024

Gross Capital Improvement Sales Tax Receipts



	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2019	79,295.51	58,106.33	87,920.39	76,437.40	53,693.56	94,665.55	81,376.26	62,772.71	105,406.27	77,960.36	55,469.43	90,838.66
2020	75,703.16	68,723.68	83,193.50	69,970.62	60,148.55	96,149.17	87,235.48	75,729.20	103,408.25	75,240.30	72,934.82	92,965.77
2021	74,850.06	70,470.10	89,794.63	74,666.46	76,622.62	103,961.32	83,491.48	65,362.20	112,179.29	84,669.70	65,092.39	100,015.67
2022	74,831.56	84,737.62	86,177.08	82,950.45	79,553.03	109,807.23	100,249.52	95,653.90	100,208.53	95,907.31	80,683.01	101,407.93
2023	94,608.47	97,452.79	82,356.34	95,325.57	88,929.33	98,621.42	106,148.87	93,630.62	103,935.42	92,051.74	90,556.28	98,032.49

CAPITAL IMPROVEMENTS SALES TAX
Transactions for FY 2023-24

		9/30/2023	10/31/2023	11/30/2023	12/31/2023	1/31/2024	2/29/2024	3/31/2024	
Beginning Balance:									
Pooled Cash		3,076,221.80	2,847,620.00	2,937,259.22	2,618,284.07	2,623,273.98	2,623,273.98	2,623,273.98	
Investments		250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	
Payables		-							
Available Beginning Balance		3,326,221.80	3,097,620.00	3,187,259.22	2,868,284.07	2,873,273.98	2,873,273.98	2,873,273.98	
Revenues:									
City Sales Tax		103,935.42	92,051.74	90,556.28	98,032.49				280,640.51
TIF Allocations		(5,106.13)	(1,399.86)		960.59				(439.27)
City Use Tax		14,029.25	13,552.58	15,289.76	16,229.70				45,072.04
Interest Income		2,452.23	1,113.35						1,113.35
Investment Interest		1,425.00							-
Sale of Properties (DEMO)		-							-
Total Revenue		116,735.77	105,317.81	105,846.04	115,222.78	-	-	-	326,386.63
Expenditures:									
Allowance - Blighted Property Fund (Property Purchases/Demo)		59.98	1,575.00	464.99	1,199.99				3,239.98
Allowance - Emergency Preparedness		-		287.52					287.52
Allowance - Maintenance Fund City Wide		7,219.40	61.75		11,988.50				12,050.25
Allowance - Sidewalk Replacement Program (Professional Services)		871.80							-
Allowance - Technology upgrade project		-	12,856.64						12,856.64
Bank Charges		140.40	70.20	70.20	70.20				210.60
Dry Fork Greenway		-							-
Fire Training Structure									
Fuel System Replacement		-			10,405.88				10,405.88
Hall of Waters SAT Grant Match		317,525.99		423,491.00	79,672.99				503,163.99
Lithia Landing Stairs, Rock Wall repair		-							
Police Station Parking Lot Repair		-			6,895.31				6,895.31
RAISE Local Match		-							-
Storm Sirens		-	1,115.00	507.48					1,622.48
									-
Transfers									-
Transfers - General Fund (Indirect cost allocation)		12,000.00							-
Total Expenditures		345,337.57	15,678.59	424,821.19	110,232.87	-	-	-	550,732.65
Ending Balance		3,097,620.00	3,187,259.22	2,868,284.07	2,873,273.98	2,873,273.98	2,873,273.98	2,873,273.98	

Allocation of ending balance:

Pooled Cash		2,847,620.00	2,937,259.22	2,618,284.07	2,623,273.98	2,623,273.98	2,623,273.98	2,623,273.98
Investments		250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00	250,000.00
Payables		-						
Total		3,097,620.00	3,187,259.22	2,868,284.07	2,873,273.98	2,873,273.98	2,873,273.98	2,873,273.98

Committed Funds:

Allowance - Blighted Property Fund		99,043.65	97,468.65	97,003.66	95,803.67	95,803.67	95,803.67	95,803.67
Allowance - Emergency Preparedness (added 9/11/23)		10,000.00	10,000.00	9,712.48	9,712.48	9,712.48	9,712.48	9,712.48
Allowance - Maintenance Fund City Wide (Revised 9/11/23)		19,746.39	19,684.64	19,684.64	7,696.14	7,696.14	7,696.14	7,696.14
Allowance - Sidewalk Replacement Program		19,256.93	19,256.93	19,256.93	19,256.93	19,256.93	19,256.93	19,256.93
Allowance - Technology upgrade project (Revised 12/21)(4/22)		25,795.16	12,938.52	12,938.52	12,938.52	12,938.52	12,938.52	12,938.52
Bank Building Roof		166,439.20	166,439.20	166,439.20	166,439.20	166,439.20	166,439.20	166,439.20
Dry Fork Greenway		973,400.00	973,400.00	973,400.00	973,400.00	973,400.00	973,400.00	973,400.00
Fire Training Structure, approved 12/23					200,000.00	200,000.00	200,000.00	200,000.00
Fuel System Replacement		26,600.00	26,600.00	26,600.00	16,194.12	16,194.12	16,194.12	16,194.12
GROA ERP Consulting Agreement		27,770.00	27,770.00	27,770.00	27,770.00	27,770.00	27,770.00	27,770.00
Hall of Waters SAT Grant Match (1/23)		735,652.30	735,652.30	312,161.30	232,488.31	232,488.31	232,488.31	232,488.31
Hall of Waters Pre-Development		10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00
Lithia Landing Stairs, Rock Wall		55,000.00	55,000.00	55,000.00	55,000.00	55,000.00	55,000.00	55,000.00
Police Station Parking Lot replacement		116,136.00	116,136.00	116,136.00	109,240.69	109,240.69	109,240.69	109,240.69
RAISE Local Match (Grant Awarded 8/15/22)		2,000,000.00	2,000,000.00	2,000,000.00	2,000,000.00	2,000,000.00	2,000,000.00	2,000,000.00
Sewer Main Re-lining		375,000.00	375,000.00	375,000.00	375,000.00	375,000.00	375,000.00	375,000.00
Total Committed Funds		4,660,942.11	4,645,853.72	4,221,102.73	4,310,940.06	4,310,940.06	4,310,940.06	4,310,940.06

Available Cash Balance		(1,563,322.11)	(1,458,594.50)	(1,352,818.66)	(1,437,666.08)	(1,437,666.08)	(1,437,666.08)	(1,437,666.08)

CAPITAL IMPROVEMENTS SALES TAX
SIX YEAR PLANNING GUIDE

		1	2	3	4	5	6			
				THIS YEAR						
	Totals	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	
Beginning Cash Balance		2,458,889.00	2,454,924.34	2,935,384.44	2,111,682.61	1,641,031.26	2,318,779.91	2,996,528.56	4,174,277.21	
Total Revenue	9,922,576.56	1,072,606.90	1,311,208.41	1,285,598.65	1,285,598.65	1,285,598.65	1,285,598.65	1,285,598.65	1,285,598.65	
Ongoing Allocation of Funds:										
Allowance - Blighted Property Fund (Property Purchases/Demo)	439,545.96	80,909.47	13,650.49	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	
Allowance - Emergency Preparedness	50,000.00			10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	
Allowance - Maintenance Fund City Wide	185,113.98	20,521.08	22,508.90	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	
Allowance - Sidewalk Replacement Program (Professional Services)	103,095.35		3,095.35	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	
Allowance - Technology upgrade project	204,965.55	36,887.01	23,454.54	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	
Bank Charges	6,784.70	842.40	842.40	850.00	850.00	850.00	850.00	850.00	850.00	
Transfers - General Fund (Indirect cost allocation)	94,235.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	
ACTIVE PROJECTS										
Dry Fork Greenway	973,400.00			200,000.00	773,400.00					
Fire Training Structure	200,000.00			200,000.00						
Fuel System Replacement	35,000.00		8,400.00	26,600.00						
Hall of Waters SAT Grant Match - Phase I	631,624.70	139,745.71	322,225.99	169,653.00						
Hall of Waters Courtyard Stabilization	566,000.00			566,000.00						Temp Shoring Front Yard
Lithia Landing Stairs, Rock wall	55,000.00			55,000.00						
Police Parking Lot Resurfacing	116,136.00			116,136.00						
RAISE Grant Match	2,000,000.00			500,000.00	500,000.00	500,000.00	500,000.00			
Sewer Main Re-Lining	375,000.00				375,000.00					
Stalled & Closing Projects										
Bank Building Roof (Labor & Materials)	166,439.00	-		166,439.00						
GROA ERP Consulting Agreement	-	-	-						27,770.00	
PAST PROJECTS	1,763,595.01	785,665.89	424,570.64	1,622.48						
Sub-Total Committed Projects	7,965,935.25	1,076,571.56	830,748.31	2,109,300.48	1,756,250.00	607,850.00	607,850.00	107,850.00	135,620.00	
Ending Total Cash Balance (without Unfunded Projects)	4,174,277.31	2,454,924.34	2,935,384.44	2,111,682.61	1,641,031.26	2,318,779.91	2,996,528.56	4,174,277.21	5,324,255.86	
Projects in Discussion, NOT Funded:										
Accounting System Purchase/Install										
Replace undersized waterlines Local Match	-									
Hall of Waters Local Match Phase II	-									
Sub-Total Projects in Discussion, Not Funded:	-	-	-	-	-	-	-	-	-	
ENDING Total Cash Balance (with Projects in Discussion)		2,454,924.44	2,935,384.54	2,111,682.71	1,641,031.36	2,318,780.01	2,996,528.66	4,174,277.31	5,324,255.96	
New Projects to be PRIORITIZED										
Bank Redevelopment	85,000								85,000	
Downtown Streetscape Grant Match	250,000			100,000	150,000					1,000,000 total project
Fishing River Watershed - Trib 1 (full cost; seeking grant funds)	520,000								520,000	2,600,000 2023 est
Fishing River Watershed - Hitchlot (full cost; seeking grant funds)	300,000						300,000			1,500,000 2023 est
Golf Cart Path	75,000			75,000						
Hall of Waters - Phase II (Full Cost)	-									3,371,276 2022 est
Hall of Waters Phase III, local match	1,000,000				400,000	450,000	150,000			
Hall of Waters - Phase IV (full cost; seeking grant funds)	-									6,000,000 2022 est
Hillcrest Cemetery Road	75,000								75,000	
Hitch Lot Access	150,000								150,000	
Industry Roadway Improvement	80,000			80,000						
Mausoleum Repairs	435,000				150,000				285,000	
Milwaukee Park	150,000								150,000	
Police Plumbing, leak - front plaza	150,000			150,000						
Replace undersized waterlines (full cost; seeking grant funds)	-									6,112,700 2022 est
St. Louis/Elms/Thompson	50,000								50,000	
Total Committed Funds	3,270,000.00	-	-	405,000.00	700,000.00	450,000.00	450,000.00	-	1,265,000.00	20,583,976
ENDING Total Cash Balance (with Projects in Discussion)	904,277.31	2,454,924.34	2,935,384.44	1,706,682.61	536,031.26	763,779.91	991,528.56	2,169,277.21	2,054,255.86	

Hall of Waters Phase II: Courtyard Stabilization - temporary	447,508.00
Dehumidity	86,000.00
Tower Stabilization	562,807.00
Entrance Doors	370,497.00
Hall of Springs, windows, doors, roof, finish bar	613,219.00
Roof, Ceiling, hallway repairs above skylite	354,600.00
Mezzanine	1,502,645.00
Phase III: Permanent Shoring - Front Yard, HVAC, Exterior Facades	5,000,000.00
Phase IV: TBD	

To finish the SAT grant - spend 41,810 on dehumidifier in basement
then you have 131,624 left for a project

City Manager
Capital Improvements Authority Meeting - 1/8/2024

To:	Authority Members
From:	Molly McGovern, City Manager
Date	1/4/2024
RE:	Approval: Request to Replenish Building Maintenance Fund

Request of $25,000

Molly McGovern, City Manager

City Manager
Capital Improvements Authority Meeting - 1/8/2024

To:	Authority Members
From:	Molly McGovern, City Manager
Date	1/4/2024
RE:	Approval: Fishing River Watershed Project 2

We are in the preliminary stages of exploring funding options for the second project identified in the Watershed Study. Please see PDF pages 31-36 beginning with 403 South Street (Hitch Lot) and PDF pages 84-85 for FEMA funding programs. There is an application deadline in February that we are preparing for. The Hitch Lot project was estimated in 2023 to cost $1,547,250; a 25% match is $386,812.50.

It is anticipated to take 1 year to solidify outside funding, 1 year to complete the preliminary planning. With funding needed in 2025-26 and 6% annual inflation on construction, we would probably need $450,000 for local match.

Please consider if this is an appropriate project to use CIP funds, so we can determine how to proceed.

Molly McGovern, City Manager

ATTACHMENTS:

Description	Type	Upload Date
Fishing River Watershed Study	Cover Memo	1/4/2024

The City of Excelsior Springs Missouri

FISHING RIVER

Watershed Study for Downtown Excelsior Springs

May 2023

Flooding will be less frequent, less extensive, less damaging, and less dangerous.

CREDITS

City of Excelsior Springs
City of Crystal Lakes
Clay County
Ray County
Vireo
GBA

TABLE OF CONTENTS

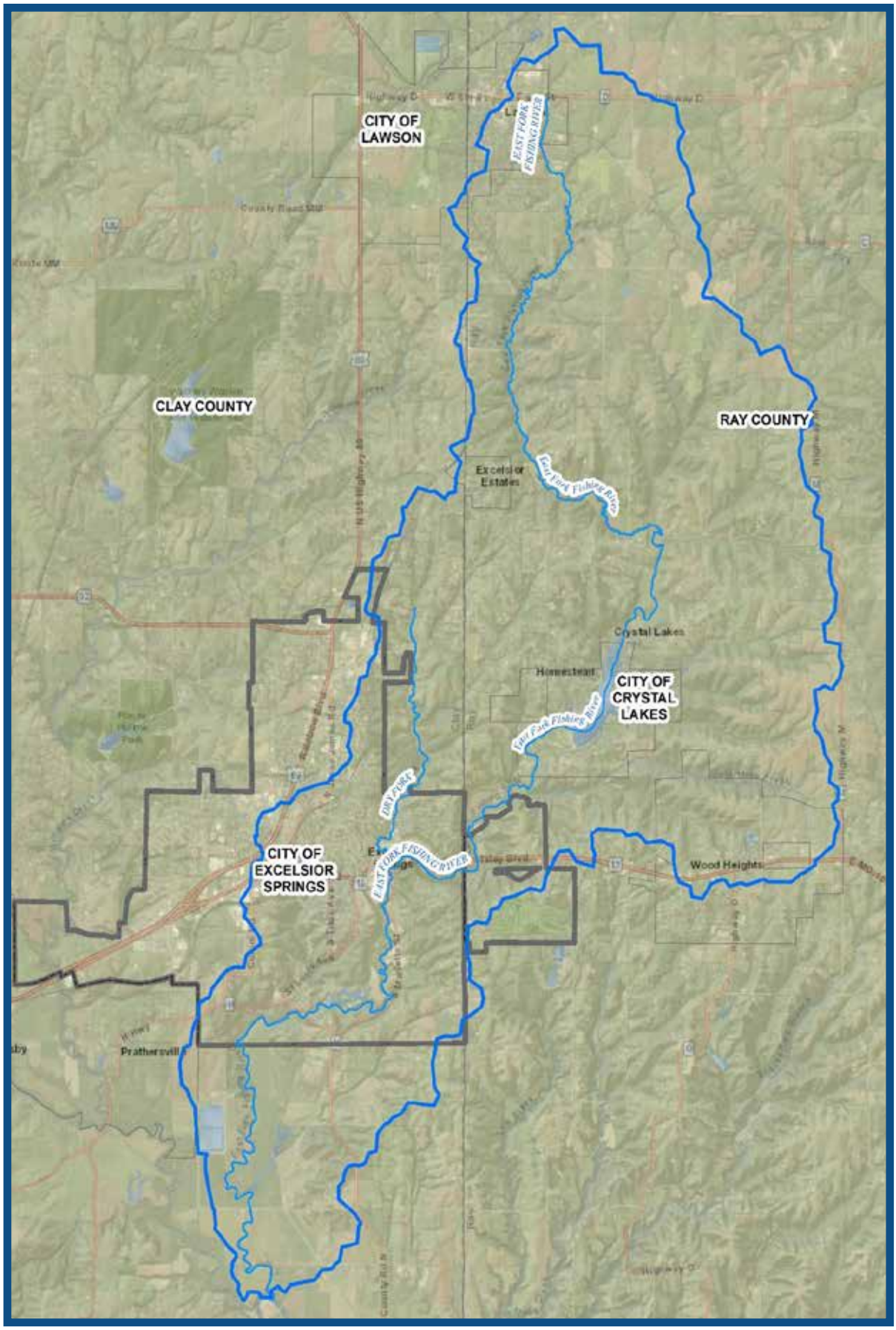


Figure 1. Watershed study area boundary.

INTRODUCTION

Study Overview

The City of Excelsior Springs, Missouri identified the need to evaluate and develop potential solutions to address flooding and erosion issues occurring in its downtown area. Chronic downtown flooding is caused by excess water at the confluence of the East Fork and Dry Fork tributaries of the Fishing River (Figure 1) and is exacerbated by backwater effects from the Fishing River. Many downtown properties, businesses, and City facilities, including the Hall of Waters and The Elms Hotel and Spa, are inundated during rainfall events, and are also threatened by streambank instability and erosion. Conditions are aggravated by the flashy nature of these streams, inadequate bridge and culvert openings, highly constrained floodplains and the proximity of adjacent structures (including exposed building foundations in some locations), and overland flooding from adjacent hillsides. These conditions threaten life, property, and infrastructure, and exact significant costs on property owners and the City. Furthermore, they are hindering Excelsior Springs by discouraging investment and revitalization of this wonderful community asset - its historic downtown.

The City has made significant progress in reducing flood risk through voluntary, residential floodplain buyouts, the creation of the Fishing River Linear Park Trail, and limited bridge improvements and replacements. However, much more is needed.

The study is in response to chronic flooding and erosion issues affecting the downtown area. The report document will describe a program of structural and non-structural watershed improvements to:

- Reduce the frequency and severity of flooding.
- Protect downtown properties, businesses, and infrastructure.
- Care for and enhance the community's ecological health and natural resources.
- Catalyze community revitalization efforts.

Proposed watershed improvements include a broad range of ecologically-based and environmentally sustainable nonstructural practices and structural improvements that are in keeping with the community's character and vision and based on extensive community engagement. Associated recommendations will:

- Outline 3 to 5-year capital projects and long-term needs.
- Describe multi-benefit opportunities.
- Identify public-private partnerships with locals and Clay and Ray Counties.
- Suggest funding sources.

Historic photo of boy fishing on the Fishing River in Excelsior Springs, date unknown. Photo courtesy of Excelsior Springs Museum and Archives.

Flood photos courtesy of the City of Excelsior Springs.

DISCOVERY

A Discovery Phase was completed to understand existing conditions within the watershed. Work in this phase included collecting data and past studies and reports of known flooding in the watershed, conducting on-site field investigations, and community outreach.

Data Collection

The project team collected, compiled, and evaluated available data from the City, County, and other publicly accessible sources. Data included historical flood studies, effective FEMA models, stormwater infrastructure, and geographic information system (GIS) planimetric data.

Existing plans were obtained as applicable, including future capital improvements, land use, comprehensive plans, economic development, parks and trails plans, and site development plans.

Previous flooding studies were obtained from the City, which document existing flooding issues within the study area, as well as previously proposed solutions. Relevant studies include:

- Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS), Clay County, Missouri and Incorporated Areas - Effective August 3, 2015
  - Includes the Flood Insurance Rate Maps which illustrate the limits and elevations of the floodplain within the project area
- U.S. Army Corp of Engineers (USACE) Continuing Authorities Program 205 Study, Excelsior Springs, Missouri, Recommendation Report - completed in December 1999
  - Report includes flooding issues within the Fishing River Watershed, proposed structural solutions, and list of recommended home buyouts

City representatives provided information on areas where instances of flooding have been reported or documented. Other studies reviewed during the planning process are included in the Reference Section at the end of the report.

EVALUATION AND ANALYSIS

During this phase, a watershed-based 2-dimensional (2D) model was developed to quantify the impacts of flooding in the current watershed and to analyze flood reduction benefits of the proposed solutions. In addition to the model, field assessments were conducted to evaluate existing structures like bridges and culverts, and to assess stream stability. This information was then used to explore opportunities and constraints within these watersheds.

Field Assessments

The project team conducted an initial field assessment in early June 2022, to observe existing conditions, including visual assessments of key infrastructure, drainage patterns and topography, land cover and vegetation, wetlands, soils, historic flooding and drainage complaints, stream and levee conditions, rainfall, and streamflow gage data. Additional field assessments were conducted in late June 2022, to collect relevant data about bridge and culvert crossings, and stream stability. Details of these latter assessments are provided in the following sections.

Stream Stability Evaluation

A stream stability assessment was conducted using the stream asset inventory (SAI) procedure developed by Vireo, which incorporates the best elements of a number of accepted stream and habitat assessments and local research. The SAI methodology provides rapid and scientifically defensible indicators of water quality, stream stability, and habitat conditions at a given location that is selected to be representative of a larger stream reach. Assessment criteria include erosion indicators; bed and bank composition; aquatic habitat features; tree canopy and understory coverage and composition; and indirect water quality indicators. These criteria are assigned individual weighted scores to create a composite score of stream quality at each location and a relative ranking of stream quality throughout the watershed.

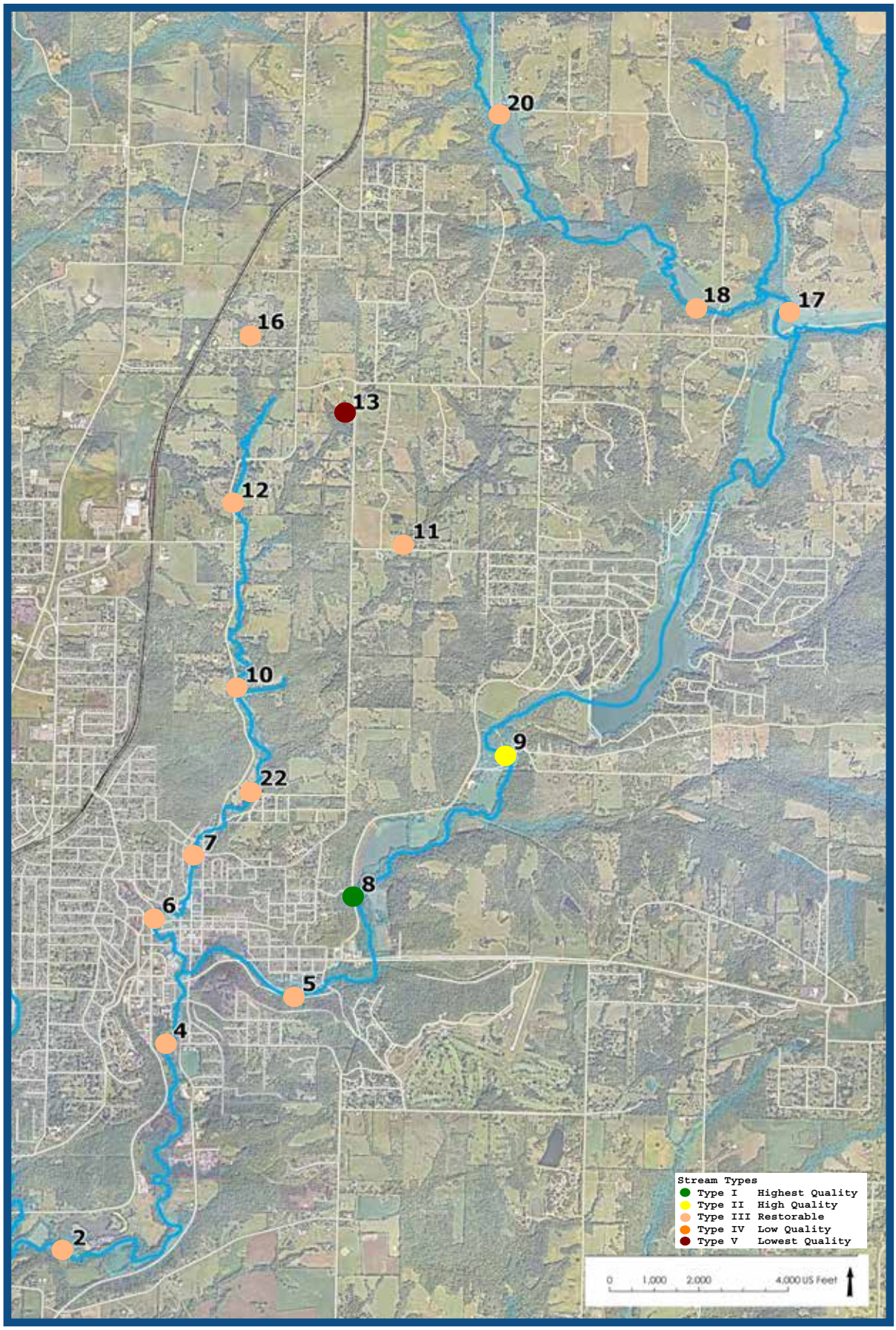


Figure 2. Map of sampling locations for stream stability assessment.

The SAI procedure has four major categories with each having five scoring components. Each component has a maximum potential score of 10 for a possible total score of 200. By dividing the total score by 20 (or by the number of measured components), the assessment provides a qualitative numerical score ranging from 0.0 to 10.0. A higher score indicates better stream conditions while a lower score indicates poor stream conditions. Note: a score of 10.0 is not possible because higher scores in some categories result in lower scores for others. Some components were not applicable or observable in certain situations, and if so, were not included. The final quality value was calculated by dividing the total site score by the number of components evaluated. For example, where bed composition could not be observed due to high flows or turbid conditions, no points were assigned for the bed composition component and the total site score was divided by 19 rather than 20. The team conducted field surveys in late June 2022. A total of 16 sites were assessed representing intermittent and perennial stream reaches within the Dry Fork and East Fork of the Fishing River watersheds (Figure 2).

Under the relative scoring system, stream reaches were assigned a score from 10 to 0 and were classified Type I (highest quality) through V (lowest quality) based on the statistical distribution of data from the study area. Stream segments were classified into five types, with the following general descriptions that may vary by locality and study area:

Type I - Highest Quality: Generally described as the highest quality naturally occurring stream in a given study area, with the least negative impact. Figure 3 shows a Type I stream reach on East Fork.

Type II - High Quality: This type of stream may have greater down- or side-cutting, but with bank and bed composition that assist in keeping the impact low. Figure 4 shows a Type II stream reach on East Fork.

Type III – Restorable: Deterioration of the channel and riparian corridor are generally more noticeable, and erosion and incision are usually more prominent. Type 5 shows a typical Type III stream reach on Dry Fork.

Type IV - Low Quality: Impacts are greater on this stream type, usually with significant indicators of bank erosion and channel instability.

Type V - Lowest Quality: The channel in this type is the most altered or degraded. In almost all cases, the riparian corridor is impaired to the point of providing little protection or benefit, and erosion and sedimentation indicators are significant.

The surveyed stream segments were classified relative to the sample population of surveyed streams, rather than applying an absolute score. The relative ranking is used for several reasons: (1) Scoring streams on an absolute scale may imply that the break points between classes are based on some quantitative linkage between the score and stream function, which is not the case; (2) Streams should be classified in comparison to general, regional conditions so that streams are assigned scores reasonable for their physiographic and development settings; and (3) Relative distribution allows the assessor to identify the truly high-quality and low-quality streams within the study area. However, comparison with surveys in other, similar communities can provide some relative indication of overall stream quality as discussed below.

A majority (82%) of the streams assessed were Type III, with one Type I and one Type II reach found in the East Fork watershed and one Type V found in the Dry Fork watershed. The latter Type V reach was an intermittent stream that was dry at the time of the assessment, which resulted in a lower score. Drought conditions within the region likely affected stream flows throughout, resulting in some streams having less water than normal. The following general observations were made of conditions within these watersheds.

Figure 3. Type I stream reach south of Crystal Lakes at SAI site 8.

Figure 4. Type II stream reach south of Crystal Lakes at SAI site 9.

Figure 5. Type III stream reach on Dry Fork upstream of SAI site 7.

Dry Fork Watershed

- Land use within the Dry Fork watershed is predominantly urban development with numerous residential homes, a few small hobby farms, and a winery. Agricultural land use is present in the upper portions of the watershed.
- The stream system is smaller with narrower stream banks and less permanent water.
- Streambanks tend to be steep and vertical in nature with lots of bank erosion on the outside of bends and deposition on the inside of bends.
- The riparian (streamside) corridor tends to be very narrow and fragmented.

East Fork Watershed

- Land use within the East Fork watershed is predominantly agriculture above and immediately below Crystal Lakes.
- The stream system is larger with wider stream banks and more permanent water.
- Rock outcrops and bedrock lined stream channels are more common in this watershed than in Dry Fork.
- The width and health of the riparian corridor is more variable dependent upon adjacent land use being cropland or livestock pasture. There is an auto salvage yard adjacent to the stream south of Crystal Lake.
- Crystal Lakes is acting as a control structure within the East Fork watershed. Improvements to the lake including dredging could benefit downstream flooding, improve water quality, and restore recreational opportunities to the community.
- Sedimentation over the lifetime of the lakes has greatly reduced the storage capacity of the main lake and resulted in diminished use of the lake for recreational purposes.
- Control of sediment and pollutant laden runoff from land surrounding the lakes and streams that feed into Crystal Lakes is critical to the long-term health of water bodies within the watershed.

Opportunities and Constraints

The project team reviewed aerial imagery, land use and soil maps, and the region's Natural Resource Inventory (NRI) data to identify where various stormwater management solution options may or may not be a contextual fit from a community planning and landscape architecture perspective. The team identified key locations where potential solutions could be implemented within existing or planned public corridors. The team also identified potential private lands that could be acquired for watershed-based solutions, including potential sites for stream and wetland banks that could facilitate other projects in the watershed. Opportunities were identified within city limits, as well as upstream areas in Clay and Ray Counties, as appropriate. Critical constraints in the watershed, such as critical public lands that should be preserved and avoided when considering project locations and environmentally sensitive areas were also considered. Figure 6 on the following page shows the opportunity areas identified by the team. Figures 7 through 10 illustrate existing conditions within the study area.

Historic photos of the Hitch Lot, looking north to the Albany Hotel and Dixon Motors in Excelsior Springs. The first is from the 1890s with a market day crowd. The second date unknown. Photo courtesy of Excelsior Springs Museum and Archives.

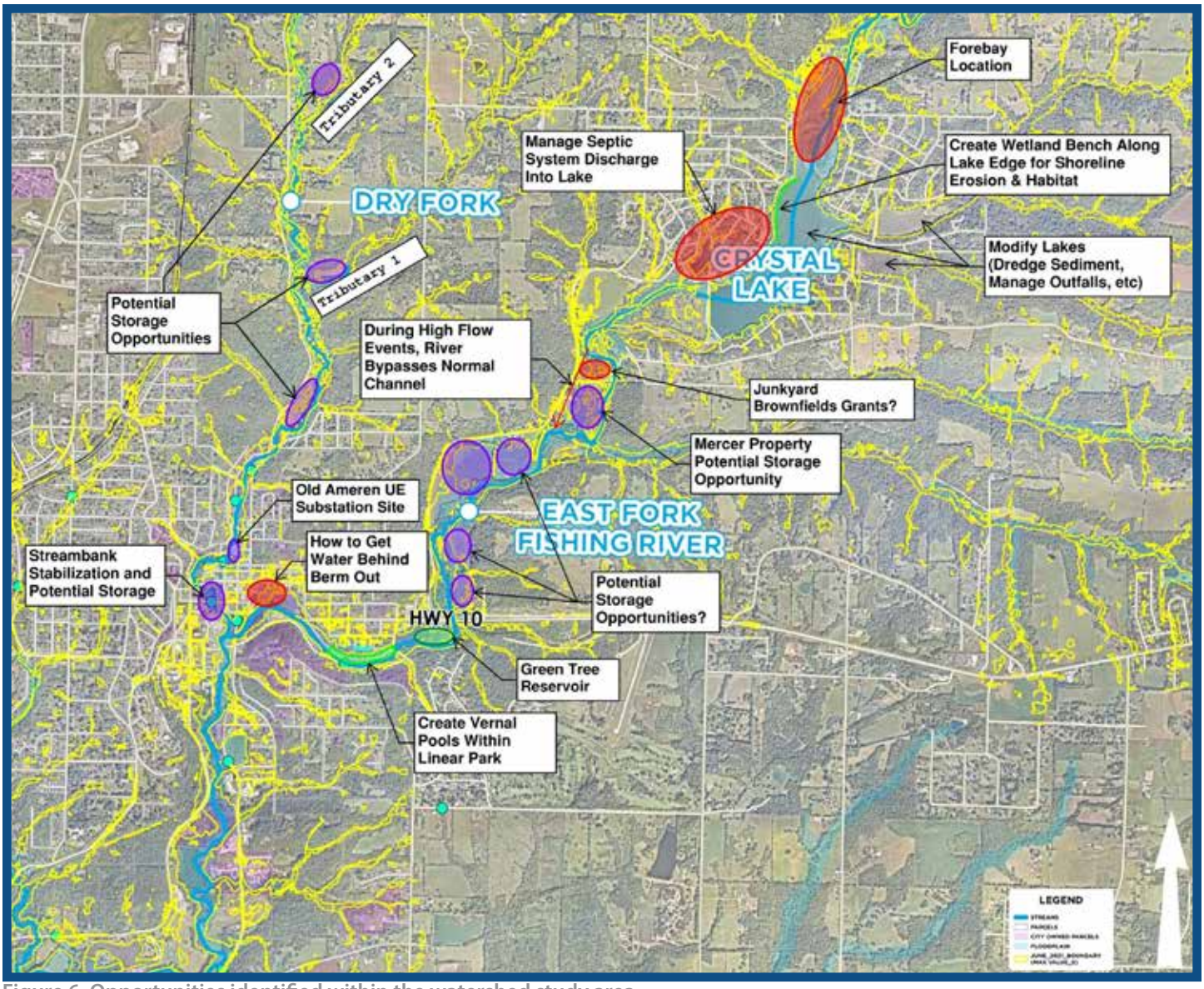


Figure 6. Opportunities identified within the watershed study area.

Figure 7. Bedrock lined channel provides stream stability at SAI site 20 on the East Fork.

Figure 8. Garland Street bridge north of the Elms Hotel.

Figure 9. Streambank instability on Dry Fork Creek near SAI site 22.

Figure 10. Crystal Lake from the dam on the southern side of the lake looking north.

Watershed Model

Existing Conditions

A HEC-RAS v. 6.2 2D model was developed to simulate existing rainfall-runoff conditions within the watershed, . Figure 1 displays the watershed boundary used in the model development. The drainage area at the Dry Fork and East Fork confluence is approximately 24 square miles. The delineated boundary extends several miles downstream of the confluence to ensure the downstream boundary condition used in the model did not impact the results within the city. A summary of the sources of data used to build the 2D grid are included in Table 1.

The model uses a rain-on-grid approach to incorporate both hydrology and hydraulic calculations into a single model. Frequency based rainfall data was obtained from the National Oceanic Atmospheric Administration (NOAA) Atlas 14 for Excelsior Springs. The rainfall scenarios used in the analysis include the 6-hour duration 2-, 5-, 10- and 100-year frequency events.

A model simulation was developed using an historic event from June 24-25, 2021, to assist with calibrating the 2D model. This event was selected because City representatives expressed that the flooding resulting from this event was the degree of flooding they were most interested in addressing. Four rain gages in the area that report to Weather Underground were accessed to collect the rainfall for this event, as well as the varying accumulated rainfall across the watershed. The Thiessen polygon method was also used in the simulation

Existing bridges, culverts, and lake outlet structures were modeled as 2D Connections in HEC-RAS. These structures were entered into the model based on their geometry observed during field assessment. This tool allows the user to input structure geometry and roadway profile information into the model as displayed by the example in Figure 11. This function allows the model to pass water through existing roadways and to calculate the appropriate hydraulics equations associated with culverts, bridges, and weirs.

The model results correlate well with previous studies and the reported history of flooding. The June 2021 rainfall event that was modeled provided peak flow results similar to a 25-year frequency event based on the trendline displayed on Figure 12. The June 2021 results are presented in the results for the Main St. site but, were replaced with a 25-year 6-hour rainfall event for the remaining analyses. The uniform distribution of the 6-hour design storm simplified the conceptual design of solutions.

Proposed Conditions

Once selected, preliminary alternative scenarios were modeled to further evaluate the practices, solutions, and potential implementation locations, to generate more refined preliminary estimates of potential benefits, while also identifying less effective or less feasible options. Overall watershed-level benefits were evaluated to understand the cumulative benefits to existing and potential future flooding, bank stability, and other related issues.

The existing conditions model was used as the starting point for analyzing all proposed solutions. The primary types of solutions evaluated in the model included grading or modifying the existing terrain. Grading modifications were incorporated into the model by adding Modification Layers to the Terrain model. This tool allows the user to draw a polygon shape and assign a new elevation to the shape, which overrides the existing elevation. An example is provided in Figure 13. The terrain modifications are shown in faded redwith the cross section showing the variation in terrain from existing compared to proposed.

Table 1. Summary of data used to develop existing conditions 2D model.

Model Component	Source	Model Uses
Topography	Clay County: Mid-America Regional Council (MARC) LiDAR, 2018 Ray County: Missouri Spatial Data Information Service (MSDIS) LiDAR, 2014	Terrain model development
Landuse	MARC Natural Resources Inventory (NRI), 2020	Curve number and Manning's Roughness development
Soils	Natural Resources Conservation Service (NRCS) SSURGO database, 2014	Curve Number development
Building Footprints	MARC Clay County Structure Footprints, 2014	Manning's Rougness development

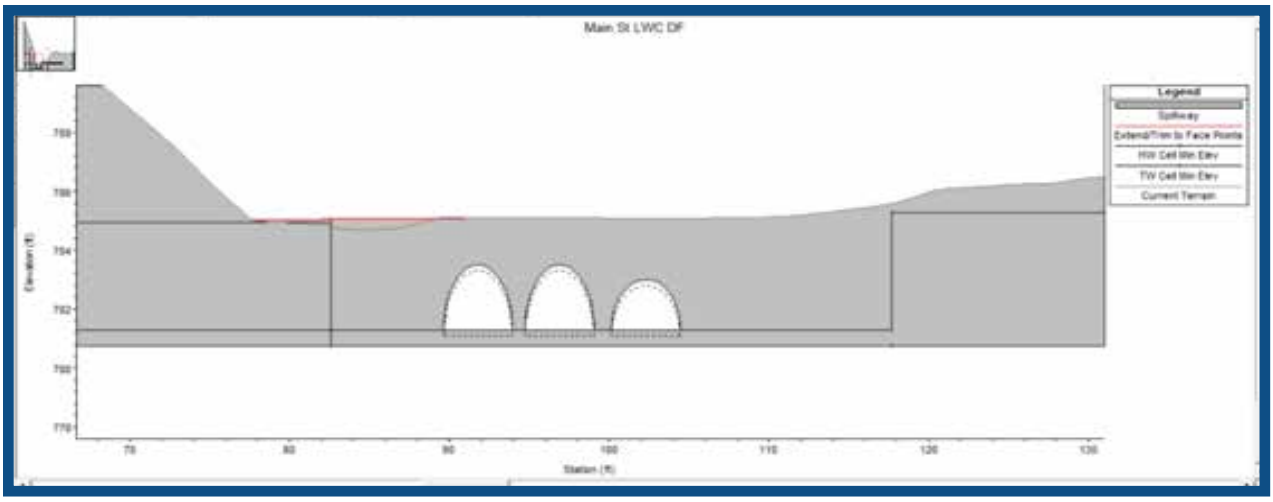


Figure 11. Existing conditions Main Street culvert shown as a HEC-RAS 2D Connection.

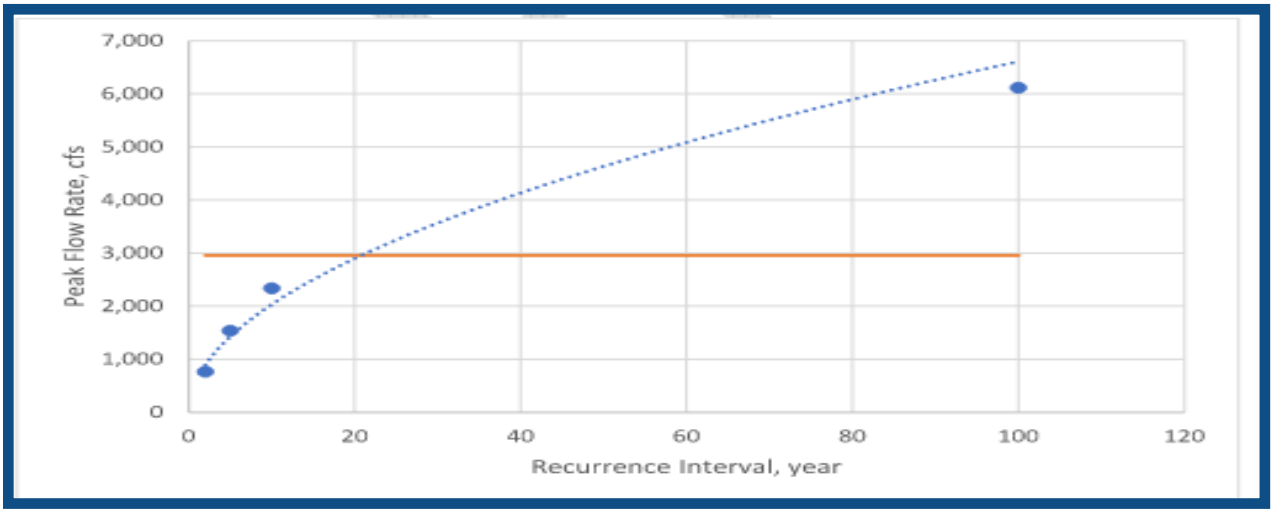


Figure 12. Modeled peak-flow rates for various recurrence intervals (blue dot), the resulting power trendline (dashed blue) and the June 2021 event (orange line).

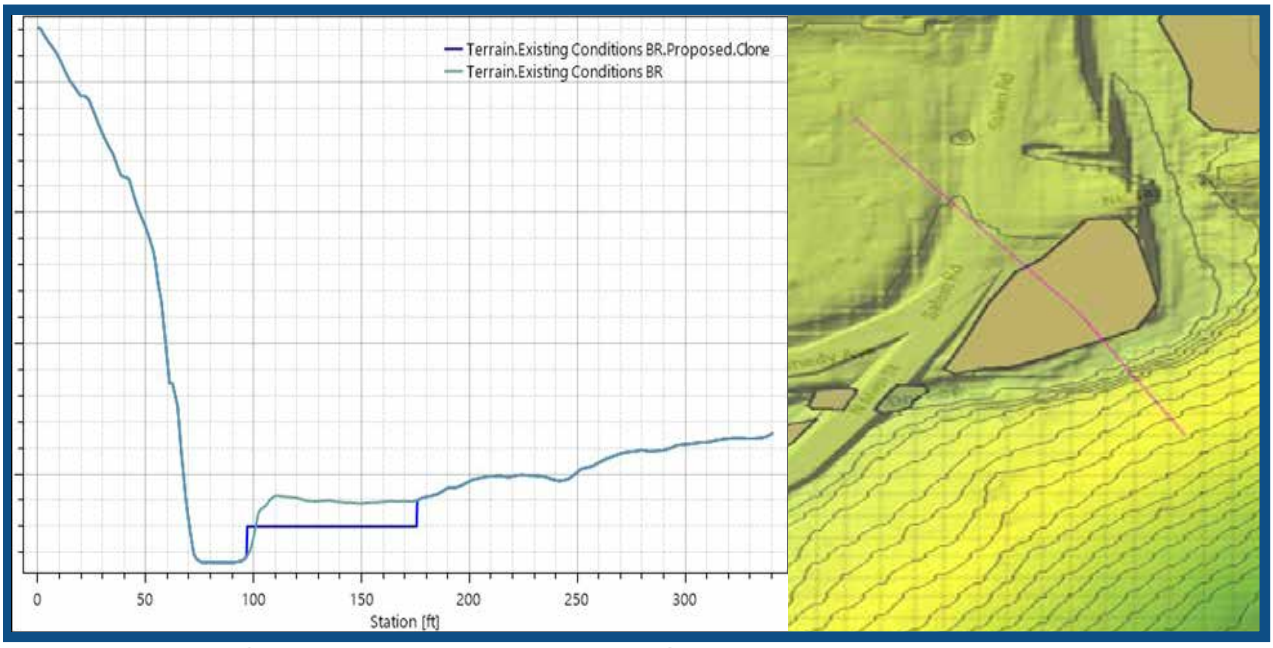


Figure 13. Example of a proposed conditions terrain modification. Cross section displays proposed (blue) compared to existing (light blue).

Potential Solutions

As the Team evaluated potential sites, they were thoughtful of the types of solutions that would be effective at managing stormwater while also meeting the aesthetic desires of the community. The following are the types of solutions the Team considered for sites throughout the watersheds.

Storage - Wet & Dry Detention

Wet detention ponds are stormwater control structures providing both retention and treatment of contaminated stormwater runoff. Wet detention ponds generally include native wetland vegetation that can assist with infiltration of water into the soils below.

Dry detention ponds are basins that detain stormwater for some minimum time (e.g., 24 hours) to allow particles and pollutants to settle and reduce peak flow rates. While native vegeation can also be used in these basins, turf grass may also be appropriate to allow for recreational use of the basin when it is dry.

Managing Stream Flows

Weirs are used to prevent out of bank events, slow the flow of water, and allow for infiltration. Each section captures water until it is full before allowing water to tumble over into subsequent weirs.

Sedimentation & Water Quality Management

Water quality describes the condition of the water, including chemical, physical, and biological characteristics, usually with respect to its suitability for a particular purpose such as drinking or swimming. Management of sediments within streams and lakes is critical to maintaining good water quality.

Riparian Buffers

A riparian forest buffer is an area adjacent to a stream, lake, or wetland that contains a combination of trees, shrubs, and other perennial plants. These vegetated buffers help to filter stormwater runoff, provide shade for streams, and provide travel corridors commonly called greenways, for wildlife and people alike.

Wet detention pond used to store and treat stormwater.

Weirs used for managing stream flows.

Wetland used for sediment & water quality management.

Greenway and riparian buffers within stream corridors.

Rain garden using native plants.

Rain barrels for capturing roof drain runoff.

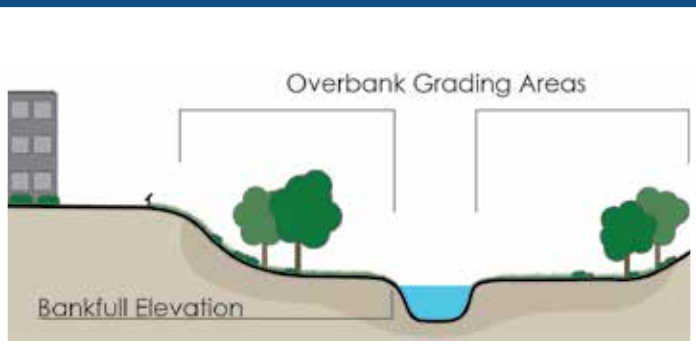


Figure 14. Illustration of a restored stream channel with areas for overbank grading.

Streambank Stabilization & Restoration

A vegetative, structural, or combination treatment of streams designed to stabilize stream banks and reduce erosion. Figure 14 illustrates another approach, which is overbank grading, or adding floodplain connectivity at the bankfull elevation. This approach reduces depths of high flows and stabilizes the stream channel by excavating the floodplain at the bankfull elevation. These overbank storage areas are utilized to store flood waters during storm events, which then allow the excess water to either flow back into the stream channel once levels return to normal or to infiltrate into the soil within the storage areas. Figure 14 is adapted from Harman and Starr 2011.

Rain Gardens & Rain Barrels

A rain garden is a depressed area in the landscape that collects rainwater from a roof, driveway, or street and allows it to soak into the ground.

Rain barrels capture water from a roof and hold it for later use such as on lawns, gardens, or indoor plants. Collecting roof runoff in rain barrels reduces the amount of water that flows from your property.

Both of these are solutions that private landowners can readily implement. The City may wish to provide assistance to homeowners by providing technical assistance and/or funding to purchase supplies.

Figure 15. Overbank storage in normal conditions.

Figure 16. Overbank storage during a flood event.

Illustration of a tiered basin and riparian plantings using native plants.

Historic photo of canoeing on the Fishing River near the Elms Hotel, date unknown. Photo courtesy of Excelsior Springs Museum and Archives.

Historic photo of a swinging bridge over the Fishing River in Excelsior Springs, date unknown. Photo courtesy of Excelsior Springs Museum and Archives.

Vegetation Management

Management of existing and proposed vegetation will play a key role in the success of these projects. Existing conditions include riparian buffers that have understory vegetation dominated by invasive species and turf grass. Selection of vegetation for the proposed solutions will be dependent upon location, structural capacity, and aesthetics. Vegetative species selected will generally be native to Missouri to promote plants that are adapted to the area's regional conditions, and that will not require extensive long-term management by the City or homeowners.

Overbank Storage Plantings

Overbank storage areas will be planted with the appropriate native herbaceous vegetation including shoreline and upland species, dependent upon water level and infiltration/release rate. Native vegetation will enhance water quality treatment and reduce long-term maintenance needs, while also improving the quality of floodplain habitat. Most storage areas will receive overflow from the stream channel only during storm events. As the stream level drops back to normal, the storage areas will release excess water that doesn't infiltrate back into the channel. Storage areas will be designed to accommodate smaller rain events and will likely be dry most of the time. When these areas are planted with trees, they are comparable to natural green-tree reservoirs that are bottomland hardwood forests land, which is shallowly flooded on a seasonal basis. Figures 15 and 16 illustrate conditions within an overbank storage area before and during flooding from a rain event.

Invasive Species Removal

Much of the existing riparian corridor adjacent to stream channels within the study area is overrun with shrub honeysuckle and euonymus (winter creeper), which are both non-native exotic species that out compete native understory vegetation. Invasive species removal will allow for treatment so that native species can be reintroduced, and to open views to the stream channel for the public.

Tiered Bioretention Basins

This type of solution consists of a series of vegetated basins that have a maximum 4' depth, with the intent to capture stormwater before it reaches the stream corridor. This project intends to utilize them for capturing hillside runoff, improving water quality as it approaches the stream, as well as slowing the initial rush of water resulting from storm events.

Riparian Corridor Enhancements

Healthy riparian corridors, also called stream buffers, consist of native trees and understory vegetation that assist in providing streambank stabilization, as well as shaded greenway corridors for both people and wildlife. Enhanced riparian corridors will provide greater attenuation, filtration and treatment of overland runoff into streams, as well as overbank flows, further reducing bank erosion and increasing water quality benefits.

In several locations, the riparian corridor is very narrow. Project should seek to establish healthy streambank vegetation and an effective wooded riparian corridor of 50 to 100 feet or greater where possible. Managing invasive species such as removing shrub honeysuckle and adding native riparian trees and shrubs to existing riparian corridors will greatly enhance effectiveness. Bank stabilization plantings will significantly reduce bank erosion and failure, and resulting sediment and pollutant loads into streams.

Wide riparian corridors also provide opportunities for recreational amenities, wildlife viewing and overall improved quality of life.

East Fork Fishing RIver at Golf Hill Drive.

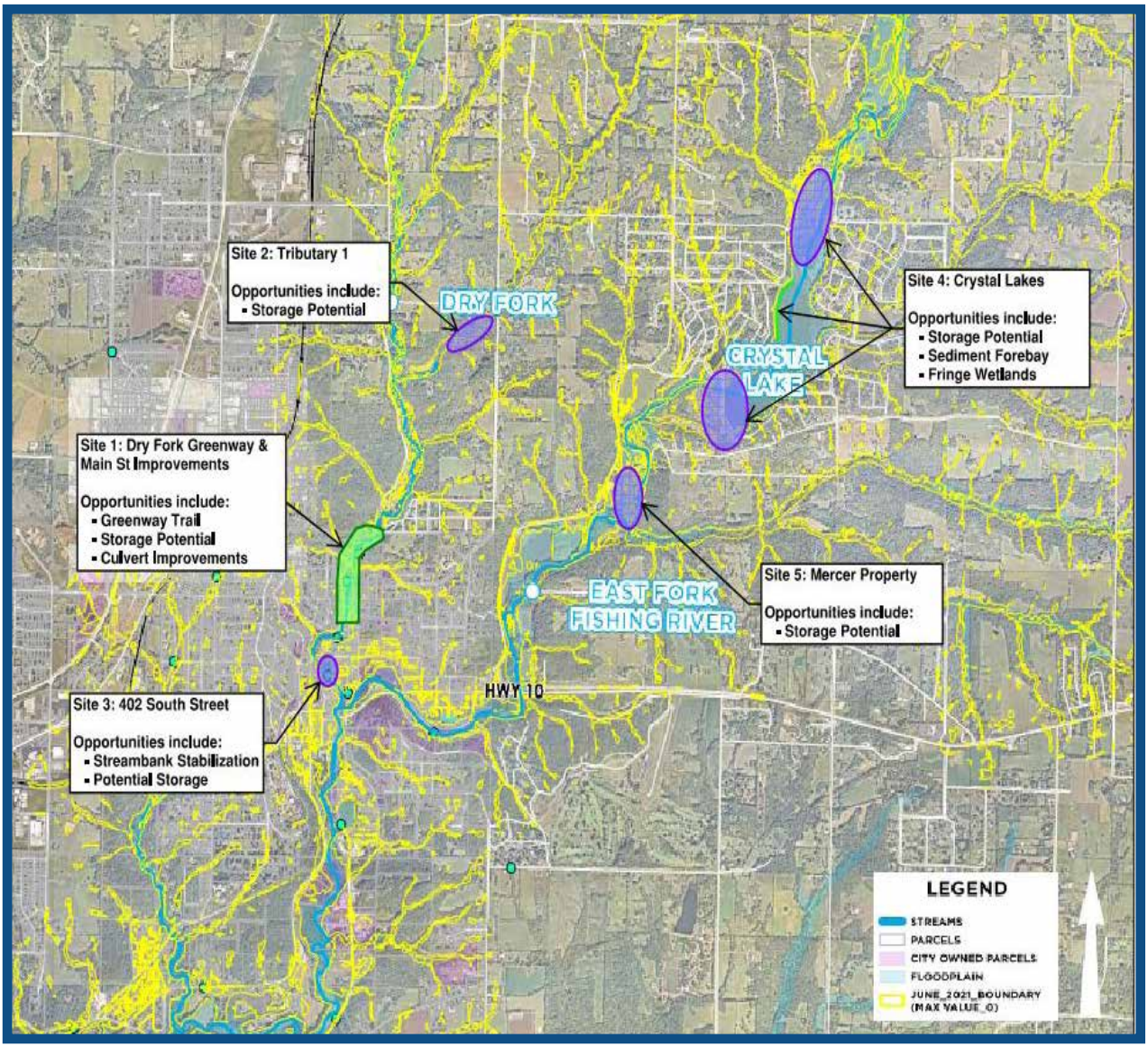


Figure 18. Map of proposed project site locations and opportunities.

CONCEPTUAL PLANNING & DESIGN

The Team identified a range of potentially applicable interventions to reduce identified flooding, erosion, and streambank failure issues, and evaluated general locations where these interventions could be applied. Ecologically and environmentally based practices, non-structural and structural solutions were evaluated to identify a broad suite of solutions that could be optimized to provide context-sensitive practices that cost-effectively reduce flooding and related problems while enhancing environmental quality and community livability. Public-private partnership opportunities, including in upstream areas outside of city limits, have been noted. The Team then identified and mapped the general locations and extents of potentially viable solutions to create conceptual alternatives that meet community objectives.

Conceptual planning solutions and alternatives from the Evaluation Phase were refined for a more detailed analysis. Additional design analysis was used to develop more realistic and defensible preliminary estimates of various solutions' size, extent, coverage, storage volumes, etc. as appropriate, depending on the type of solution; and to help ensure that the potential solutions are context sensitive.

Project Sites

The potential solutions identified during the Opportunities and Constraints analysis were further evaluated and refined to five suitable locations (Figure 18). Three of the sites are on Dry Fork and two are on East Fork. The sites are presented in no particular order.

- **Site 1:** Dry Fork Greenway and Main Street Improvements
- **Site 2:** Tributary 1 north of Excelsior Springs city limits
- **Site 3:** 402 South Street (Old Auto Sales Dealership)
- **Site 4:** Crystal Lakes
- **Site 5:** Mercer Property

The Team identified value-added opportunities for multiple benefits such as water quality improvement, recreation, habitat connectivity, and community amenities that could be implemented in conjunction with the watershed improvements or in later phases, depending on available funding and partnerships. The flood reduction benefits shown are for each project area individually. The benefits of combining project areas are presented in the Alternatives Analysis and Prioritization Section.

Site 1 - Dry Fork Greenway & Main Street Improvements

Existing Conditions

The project area is one of several areas with frequent and severe observed flooding. Located in the Dry Fork watershed, north of the Excelsior Springs downtown, the goal of the project is to reduce the flooding frequency of Main Street, which is currently described as a low water crossing.

The FEMA Flood Insurance Rate Map (FIRM) Panel 29047C0176E shows the base flood elevation (BFE) ranging from 784-ft to 794-ft throughout the project area. The information collected from the community indicated that roadways within the project area experience flooding during storms that occur much more frequently than the 100-year event that the FEMA maps are based on. Many of the homes within the project area were purchased and demolished as part of a flood buy-out program after the major 1993 Missouri River flood. However, four homes located within the floodplain remain, of which three continue to experience flooding during out of bank events. The properties that were demolished in the years ranging from 1994-1996 are listed in the 1999 USACE Continuing Authorities Section 205 Study.

Information collected during field investigations showed that the culvert currently consists of three squash corrugated metal pipes (CMP) that are roughly 52-inches by 26-inches in dimension (Figure 19). Reports from City representatives indicate that the culvert barrels were not designed based on any design event and the road frequently overtops. In the right overbank on the upstream side is a bare dirt parking area owned by the City, which is also under water during frequent flood events (Figure 20). A scour pool has formed on the downstream side of the channel, which has undermined the apron at the outlet of the CMPs (Figure 21). The existing structure appears to be protecting the upstream reach of the channel from a headcut, allowing the upstream channel to maintain its existing slope and bed elevation.

Figure 19. Low water crossing at Main St.

Figure 20. Parking area on right overbank of Dry Fork north of Main Street low water crossing.

Figure 21. A scour hole has formed downstream of the culvert at Main St.

Table 2. Existing conditions peak flow at the Main St. crossing over Dry Fork.

	Flow Rate, cfs			Main Street 1		Main Street 2	
Rainfall Event	Culvert	Weir	Total Flow	Max Depth on Road, ft	Max Velocity, ft/s	Max Depth on Road, ft	Max Velocity, ft/s
2-year, 6-hour	160	630	770	2.3	5.6	0.4	3.9
5-year, 6-hour	160	1400	1,540	3.6	7.2	1.8	5.5
10-year, 6-your	160	2210	2,340	4.6	8.2	2.8	6.3
June 24-25, 2021	160	2520	2,960	5.3	8.8	3.4	6.6
100-year, 6-hour	160	5960	6,120	7.8	10.9	5.7	7.9

Table 3. Existing conditions model results for infrastructure downstream of the Main St. culvert improvements.

		Water Surface Elevation, ft			Kennedy Ave	
Rainfall Event	Peak Flow Rate , cfs	720 N. Main St	618 Kennedy Ave	525 Caldwell Ave	Max Depth, ft	Max Velocity, ft/s
2-year, 6-hour	820	N/A	N/A	N/A	0.7	1.4
5-year, 6-hour	1,610	N/A	780.5	N/A	2.0	3.9
10-year, 6-your	2,440	N/A	781.7	781.8	3.2	5.3
June 24-25, 2021	3,020	N/A	782.3	782.5	3.8	5.9
100-year, 6-hour	6,650	788.1	784.8	784.7	6.2	9.5

Results for the existing conditions modeling at Main Street are provided in Table 2. The results include a summary of flow rates through the culvert, over the road (weir), and the total flow just downstream of the road crossing. Results also include a summary of depths and velocities on the road at two points: Main Street 1 is the existing low point of the road, and Main Street 2 is the location of maximum depth for proposed conditions. The locations of the points of interest within Table 2 are provided in Figure 22. The floodplain for the 5-year event is presented on Figure 22, as it is the smallest storm event modeled with significant out of bank flooding. The 100-year event is also presented, as it was the most extreme event modeled.

Model results are also provided for the area downstream of Main Street, where Kennedy Avenue runs parallel to Dry Fork. This stretch of Kennedy Avenue was identified as a flooding issue in the data provided by the City. There are several properties along this downstream area that did not participate in the flood buy-out program. Flooding of these homes is still a concern, so verifying the downstream impacts of the Main Street improvements was necessary. The existing conditions results for this downstream area are provided in Table 3, points of interest in the table are provided in Figure 22.

Flood buyout area between Kennedy Ave and Dry Fork.

Kennedy Ave looking north with Dry Creek on the right.

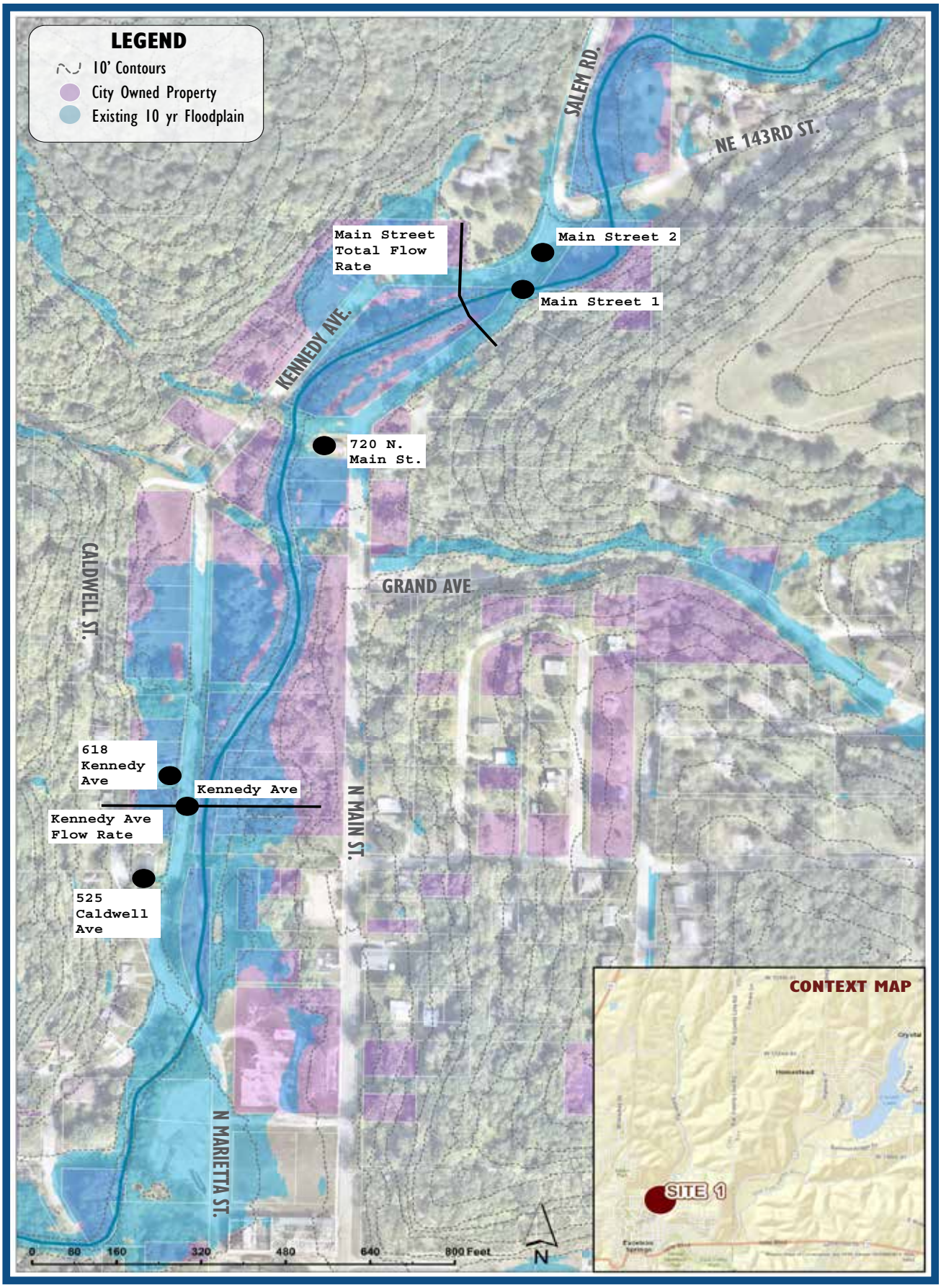


Figure 22. Existing conditions and overview of the project area for Site 1.

Flooding Improvements

The proposed solutions, illustrated in Figure 23, include raising the profile grade of Main Street approximately 3-ft at the current lowest point and increasing the capacity of the culvert by replacing the existing CMPs with a double 9-ft by 6-ft reinforced concrete box (RCB) culvert. As a result of the proposed road profile changes, the low point in the road shifted from just over the creek to approximately 70-feet north of the crossing (Main Street 2 on Figure 22). Approximately 700 linear feet of Main Street also needs to be raised to accommodate the increase in grade over the culvert.

Additional flood storage was added to the left overbank upstream of the 142nd Terrace bridge and to the right bank just upstream of Main Street with the goal of reducing peak flows that reach the improved culvert. Additional storage would be added downstream of the proposed road improvements to minimize any potential downstream impacts that could result from conveying water under Main Street that previously pooled on the road near the intersection of Main Street/Salem Road and Kennedy Avenue.

Table 4 and Table 5 present the results of the proposed improvements project. As a result of the increase in culvert capacity and road profile, the total flows just downstream of the Main Street crossing decreased for the more frequent events, the 2- through 10-year, but increased for the larger events, such as the 100-year.

The depths and velocities on Main Street decreased for all events, specifically for the 2- and 5-year event which no longer overtop the roadway. The additional storage provided with overbank grading and floodplain connection aided in mitigating any potential downstream impacts. Water surface elevations, depths, and velocities were measured at key locations downstream of the project to verify there was no additional infrastructure (buildings, roads) impacted by the project. These locations are displayed in Figure 22.

Areas of overbank grading and floodplain storage are also included throughout the project site to mitigate any potential flow increases resulting from roadway improvements, as well as to provide additional attenuation of frequent floods, improve water quality of the stream, and provide a recreational benefit to the community through creation of a greenway trail.

An alternative approach that was evaluated included converting approximately 300 linear feet of Kennedy to a multi-use trail, and buying out two homes. This alternative was cost prohibitive within the constraints of the grant funding the City was pursuing at the time of this study.

Table 4. Proposed conditions for model results for the Main St. improvements.

	Flow Rate, cfs			Main Street 1		Main Street 2	
Rainfall Event	Culvert	Weir	Total Flow	Max Depth on Road, ft	Max Velocity, ft/s	Max Depth on Road, ft	Max Velocity, ft/s
2-year, 6-hour	160	630	770	2.3	5.6	0.4	3.9
5-year, 6-hour	160	1400	1,540	3.6	7.2	1.8	5.5
10-year, 6-your	160	2210	2,340	4.6	8.2	2.8	6.3
June 24-25, 2021	160	2520	2,960	5.3	8.8	3.4	6.6
100-year, 6-hour	160	5960	6,120	7.8	10.9	5.7	7.9

Table 5. Proposed conditions model results for properties located along Kennedy Avenue.

		Water Surface Elevation, ft			Kennedy Ave	
Rainfall Event	Peak Flow Rate , cfs	720 N. Main St	618 Kennedy Ave	525 Caldwell Ave	Max Depth, ft	Max Velocity, ft/s
2-year, 6-hour	820	N/A	N/A	N/A	0.7	1.4
5-year, 6-hour	1,610	N/A	780.5	N/A	2.0	3.9
10-year, 6-your	2,440	N/A	781.7	781.8	3.2	5.3
June 24-25, 2021	3,020	N/A	782.3	782.5	3.8	5.9
100-year, 6-hour	6,650	788.1	784.8	784.7	6.2	9.5

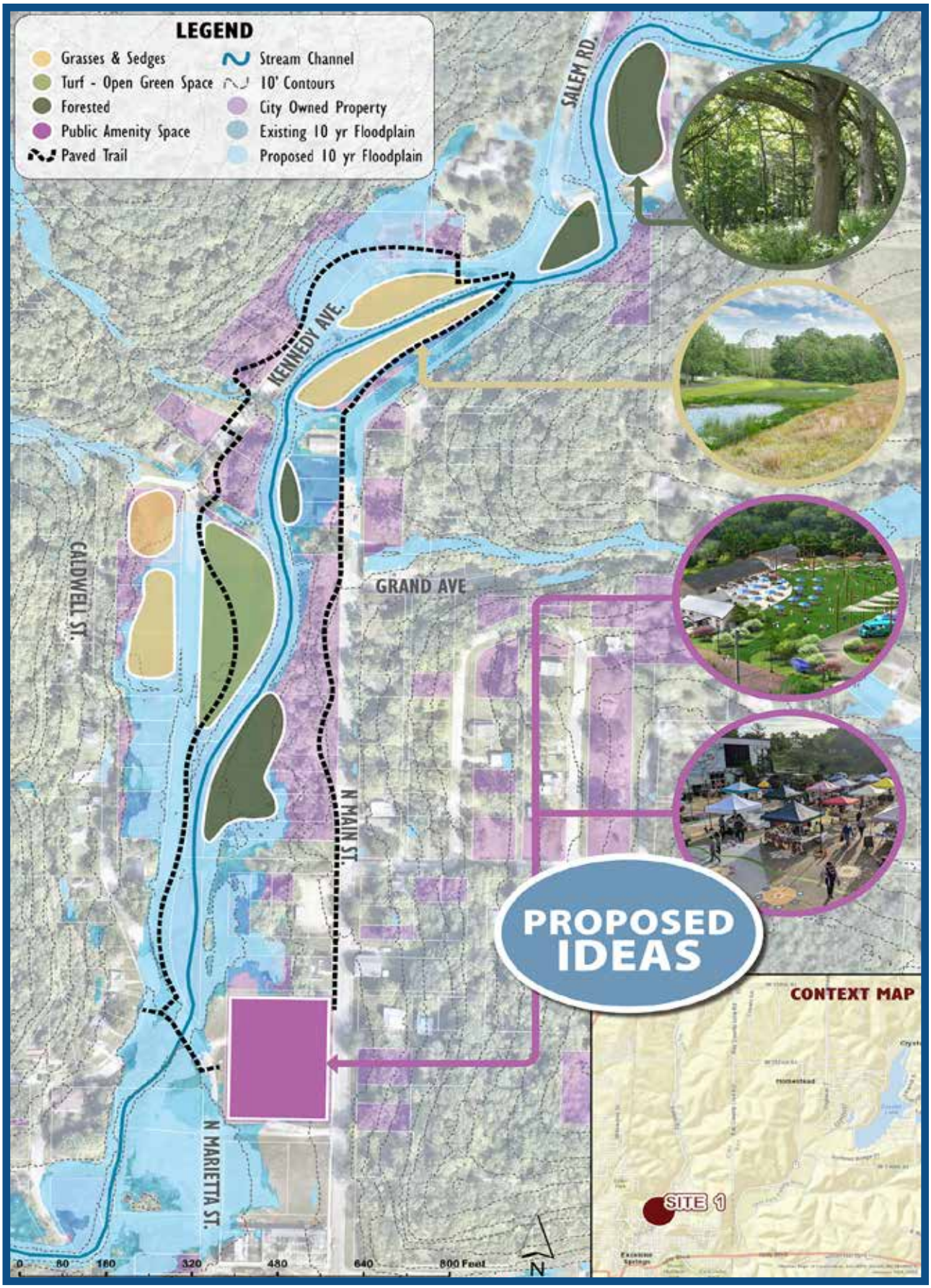


Figure 23. Illustration of greenway stormwater solutions, trail system, and potential amenities.

Vegetation Management & Site Amenities

The Fishing River Linear Trail park and Isley Woods Natural Area along the East Fork provide examples of the range of vegetation and management that can occur within a greenway system.

Vegetation management within this project area will be a combination of the management options noted earlier in the Vegetation Management Section. Specific plantings will be determined during the design of the greenway. Figure 23 illustrates some of the proposed ideas for the greenway corridor with storage areas and park amenities like trails. Figure 24 illustrates how tree plantings along the trail can provide shade for the trail users and protect the stream.

Site Considerations

Construction for this project would occur within City-owned right-of-way (ROW) or within the parcels the City has purchased as part of the flood buy-out program. It is assumed that no additional easements or ROW will need to be acquired to complete construction of the project. The proposed buy-out costs are included in the engineering opinion of construction costs (EOPCC) and are based on 2022 appraisal values.

The only utility information available at the time of this study included location of City water and sanitary sewer. Coordination and possible relocation of these and other utilities within the project area will need to be a consideration during design. Because of the limited information available, an assumed relocation estimate of 5% of construction has been included in the EOPCC.

Permits that will need to be considered include the following:

- No-rise Certification and Floodplain Development Permit
  - The proposed changes to Main Street will result in fill being placed in the regulatory floodway. A no-rise analysis will need to be completed using the effective FEMA model to verify that there are no impacts on the existing base flood elevation (BFE). This certification and a Floodplain Development Permit application will need to be submitted to the City's floodplain administrator. Because of the amount of material being excavated from the floodplain, it is anticipated that a no-rise can be achieved, and a conditional letter of map revision (CLOMR) will not be required.
- Missouri Land Disturbance Stormwater Permit
  - The project will disturb more than 1 acre, requiring a land disturbance permit and a stormwater pollution prevention plan (SWPPP) with site-specific best management practices to minimize soil exposure, erosion, and pollutant discharge.
- USACE Clean Water Act Section 404 Permit
  - The proposed work within the stream channel will be limited to the replacement of the culvert under Main Street. This work will fall under the Nationwide Permit (NWP) 14 for linear transportation projects.

Figure 24.
Illustration of a greenway trail and riparian corridor enhancements.

Opinion of Cost

Table 6 represents an engineering opinion of probable construction cost (EOPCC) for the project area in Site 1. This planning-level cost estimate is based on prior projects of a similar nature and scale, published data sources, unit costs, and best professional judgment, as applicable and appropriate. Costs presented here are for planning purposes only and will be refined during project design.

The timing of this work coincided with the development of a stormwater grant application to the Missouri Department of Natural Resources (MDNR) for American Rescue Plan Act (ARPA) funding.

The grant application focused on a greenway plan for Dry Fork and improvements to the Main Street low water crossing south of NE 143rd Street. The grant application required an engineering report to support the proposed project, which included detailed analysis of the proposed improvements along with vegetative solutions, and a preliminary cost estimate. The application provided an early opportunity to fully evaluate a proposed solution for effectiveness, community amenities, and cost. Excerpts from the report were presented in this section to illustrate the modeling process and results. The engineering report developed in support of the ARPA grant application is in Appendix A.

Table 6. Planning level cost estimate for the Dry Fork Greenway and Main Street improvements.

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	EXTENSION
1	MOBILIZATION	1	LS	$ 315,000	$ 315,000
2	CONTRACTOR FURNISHED SURVEY AND STAKING	1	LS	$ 20,000	$ 20,000
3	UNCLASSIFIED EXCAVATION	28,550	TON	$ 16	$ 456,800
4	EMBANKMENT	1,915	CY	$ 10	$ 19,150
5	2-9x6 CONCRETE CULVERT	55	LF	$ 3,000	$ 165,000
6	CONCRETE STREET REPAIR	5,750	SY	$ 250	$ 1,437,500
7	CONCRETE RIBBON CURB AND GUTTER	3,974	LF	$ 50	$ 198,700
8	CONCRETE SIDEWALK REMOVAL & REPLACEMENT	38,360	SF	$ 10	$ 383,600
9	CONCRETE DRIVEWAY APRON	60	SY	$ 90	$ 5,400
10	TEMPORARY TRAFFIC CONTROL	1	LS	$ 15,000	$ 15,000
11	TEMPORARY EROSION CONTROL	1	EA	$ 10,000	$ 10,000
12	TIERED BASIN - SEEDING	0.5	AC	$ 10,000	$ 5,000
13	TIERED BASIN - PLUGS	5,837	EA	$ 8	$ 46,696
14	OVERBANK STORAGE PLANTINGS - SEEDING	1	AC	$ 10,000	$ 10,000
15	OVERBANK STORAGE PLANTINGS - PLUGS	36,369	EA	$ 8	$ 290,952
16	INVASIVE SPECIES REMOVAL	6	AC	$ 4,500	$ 27,000
17	RIPARIAN CORRIDOR ENHANCEMENT	250	EA	$ 75	$ 18,750
18	TURF GRASS	9.5	AC	$ 3,000	$ 28,500
Subtotal Construction Costs					**$ 3,453,048**
Administrative Costs/Contingencies					
	Engineering/Design			15%	$ 517,957.20
	Contingency (% of Construction)			10%	$ 345,305
	Utility Relocation (% of Construction)			5%	$ 172,652
	City, Legal, Administrative, & Overhead (% of Construction)			7%	$ 241,713
	Right of Way/Easement Acquisition			0%	$ -
TOTAL ADMINISTRATIVE COSTS					**$ 759,671**
	TOTAL PROJECT COST				**$ 4,212,719**

Site 2 - Tributary 1 Dry Fork Creek

Existing Conditions

The confluence of an unnamed tributary channel to Dry Fork (Figure 25) is located approximately 0.8 mile upstream of the 143rd Street bridge crossing, or just east of Salem Rd approximately 0.7 mile north of the intersection of Salem Rd with Kennedy Ave, N. Main St, and 143rd Street. Figure 26 shows what existing conditions are in and around the stream channel within the general project area.

With a one square mile drainage area, the tributary contributes 40-percent of the total flow in Dry Fork calculated just downstream of the confluence with East Fork (Table 7).

Land use is designated as agricultural according to the Clay County Assessor. There are no habitable structures or any roadways along the tributary channel and no flooding issues were reported along this tributary.

To further compare the impact solutions could have on the watershed in critical downtown locations, flow values were compared at three key locations: the most downstream point of East Fork, the most downstream point of Dry Fork, and at the confluence of the two (Table 8).

Roughly 1,100 feet of the tributary channel is within floodplain Zone AE or Zone A, but upstream of that, the floodplain is unmapped. This project area was included as part of a larger project area in the 1999 USACE 205 study, which recommended the addition of five detention areas on the main channel of Dry Fork, from three quarter miles upstream of the confluence with East Fork to just downstream of the confluence with this tributary. That proposed system of detention areas would have resulted in a 12% reduction in peak flows and a 0.7-foot reduction in water surface elevation for the 100-year event at the S. Thompson Ave bridge.

Table 7. Existing conditions peak flows for the tributary and main stem of Dry Fork Creek.

Rainfall Event	Tributary	Main Stem, Confluence	Dry Fork Downstream	East and Dry Fork Confluence
2-year, 6-hour	240	640	850	1,700
5-year, 6-hour	500	1,290	1,650	3,600
10-year, 6-hour	810	2,010	2,470	5,440
25-year, 6-hour	1,330	3,300	3,700	8,570
50-year, 6-hour	1,750	4,390	4,430	11,580
100-year, 6-hour	2,220	5,600	5,990	14,890

Table 8. Existing conditions and flood depths at street locations provided by the City.

Rainfall Event	North Main Low Water Crossing	Kennedy Ave	N. Thompson	South St. at Hitch Lot	S. Marietta
2-year, 6-hour	2.1	0.8	0.0	0.0	0.0
5-year, 6-hour	3.3	2.1	1.0	0.6	0.4
10-year, 6-hour	4.3	3.3	1.6	1.6	3.5
25-year, 6-hour	5.7	4.6	2.5	5.1	5.8
50-year, 6-hour	6.6	5.5	4.3	7.7	7.5
100-year, 6-hour	7.3	6.3	5.7	11.0	8.6

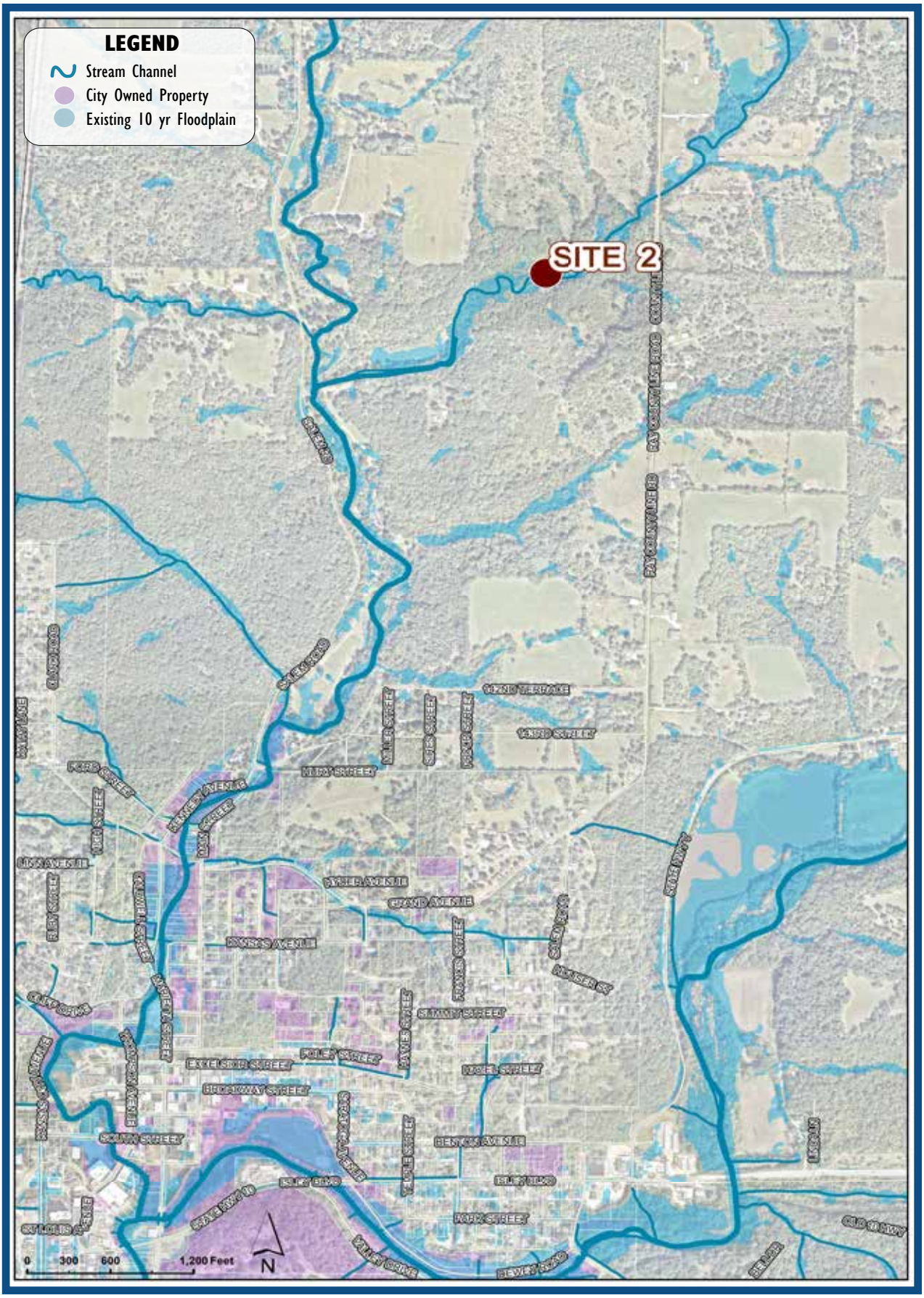


Figure 25. Existing conditions and overview of project area for Site 2.

Figure 26. Photos of existing conditions within the Tributary 1 Dry Fork Creek project area.

Flooding Improvements

The proposed solutions, illustrated in Figure 27, include constructing an impoundment in line with the tributary channel to create a dry detention basin. The location of the proposed impoundment would be near the western limits of the parcel boundary. One of the objectives of the proposed project is to limit construction to a single parcel, thus limiting the number of existing property owners to coordinate with.

The culvert under the proposed impoundment was sized as a 10-ft by 4-ft. RCB. This size allows the channel to continue to pass the baseflow and bankfull flow without significant change to the flow regime and will detain the larger flow events and reduce the overall peak discharges in the main channel of Dry Fork. Additional grading behind the impoundment was also proposed to reduce the overall water surface impacts, specifically outside of the property boundary and on Ray County Road.

Tables 9 and 10 present the results of the proposed improvement project. The proposed project will have the greatest impact on the 10- and 25-year events. Downstream of the project, within the downtown area of Excelsior Springs, the project showed less of an improvement during the 50- and 100-year events because the dam was overtopped, adding the impacts of weir flow to the flow through the RCB. The proposed project also had less of an impact during the more frequent 2- and 5-year events, because the RCB under the proposed impoundment was sized to maintain the existing flow regime and convey the smaller, more frequent events with little to no impact.

The 2D model proposed 100-year floodplain boundary is compared with the existing conditions boundary on Figure 12. Within the proposed detention area, the flooding area increases up to a point just downstream of Ray County Line Rd. Upstream of the road, the flooding areas align with one another, indicating there will be no negative impacts outside of the project area.

Table 9. Proposed conditions peak flows with a percent reduction when compared to existing.

Rainfall Event	Tributary	% Red.	Main Stem, Confluence	% Red.	Dry Fork Downstream	% Red.	East and Dry Fork Confluence	% Red.
2-year, 6-hour	240	0%	640	0%	850	0%	1,670	2%
5-year, 6-hour	460	8%	1,230	5%	1,590	4%	3,420	5%
10-year, 6-hour	590	27%	1,750	13%	1,590	36%	5,420	0%
25-year, 6-hour	880	34%	2,710	18%	3,320	10%	8,600	0%
50-year, 6-hour	1,470	16%	4,060	8%	4,020	9%	11,290	3%
100-year, 6-hour	2,060	7%	5,600	0%	5,320	11%	14,740	1%

Table 10. Proposed conditions depths with reduction (or increase) compared to existing.

Rainfall Event	North Main Low Water Crossing	Depth Diff.	Kennedy Ave	Depth Diff.	N. Thompson	Depth Diff.	South St. at Hitch Lot	Depth Diff.	S. Marietta	Depth Diff.
2-year, 6-hour	1.8	0.3	0.2	0.6	0.0	0.0	0.1	(0.1)	0.0	0.0
5-year, 6-hour	2.9	0.4	0.3	1.8	0.0	1.0	1.3	(0.7)	0.0	0.4
10-year, 6-hour	3.8	0.5	2.8	0.5	0.0	1.6	1.6	0.0	2.4	1.1
25-year, 6-hour	4.9	0.8	4.1	0.5	1.5	1.0	3.9	1.2	5.5	0.3
50-year, 6-hour	5.8	0.8	5.0	0.5	3.4	0.9	6.9	0.8	7.3	0.2
100-year, 6-hour	6.7	0.6	6.0	0.3	5.9	(0.2)	10.2	0.8	8.5	0.1

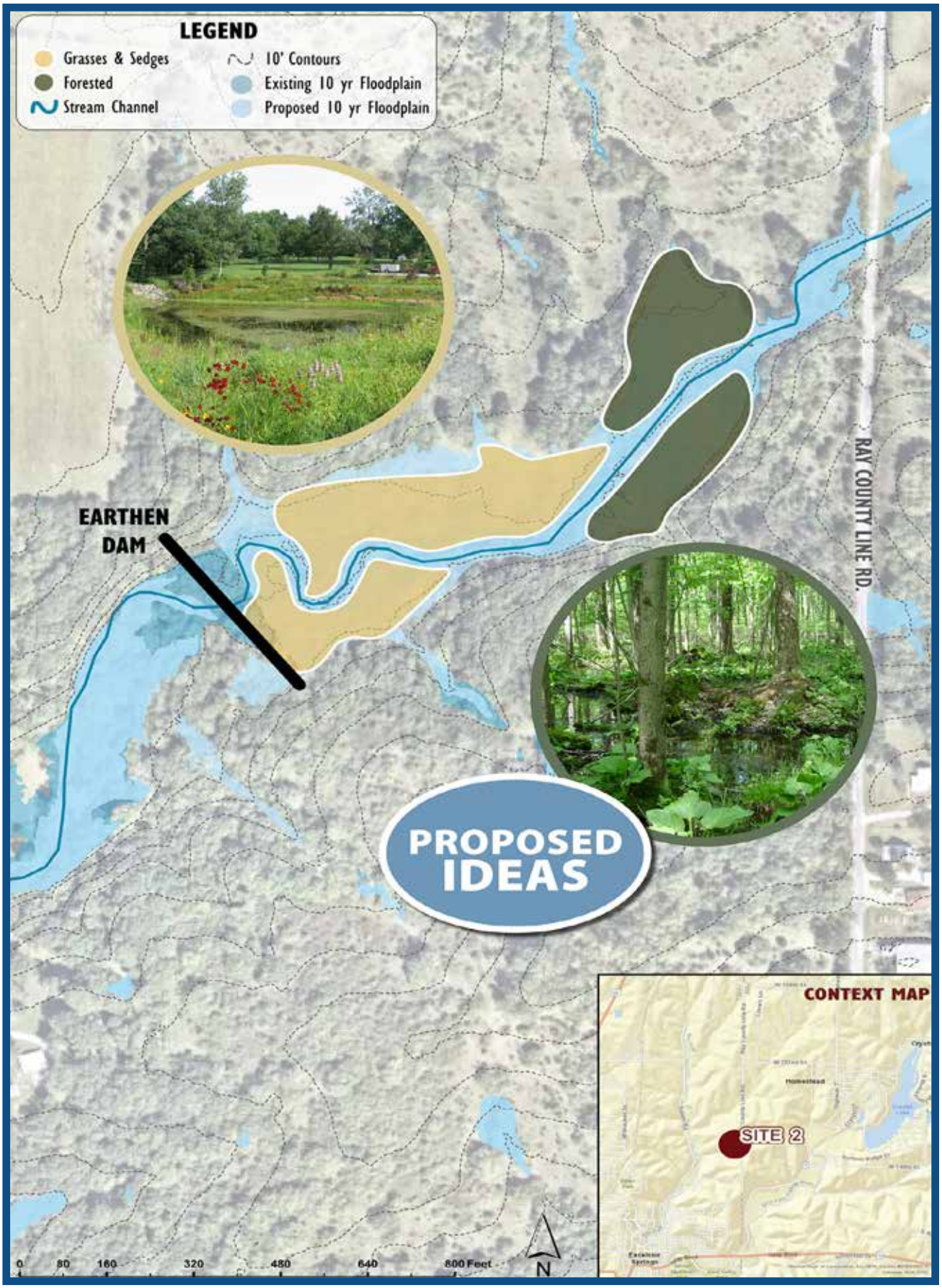


Figure 27. Proposed vegetative solutions for overbank storage areas in the Site 2 project area.

Vegetation Management & Site Amenities

Plantings within this project area will focus on overbank storage using dry detention with native grasses, sedges, and trees; streambank stabilization, and riparian corridor enhancements (Figure 27). Site amenities can be determined during design, and should take into consideration landowner desires such as north-south access across the stream and a pond.

Site Considerations

Construction of the proposed solution will require establishment of a permanent City owned drainage easement. The 2022 appraisal reports for the property were obtained from the Clay County Assessor website.

The only utility information available at the time of this study includes location of City water and sanitary sewer. There are currently no buildings on the property, so it is unlikely that utilities will be an issue during construction.

Permits that have been considered include the following:

- Missouri Dam & Reservoir Safety Permit
  - A permit will not be required, as the dam height is less than 35 ft.
- No-rise Certification and Floodplain Development Permit
  - The proposed project area is not within a FEMA regulatory floodplain.
- Missouri Land Disturbance Stormwater Permit
  - The project will disturb more than 1 acre, requiring a land disturbance permit and a stormwater pollution prevention plan (SWPPP) with site-specific best management practices to minimize soil exposure, erosion, and pollutant discharge.
- USACE Clean Water Act Section 404 Permit

Opinion of Cost

Table 11 represents an EOPCC for the project area in Site 2. This planning-level cost estimate is based on prior projects of a similar nature and scale, published data sources, unit costs, and best professional judgment, as applicable and appropriate. Costs presented here are for planning purposes only and will be refined during project design.

Table 11. Planning level cost estimate for the Tributary 1 Dry Fork Creek project site.

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	EXTENSION
1	MOBILIZATION	1	LS	$ 180,000	$ 180,000
2	CONTRACTOR FURNISHED SURVEY AND STAKING	1	LS	$ 10,000	$ 10,000
3	CLEARING AND GRUBBING	1	LS	$ 500,000	$ 500,000
4	UNCLASSIFIED EXCAVATION AND HAUL OFF	29,400	CY	$ 20	$ 588,000
5	EMBANKMENT	7,600	CY	$ 15	$ 114,000
6	9X4 CONCRETE CULVERT (RCB)	120	LF	$ 1,300	$ 156,000
7	RIPRAP	1,700	CY	$ 225	$ 382,500
8	TEMPORARY EROSION CONTROL	1	LS	$ 10,000	$ 10,000
9	PERMANENT RESTORATION	1	LS	$ 125,000	$ 125,000
Subtotal Construction Costs					**$ 2,065,500**
Administrative Costs/Contingencies					
	Engineering/Design				$ 150,000
	Contingency (% of Construction)			20%	$ 413,100
	Utility Relocation (% of Construction)			0%	$ -
	Right of Way/Easement Acquisition				$ 120,000
TOTAL ADMINISTRATIVE COSTS					**$ 533,100**
	TOTAL PROJECT COST				**$ 2,598,600**

Site 3 - 402 South Street

Existing Conditions

Site 3 project area is located in downtown Excelsior Springs and host to several historic landmarks. The historic and still utilized Hitch Lot, at the intersection of South St. and Thompson Ave, is an area where the City has noted significant flood depths. Also located within the project area is the Albany, a historic hotel constructed in the early 1900s as the first hotel for black visitors in Excelsior Springs, which has also experienced damage from flooding.

This site is located within the FEMA Zone AE floodplain with a regulatory floodway. The reach of Dry Fork with characteristics representative of the stream as it flows through downtown, with buildings and parking structures built up to the stream banks, often with foundations acting as the stream banks, and narrow bridge and culvert crossings (Figure 28).

The project site is located approximately 800 feet upstream of its confluence with East Fork Fishing River, with no significant incoming tributary channels contributing additional flow. Tables 12 and 13 provide peak or maximum flow rates for the range of rainfall events previously defined at various locations along Dry Fork and depths on the streets identified by the City with flooding issues.

On Dry Fork, values were obtained at four locations: at the project site to understand the localized impact of the proposed solutions, approximately 400-feet downstream, and downstream of the confluence with East Fork Fishing River to evaluate the downstream benefits. Figures 29 through 31 show existing conditions within and adjacent to the Dry Fork Creek channel.

Table 12. Existing conditions peak flow rates for various locations at or downstream of site.

Rainfall Event	402 South St	Dry Fork Downstream	East and Dry Fork Confluence
2-year, 6-hour	640	850	1,700
5-year, 6-hour	1,290	1,650	3,600
10-year, 6-hour	2,010	2,470	5,440
25-year, 6-hour	3,300	3,700	8,570
50-year, 6-hour	4,390	4,430	11,580
100-year, 6-hour	5,600	5,990	14,890

Table 13. Existing conditions water surface elevations for various locations at or downstream of site.

Rainfall Event	N. Thompson	South St. at Hitch Lot	S. Marietta
2-year, 6-hour	0.0	0.0	0.0
5-year, 6-hour	1.0	0.6	0.4
10-year, 6-hour	1.6	1.6	3.5
25-year, 6-hour	2.5	5.1	5.8
50-year, 6-hour	4.3	7.7	7.5
100-year, 6-hour	5.7	11.0	8.6

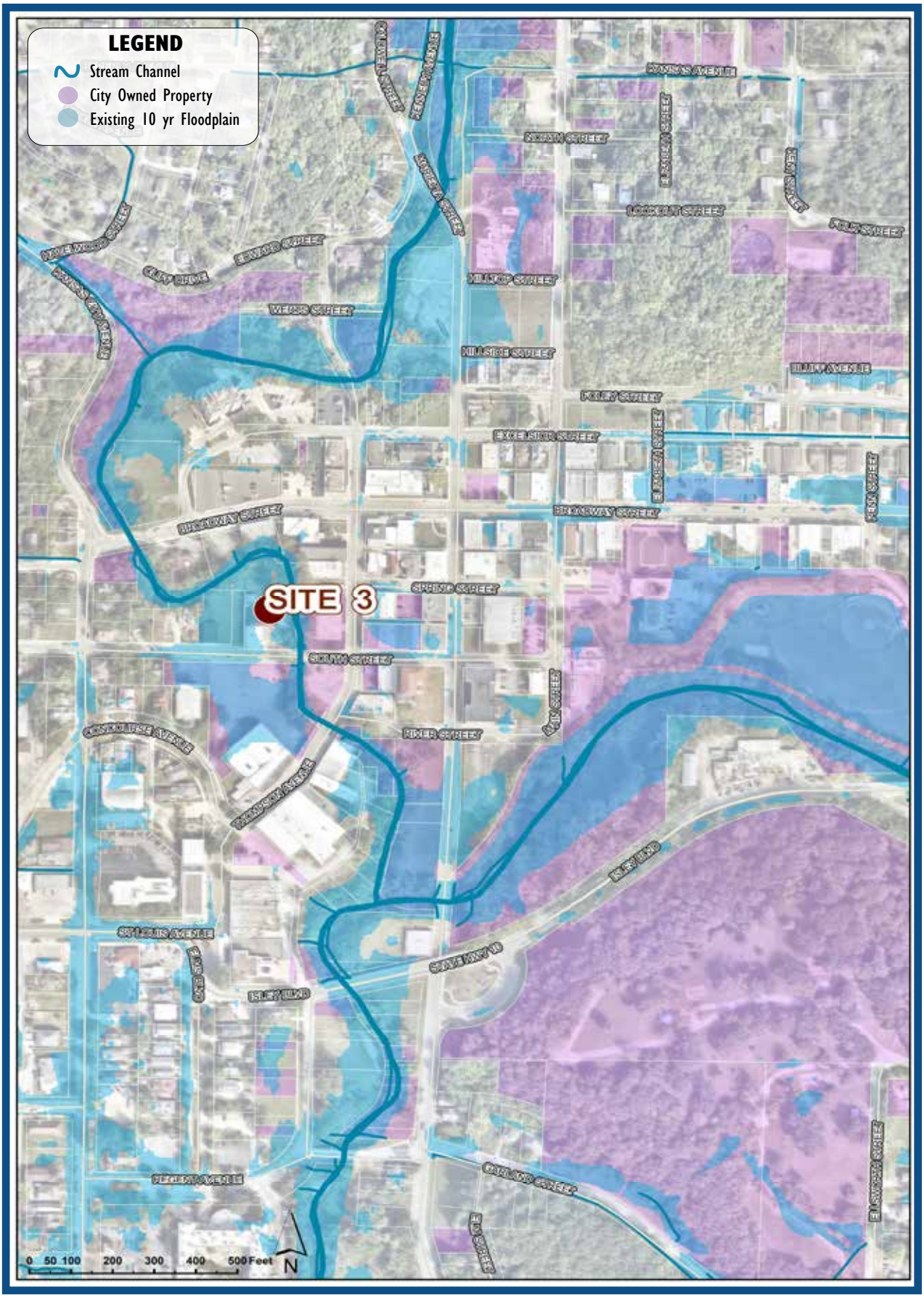


Figure 28. Existing conditions and overview of project area for Site 3.

Figure 29. Existing condition of the streambank along inside bend of the creek.

Figure 30. Existing condition of the streambank with gabion baskets along the outside bend of the creek.

Figure 31. Existing open space adjacent to the project site with the Albany Hotel in the background.

Flooding Improvements

One goal within this project area is to reconnect the floodplain to the stream. Therefore, the proposed solutions consist of buying the property at 402 South Street and adding flood storage within the creek overbanks (Figure 32). This will include removing the hard armoring along the inside bend of the channel, cutting down the bank, and protecting it with a riprap toe and native vegetation. The overbank/flood bench storage area would use retaining walls and graded slopes to minimize steep grades from South St. down to the bottom of the detention area.

Additionally, the existing northern gabion wall along this reach of stream channel (Figure 30) would be removed and replaced with a retaining wall to increase streambank stability.

Based on initial field investigations, the height of the streambank required to allow frequent out of bank flows to occur is 3-feet from the streambed to top of bank. This would require roughly 10-feet of vertical cut to be removed from the overbank. The goal is to reduce flows moving downstream through the channel and downtown bridges. Localized reduction of flooding depths on South Street and on the Hitch Lot location are also goals of the proposed solutions.

Consideration was also given to increasing the waterway opening of the South Street bridge crossing; however, it was determined that the added overbank storage provided the most benefit when the existing bridge dimensions were maintained.

Tables 14 and 15 present the results of the proposed improvements project. If implemented independently of any other projects included in this plan, the proposed project will have the greatest impact on the 10- and 25-year events. Upstream of the project site, flood depths were reduced at N. Thompson Street by 1.6-ft for the 10-year event, essentially removing the modeled 10-year flooding from the road. Depth reductions also occurred downstream, with a 1-ft reduction for the 10-year event at Marietta Street near the bridge over East Fork Fishing River. Flow rates did not change significantly between existing and proposed conditions.

Table 14. Proposed conditions peak flows with a percent reduction when compared to existing.

Rainfall Event	402 South St	% Red.	Dry Fork Downstream	% Red.	East and Dry Fork Confluence	% Red.
2-year, 6-hour	850	-33%	850	0%	1,660	2%
5-year, 6-hour	1,660	-29%	1,660	-1%	3,440	4%
10-year, 6-hour	2,490	-24%	2,490	-1%	5,420	0%
25-year, 6-hour	3,840	-16%	3,790	-2%	8,520	1%
50-year, 6-hour	4,630	-5%	4,430	0%	11,110	4%
100-year, 6-hour	5,770	-3%	5,390	10%	14,550	2%

Table 15. Proposed conditions depths with reduction (or increase) compared to existing conditions.

Rainfall Event	N. Thompson	Depth Diff.	South St. at Hitch Lot	Depth Diff.	S. Marietta	Depth Diff.
2-year, 6-hour	0.0	0.0	0.0	0.0	0.0	0.0
5-year, 6-hour	0.0	1.0	0.0	0.6	0.0	0.4
10-year, 6-hour	0.0	1.6	1.4	0.2	2.4	1.1
25-year, 6-hour	2.1	0.4	4.1	1.0	5.5	0.3
50-year, 6-hour	4.2	0.1	7.2	0.5	7.2	0.3
100-year, 6-hour	6.2	(0.5)	10.7	0.3	8.5	0.1

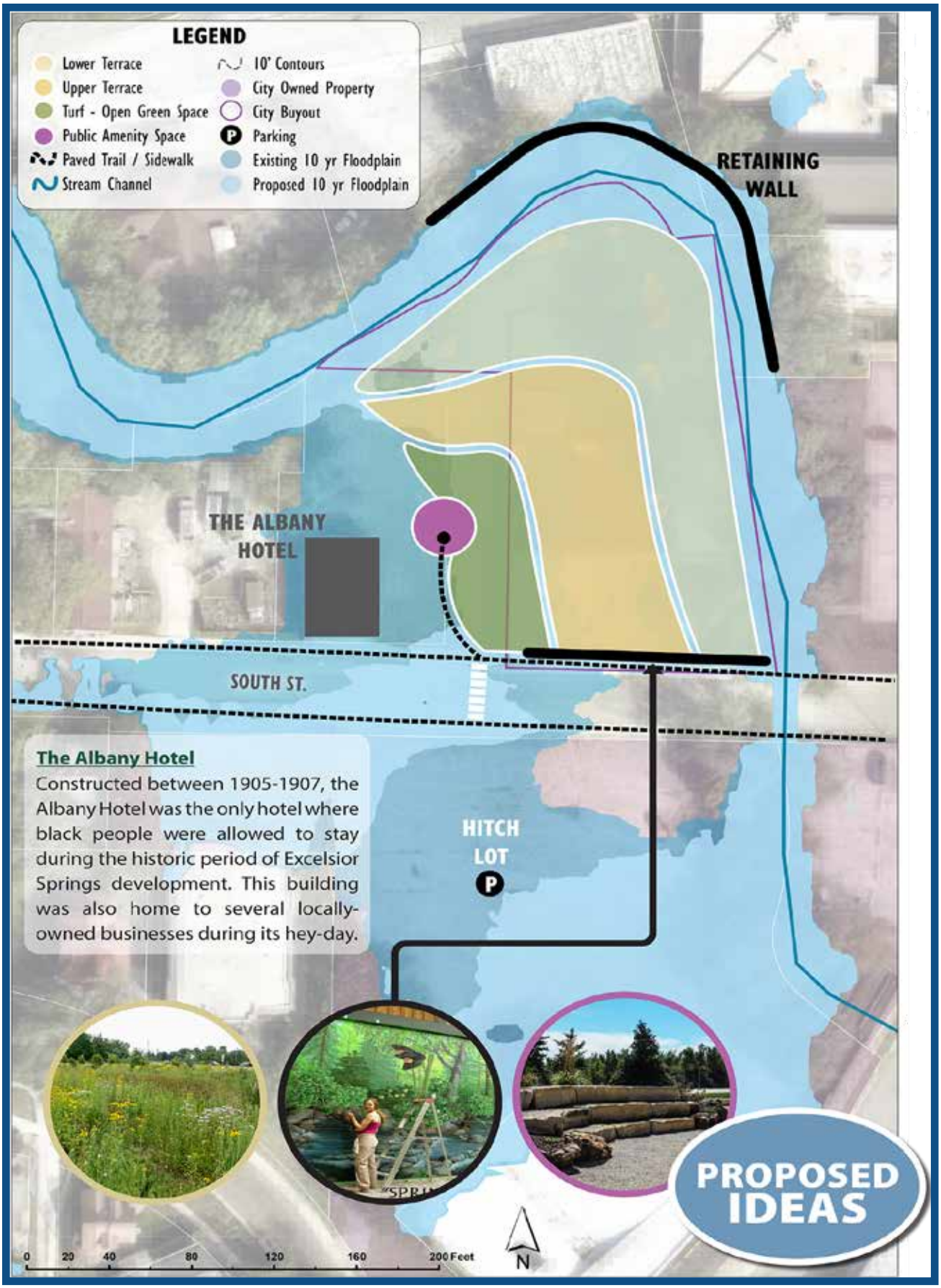


Figure 32. Proposed vegetative solutions and potential site amenities for Site 3.

Vegetation Management & Site Amenities

Plantings within this project area will focus on overbank storage, streambank stabilization, and riparian corridor enhancements. Given the central location and historic surroundings of this project area, site amenities should focus on educating people about the history of the community from a watershed perspective, as well as current stormwater management techniques like those used at this site.

Figure 32 illustrates proposed planting zones, and educational and other potential site amenities. Given the central location of this site, it presents an excellent opportunity to provide interpretation of stormwater management and the history of the surrounding area including the Hitch Lot and the Albany Hotel. The addition of seat walls and terracing would help protect the Albany to the west and allow the community to pursue restoration of this historic hotel. Funding of site amenities would likely need to be sought through sources outside of stormwater funding.

Site Considerations

Permits that will need to be considered for the proposed solutions include the following:

- No-rise Certification and Floodplain Development Permit
  - The proposed project involves excavation and does not include placing fill within the floodway, eliminating the need for a no-rise certification or a potential Letter of Map Change. A floodplain development permit will be required.
- Missouri Land Disturbance Stormwater Permit
  - The project will disturb less than 1 acre and will not require a land disturbance permit and a stormwater pollution prevention plan (SWPPP).
- USACE Clean Water Act Section 404 Permit
- Historic building considerations
- Site remediation

Opinion of Cost

Table 16 represents an EOPCC for the project area in Site 3. This planning-level cost estimate is based on prior projects of a similar nature and scale, published data sources, unit costs, and best professional judgment, as applicable and appropriate. Costs presented here are for planning purposes only and will be refined during project design. Costs for interpretive elements for the site are not included in the estimate below.

Table 16. Planning level cost estimate for the 402 South Street project site.

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	EXTENSION
1	MOBILIZATION	1	LS	$ 80,000	$ 80,000
2	CONTRACTOR FURNISHED SURVEY AND STAKING	1	LS	$ 10,000	$ 10,000
3	TEMPORARY EROSION CONTROL	1	LS	$ 5,000	$ 5,000
4	CLEARING AND GRUBBING	1	LS	$ 5,000	$ 5,000
5	UNCLASSIFIED EXCAVATION	10,100	CY	$ 25	$ 252,500
6	DEMOLITION	1	EA	$ 70,000	$ 70,000
7	GRAVITY RETAINING WALL	900	SFF	$ 110	$ 99,000
8	REMEDIATION	1	LS	$ 100,000	$ 100,000
9	RIPRAP	40	CY	$ 225	$ 9,000
10	RESTORATION	1	LS	$ 60,000	$ 60,000
11	6" PAVEMENT REPAIR (ASPHALT)	2,800	SY	$ 75	$ 210,000
12	REMOVE AND REPLACE HOMEMADE GABION WALL WITH GRAVIT	1,400	SFF	$ 130	$ 182,000
Subtotal Construction Costs					**$ 1,082,500**
Administrative Costs/Contingencies					
	Engineering/Design				$ 160,000.00
	Contingency (% of Construction)			25%	$ 270,625
	Utility Relocation (% of Construction)			5%	$ 54,125
	Right of Way/Easement Acquisition				$ 140,000
TOTAL ADMINISTRATIVE COSTS					**$ 464,750**
	TOTAL PROJECT COST				**$ 1,547,250**

Site 4 - Crystal Lakes

Existing Conditions

The city of Crystal Lakes is a community that is located 1.8 miles upstream from Highway 10 on the northeast segment of the East Fork Fishing River. Crystal Lake is a 90-ac lake that serves as a recreational and residential landmark for residents (Figure 33). The lake exists in an area that was previously a limestone quarry. According to a Phase I Dam Inspection Report performed for the USACE-St. Louis District (Black & Veatch 1978), the dam was designed by the late E.I. Myers, Consulting Engineer of Kansas City, Missouri, in 1969. Construction began in 1969 and the impoundment of water began in 1970. The lake's drainage area is 9,900 acres of which, approximately 15 percent is within the Lake Arrowhead and Timber Lake drainage areas. These two smaller lakes are located on tributaries that feed into the main Crystal Lake on the eastern side.

Figure 33. View of Crystal Lake looking north from the dam.

Figures 34 shows Shelly Smith Dam Road, which serves as the principal spillway, working in combination with an outlet conduit made up of a double 7-ft by 5-ft reinforced concrete box (RCB).

Figure 34. Principal spillway and outlet conduit.

Crystal Lake is the largest lake in the Fishing River watershed, but currently provides minimal storage above its normal pool elevation during significant rainfall events (Table 17). During most rainfall events, the lake overtops it's spillway and makes Shelly Smith Dam Road impassable for residents and visitors (Figure 35). In a 10-year modeled event, the road typically overtops by 3 ft. Additionally, since its construction, accumulation of sediment has filled in the lake, making it shallower, and limiting resident's use. This was confirmed by multiple site visits and attending workshops where the community expressed concerns about flooding in their community. An existing conditions map is illustrated in Figure 36.

Figure 35. The principal spillway for the Crystal Lake dam. Storm events readily flood the road over the spillway.

Table 17. Existing conditions at Crystal Lake with peak flow inflows and outflows.

Rainfall Event	Crystal Lakes, In	Crystal Lakes, Out
2-year, 6-hour	1,440	1,400
5-year, 6-hour	3,110	2,950
10-year, 6-hour	4,630	4,380
25-year, 6-hour	7,100	6,550
50-year, 6-hour	9,190	8,580
100-year, 6-hour	11,670	10,760

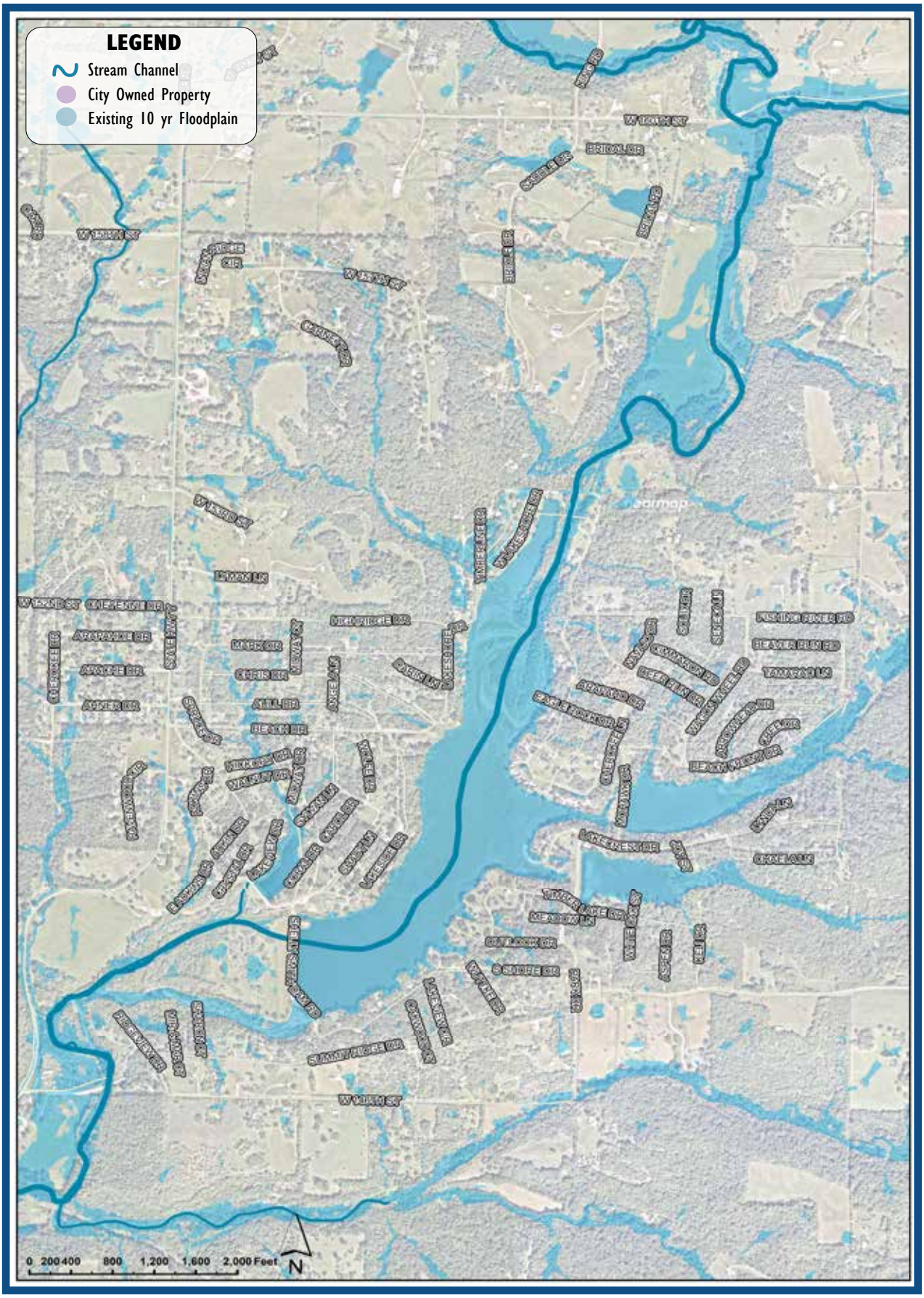


Figure 36. Existing conditions and overview of project area for Site 4.

Discussions with both the cities of Excelsior Springs and Crystal Lakes led to a potential opportunity to explore dredging the accumulated sediment out of the lake. Because as-built data from construction of Crystal Lakes is not available, a bathymetric survey was completed to gain current information on the lake below the surface of the water.

The bathymetric survey was completed using a dual frequency sonar to produce two layers of data: top of soft sediment and bottom of sediment (Figure 37). Additional LiDAR was flown of the lake to collect a top of water surface elevation and lake fringe area. The goal was to determine the true bottom of the lake in order to estimate the volume of material in the lake and costs associated with dredging. Limitations of this technology included only being able to reach through 24" of silt between the two frequencies, which was the case with Crystal Lakes. Additionally, the upstream end of the lake was too shallow for the bathymetric boat to travel on, with accumulated sediment well above the surface water in some areas, so an aerial drone was flown to obtain LiDAR surface data for that portion of the lake. The results were a starting point to obtain the current water surface elevation, and accurate terrain data for above the water's surface.

To estimate the as-built conditions of the lake, a USGS map of the Crystal Lakes area from 1957 was used to represent flow lines and bottom elevations. This data was overlayed onto cross sections pulled from the bathymetry data to estimate cross-sectional areas. Using these areas, the geometry of the lake was calculated, interpolating between the distance of each cross section in the lake. Volumes were calculated for as-built water volume, current water volume, above water sediment volume, and below water sediment volume (Figure 38). To better visualize what the estimated sedimentation level within the lake looks like, Figure 39 shows a heat map with a range of sediment depths, where red indicates built up sediment and green indicates open water.

This methodology proved that roughly 75% of the as-built lake has been filled in over the past 60 years, resulting in 2,000,000 cubic yards of sediment that could be removed from Crystal Lake, including both below and above water accumulation. This estimate assumes the entire upper portion of the lake is completely filled in and would have to be removed.

Figure 37. Boat and equipment used to complete the bathymetry survey for Crystal Lake.

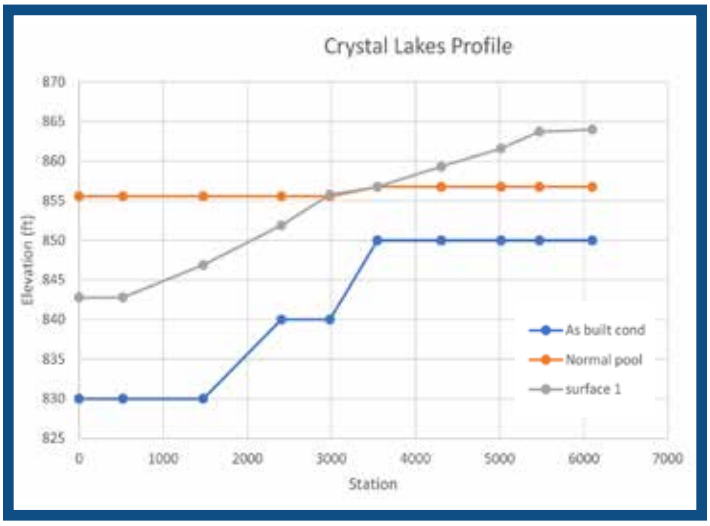


Figure 38. Profile of water surface levels for Crystal Lake for as built versus existing conditions.

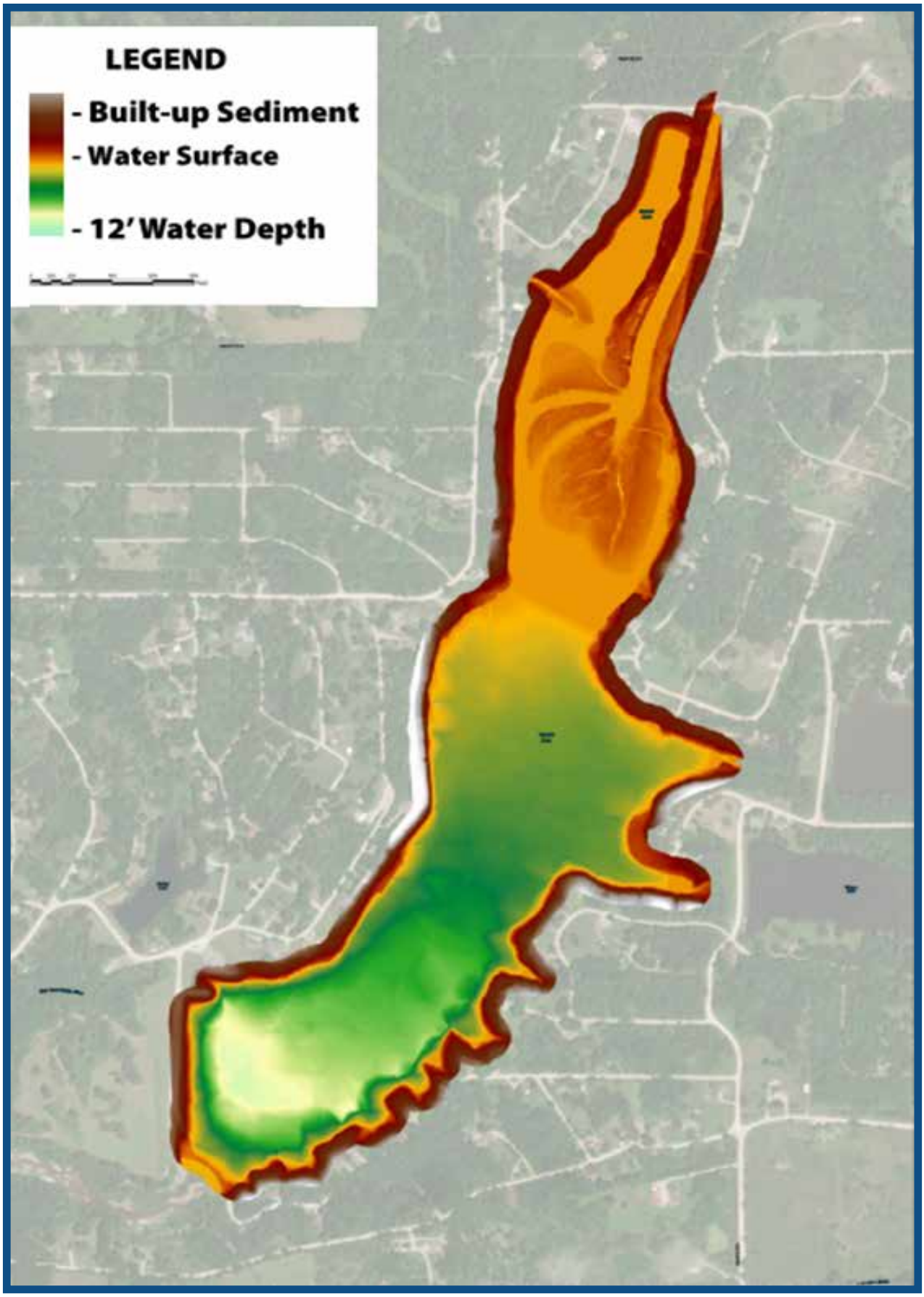


Figure 39. Heat map showing sediment levels within Crystal Lake.

Flood Improvements

The primary solution for Excelsior Springs is to lower the normal pool of the lake to increase the storage capacity of the lake above the normal pool, which would decrease and slow down flows directly downstream on East Fork. These modifications were modeled with lowering the elevation of the normal pool 1 ft, lowering the primary spillway 1 ft, and raising the road on the principal spillway by 4 ft.

The modifications result in a significant decrease in flows and depths downstream, particularly at Marietta St. However, these modifications will also have to be presented with a solution to reasonably dredge a portion of the lake to maintain existing lake levels and provide water quality benefits for Crystal Lakes residents. Some form of dredging will be required in both portions of the lake, and upstream BMPs will need to be considered to prevent and slow future sediment deposition.

Figure 40 below illustrates the amount of sediment that would need to be removed from the lake for as-built versus the above noted improvements. Figure 41 shows the location of the proposed sediment forebay and wetland vegetation that could be implemented as a means of reducing future sedimentation within the main lake and improving aesthetics and habitat in the upper area of the lake.

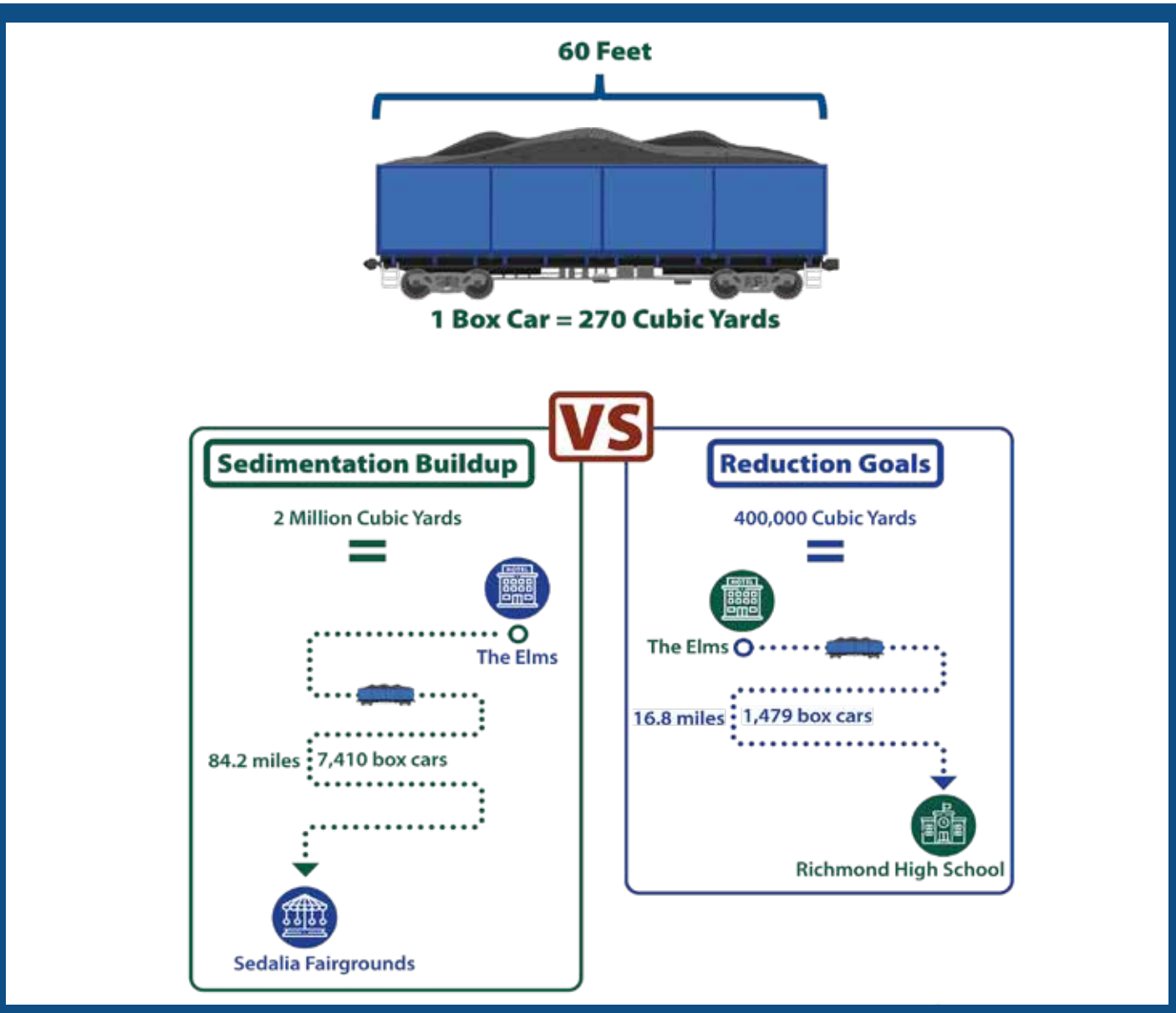


Figure 40. Graphical analogy of level of effort for sediment removal.

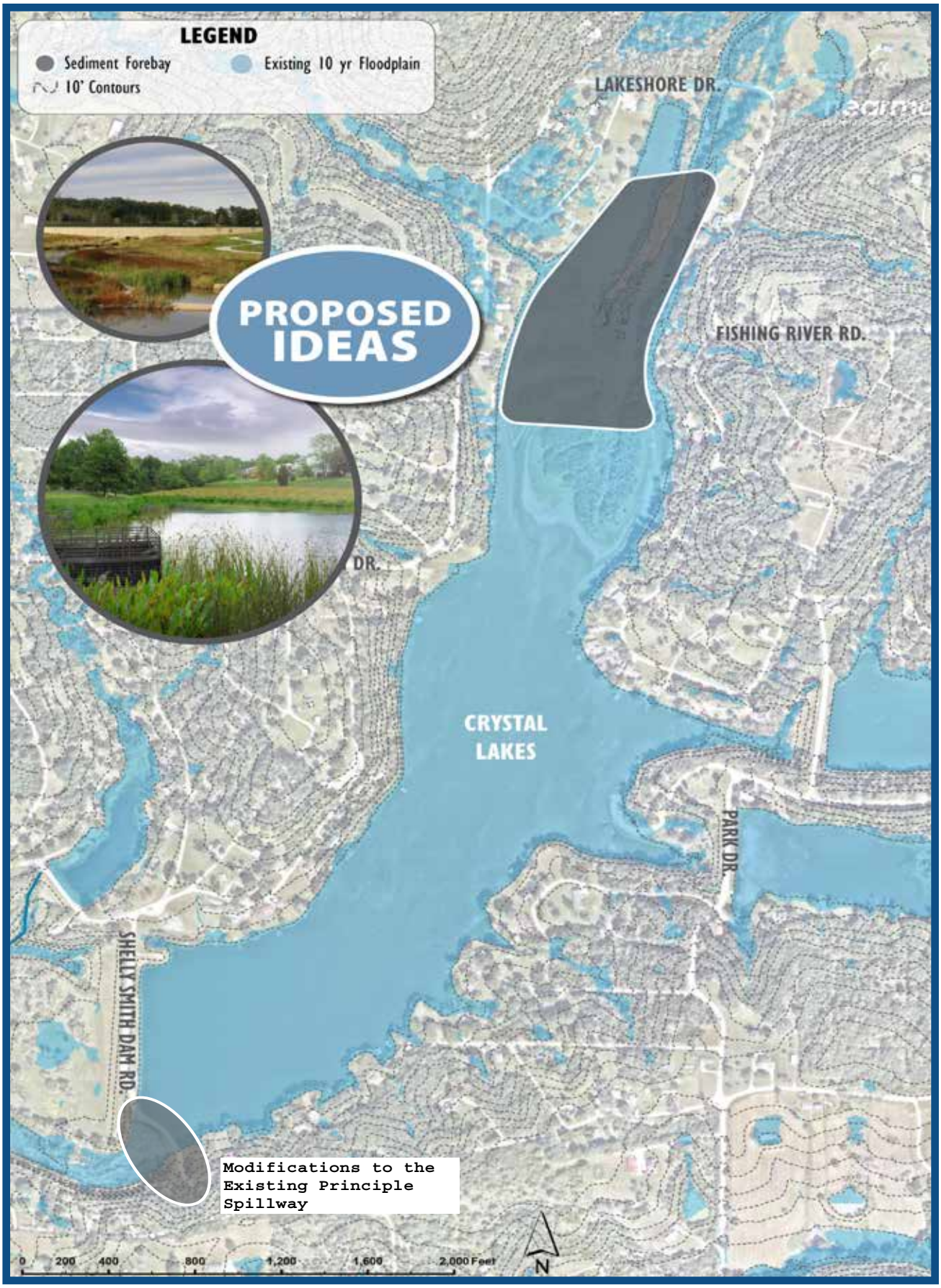


Figure 41. Proposed solutions for Crystal Lakes.

Opinion of Cost and Additional Study

An EOPCC indicated a cost to bring the lake back to as-built conditions roughly between $60-100 million. The proposed spillway modifications and sediment reduction goal is estimated at $20-30 million. Neither of these options present realistic costs for either city to incur, so further study is recommended to develop a reasonable plan of action.

An additional study is recommended to evaluate options for sediment dredging of Crystal Lakes. The study should be aimed at providing a more refined estimate of the volume of sediment in the lake and providing the City with alternative solutions based on their prioritized goals for the lake and their budget.

Recommended scope items should include:

- Field investigations to supplement the bathymetry survey, including:
  - Additional survey of the upper portion of the lake to identify the hard bottom of the lake, which the bathymetry could not complete due to depth of sediment.
  - Sediment samples to test and determine moisture content, density, organic content, sand content, Atterberg limits, grain size, and specific gravity. Understanding these properties of the sediment will aid in the evaluation of dredging options as well as refine cost estimates.
- Evaluation of alternatives for dredging the lake based on the City's goals, budget and available locations to dispose of dredged sediments. Evaluation should include cost estimates for each option. Alternatives may include mechanical and hydraulic dredging, as well as options for addressing settled organics in place, depending on the results of the material testing.
- Development of pros and cons for each alternative as related to lake management goals, recommended phased approach, and recommended maintenance plan.

In addition to the engineering study, the City should partner with agencies like the NRCS, and others noted in the Partners and Funding Section to explore opportunities that could help the community achieve implementation of solutions that will enhance and improve the lake and its watershed for current and future generations.

Site 5 - Mercer Property

Existing Conditions

After discussions with the Excelsior Springs community and property owners, a resident indicated to the City that they would be interested in using their land as a part of the solution to the flooding problem in the city. Joyce and Ramon Mercer own a 50-acre plot of land along Highway Y on East Fork that could serve as potential storage areas. Along this area on East Fork, there is an incoming tributary, Gold Mine Creek, contributing 2,200 cfs of flow into the main channel during a 10-year event. This project area is constrained by the property boundaries where not all areas are suitable for excavation, as the land becomes too steep and expensive to realistically move. Upstream of this property is a used car lot owned by a resident who is less likely to sell land to the city. Current conditions show water bypasses the 146th St. bridge and sends occasional cars and parts into the stream system, which is of concern to downstream property owners.

The proposed solutions evaluated for this area included creating offline storage areas on the Mercer Property. The goal was to capture flows from Gold Mine Creek to further reduce overall peak flow rates and volumes. Given the magnitude of total flows discharging from Crystal Lakes, this site is not large enough to further attenuate those flows, which is why the focus was on the tributary. However, while the modeling analysis showed that peak flows were reduced from the tributary, the overall flows reaching Excelsior Springs were not reduced. This proposed condition would have little impact on flooding in the City and therefore, it is not recommended as a priority solution and has been removed from further consideration within this study.

Alternatives Analysis and Prioritization

The planning-level cost estimates developed for the conceptual alternatives were based upon prior projects of a similar nature and scale, published data sources, unit costs, and best professional judgment, as applicable and appropriate.

Due to the absence of cost data for repetitive losses resulting from flooding, a preliminary cost/benefit analysis to rank and prioritize preliminary solutions and alternatives based on their costs and potential benefits could not be completed. In the future, if the City is able to access FEMA's HAZUS Program (a nationally standardized risk modelling methodology), a more detailed cost/benefit analysis of the proposed solutions could be completed.

The analysis should use a watershed approach that evaluates overall watershed benefits and costs, as well as site-specific conditions.

Given the available data, the consultant team modeled the results of proposed solutions in isolation and in combination. Figure 42 shows the flood reduction benefits resulting from the combination of project sites 1 through 3 and the additional benefits of adding site 4. Figure 43 shows the locations where flood reductions were evaluated that correspond with the data shown in Figure 42. As noted, reductions are based upon the 10-year storm event. For events larger than the 10-year storm, flood reductions would be less.

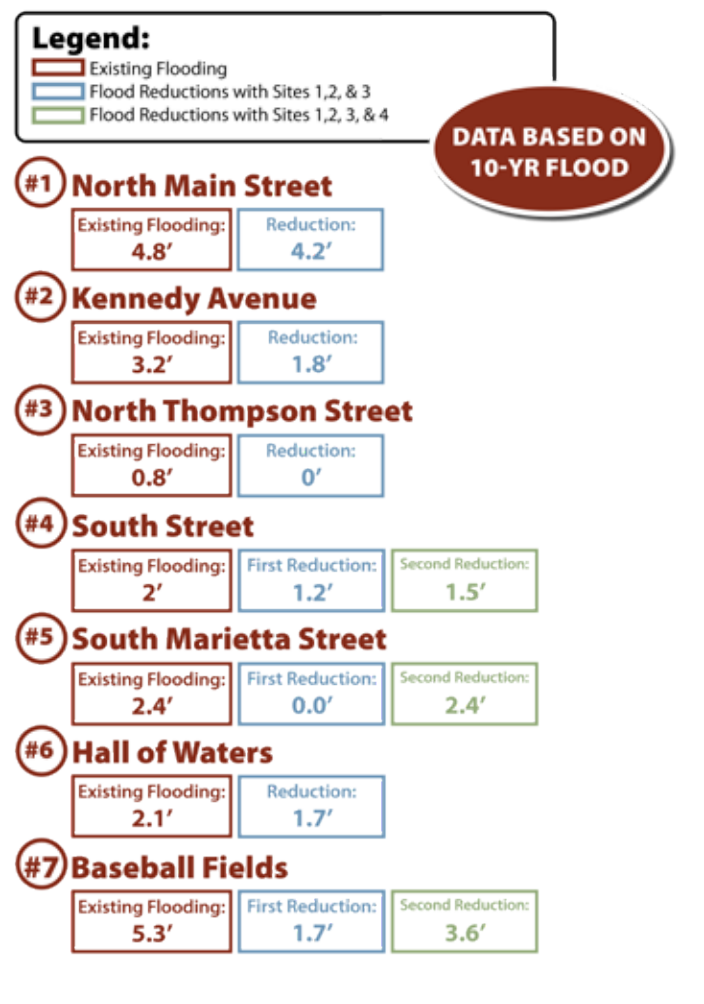


Figure 42. Flood reduction values for key locations with implementation of the proposed projects.

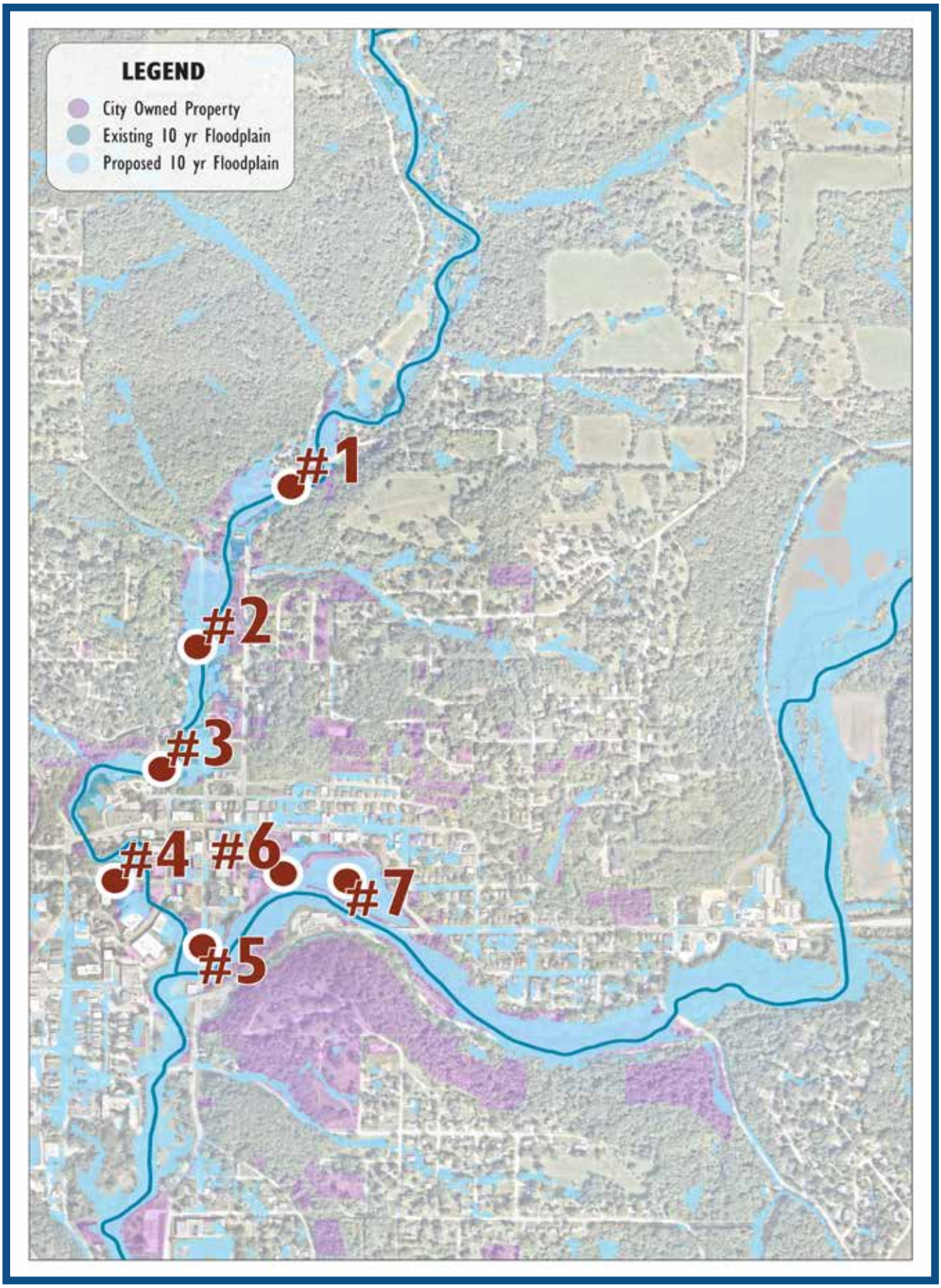


Figure 43. Key locations where flood reductions would occur with implementation of the proposed projects.

COMMUNITY ENGAGEMENT

This watershed planning effort involved development and implementation of a thoughtful planning process that not only delivered the watershed study, but also meaningfully engaged a wide range of people with an interest in the project. The project team connected with stakeholder groups in ways that folded their concerns and potential strategies for addressing them into the planning process and the resulting study document.

The community engagement plan identified goals, objectives, stakeholder groups, strategies, tools, schedule, and metrics for effective public outreach and stakeholder involvement.

Outreach Goals & Objectives

Community engagement activities focused on achieving the following goals:

- Adhering to the City's outreach and communication protocols.
- Offering opportunities for a broad range of community stakeholders to have meaningful engagement during the project.
- Gathering timely and useful stakeholder feedback throughout the planning process by providing a customized range of engagement and commenting opportunities for the project.
- Developing and maintaining a common understanding of the project among stakeholder groups while balancing information about existing conditions along with the vision for the future.

Figure 44. Messaging for engaging with the public.

Figure 45. Engaging people attending Water Fest 2022.

Table 18. Engagment activities to gain public input

Invitees	Timing	Activity	Participants
General public	Fri., June 24, 2022 3 to 9 p.m. Sat., June 25, 2022 9 a.m. to 9 p.m.	Waterfest Pop-Up event Historic Downtown Excelsior Springs 201. E Broadway Excelsior Springs, MO 64024	232
Downtown Business Owners	Weds., July 13, 2022 5:30 – 7 p.m.	Merchant Mingle Ventana Gourmet Grill 117 W Broadway St, Excelsior Springs, MO 64024	54
General public and stakeholders	Jun. 14 – Jul. 15, 2022	www.tinyurl.com/FishingRiverComments (Online opinion survey)	24

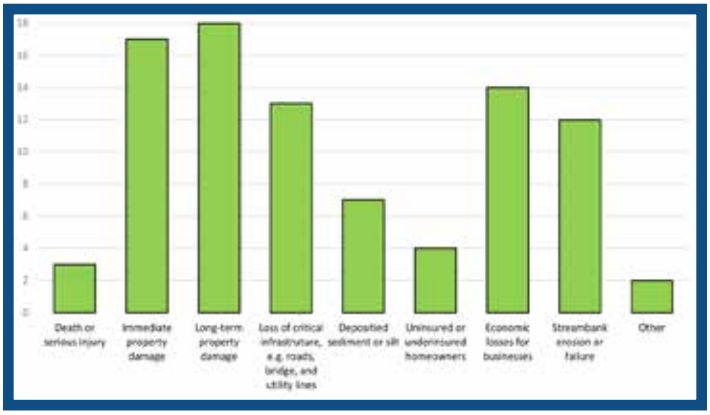


Figure 46. Community opinion survey results for the question asking what are the most concerning flooding impacts.

Community Outreach

Table 18 shows the types and attendance at events held during the summer, where staff and consultants were able to engage the public and business owners, and gain input throughout the initial phases of this study. Figures 44 and 45 illustrate some of the information shared during the various early engagement activities.

A public opinion survey was posted on the project website following Water Fest. The online survey asked participants questions related to downtown flooding locations and impacts. Results of the on-line survey question regarding most concerning downtown flooding impacts are shown in Figure 46.

Figure 47. People sharing ideas during the community workshop discussion session.

Figure 48. Large format worksheet for workshop.

Public Workshops

Community Workshop

Vireo conducted the first community workshop for the watershed study on September 7, 2022. The meeting was held at the Excelsior Springs Community Center from 6 p.m. to 8 p.m., and had 24 attendees.

The objectives for the workshop were to present data collection, modeling, and public engagement results to date, related to flooding in Downtown Excelsior Springs, and to facilitate open discussions about potential solutions. During the workshop, the consultant team provided a presentation showing how data collection and public engagement was informing development of potential solutions.

Following the presentation, participants broke into four different groups to discuss potential solutions and provide input on what they liked or didn't like, as well as any additional solutions not presented. Figure 47 shows participants actively engaging in discussions and Figure 48 illustrates the large format worksheet used to gain written input from participants.

Comments received during the group discussions generally related to:

- Desire to capture water wherever possible.
- Desire to manage water flow and detention with visually appealing plantings such as riparian buffers and rain gardens.
- Solutions should be visually appealing and cost effective, and provide additional benefits to the community including recreation, etc.

Community Open House

Vireo conducted a community open house for the Fishing River Watershed Study on March 7th, 2023. The meeting was held at the Excelsior Springs Museum from 6 p.m. to 8 p.m., and there were 45 attendees. The open house was intended to present recommended improvements and opportunities, related to flooding in Downtown Excelsior Springs. At the open house, a short presentation was given by Vireo and GBA staff discussing how the data collection, public engagement, and modeling informed development of the recommended improvements. Following the presentation, participants were able to review presentation boards with information on each of the potential project sites, ask questions, and provide comments and feedback on what they liked or didn't like, as well as any additional ideas for public spaces. Figure 49 shows participants listening to the presentation and then interacting with the Team to ask questions and provide input on the proposed solutions.

The purpose of the open house was to:

- Bring together community members involved with the Fishing River Watershed Study and provide them with details on recommended improvements and opportunities, which could be implemented in Excelsior Springs and the two subwatersheds.
- Gather community feedback regarding the recommended improvements and integrate the information into the final watershed report.

The consultant team provided a presentation at the start of the open house, which was live streamed on the Excelsior Springs Citizen's YouTube channel:

https://excelsiorcitizen.com/citizens-dive-into-data-at-citys-watershed-open-house/

In addition to the presentation, there were large format presentation boards set up to engage participants in discussions regarding recommended improvements (Figure 49). A pdf of the presentation and boards was posted to the project website:

https://cityofesmo.com/index.php/fishingriverdowntown/

During the discussion portion of the open house, people were asked to provide input on each proposed solution (Figure 50). The questions were put on each presentation board to prompt participants to share what types of amenities within the greenway; what excites, concerns or worries them; and any other comments regarding the project. Below are the written comments collected from participants.

What types of amenities would you like to see in the Greenway?

- Amphitheater
- Farmers Market

What excites you about the recommended preliminary solutions?

- Engaging a dormant area
- Native plants and improved water quality
- Rain gardens

What worries you most about the potential solutions?

- Native plants?
- Make sure to keep the Albany Hotel

What other comments, questions, or concerns would you like to share?

- Consider creating a recreational use pool through town with depth to support kayak and paddle boat usage.

Figure 49. Participants at the open house listening and actively engaging with presenters.

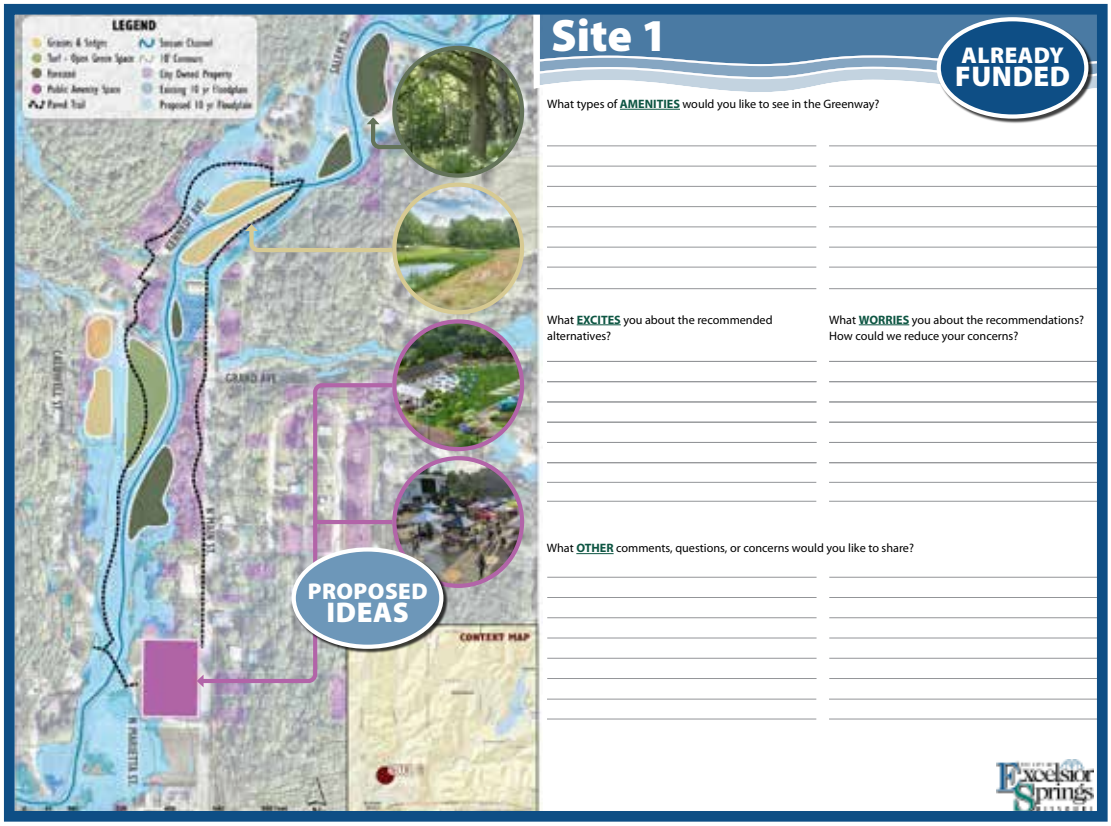


Figure 50. Example of the large format presentation board for discussion at the open house.

POTENTIAL PARTNERS & FUNDING

The project team worked with the City to identify potential partners and funding opportunities, including existing and potential future governmental, agency, not-for-profit and community organizations, foundations, state and federal grant programs, and public-private partnership opportunities. Potential funding opportunities were linked by agency and/or organization. The primary types and sources are listed below. A full synopsis of potential funding is included in Appendix B.

- Flooding and Water Quality
  - US Dept of Agriculture (USDA) Natural Resource Conservation Service (NRCS)
  - Federal Emergency Management Agency (FEMA)
  - American Rescue Plan Act (ARPA)
  - Environmental Protection Agency (EPA)
- Land Acquisition, Restoration, and Habitat
  - EPA Urban Waters Program
  - US Fish and Wildlife Service (USFWS)
  - USDA NRCS and Forest Service
  - National Park Service (NPS)
  - Missouri Department of Conservation (MDC)

REFERENCES

Federal Emergency Management Agency (FEMA). 2015. Flood Insurance Study, Clay County, Missouri and incorporated areas, volumes 1 and 2.

Harman, W., R. Starr. 2011. Natural Channel Design Review Checklist. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD and U.S. Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Wetlands Division. Washington, D.C. EPA 843-B-12-005

Natural Resource Conservation Service (NRCS). 1986. East Fork Fishing River Flood Plain Management Study, Clay and Ray Counties, Missouri.

U.S. Army Corps of Engineers (USACE). 1978. Phase I Inspection Report, National Dam Safety Program. Prepared by Black and Veatch for the St Louis District.

USACE. 1999. Continuing Authorities Program 205 Study, Excelsior Springs, Missouri. Prepared by HDR for the Kansas City District.

APPENDICES

APPENDIX A

FISHING RIVER WATERSHED STUDY ASSESSMENT REPORT

FISHING RIVER WATERSHED STUDY ENGINEERING ASSESSMENT REPORT

GREENWAY TRAIL AND MAIN STREET IMPROVEMENTS

Prepared For:

City of Excelsior Springs, MO
201 E. Broadway
Excelsior Springs, MO

Vireo Proj. No. P-22001
GBA Proj. No. 15185.00

Submitted:
October 4, 2022

vireo GBA

Table of Contents

1. Purpose and Background

This project constitutes the first implementation phase of a larger watershed level plan being developed to reduce frequent and sometimes severe flooding and streambank erosion within the downtown area of the City of Excelsior Springs. The watershed encompasses two tributaries of Fishing River, Dry Fork and East Fork Fishing River. Dry Fork confluences with East Fork in the City of Excelsior Springs. This initial project begins to address the more frequent flood events while also providing water quality and stream stabilization benefits. The incorporation of future projects will provide even greater, cumulative flood reduction, water quality and streambank stabilization benefits as future phases of the plan are implemented.

The project area (Figure 1) is one of several areas with frequent and severe observed flooding. Located in the Dry Fork watershed, north of the Excelsior Springs downtown, the goal of the project is to reduce the flooding frequency of Main Street, which is currently described as a low water crossing. Additional areas of overbank grading and floodplain storage are also included in the project to mitigate any potential flow increases resulting from roadway improvements, as well as to provide additional attenuation of frequent floods, improve water quality of the stream, and provide recreational benefit to the community through creation of a greenway trail.

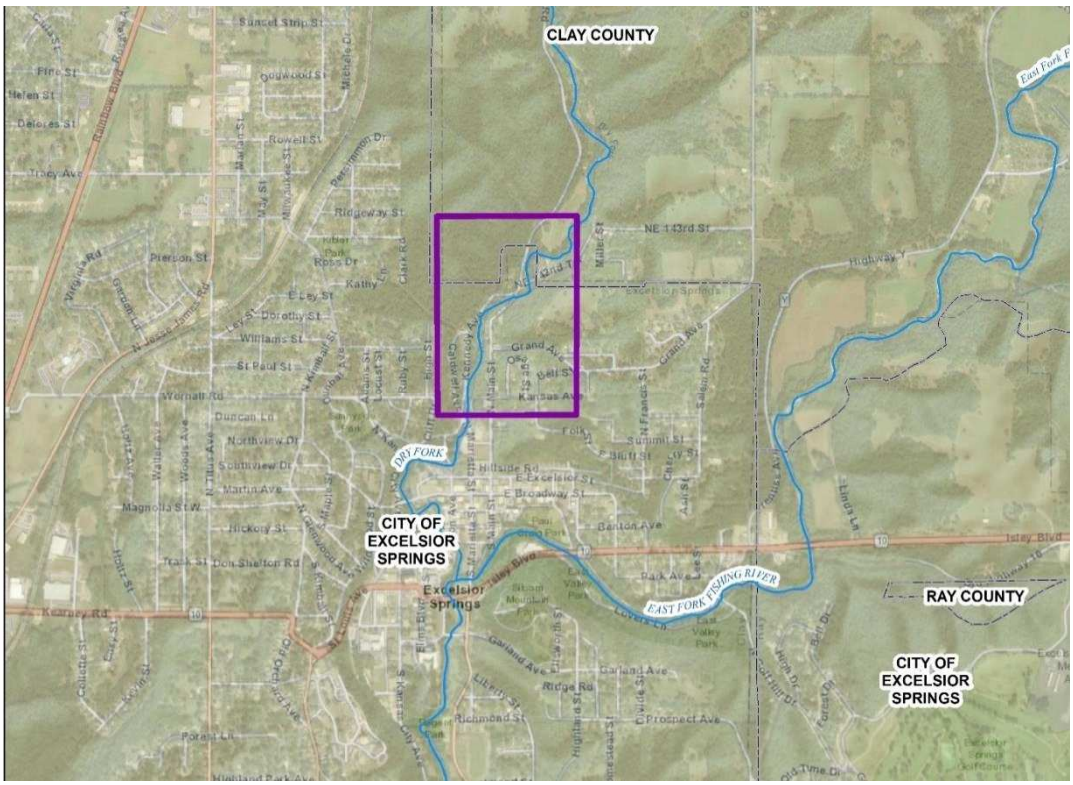


Figure 1. Project area location map

To develop the proposed solutions for this project area, a Discovery Phase was completed to collect past studies and reports of known flooding in the watershed, as well as conduct on-site investigations in the field. An Evaluation Phase was completed to develop a watershed based 2-dimensional (2D) model to quantify the impacts of flooding in the current watershed and to analyze flood reduction benefits of the proposed solutions. Provided in this report is the summary of the methods to complete each of those Phases of the study and the resulting findings. Included in the summary of findings is the quantified results from the modeling, a vegetation plan for stabilizing the creek banks and providing water quality enhancements, an engineer's opinion of probable construction costs, and a summary of potential permits that will need to be considered during design and construction phases.

2. Methodology

2.1 Prior Studies and Known Flooding

Previous flooding studies were obtained from the City, which document the existing flooding issues in the project area as well as previously proposed solutions. Relevant studies include:

- Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS), Clay County, Missouri and Incorporated Areas - Effective August 3, 2015
    - Includes the Flood Insurance Rate Maps which illustrate the limits and elevations of the floodplain within the project area
- U.S. Army Corp of Engineers (USACE) Continuing Authorities Program 205 Study, Excelsior Springs, Missouri, Recommendation Report - completed in December 1999
    - Report includes flooding issues within the Fishing River Watershed, proposed structural solutions, and list of recommended home buyouts

City representatives provided information on areas where instances of flooding have been reported or documented. A shapefile was provided by the City GIS Department on 3/15/2022 during the data collection phase of the project titled FloodingProperty.shp. This shapefile will be included on Figure 10 presented in Section 3. Summary of Findings.

2.2 Field Investigations

The project team completed field investigations on two occasions: June 2, 2022 with City representatives and June 28, 2022 to collect data for the model development. During the first visit, the project area was visited to discuss the extents of flooding that impacts streets. During the second visit, the modeling team walked Dry Fork and East Fork within the City limits to collect relevant data about bridge and culvert crossings. Data collected included width and length of

structure opening, depth of normal flow at the structure, and thickness of top slab or distance from top of opening to profile grade of road. Notes were taken on the degree of structure skew and angle of wingwalls, as applicable, as well as on any features that might obstruct the flow or influence roughness.

2.3 Model Development

2.3.1 Existing Conditions Model

To simulate existing rainfall-runoff conditions of the watershed, a HEC-RAS v. 6.2 2D model was developed. Figure 2 displays the watershed boundary used in the model development. The drainage area where Dry Fork and East Fork confluence is approximately 24 square miles. The delineated boundary extends several miles downstream of the confluence to ensure the downstream boundary condition used in the model did not impact the results within the City. The model uses a rain-on-grid approach to incorporate both hydrology and hydraulic calculations into a single model. A summary of the sources of data used to build the 2D grid are included in Table 1.

Table 1. Summary of data used to develop existing conditions 2D model

Model Component	Source	Model Uses
Topography	Clay County: Mid-America Regional Council (MARC) LiDAR, 2018 Ray County: Missouri Spatial Data Information Service (MSDIS) LiDAR, 2014	Terrain model development
Landuse	MARC Natural Resources Inventory (NRI), 2020	Curve number and Manning's Roughness development
Soils	Natural Resources Conservation Service (NRCS) SSURGO database, 2014	Curve Number development
Building Footprints	MARC Clay County Structure Footprints, 2014	Manning's Rougness development

Frequency based rainfall data was obtained from the National Oceanic Atmospheric Administration (NOAA) Atlas 14 for Excelsior Springs. The rainfall scenarios used in the analysis include the 6-hour duration 2-, 5-, 10- and 100-year frequency events (Table 2.)

Table 2. Total 6-hr rainfall depths for range of modeled recurrence interval storms (Source: NOAA Atlas 14, Volume 8, Ver. 2, Excelsior Springs, MO).

Average Recurrence Interval years	Depth at 6-hr Duration inches
2	2.68
5	3.48
10	4.15
100	5.88

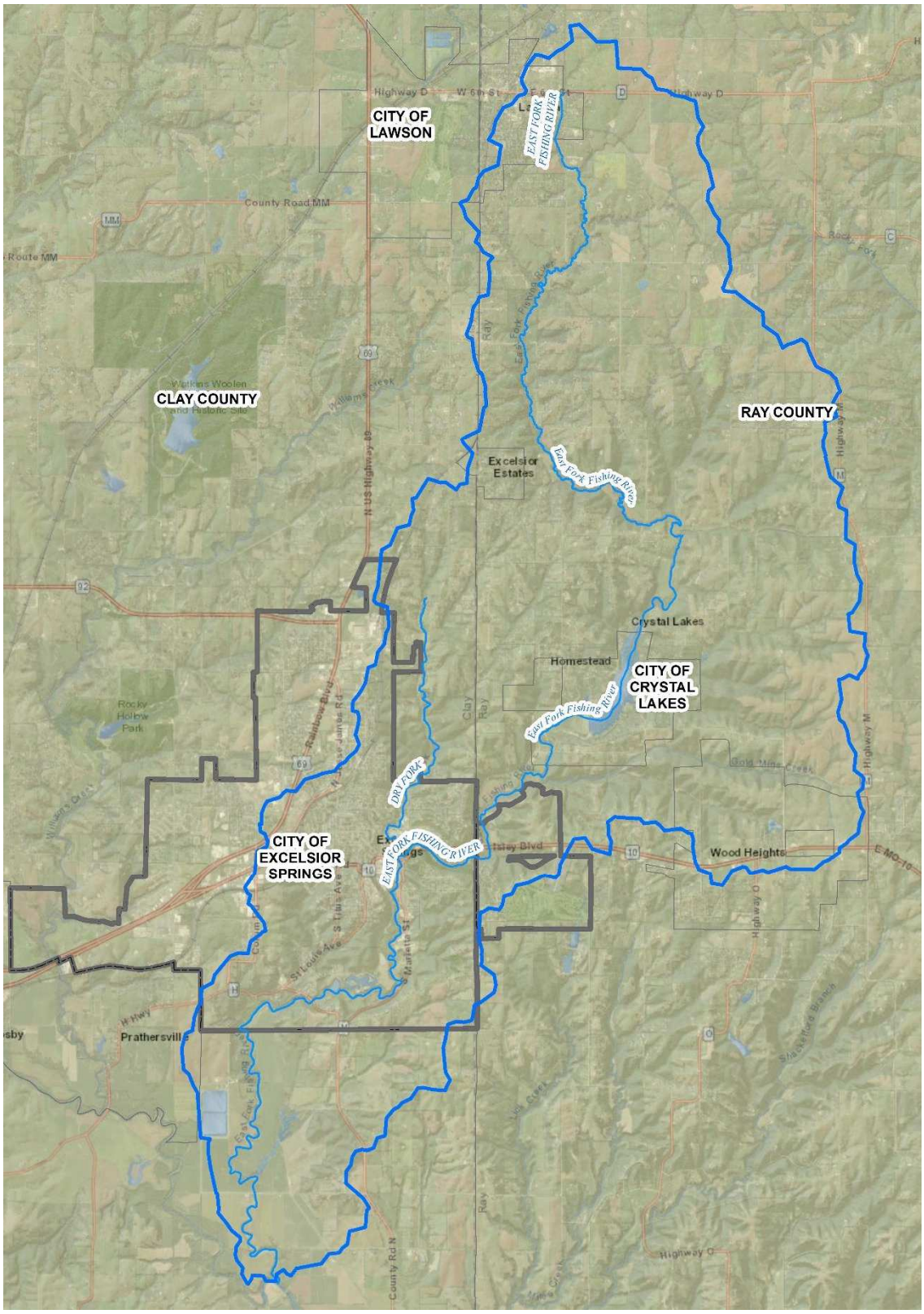


Figure 2. Fishing River watershed boundary used to develop the 2D model inputs.

An event from June 24-25, 2021 was also included in the analysis because City representatives expressed that the flooding resulting from this event was the degree of flooding they were most interested in addressing. Four rain gages in the area that report to Weather Underground were accessed to collect the rainfall for this event and the Thiessen polygon method was used in the simulation. Figure 3 displays the location of the four rain gages used in the analysis as well as the varying accumulated rainfall across the watershed.

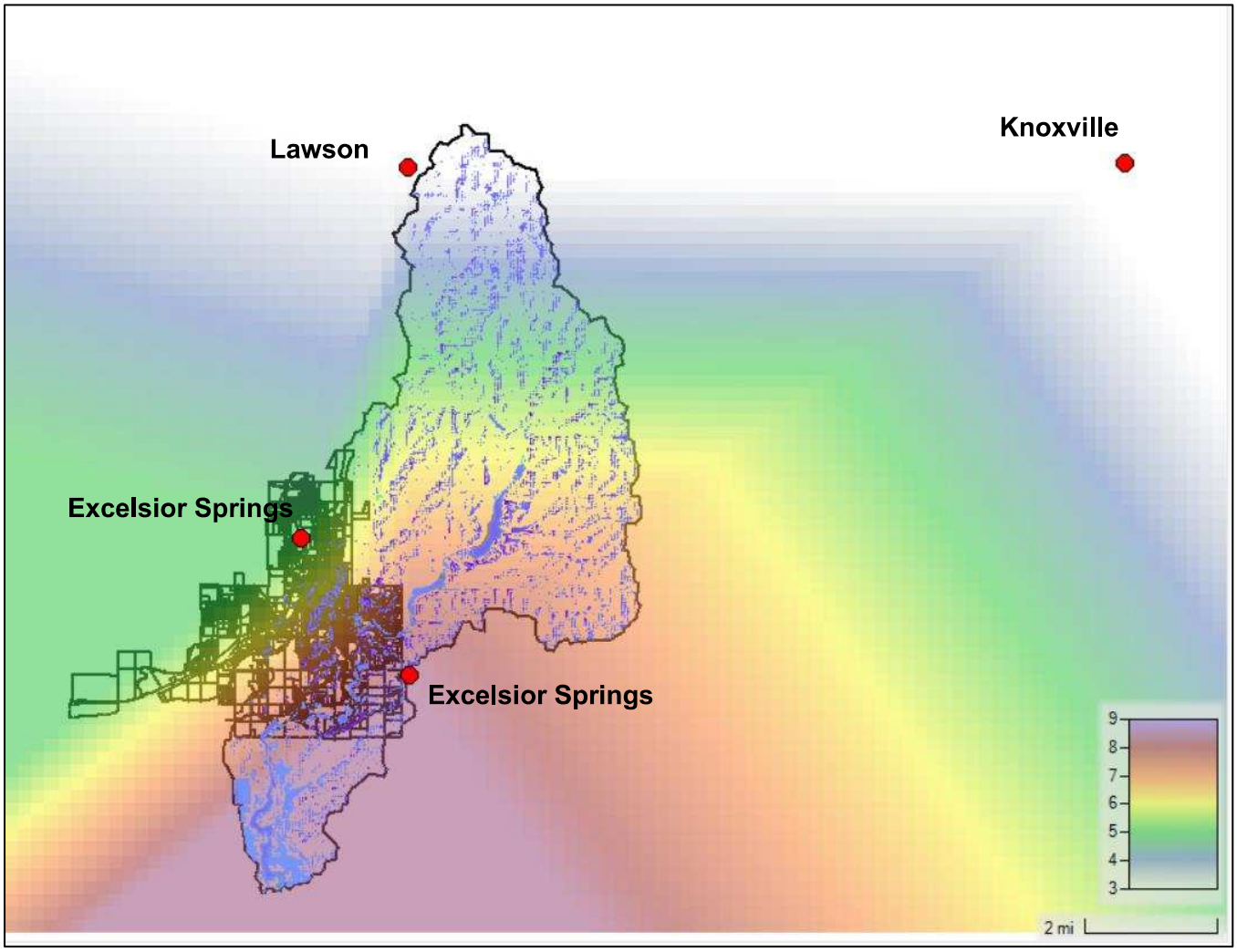


Figure 3. Rainfall accumulation across the Fishing River Watershed and gage locations used for June 24-25, 2021 storm event.

Existing bridges, culverts, and lake outlet structures were modeled as 2D Connections in HEC-RAS. This tool allows the user to input structure geometry and roadway profile information into the model as displayed by the example in Figure 4. This function allows the model to pass water through existing roadways and to calculate the appropriate hydraulics equations associated with culverts, bridges, and weirs.

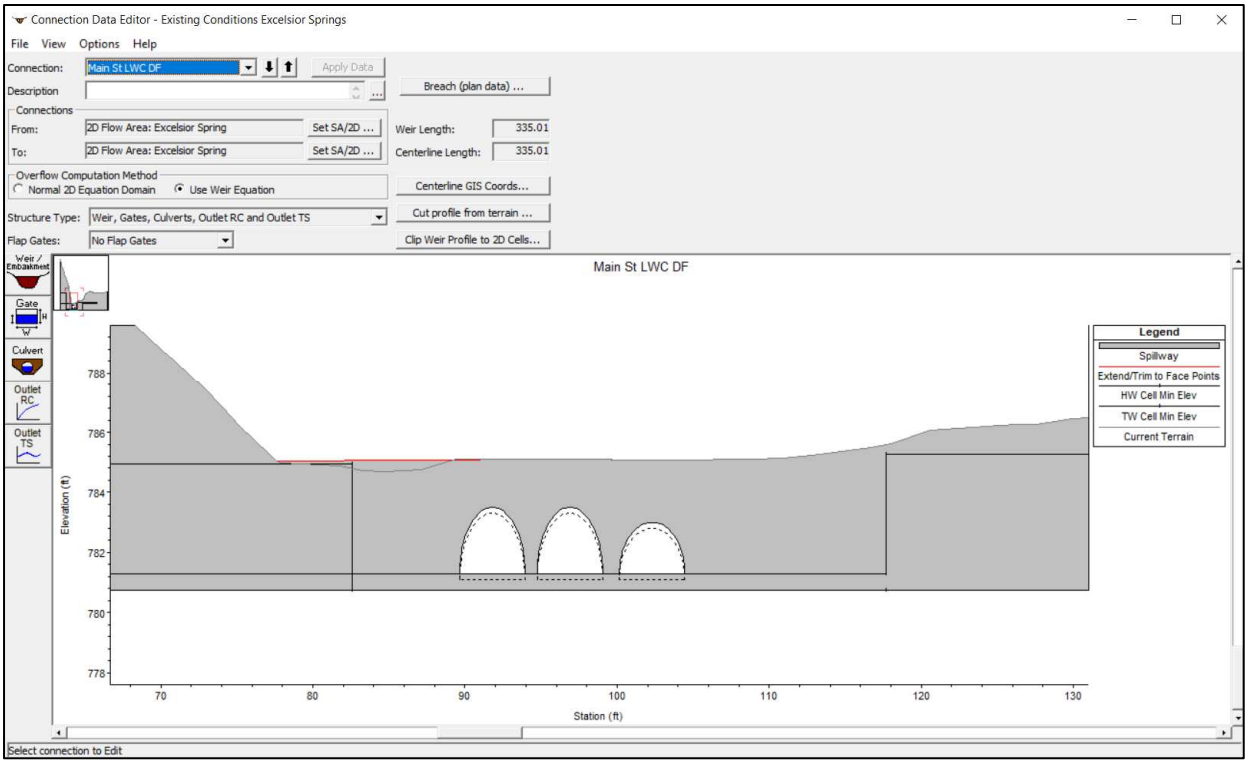


Figure 4. Existing conditions Main Street culvert shown as a HEC-RAS 2D Connection.

2.3.2 Proposed Conditions Model

The existing conditions model was used as the starting point for analyzing all proposed solutions. The primary types of solutions evaluated in the model include grading, or modifying the existing terrain, and modifying the existing culvert structure and road profile. Grading modifications were incorporated into the model by adding Modification Layers to the Terrain model. This tool allows the user to draw a polygon shape and assign the shape a new elevation, which overrides the existing elevation. An example is provided in Figure 5. The terrain modifications are shown in faded red and the cross section cut just upstream of Main Street shows the variation in terrain, existing compared to proposed.

Additional terrain modifications were made as necessary to represent changes to the roadway profile, which was required to fit the larger culvert under under Main Street. The

same method used to show cut in the creek overbanks was used to modify the terrain to represent the needed fill to show roadway changes.

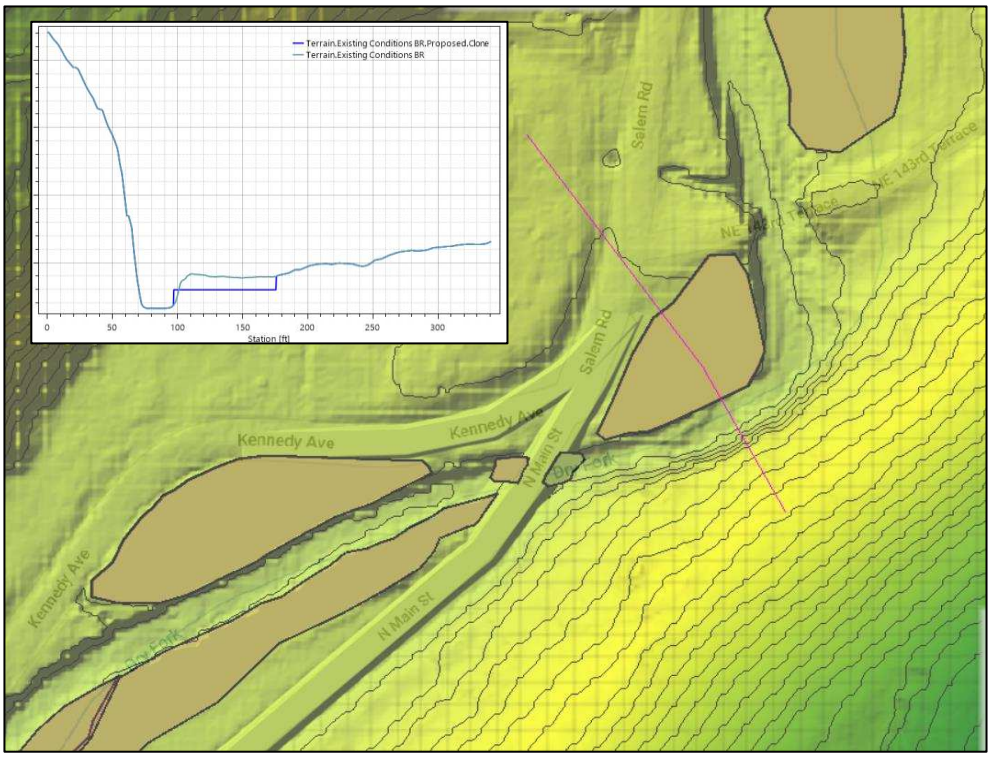


Figure 5. Example of a proposed conditions terrain modification. Cross section displays proposed (blue) compared to existing (light blue).

3. Summary of Findings

3.1 Existing Conditions

The FEMA Flood Insurance Rate Map (FIRM) Panel 29047C0176E (Figure 6) shows the base flood elevation (BFE) ranging from 784-ft to 794-ft throughout the project area. The information collected from the community indicated that roadways within the project area experience flooding during storms that occur much more frequently than the 100-year event that the FEMA maps are based on. Many of the homes within the project area were purchased and demolished as part of a flood buy-out program, however four homes located within the floodplain remain and continue to experience flooding during out of bank events. The properties that were demolished in the years ranging from 1994-1996 are listed in the 1999 USACE 205 study and the City owned parcels are displayed on Figure 10, provided in the upcoming Section 3.2.

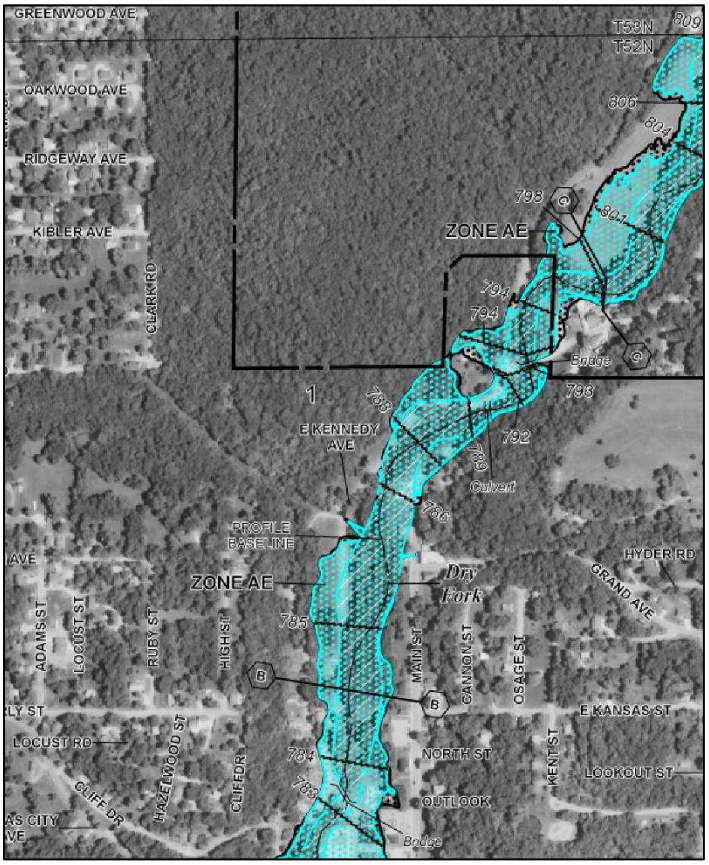


Figure 6. Project location effective floodplain, FIRM Panel 29047C0176E

Information collected during field investigations showed that the culvert currently consists of three squash corrugated metal pipes (CMP) that are roughly 52-inches by 26-inches in dimension (Figure 7). Reports from City representatives indicate that the culvert barrels were not designed based on any design event and the road frequently overtops. In the right overbank on the upstream side is a dirt parking area owned by the City which is also under water during frequent flood events (Figure 8). A scour pool has formed on the downstream side of the channel, which has undermined the apron at the outlet of the CMPs (Figure 8). The existing structure appears to be protecting the upstream reach of the channel from a headcut, allowing the upstream channel to maintain its existing slope and bed elevation.

Figure 7. Dry Fork channel just upstream of Main Street (left) and close up of a single barrel on the upstream side of the road (right)

Figure 8. Parking area on right overbank (left) and scour hole that has formed just downstream of the culvert (right).

The model results correlate well with the previous studies and reported history of flooding. Results for the existing conditions at Main Street are provided in Table 3. The June 2021 rainfall event that was modeled provided peak flow results similar to a 20-year frequency event based on the trendline displayed on Figure 9. The June 2021 results are presented in the results table labeled as the specific event, but could be replaced with a 20-year, 6-hour frequency event in the model and design of proposed solutions.

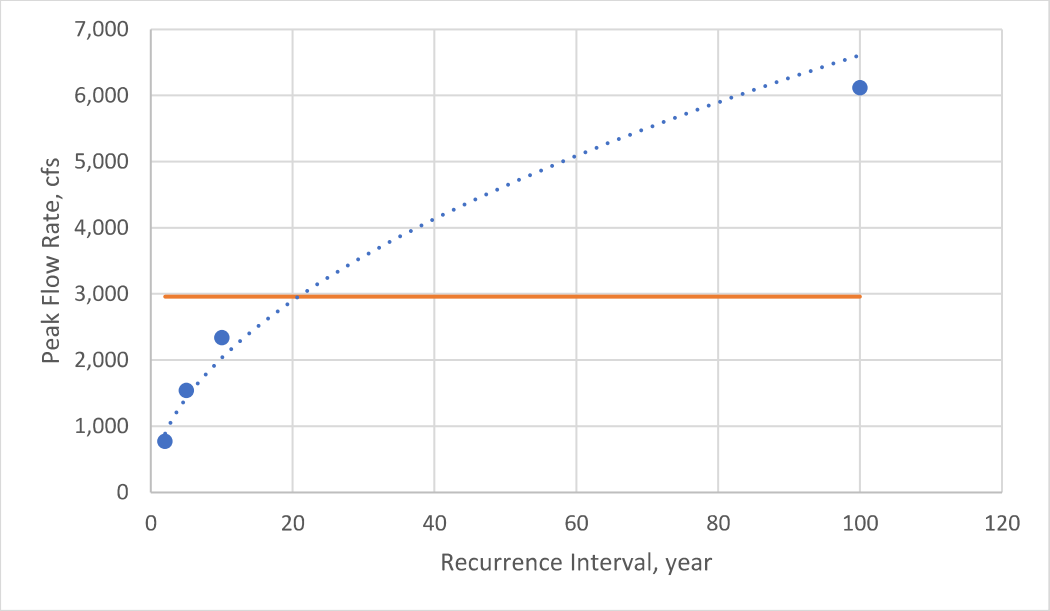


Figure 9. Modeled peak flow rates for various recurrence intervals (blue dot), the resulting power trendline (dashed blue) and the June 2021 event (orange line)

The results include a summary of flow rates through the culvert, over the road (weir) and the total flow just downstream of the road crossing. Results also include a summary of depths and velocities on the road at two points: Main Street 1 is the existing low point of the road and Main Street 2 is the location of maximum depth for proposed conditions, which will be described in greater detail in Section 3.2. The locations of the points of interest within Table 3 are provided on Figure 10. The floodplain for the 5-year event is presented on Figure 10 as it is the smallest storm event modeled with significant out of bank flooding. The 100-year event is also presented as it was the most extreme event modeled.

Table 3. Existing conditions model results at the Main Street crossing over Dry Fork

	Flow Rate, cfs			Main Street 1		Main Street 2	
Rainfall Event	Culvert	Weir	Total Flow	**Max Depth on Road, ft**	**Max Velocity, ft/s**	**Max Depth on Road, ft**	**Max Velocity, ft/s**
2-year, 6-hour	160	630	770	2.3	5.6	0.4	3.9
5-year, 6-hour	160	1400	1,540	3.6	7.2	1.8	5.5
10-year, 6-your	160	2210	2,340	4.6	8.2	2.8	6.3
June 24-25, 2021	160	2520	2,960	5.3	8.8	3.4	6.6
100-year, 6-hour	160	5960	6,120	7.8	10.9	5.7	7.9

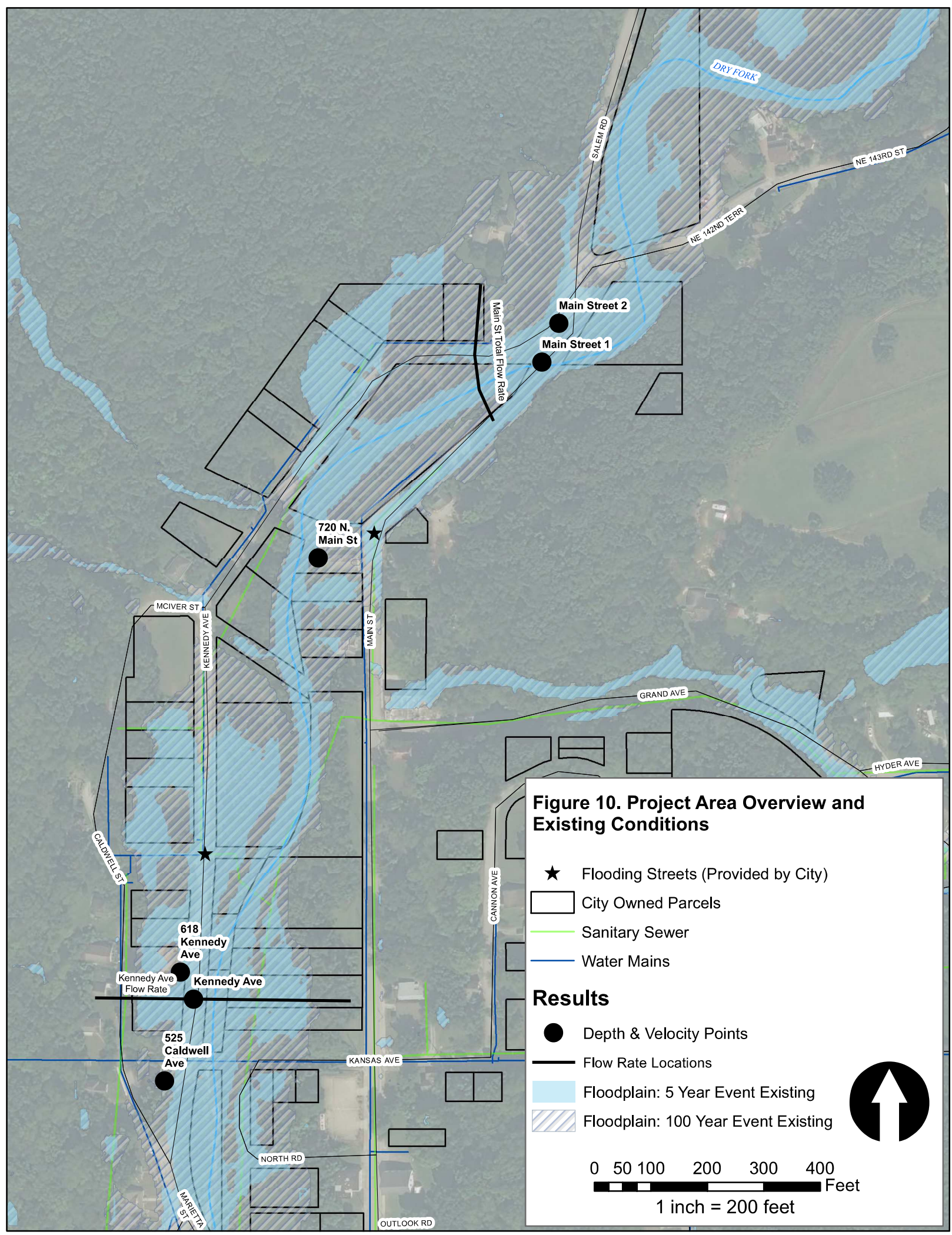


Figure 10. Project Area Overview and Existing Conditions

- ★ Flooding Streets (Provided by City)
- City Owned Parcels
- Sanitary Sewer
- Water Mains

Results

- Depth & Velocity Points
- Flow Rate Locations
- Floodplain: 5 Year Event Existing
- Floodplain: 100 Year Event Existing

0 50 100 200 300 400 Feet

1 inch = 200 feet

Model results are also provided for the area downstream of Main Street, where Kennedy Avenue runs parallel to Dry Fork. This stretch of Kennedy Avenue was identified as a flooding issue in the data provided by the City. Along this downstream area, there are several properties that did not participate in the flood buy-out program. Flooding of these homes is still a concern, so verifying the downstream impacts of the Main Street improvements was necessary. The existing conditions results for this downstream area are provided in Table 4 and the points of interest in the table are provided on Figure 10.

Table 4. Existing conditions model results for infrastructure downstream of Main Street culvert improvements.

		Water Surface Elevation, ft			Kennedy Ave	
Rainfall Event	Peak Flow Rate , cfs	720 N. Main St	618 Kennedy Ave	525 Caldwell Ave	Max Depth, ft	Max Velocity, ft/s
2-year, 6-hour	820	N/A	N/A	N/A	0.7	1.4
5-year, 6-hour	1,610	N/A	780.5	N/A	2.0	3.9
10-year, 6-your	2,440	N/A	781.7	781.8	3.2	5.3
June 24-25, 2021	3,020	N/A	782.3	782.5	3.8	5.9
100-year, 6-hour	6,650	788.1	784.8	784.7	6.2	9.5

3.2 Improvement Alternative 1

The proposed solutions, illustrated in Figure 11, include raising the profile grade of Main Street approximately 3-ft at the current lowest point and increasing the capacity of the culvert by replacing the existing CMPs with a double 9-ft by 6-ft reinforced concrete box (RCB) culvert. As a result of the proposed road profile changes, the low point in the road shifted from just over the creek to approximately 70-feet north of the crossing (Main Street 2 on Figure 11). Approximately 700 linear feet of Main Street also needs to be raised to accommodate the increase in grade over the culvert. Approximately 300 linear feet of Kennedy will need to be improved near the intersection with Main Street to provide an appropriate transition to the new grade.

Additional flood storage was added to the left overbank upstream of the 142nd Terrace bridge and to the right bank just upstream of Main Street with the goal of reducing peak flows that reach the improved culvert. Additional storage would be added downstream of the proposed road improvements to minimize any potential downstream impacts that could result from conveying water under Main Street that previously pooled on the road near the intersection of Main Street/Salem Road and Kennedy Avenue. An additional figure displaying proposed Alternative 1 is provided in Appendix A.

3.2.1 Flooding Improvements

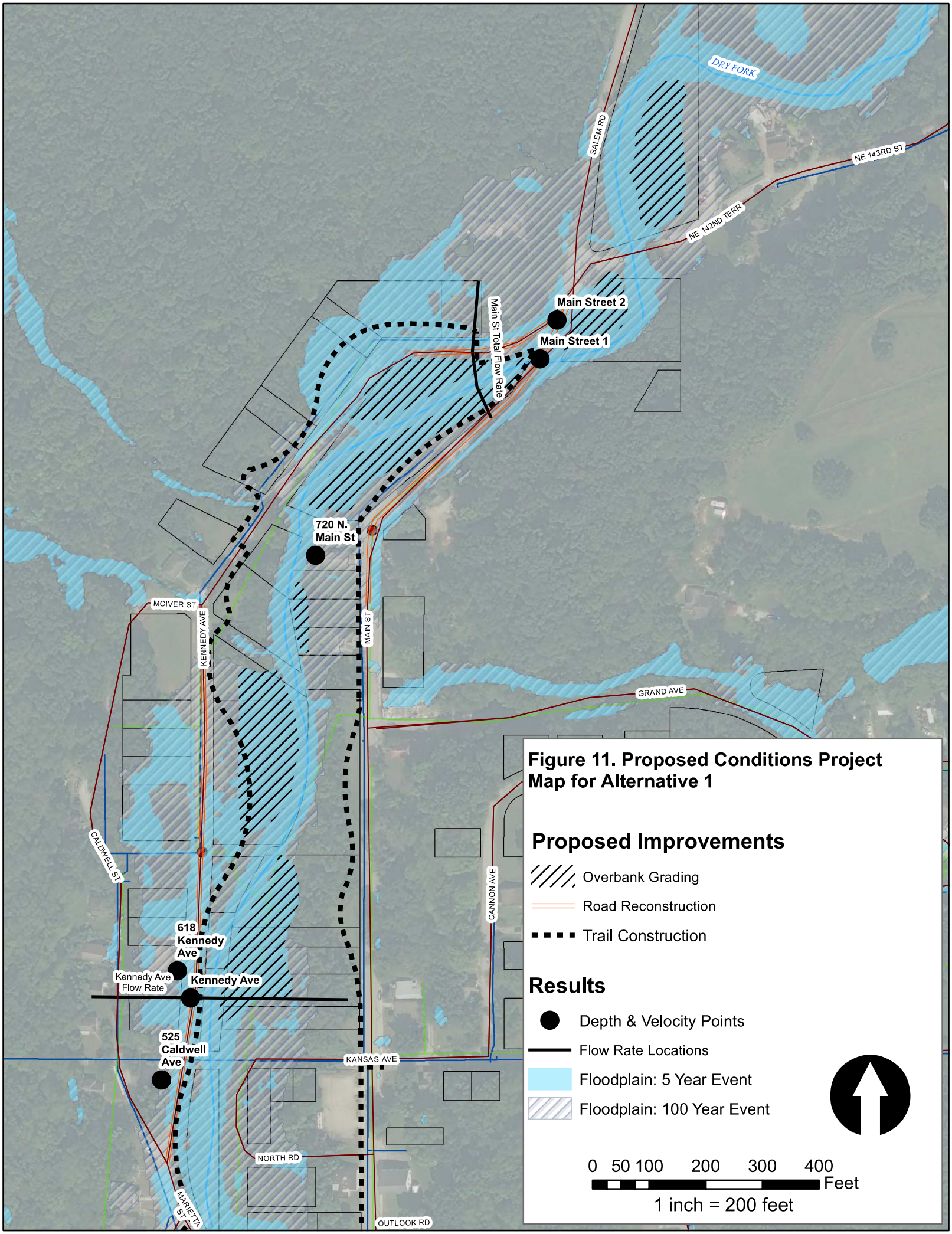
Tables 5 and 6 present the results of the proposed improvements project. As a result of the increase in culvert capacity and road profile, the total flows just downstream of the Main Street crossing decreased for the more frequent events, the 2- through 10-year, but increased for the larger events, such as the 100-year. The depths and velocities on Main Street decreased for all events, specifically for the 2- and 5-year event which no longer overtop the roadway. The additional storage provided with overbank grading and flooding connection aided in mitigating any potential downstream impacts. Water surface elevations, depths, and velocities were measured at key locations downstream of the project to verify there was no additional infrastructure (buildings, roads) impacted by the project. These locations are displayed in Figure 11.

Table 5. Proposed conditions for model results for Main Street Improvements (Alternative 1)

	Flow Rate, cfs			Main Street 1		Main Street 2	
Rainfall Event	Culvert	Weir	Total Flow	**Max Depth on Road, ft**	**Max Velocity, ft/s**	**Max Depth on Road, ft**	**Max Velocity, ft/s**
2-year, 6-hour	640	74	710	0	0	0	0
5-year, 6-hour	860	580	1,440	0	0	0.3	3.5
10-year, 6-hour	1070	1210	2,280	0.6	5.2	1.4	4.9
June 24-25, 2021	1130	1910	3,040	1.6	5.9	2.3	5.6
100-year, 6-hour	1230	5190	6,420	4.3	7.3	4.9	7.5
Difference Between Existing and Proposed (Proposed - Existing)							
2-year, 6-hour	480	-556	-60	-2.3	-5.6	-0.4	-3.9
5-year, 6-hour	700	-820	-100	-3.6	-7.2	-1.5	-2
10-year, 6-hour	910	-1000	-60	-4	-3	-1.4	-1.4
June 24-25, 2021	970	-610	80	-3.7	-2.9	-1.1	-1
100-year, 6-hour	1070	-770	300	-3.5	-3.6	-0.8	-0.4

Table 6. Proposed conditions model results for properties located along Kennedy Avenue (Alternative 1)

		Water Surface Elevation, ft			Kennedy Ave	
Rainfall Event	**Peak Flow Rate , cfs**	**720 N. Main St**	**618 Kennedy Ave**	**525 Caldwell Ave**	**Max Depth, ft**	**Max Velocity, ft/s**
2-year, 6-hour	760	N/A	N/A	N/A	0.0	0.0
5-year, 6-hour	1,540	N/A	N/A	N/A	1.0	4.5
10-year, 6-your	2,380	N/A	781.4	781.5	2.5	4.9
June 24-25, 2021	3,110	N/A	782.0	782.0	3.1	4.9
100-year, 6-hour	6,650	787.8	784.4	784.4	5.6	7.0
Difference Between Existing and Proposed (Existing - Proposed)						
2-year, 6-hour	-60	N/A	N/A	N/A	-0.7	-1.4
5-year, 6-hour	-70	N/A	N/A	N/A	-1.0	0.6
10-year, 6-your	-60	N/A	-0.3	-0.3	-0.7	-0.4
June 24-25, 2021	90	N/A	-0.3	-0.5	-0.7	-1.0
100-year, 6-hour	0	-0.3	-0.4	-0.3	-0.6	-2.5


DRY FORK
SALEM RD
NE 143RD ST
NE 142ND TERR
Main Street 2
Main Street 1
Main St Total Flow Rate
720 N. Main St
MCIVER ST
KENNEDY AVE
MAIN ST
GRAND AVE
CALDWELL ST
CANNON AVE
618 Kennedy Ave
Kennedy Ave
Kennedy Ave Flow Rate
525 Caldwell Ave
KANSAS AVE
NORTH RD
MARIETTA ST
OUTLOOK RD
Figure 11. Proposed Conditions Project Map for Alternative 1
Proposed Improvements
Overbank Grading
Road Reconstruction
Trail Construction
Results
Depth & Velocity Points
Flow Rate Locations
Floodplain: 5 Year Event
Floodplain: 100 Year Event
0 50 100 200 300 400
Feet
1 inch = 200 feet

3.2.2 Vegetation Management Plan

3.2.2.1 Overbank Storage Plantings

Each overbank storage area would be planted with the appropriate native herbaceous vegetation including shoreline and upland species, dependent upon water level and infiltration/release rate. Native vegetation will enhance water quality treatment and reduce long-term maintenance needs, while also improving floodplain habitat quality. Most storage areas will receive overflow from the creek channel only during storm events. As the creek level drops back to normal, the storage areas will release excess water that doesn't infiltrate, back into the channel. The storage areas will be designed to accommodate smaller rain events and will likely be dry most of the time.

3.2.2.2 Invasive Species Removal

Much of the existing riparian corridor adjacent to Dry Fork is overrun with shrub honeysuckle and euonymus (winter creeper), which are both non-native exotic species that outcompete native understory vegetation. Invasive species removal will allow for the treatment and some removal so that native species can be reintroduced and open views to the stream channel for the public.

3.2.2.3 Riparian Corridor Enhancements

Healthy riparian corridors consisting of native trees and understory vegetation assist in providing streambank stabilization, as well as shaded greenway corridors for both people and wildlife. In several locations, the riparian corridor is very narrow. The project will seek to establish healthy streambank vegetation and an effective wooded riparian corridor of 50 to 100 feet or greater where possible. Managing invasive species such as removing shrub honeysuckle and adding native riparian trees and shrubs to the existing riparian corridor will greatly enhance its effectiveness. Bank stabilization plantings will significantly reduce bank erosion and failure, and resulting sediment and pollutant loads in the stream. The enhanced riparian corridor will provide greater attenuation, filtration and treatment of overland runoff into the stream as well as overbank flows, further reducing bank erosion and increasing water quality benefits.

3.2.2.4 Tiered Bioretention Basins

Tiered Bioretention consists of a series of vegetated basins, a maximum of 4' in depth, with the intent to capture stormwater before it reaches the creek corridor. This project intends to utilize them for capturing hillside runoff, improving water quality as it reaches the stream, as well as slowing that initial rush of water. The 26.4 acres of watershed depicted in Figure 12 all drain to the tiered basins with a 60,000 cubic feet capacity.

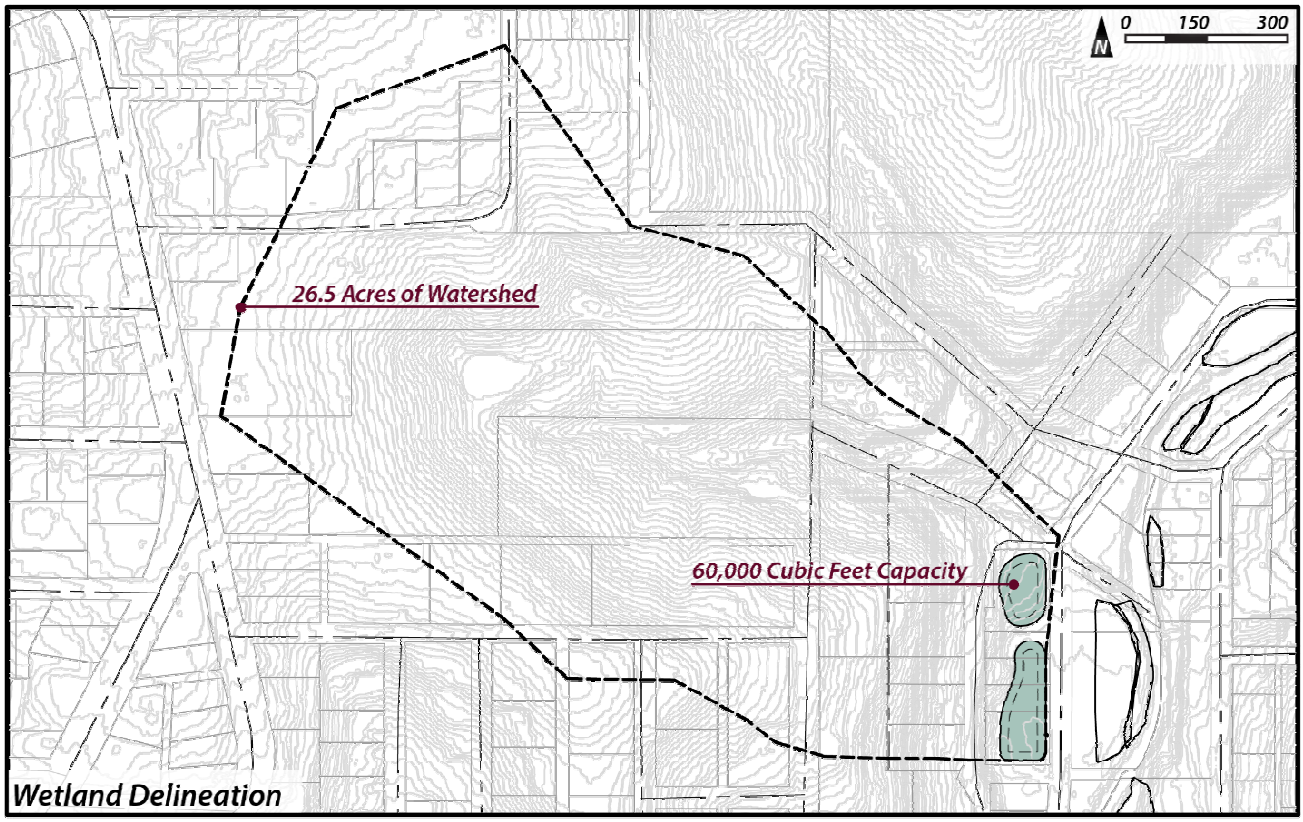


Figure 12. Watershed area draining to proposed bioretention basins.

3.2.3 Engineers Opinion of Probable Construction Costs

The Engineers Opinion of Probable Construction Costs (EOPCC) for Alternative 1 is provided in Table 7.

Table 7. EOPCC for Alternative 1

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	EXTENSION
1	MOBILIZATION	1	LS	$ 315,000	$ 315,000
2	CONTRACTOR FURNISHED SURVEY AND STAKING	1	LS	$ 20,000	$ 20,000
3	UNCLASSIFIED EXCAVATION	28,550	TON	$ 16	$ 456,800
4	EMBANKMENT	1,915	CY	$ 10	$ 19,150
5	2-9x6 CONCRETE CULVERT	55	LF	$ 3,000	$ 165,000
6	CONCRETE STREET REPAIR	5,750	SY	$ 250	$ 1,437,500
7	CONCRETE RIBBON CURB AND GUTTER	3,974	LF	$ 50	$ 198,700
8	CONCRETE SIDEWALK REMOVAL & REPLACEMENT	38,360	SF	$ 10	$ 383,600
9	CONCRETE DRIVEWAY APRON	60	SY	$ 90	$ 5,400
10	TEMPORARY TRAFFIC CONTROL	1	LS	$ 15,000	$ 15,000
11	TEMPORARY EROSION CONTROL	1	EA	$ 10,000	$ 10,000
12	TIERED BASIN - SEEDING	0.5	AC	$ 10,000	$ 5,000
13	TIERED BASIN - PLUGS	5,837	EA	$ 8	$ 46,696
14	OVERBANK STORAGE PLANTINGS - SEEDING	1	AC	$ 10,000	$ 10,000
15	OVERBANK STORAGE PLANTINGS - PLUGS	36,369	EA	$ 8	$ 290,952
16	INVASIVE SPECIES REMOVAL	6	AC	$ 4,500	$ 27,000
17	RIPARIAN CORRIDOR ENHANCEMENT	250	EA	$ 75	$ 18,750
18	TURF GRASS	9.5	AC	$ 3,000	$ 28,500
Subtotal Construction Costs					**$ 3,453,048**
Administrative Costs/Contingencies					
	Engineering/Design			15%	$ 517,957.20
	Contingency (% of Construction)			10%	$ 345,305
	Utility Relocation (% of Construction)			5%	$ 172,652
	City, Legal, Administrative, & Overhead (% of Construction)			7%	$ 241,713
	Right of Way/Easement Acquisition			0%	$ -
TOTAL ADMINISTRATIVE COSTS					**$ 759,671**
	TOTAL PROJECT COST				**$ 4,212,719**

3.3 Improvement Alternative 2

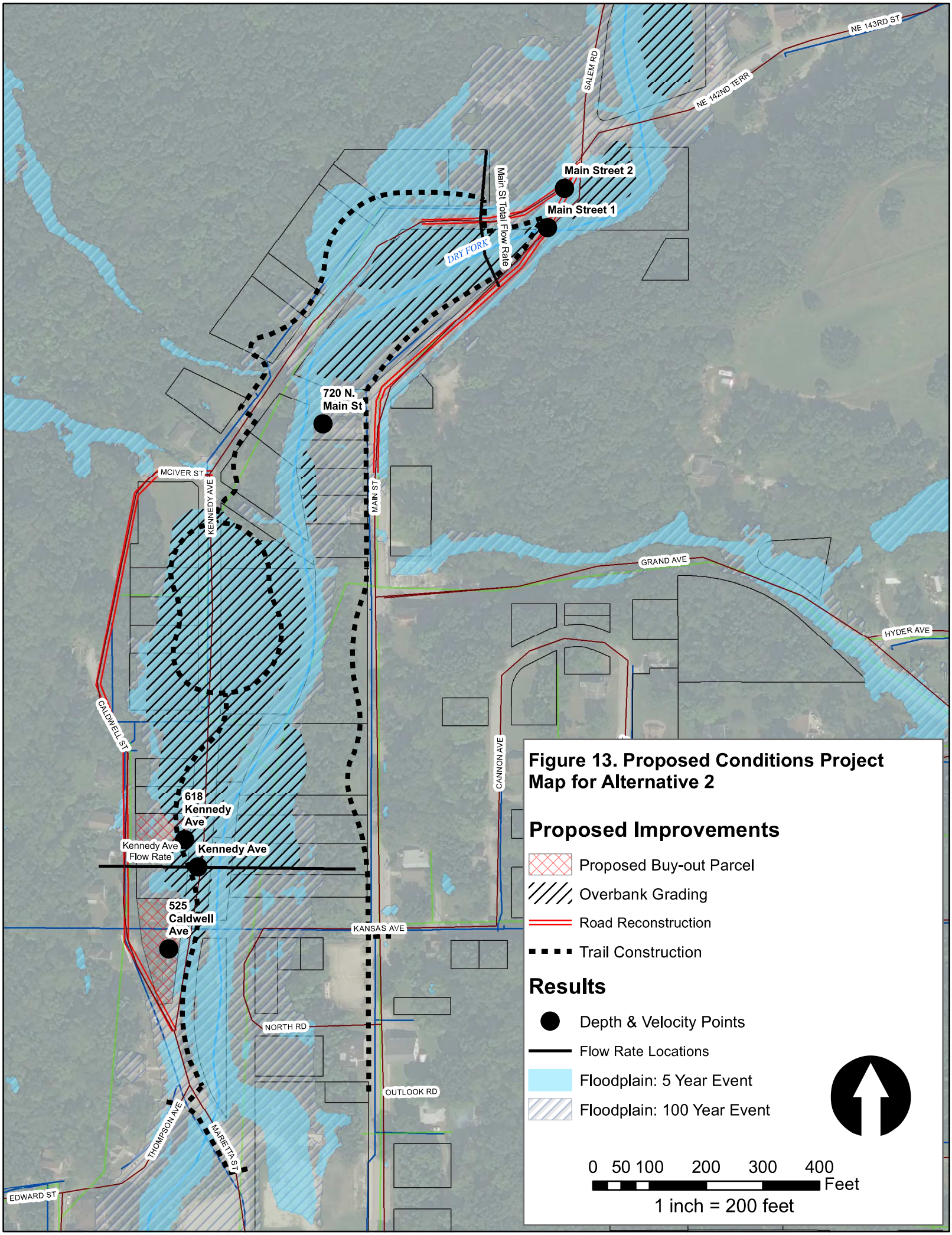
Improvement Alternative 2 includes all of the components of Alternative 1 with the inclusion of 2 home buy-outs and removal of a stretch of Kennedy Avenue (Figure 10). It also includes road widening and reconstruction of Caldwell Avenue, which will be used as a replacement. With the removal of the additional homes in the floodplain and the roadway, additional grading is proposed in the overbank for flood storage and for more opportunities to develop the greenway. An additional figure displaying proposed Alternative 2 is provided in Appendix A.

3.3.1 Flooding Improvements

Table 8 presents the results of the proposed improvements project. The results at Main Street were unchanged from Table 5, so those results have not been included in this section. The flows, depths, and velocities along the removed length of Kennedy Avenue did not change significantly from Alternative 1. The most significant benefit provided by this alternative when comparing the two is that 2 homes and the roadway have been removed from Dry Fork flooding.

Table 8. Proposed conditions model results for properties located along Kennedy Avenue (Alternative 2)

		Water Surface Elevation, ft			Kennedy Ave	
Rainfall Event	**Peak Flow Rate , cfs**	**720 N. Main St**	**618 Kennedy Ave**	**525 Caldwell Ave**	**Max Depth, ft**	**Max Velocity, ft/s**
2-year, 6-hour	760	N/A	N/A	N/A	0.0	0.0
5-year, 6-hour	1,540	N/A	779.9	N/A	0.6	4.9
10-year, 6-hour	2,380	N/A	781.3	781.4	2.15	5.4
June 24-25, 2021	3,110	N/A	781.7	782.0	2.8	5
100-year, 6-hour	6,640	787.7	784.4	784.4	5.3	7.1
Difference Between Existing and Proposed (Existing - Proposed)						
2-year, 6-hour	-60	N/A	N/A	N/A	-0.7	-1.4
5-year, 6-hour	-70	N/A	-0.6	N/A	-1.39	1
10-year, 6-hour	-60	N/A	-0.4	-0.4	-1.05	0.1
June 24-25, 2021	90	N/A	-0.6	-0.5	-1	-0.9
100-year, 6-hour	-10	-0.4	-0.4	-0.3	-0.9	-2.4


NE 143RD ST
NE 142ND TERR
SALEM RD
Main Street 2
Main Street 1
Main St Total Flow Rate
DRY FORK
720 N. Main St
MCIVER ST
KENNEDY AVE
MAIN ST
GRAND AVE
HYDER AVE
CANNON AVE
CALDWELL ST
618 Kennedy Ave
Kennedy Ave Flow Rate
Kennedy Ave
525 Caldwell Ave
KANSAS AVE
NORTH RD
OUTLOOK RD
THOMPSON AVE
MARIETTA ST
EDWARD ST
Figure 13. Proposed Conditions Project Map for Alternative 2
Proposed Improvements
Proposed Buy-out Parcel
Overbank Grading
Road Reconstruction
Trail Construction
Results
Depth & Velocity Points
Flow Rate Locations
Floodplain: 5 Year Event
Floodplain: 100 Year Event
0 50 100 200 300 400
Feet
1 inch = 200 feet

3.3.2 Vegetation Management Plan

Vegetative solutions would be the same for both alternatives. Table 9 reflects the difference in quantities and costs for this alternative.

3.3.3 Engineers Opinion of Probable Construction Costs

The EOPCC for Alternative 2 is provided in Table 9.

Table 9. EOPCC for Alternative 2

ITEM NO	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	EXTENSION
1	MOBILIZATION	1	LS	$ 365,000	$ 365,000
2	CONTRACTOR FURNISHED SURVEY AND STAKING	1	LS	$ 20,000	$ 20,000
3	DEMOLITION	1	LS	$ 90,000	$ 90,000
4	UNCLASSIFIED EXCAVATION	39,650	TON	$ 16	$ 634,400
5	EMBANKMENT	1,915	CY	$ 10	$ 19,150
6	2-9x6 CONCRETE CULVERT	55	LF	$ 3,000	$ 165,000
7	CONCRETE STREET REPAIR	5,910	SY	$ 250	$ 1,477,500
8	CONCRETE RIBBON CURB AND GUTTER	2,000	LF	$ 50	$ 100,000
9	CONCRETE SIDEWALK REMOVAL & REPLACEMENT	43,550	SF	$ 10	$ 435,500
10	CONCRETE DRIVEWAY APRON	20	SY	$ 90	$ 1,800
11	TEMPORARY TRAFFIC CONTROL	1	LS	$ 15,000	$ 15,000
12	TEMPORARY EROSION CONTROL	1	EA	$ 10,000	$ 10,000
13	OVERBANK STORAGE PLANTINGS - SEEDING	1	AC	$ 10,000	$ 10,000
14	OVERBANK STORAGE PLANTINGS - PLUGS	75,137	EA	$ 8	$ 601,096
15	INVASIVE SPECIES REMOVAL	6	AC	$ 4,500	$ 27,000
16	RIPARIAN CORRIDOR ENHANCEMENT	250	EA	$ 75	$ 18,750
17	TURF GRASS	8	AC	$ 3,000	$ 24,000
Subtotal Construction Costs					**$ 4,014,196**
Administrative Costs/Contingencies					
	Engineering/Design			15%	$ 602,129.40
	Contingency (% of Construction)			10%	$ 401,420
	Utility Relocation (% of Construction)			5%	$ 200,710
	City, Legal, Administrative, & Overhead (% of Construction)			7%	$ 280,994
	Right of Way/Easement Acquisition/Home Buyout				$ 160,000
TOTAL ADMINISTRATIVE COSTS					$ 1,043,123
	TOTAL PROJECT COST				**$ 5,057,319**

3.4 Site Considerations

Construction for either alternative will occur within City right-of-way (ROW) or within the parcels the City purchased as part of the flood buy-out program. It is assumed that no additional easements or ROW will need to be acquired to complete construction of the project. The proposed buyouts included in Alternative 2 are accounted for in the EOPCC. The buyouts cost includes the 2022 appraisal values. Reports from the Clay County Assessor website are available in Appendix B of this report.

The only utility information available at the time of this study includes location of City water and sanitary sewer. Coordination and possible relocation of these and other utilities within the project area will need to be a consideration during design. Because of the limited information available, an assumed relocation estimate of 5% of construction has been included in the EOPCC.

Permits that will need to be considered with either Alternative 1 or 2 include the following:

- *No-rise Certification and Floodplain Development Permit*
    - The proposed changes to Main Street will result in fill being placed in the regulatory floodway. A no-rise analysis will need to be completed using the effective FEMA model to verify that there are no impacts on the existing BFE. This certification and a Floodplain Development Permit application will need to be submitted to the City's floodplain administrator. Because of the amount of material being excavated from the floodplain, it is anticipated that a no-rise can be achieved and a CLOMR will not be required.
- *Missouri Land Disturbance Stormwater Permit*
    - The project will disturb more than 1 acre, requiring a land disturbance permit and a stormwater pollution prevention plan (SWPPP) with site-specific best management practices to minimize soil exposure, erosion, and pollutant discharge.
- *USACE Clean Water Act Section 404 Permit*
    - The proposed work to be completed within the stream channel will be limited to the replacement of the culvert under Main Street. This work will fall under the Nationwide Permit (NWP) 14 for linear transportation projects.

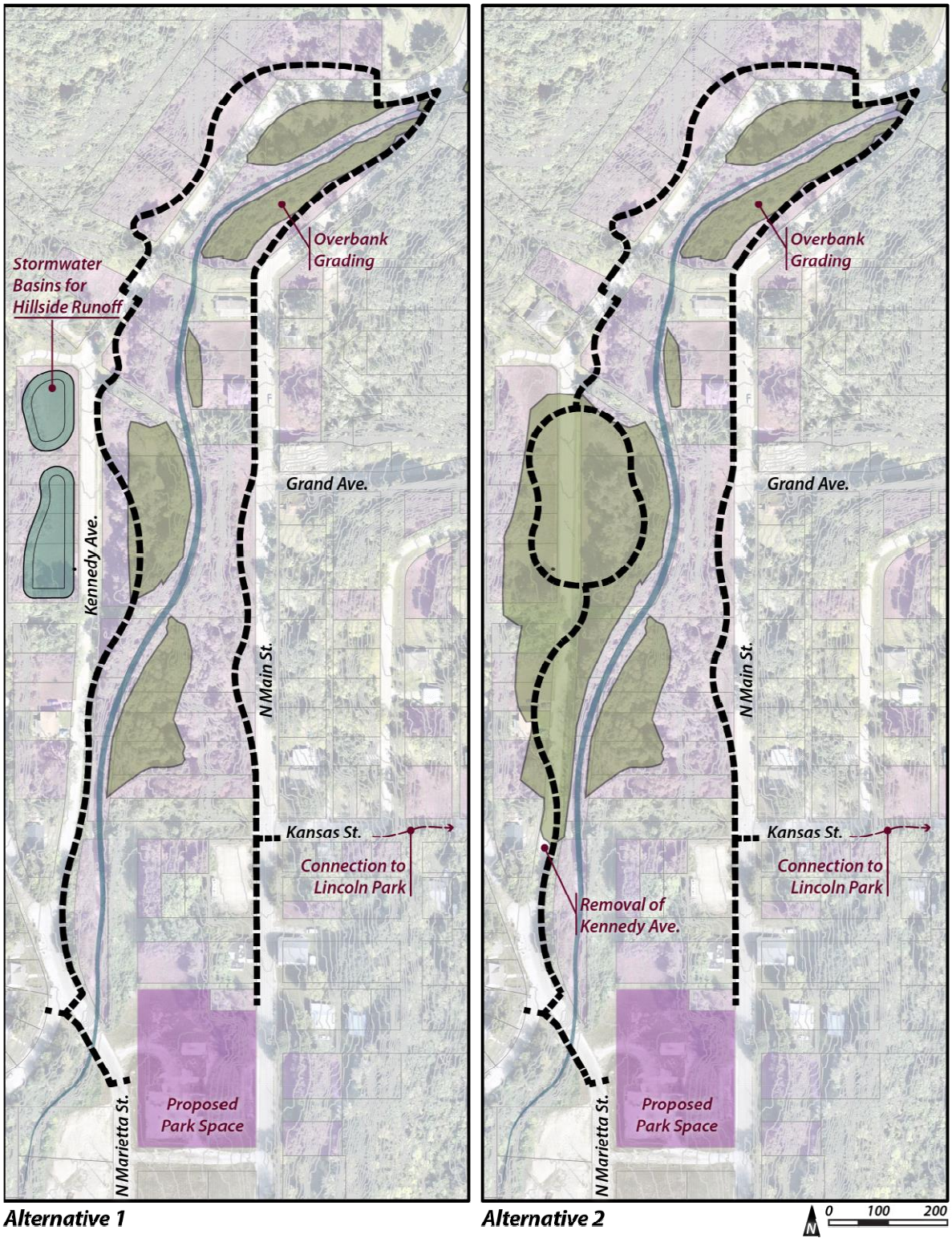
3.5 Recommendations

Alternative 2 is the recommended alternative for the project area. The overall construction costs estimated were higher than Alternative 1 because of the demolition of Kennedy Avenue, the homes, and the reconstruction of Caldwell Avenue. However, with the added demolition, Alternative 2 results in two buildings and a roadway being removed from flooding impacts, in addition to improving the flooding depths on Main Street. The purchase of the homes is dependent on both the City's and property owner's willingness to sell and buy, which will determine the overall feasibility of this alternative.

APPENDIX A

PROPOSED GREENWAY TRAIL

GREENWAY TRAIL



APPENDIX B

CLAY COUNTY ASSESSOR PARCEL INFORMATION

Search menu

Search Result | Parcel Detail | Value | Deed | Dwelling | Photo | Sketch | Map

Prop ID:	**324361**
Parcel ID:	**12311001101200**
Property Address:	525 CALDWELL AVE
Owner:	COLE JASON ALLEN
Owner Street:	525 Caldwell St
Owner City:	Excelsior Springs
Owner State:	MO
Owner Zipcode:	64024-1558
Map Description:	CITY BLOCKS EXCELSIOR SPRINGS CB 177 & WHITES ADDITION (611-345) LT 12
Use Code:	*02*
Property Type:	RES
Section:	1
Township:	52
Range:	30
Tax Area:	*7*

Report Problem
Click here to report Mailing address change
Fill in this form to request Split/Merge properties

Search menu

Search Result | Parcel Detail | Value | Deed | Dwelling | Photo | Sketch | Map

Prop ID: 324361 Parcel ID: 12311001101200

Assessment Value Information :

Year	Appraised Value	Assessed Value
2021	72,800	13,830
2022	72,800	13,830

Call Residential Real Estate: (816)407-3510 | Commercial Real Estate: (816)407-3530 or email assessor@claycountymo.gov

Search menu

Search Result | Parcel Detail | Value | Deed | Dwelling | Photo | Sketch | Map

Prop ID:	**290207**
Parcel ID:	**12307001502200**
Property Address:	618 KENNEDY AVE
Owner:	HOLTZCLAW SHALAE M
Owner Street:	618 Kennedy St
Owner City:	Excelsior Springs
Owner State:	MO
Owner Zipcode:	64024-1503
Map Description:	WHITE'S ADDITION LT 5
Use Code:	*02*
Property Type:	RES
Section:	1
Township:	52
Range:	30
Tax Area:	*7*

Report Problem
Click here to report Mailing address change
Fill in this form to request Split/Merge properties

Search menu

Search Result | Parcel Detail | Value | Deed | Dwelling | Photo | Sketch | Map

Prop ID: 290207 Parcel ID: 12307001502200

Assessment Value Information :

Year	Appraised Value	Assessed Value
2021	49,200	9,350
2022	49,200	9,350

Call Residential Real Estate: (816)407-3510 | Commercial Real Estate: (816)407-3530 or email assessor@claycountymo.gov

APPENDIX B

PRELIMINARY FUNDING, POLICY, AND PARTNERSHIP OPPORTUNITIES

Preliminary Funding, Policy, and Partnership Opportunities

The following sections present preliminary research on stormwater management funding opportunities that may be applicable to Excelsior Springs to fund or supplement projects that may help mitigate downtown flooding specifically. The descriptions are general in nature and are not tailored to potential projects or study characteristics. Additional research is needed to determine whether and how these opportunities may be applicable, and eligibility and application requirements if so.

Flooding and Water Quality

1) Natural Resource Conservation Service (NRCS) Easement Programs and Partnerships

There are several conservation easement programs administered by NRCS with funding provided through USDA and the congressionally appropriated Farm Bill. The programs provide financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. The grants will pay for all costs associated with recording program easements including fees, charges for abstracts, survey and appraisal fees, and title insurance. Grant funds may be used for acquisition and restoration costs, funding ratios depend on easement type, three options are typical: Perpetual Permanent, 30-Year Temporary Easement, No Easement - Restoration Cost-Share Agreement. Currently, three programs are funded:

- **Emergency Watershed Protection - Floodplain Easement (EWP-FPE)** offers an alternative method to the traditional EWP Program Recovery. NRCS recommends this option to landowners and others where acquiring an easement is the best approach (more economical and prudent) to reduce threat to life and/or property. A major goal of EWP–FPE is to restore the land, to the maximum extent possible, to its natural condition. Restoration techniques include the use of structural and non-structural practices to restore the flow and storage of floodwaters, control erosion, and improve management of the easement. NRCS may purchase EWP-FPE permanent easements in floodplains where the land has been damaged by flooding at least once during the previous calendar year or was subject to flood damage at least twice within the previous 10 years; or if they contribute to the restoration of floodwater storage and flow, offer a way to control erosion, or improve the practical management of the floodplain easement.

  A permanent easement is the only enrollment option under EWP-FPE. Permanent floodplain easements are available on the following types of land:

- Agricultural or open lands. NRCS will pay up to the entire cost of the easement value and up to the entire cost for easement restoration.
- Lands primarily used for residential housing. In these cases, NRCS will pay up to

the entire easement value and up to the entire cost of the structure's value if the landowner chooses to have it demolished. If the landowner prefers to relocate the residence instead of demolishing it, NRCS will pay all costs associated with relocating the residence to a location outside the floodplain. A project sponsor is required for lands primarily used for residential housing and for the purchase of the remaining lot after structures are removed.

- https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/landscape/ewp p/?cid=nrcs143_008216
- NRCS Watershed Flood Prevention Operations Program (WFPO)
- This program provides for cooperation between the Federal government, states, and their political subdivisions, to work together to prevent erosion; floodwater and sediment damage; to further conservation development; use and disposal of water; and to further the conservation and proper use of land in authorized watersheds.
- USDA's Natural Resources Conservation Service (NRCS) offers financial and technical assistance through this program for the following purposes:
    - Erosion and sediment control
    - Watershed protection
    - Flood prevention
    - Water quality Improvements
    - Rural, municipal and industrial water supply
    - Water management
    - Fish and wildlife habitat enhancement
    - Hydropower sources

    https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/landscape/wfpo/?cid=nrcs143_008271

2) **Federal Emergency Management Agency**

- **Building Resilient Communities and Infrastructure (BRIC)** Communities across the country are exposed to a range of natural hazard threats like wildfire, earthquakes, floods and hurricanes. Many of these are worsening with climate change, making it more important than ever to protect our communities. When disasters strike, they disrupt our lives and can take years to recover from. BRIC, FEMA's new $500 million hazard mitigation grant program, aims to fund innovative projects to reduce the nation's risk for a safer, more resilient future. BRIC priorities include incentivizing risk reduction projects for:
    - Public Infrastructure
    - Community lifelines (e.g., power, communication, healthcare, security)

- Nature-based solutions
- Adopting and enforcing modern building codes

States serve as applicants, applying directly to FEMA. Communities and other governmental entities may apply as sub-applicants, meaning they apply through their state emergency management agency, and they can apply for multiple projects.

https://www.fema.gov/grants/mitigation/building-resilient-infrastructure- communities

- **Flood Mitigation Assistance (FMA) Grant**

  The Flood Mitigation Assistance Program is a competitive grant program that provides funding to states, local communities, federally recognized tribes and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program. FEMA chooses recipients based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project. FEMA requires state, local, tribal and territorial governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for hazard mitigation assistance projects.

  https://www.fema.gov/grants/mitigation/floods

- **FEMA's Hazard Mitigation Grant Program (HGMP)**

  The HGMP provides funding to state, local, tribal and territorial governments for eligible mitigation measures that reduce disaster losses. "Hazard mitigation" is any sustainable action that reduces or eliminates long-term risk to people and property from future disasters. Mitigation planning breaks the cycle of disaster damage, reconstruction and repeated damage. Hazard mitigation includes long-term solutions that reduce the impact of disasters in the future. This grant funding is available after a presidentially declared disaster.

  https://www.fema.gov/grants/mitigation/hazard-mitigation

3) **American Rescue Plan Act (ARPA)**

- **Missouri Department of Natural Resources (MDNR) ARPA Water Infrastructure Community Grant Program Stormwater Grant**

  On March 11, 2021, the President signed the American Rescue Plan Act of 2021 (the Act) into law (Section 602(b) of the Social Security Act, as added by section 9901 of the American Rescue Plan Act (ARPA), Pub. L. No. 117-2). The Act will fund a multitude of efforts aimed at alleviating the COVID-19 pandemic and associated economic downturn. As part of those efforts, the Act

provided over $2.6 billion dollars to the State of Missouri for a number of uses, including funding "to make necessary investments in water, sewer, and broadband infrastructure."

Based on a recommendation by the Governor, the state legislature appropriated $410 million dollars of state ARPA funds to the Department in state fiscal year 2023 to invest in Missouri's water infrastructure through community grant programs, including stormwater grants for water quality and drainage improvements. The application period closed July 14th, 2022. Excelsior Springs applied and should receive word on its application by October 15th, 2022.

4) Environmental Protection Agency (EPA) 319 Grants

The Clean Water Act (CWA) Section 319 Grant program is a federally funded program administered by the Missouri Department of Natural Resources (MDNR). EPA 319 grant funds support a wide variety of activities including impairment assessment, technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. Grants typically range from $20,000 to $300,000 and require a non-federal match of at least 40 percent of the project total. Matching support can be project specific, in-kind contributions, such as use of equipment and volunteers. Preference may be given to projects that address restoration of 303(d)-listed waters by implementing control measures of the specific contaminant(s) for which the water is listed. Projects must have a technology transfer (information sharing) component; tours, field days, booklets, brochures, etc. and include a method of measuring success. Cost-effectiveness is a significant factor; indirect costs are limited to a maximum of 13 percent.

http://www.epa.gov/polluted-runoff-nonpoint-source-pollution/319-grant-program-states- territories-and-tribes

5) Clean Water Neighbor (CWN) Grants

The CWN program is a federally funded program (through use of EPA 319 CWA funds) administered by the MDNR. CWN grant funds typically implement projects that demonstrate nonpoint source pollution control practices and inform individuals and organizations of water quality problems caused by nonpoint pollutant sources. Project examples include rain gardens, storm drain stenciling, youth activities, workshops, pervious pavement installations, or green roofs. Grants typically range from $500 to $20,000.

http://www.kdheks.gov/nps/cwn.htm

6) **EPA Wetland Program Development Grants (WPDG)**

Wetland Program Development Grants (WPDGs) assist state, territorial, tribal, local government agencies, and interstate/intertribal entities in developing or refining state/ territorial/tribal/local programs which protect, manage, and restore wetlands. The primary focus of these grants is to develop/refine state, territorial, and tribal wetland programs. A secondary focus is to develop/refine local (e.g., county or municipal) programs. All applications submitted must be for projects that develop or refine state/territorial/tribal/local government wetland programs. Implementation of wetland protection programs is not an eligible project under this announcement. An implementation project is one that is accomplished through the performance of routine, traditional, or established practices, or a project that is simply intended to carry out a task rather than transfer information or advance the state of knowledge. All monitoring and mapping projects should transfer information or advance the state of knowledge and therefore are eligible under this grant.

Requests for proposal (RFPs) are typically issued in the springtime. Core program elements include:

1. Monitoring and assessment.
2. Voluntary restoration and protection.
3. Regulatory approaches include CWA Section 401 certification.
4. Wetland-specific water quality standards.

https://www.epa.gov/wetlands/wetland-program-development-grants-and-epa-wetlands-grant-coordinators

7) **Multipurpose Grant (MPG) program for States and Tribes**

Multipurpose funds are intended to be used at state and tribal discretion, for high-priority activities to complement activities funded under established environmental statutes. EPA encourages grantees to consider using funds to address per- and polyfluoroalkyl substances (PFAS). Grantees may also direct the funds to address other important priorities, such as advancing environmental justice and tackling climate change. For states and territories, funding is available to agencies that implement the categorical grant programs. For tribes, funding is available to tribes that have been delegated federal regulatory authority through the treatment in a similar manner to a state (TAS) process, and tribes approved to operate certain environmental regulatory programs through non-TAS approval provisions found in federal environmental statutes and regulations. Through these grants, EPA and its state and tribal partners will advance priorities to deliver environmental and public health results across the nation.

https://www.epa.gov/grants/multipurpose-grants-states-and-tribes

8) **Clean Water State Revolving Fund (CWSRF)**

Administered by EPA, the CWSRF is a low-cost financial assistance program for a wide range of water infrastructure projects including stormwater management, control of nonpoint sources of pollution, green infrastructure, climate resilience and mitigation, and water quality projects. EPA uses a combination of federal and state funds, to provide low interest loans to eligible recipients. Under the Bipartisan Infrastructure Law (BIL), $11.7 billion is allocated for the CWSRF, 49% of which must be made available as grants and forgivable loans to qualifying disadvantaged communities.

https://www.epa.gov/cwsrf

https://www.epa.gov/infrastructure

9) **Section 604(b) Water Quality Management Planning Grant**

The MDNR grants sub-awards to assist regional public comprehensive planning organizations and interstate organizations in carrying out water quality management planning. When funds are available, a project solicitation request specifying project scope, length and available funds will be advertised. There is no match requirement. Regional Planning Commissions and Regional Councils of Government within the state are eligible to apply for this funding. In this region, this is the Mid-America Regional Council (MARC). Eligible projects and costs include:

- Identifying nonpoint sources of water pollution.
- Developing or implementing all of part of a Source Water Protection Plan.
- Assisting with Municipal Storm Sewer System (MS4) compliance through technical assistance.
- Implementing stormwater management programs by assisting with data collection and record keeping, as well as developing policies and procedures, developing a vulnerability assessment and resiliency plan for stormwater and floodplain management, assessing water quality in an at-risk watershed, studying possibilities for wastewater treatment facility consolidation or regionalization, and updating an outdated Section 208 Water Quality Management Plan.

Land Acquisition, Restoration, and Habitat

1) **Urban Waters Five Start Grant**

A private-public partnership and conservation grant sponsored by National Fish and Wildlife Foundation (NFWF) and funded by EPA's Wetlands and Urban Waters Programs and the US Forest Service, US Fish and Wildlife Service and in conjunction with the Urban Waters Federal Partnership. Projects addressing stormwater management, water scarcity, source water protection as well as wetlands, riparian, forest and water quality protection, and restoration projects in local communities

qualify. The program requires the establishment and/or enhancement of partnerships including education/outreach components.

www.nfwf.org/fivestar

2) **Evergy Community Impact Program**

Evergy offers mini-grants to communities and nonprofits for programs targeted toward the sustainability, conservation and beautification of regional natural resources. Past awardees have included environmental education, tree planting, conservation easements, recycling, and community clean-up events. Evergy is also actively involved in restoring habitats for several types of raptors, birds and waterfowl.

https://forms.benevity.org/9ecaab6f-8476-48f1-b784-3596cea2cd7d

3) **North American Wetlands Conservation Act Grants**

Two grants are offered, Small Grants and Standard Grants. The 25 year program is competitive, matching grants that support public-private partnerships that further the goals of the North American Wetlands Conservation Act. Projects must involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats for the benefit of all wetlands-associated migratory birds. For small grants, priority is given to grantees or partners new to the Act's Grants, are limited to $75,000 with a minimum of 50% matching funds. The standard grant program awards up to $1,000,000 and requires at least 33% matching funds. There are two funding cycles per year; proposals should be sent to the U.S. Fish & Wildlife Service's Division of Bird Habitat Conservation (Division) through Grants.Gov.

https://www.govinfo.gov/content/pkg/USCODE-2017-title16/pdf/USCODE-2017-title16-chap64-sec4401.pdf

https://www.fws.gov/service/north-american-wetlands-conservation-act-nawca-grants-us-standard

4) **Natural Resource Conservation Service (NRCS) Easement Programs and Partnerships**

In addition to the programs noted in the Flooding and Water Quality section above, the NRCS is currently funding the following programs:

- **Agricultural Conservation Easement Program (ACEP)** supports organizations to protect working agricultural lands and limit non-agricultural uses of the land.

  https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/

  - **Wetland Reserve Enhancement Partnership** (WREP) is a special enrollment option under the ACEP's Wetland Reserve Easement component. The

program is designed to create collaboration with the USDA through partnership agreements to protect, restore, and enhance wetlands. A 25% match is required for easement, restoration, or management costs. However, projects that go above and beyond required contributions may be given higher consideration.

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/ac ep/?cid=nrcseprd1459249

- **Wetland Reserve Easements** are designed to restore, protect and enhance wetlands. (formerly called the Wetland Reserve Program). The is a voluntary program providing landowners the opportunity to protect, restore, and enhance wetlands on their property by establishing long-term conservation and wildlife practices and protection. The program goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. Converted wetlands, potential wetlands, riparian buffers and wetlands that had previously been restored under a local, state, or Federal program that need long-term protection are eligible.

  https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcseprd416653

- **Healthy Forests Reserve Program (HFRP)** helps landowners restore, enhance and protect forestland on private lands through easements and financial assistance. HRFP is primarily focused on the recovery of endangered or threatened species, improving plant and animal biodiversity, and enhancing carbon sequestration.

  https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/fore sts/?cid=nrcs143_008387

- **Regional Conservation Partnership Program (RCPP)** promotes coordination of NRCS conservation activities with partners that offer value-added contributions to expand our collective ability to address on-farm, watershed, and regional natural resource concerns. Through RCPP, NRCS seeks to co-invest with partners to implement projects that demonstrate innovative solutions to conservation challenges and provide measurable improvements and outcomes tied to the resource concerns they seek to address. RCPP is now a standalone program with its own funding--$300 million annually. Moving forward, landowners and ag producers will enter into RCPP contracts and RCPP easements. Forest protection, restoration, and public works watershed improvements are examples of eligible projects.

  https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/

- **Environmental Quality Incentives Program (EQIP)** provides financial and technical assistance to agricultural producers and non-industrial forest managers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, increased soil health and

reduced soil erosion and sedimentation, improved or created wildlife habitat, and mitigation against drought and increasing weather volatility. This voluntary conservation program helps producers make conservation work for them. Together, NRCS and producers invest in solutions that conserve natural resources for the future while also improving agricultural operations. Through EQIP, NRCS provides agricultural producers and non- industrial forest managers with financial resources and one-on-one help to plan and implement improvements, or what NRCS calls conservation practices. Using these practices can lead to cleaner water and air, healthier soil and better wildlife habitat, all while improving agricultural operations. Through EQIP, you can voluntarily implement conservation practices, and NRCS co-invests in these practices with you. Some of these benefits include:

- Reduction of contamination from agricultural sources, such as animal feeding operations.
- Efficient utilization of nutrients, reducing input costs and reduction in nonpoint source pollution.
- Increased soil health to help mitigate against increasing weather volatility and improved drought resiliency.

https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

5) **USDA Community Forest Program (CFP)**

The Community Forest Program (CFP) is a competitive grant program that provides financial assistance to tribal entities, local governments, and qualified conservation non- profit organizations to acquire and establish community forests that provide community benefits. Community benefits include economic benefits through active forest management, clean water, wildlife habitat, educational opportunities, and public access for recreation. The grants will pay up to 50% of program costs, with a 50% non-federal match requirement. FY 2021 awards ranged from just under $200,000 to $600,000. The following private forest lands are eligible:

- Threatened by conversion to non-forest use
- Not held in trust by the United States
- That provides defined community benefits

At least five acres in size, suitable to sustain natural vegetation, and at least 75 percent forested.

https://www.fs.usda.gov/managing-land/private-land/community-forest

6) **Missouri Department of Conservation (MDC) Land Conservation Partnership Grant**

The MDC offers communities and partners a number of grant and cost-share options to assist with everything from green development to wildlife habitat to enhancing outdoor recreation opportunities. The Land Conservation Partnership Grant is a competitive, matching grant to help communities acquire land or easements and

provide opportunities for land conservation or outdoor recreation access. The Land Conservation Partnership Grant has four partnership opportunities, three of which may be applicable for this project:

- The **Outdoor Recreation Infrastructure Program** is a reimbursement-based grant program for enhancing public access and opportunities for citizen engagement in conservation-related outdoor recreation through the development of outdoor recreation infrastructure. Examples of possible projects include a community trail system that connects urban residents to natural habitats, an outdoor pavilion, an outdoor community archery range, or a public fishing dock. Funding is based on available funds, viability of the proposal, and the extent to which the project advances MDC's goal to connect people to nature. The Outdoor Recreation Infrastructure Program utilizes a formal Request for Proposals process. Applications must be received by September 2nd, 2022, to be considered.

- The **Conservation Land Acquisition Program** provides financial assistance to local governments and non-profit organizations for acquiring lands through fee title to be held and managed by the partner. The purposes of the grant are to: 1) provide public access to lands that allow citizens to discover and connect to nature and participate in related outdoor recreation activities, and 2) enhance long-term conservation of wildlife species, habitats, and ecosystem services through protection of lands having important conservation value. Applications for the Conservation Land Acquisition Program can be submitted and considered on a rolling basis at any time.

- The **Conservation Easement Assistance Program** provides financial assistance to land trusts and local governments for acquiring conservation easements on privately-owned land having especially high conservation value. The primary purpose of the grant is to provide long-term habitat protection of land that has especially high conservation value for wildlife, water quality, outdoor recreation, and/or other ecosystem services. Projects selected for funding will be eligible for 100% MDC reimbursement of costs associated with establishing a donated conservation easement (e.g., drafting, closing costs, stewardship fees, etc.). The program currently does not pay landowners for the value of the conservation easement but is being reviewed to assess the feasibility of doing so for especially important tracts. For projects in which funding to pay the landowner for the easement value is needed/desired, applicants should wait until after a preliminary review by MDC staff before applying. Applications for the Conservation Land Acquisition Program can be submitted and considered on a rolling basis at any time.

- The **Urban Conservation Cost Share Program** promotes sustainable development practices and the establishment of natural resource conservation practices in municipal and developing areas. Cost-share is authorized for

activities such as native prairie restorations, forest and woodland management, tree plantings, and invasive species control. In addition, practices eligible for cost-share include urban green space planning, engineering drawings, etc. Applications are available annually beginning in July, and evaluated on a quarterly basis.

Community Conservation Funding Opportunities | Missouri Department of Conservation (mo.gov)

7) **Missouri Department of Conservation Community Conservation Grant Program**

MDC's Community Conservation Grant Program promotes urban wildlife habitat improvement, encourages organizational partnerships for land stewardship, and supports the training of partner staff to manage natural landscapes. The Community Conservation Grant opportunity is available for communities meeting practice requirements and approval by their local MDC Community Conservation Team.

Eligible applicants include (1) government entities (e.g., municipal and county parks departments, schools), or (2) non-profit corporations. Applications from schools and school districts must identify a full-time staff member as project manager. If the applicant is not the property owner, a letter of permission must accompany the application.

Practices eligible for funding must promote urban habitat and include land management activities necessary for habitat restoration, native plant establishment, terrestrial and aquatic habitat enhancement, exotic species control, and staff training for natural landscape management.

Grant applications are available beginning in July annually and will be evaluated on a quarterly basis. For more information about the Community Conservation Grant Program, contact your regional office.

Community Conservation Funding Opportunities | Missouri Department of Conservation (mo.gov)

8) **Land and Water Conservation Fund**

The Land and Water Conservation Fund (LWCF) was established by Congress in 1964 to fulfill a bipartisan commitment to safeguard natural areas, water resources and cultural heritage, and to provide recreation opportunities to all Americans. The fund invests earnings from offshore oil and gas leasing to help strengthen communities, preserve history and protect the national endowment of lands and waters. On August 4, 2020, the Great American Outdoors Act (GAOA) was signed into law, authorizing $900 million annually in permanent funding for LWCF.

The state side of the LWCF provides matching grants to states and local governments for the acquisition and development of public outdoor recreation areas and facilities. Over its first 49 years (1965 - 2014), LWCF has provided more than $16.7 billion to acquire new Federal recreation lands as grants to state and local governments. Seventy-five percent of the total funds obligated have gone to locally sponsored projects to provide close-to-home recreation opportunities that are readily accessible to America's youth, adults, senior citizens, and the physically or mentally challenged. The state side of LWCF is administered by the State and Local Assistance Programs Division.

9) **EO 14008 on Climate Change** initiated the America the Beautiful initiative. The initiative sets the nation's first-ever goal to conserve 30% of U.S. lands and waters by 2030. The 10-year locally led, and nationally scaled campaign will lift up efforts to conserve, connect, and restore the lands, waters, and wildlife upon which all depend.

   https://www.doi.gov/blog/america-beautiful-our-work-conserve-least-30-lands-and-waters-2030

City Manager
Capital Improvements Authority Meeting - 1/8/2024

To: Authority Members

From: Molly McGovern, City Manager

Date 1/4/2024

RE: Approval: Industrial Roadway Improvements

When private investment and job creation is made, we have an opportunity to seek outside funding to make public improvements. We are not in a position to make a public announcement before grant funds are awarded. The proposed project is located on S. McCleary Road, south of US-69 at 301 S. McCleary Road, Excelsior Springs, MO in Clay County. The purpose and need of the project is to provide an alternative route for truck traffic between Magna and the Ford Plant in the event their most direct access from McCleary Road to US-69 becomes blocked due to an emergency event. The needed improvements address three main pinch points to accomplish the proposed project. Improve two secondary intersections to increase safety and maneuverability for semi-truck traffic in the fully developed condition. St. Louis Ave./S. McCleary Road and St. Louis Ave./Corum Road intersections both require a larger turning radius. Railway crossing improvements to regrade/create railway crossings to increase the secondary route's safety, visibility, and efficiency for semi-truck traffic in the fully developed condition.

Funding sources and uses:

§ Private improvements will include the construction of training facility adjacent to the existing plant (see attached illustration) - $4 million; acquisition of equipment - $1.5Million will be financed by private resources

§ Public roadway improvements including engineering and construction; Grant and City Funds will be used.

§ Grant preparation and administration. City funds will be used.

§ CDBG Grant $417,027, City Funds $78,219

I am asking for approval from CIP for $80,000 to match the grant if awarded. We will be working to submit an application during January.

	CDBG Grant	City Funds	Total
Construction & Testing	383,061	0	383,061
Engineering	33,966	33.966	67,932
ROW Acquisition Agent	0	9,000	9,000
Grant Admin	0	31,753	31,753
Sub-Total	417,027	(15%) 74,719	491,746
Grant Writing	0	3,500	3,500
Total	417,027	78,219	495,246

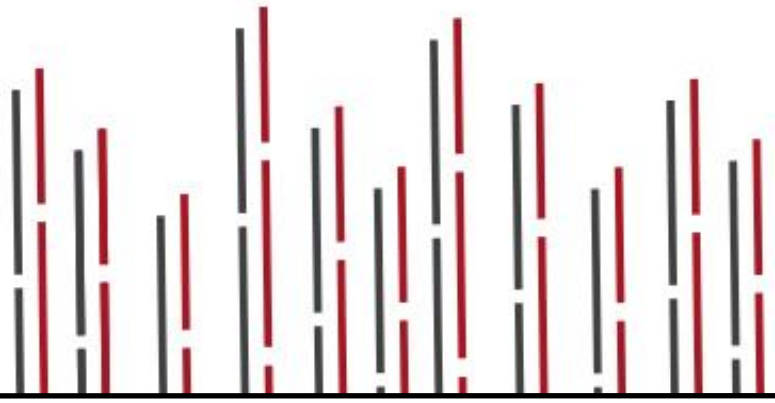
Molly McGovern, City Manager

ATTACHMENTS:

Description	Type	Upload Date
Preliminary Engineering Report	Cover Memo	1/4/2024

LAMP
RYNEARSON

9001 State Line Rd., Ste. 200
Kansas City, MO 64114
[P] 816.361.0440
[F] 816.361.0045
LampRynearson.com



Community Development Block Grant Preliminary Engineering Report

Prepared for:
The City of Excelsior Springs, MO

Magna Seating Factory – Public Infrastructure Improvements

October 2023

Leaving a Legacy of Enduring Improvements to Our Communities
Lamp Rynearson Purpose Statement

TABLE OF CONTENTS

TABLES

FIGURES

TITLE PAGE

Preliminary Engineering Report (PER) Information

Project Name:	Magna Seating Factory Expansion Alternative Route Street Improvements to the McCleary Crossover on Highway 69 Corum Rd / St. Louis Ave / McCleary Rd
Owner:	City of Excelsior Springs, Missouri 201 E. Broadway Ave Excelsior Springs, Missouri 64024 (816) 630-0752
CDBG Applicant:	City of Excelsior Springs, Missouri
Engineer:	Lamp Rynearson, Inc. 9001 State Line Road, Suite 200 Kansas City, Missouri 64114 (816) 361-0440 (phone) (816) 361-0045 (fax) dan.mcghee@lamprynearson.com
Licensed Engineer:	Mark Daniel McGhee Jr. MO PE-2008019568

Date of Report:	October 17, 2023

1 PURPOSE AND NEED FOR THE PROJECT

A. Purpose and Need for Expansion and Improvements of Existing Infrastructure

The proposed infrastructure improvements will provide a secondary access to US-69 for a just-in-time auto parts supplier located in an area that continues to develop and improve traffic operations and safety for the community to support increased semi-truck traffic. The project will allow for expanded operations of an existing commercial entity (Magna Seating Factory) and provide alternative access to the commercial zone located south of Highway 69 and bounded by Corum Rd and S McCleary Rd.

B. Health and Safety Concerns

The existing crossover for Highway 69, located at S McCleary Rd, has a unique configuration that complicates traffic maneuvering with a short stacking distance and creates a natural chokepoint to access the commercial/industrial zone located to the east and west of S McCleary Rd. Alternative route improvements would improve both commercial and residential traffic flow that utilizes the Highway 69 intersection by increasing route alternatives. Alternative route improvements will also provide a secondary route for truck traffic and emergency vehicles in the event the crossover becomes blocked due to an emergency event.

C. Violations and/or Environmental Issues and Agency Concerns and Recommendations

No known violations, agency concerns, or environmental issues are associated with the proposed project. The project focuses on modifying existing infrastructure to serve as a second access point to commercial/industrial areas south of Highway 69.

D. Existing Population and Projected Population for 20 Years

The 2020 census population was 10,553. The projected population in 20 years is 11,659 (0.5% annual growth).

E. Projected Economic Growth

The project will open new semi-truck routes, which opens land for development opportunities, eventually leading to unquantified economic growth.

F. Operation and Maintenance (O&M) Issues

No operation and maintenance issues are present for the proposed project.

G. Future Needs of Owners / Beneficiaries

The project will allow Magna Seating Factory to expand its operations by providing an alternative route to the factory in case of an accident at the S McCleary Rd intersection. The proposed road improvements will allow for increased semi-truck traffic along Corum Road.

H. Whether the Project is in Conformance with any Existing Comprehensive or Strategic Plans

Corum Rd, S McCleary Rd, and St. Louis Avenue are identified as the streets bounding the "South Growth Area" in the Excelsior Springs Comprehensive Plan (ESCP) dated December 2009. Improving these streets, as proposed within this report, would bring the streets into conformance with the existing comprehensive plan. The Future Land Use Map identifies medium and low density residential. The proposed improvements would increase accessibility to the area for emergency vehicles and provide better site distances to improve safety.

2 PROJECT DESCRIPTION

A. Project Details

Magna Seating Factory, located in Excelsior Springs, MO, is a just-in-time supplier to the nearby Ford Manufacturing plant. Magna Seating Factory is considering a 65,000 SF expansion on the south side of their existing building on McCleary Road. The expansion will enable the plant to construct a training facility and create additional jobs.

The expansion represents a $5.5 million private investment in real and personal property improvements and creation of 125 additional jobs.

The public improvements needed will provide an alternative route for truck traffic between Magna Seating Factory and the Ford Plants in the event their most direct access from McCleary Road to US-69 becomes blocked due to an emergency event. As a just-in-time supplier, Magna Seating Factory produces a product that will be delivered as needed to be installed on the manufacturing line at the Ford Plant. Any delay in travel between plants represents a slow-down in production. The needed improvements address three main pinch points to accomplish the proposed project.

1. Intersection improvements: improve two secondary intersections to increase safety and maneuverability for semi-truck traffic in the fully developed condition.
    a. Intersection of St. Louis Ave/S. McCleary Road and St. Louis Ave./Corum Road will both require a larger turning radius (see Figures 5.2 and 5.3 in Recommended Alternative Section).
2. Railway crossing improvements: regrade/create railway approach crossings (alternative dependent) to increase the secondary route's safety, visibility, and efficiency for semi-truck traffic in the fully developed condition (see Figure 5.4 in Recommended Alternative Section).

Funding sources and uses:

- Private improvements will include the construction of a training facility adjacent to the existing plant - $4 million; acquisition of equipment - $1.5 Million will be financed by private resources
- Public roadway improvements including engineering and construction; Grant and City Funds will be used.
- Grant preparation and administration. City funds will be used.
- CDBG Grant $417,027, City Funds $78,219

	CDBG Grant	City Funds	Total
Construction and Testing	383,061	0	383,061
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Grant Administration	0	31,753	31,753
Sub-Total	417,027	(15%) 74,719	491,746
Grant Writing	0	3,500	3,500
Total	417,027	78,219	495,246

Table 2-1 – Detailed Funding Source Contributions

B. Timeline for Construction

Construction would commence approximately 3 months after improvements are designed and permitted, allowing time for bidding and project award. Construction would take approximately 4 months to complete but is contingent on the season and weather. Design and permitting is anticipated to take 4 months and would begin once project funding is authorized.

C. Location

The project is located near the southern extent of Excelsior Springs, with the northernmost street of the project area being westbound Highway 69. The project's west, south, and east extents are bound by S McCleary Road, St. Louis Ave, and Corum Rd, respectively. A portion of the project is located outside of Excelsior Springs in Prathersville, but Excelsior Springs will not seek funding assistance from Prathersville. Coordinates are approximately 39°19'48.55"N and 94°15'22.32"W. The location map on the following page shows the proposed project elements.

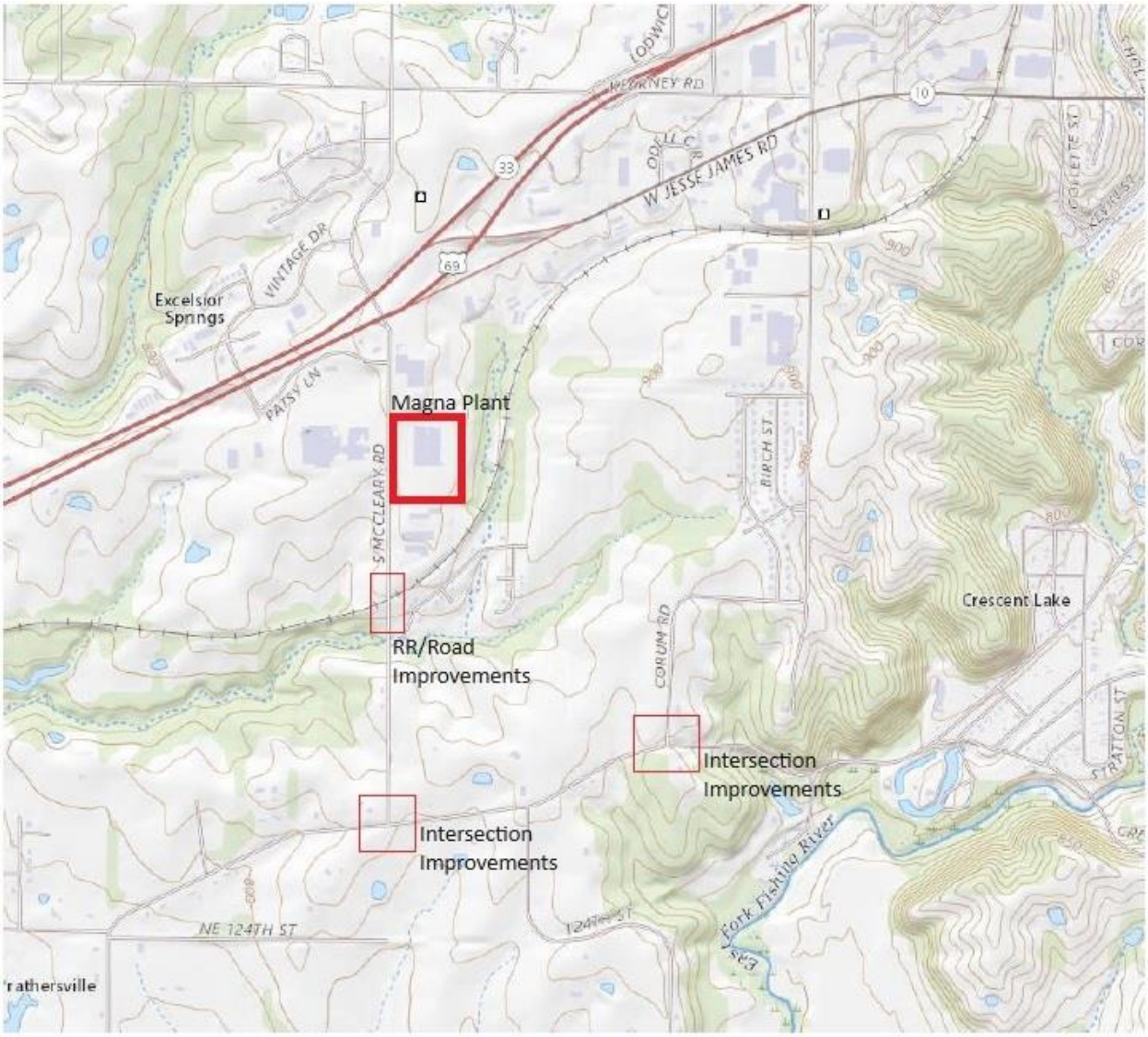

Figure 2-1 – Project Location Map

3 EXISTING INFRASTRUCTURE AND LAND DESCRIPTION

A. Location of Existing and Proposed Infrastructure to be Addressed by the Project

The project is located near the southern extents of Excelsior Springs, south of Highway 69, in Section 10, Township 52N, and Range 30W. The subject area encompasses a large area due to the existing configuration of access to Highway 69. The project's north, west, south, and east extents are defined by westbound Highway 69, S McCleary Road, St. Louis Ave, and Corum Rd. Coordinates are approximately 39º19'48.55"N and 94º15'22.32"W.

B. Location of Property Proposed for Acquisition, if Applicable

The proposed alternative route will require minimal right-of-way acquisition at intersections. Proposed improvements will be coordinated with Prathersville as applicable.

C. Location of Easements Needed

The proposed alternative route will not require additional easements.

D. Origin of Funding for Original Infrastructure, Including any Existing Debt

Not applicable.

E. History and Condition of Infrastructure, Current Easements

The existing infrastructure is in adequate shape but warrants improvements to increase safety, maneuverability, and to promote economic growth.

4 ALTERNATIVES CONSIDERED (INCLUDING NO PROJECT ALTERNATIVE)

A. Description of Each Alternative

Two alternate options have been considered. One alternate includes connecting Johnson Industrial Drive to the northern drive into the Magna Seating Factory. The route is detailed in Figure 4-1 below. This alternate has been ruled out because of significant additional right-of-way acquisition, substantial changes in topography, creation of a stream crossing, and construction of a separated railroad crossing. Additionally, the preliminary engineering project cost estimate is $6.68 million over the proposed design.

Figure 4-1 – Alternative 1 (Johnson Industrial Drive Connection)

A no-project alternative would not improve existing intersection safety, and traffic flow on S McCleary Road would be hampered by the difficult at grade railroad crossing. The no-project alternative would continue to limit safe access routes to the just-in-time auto parts supplier. The exhibit on the following page shows the proposed project (labeled 1), and the alternative project that was considered (labeled 2).

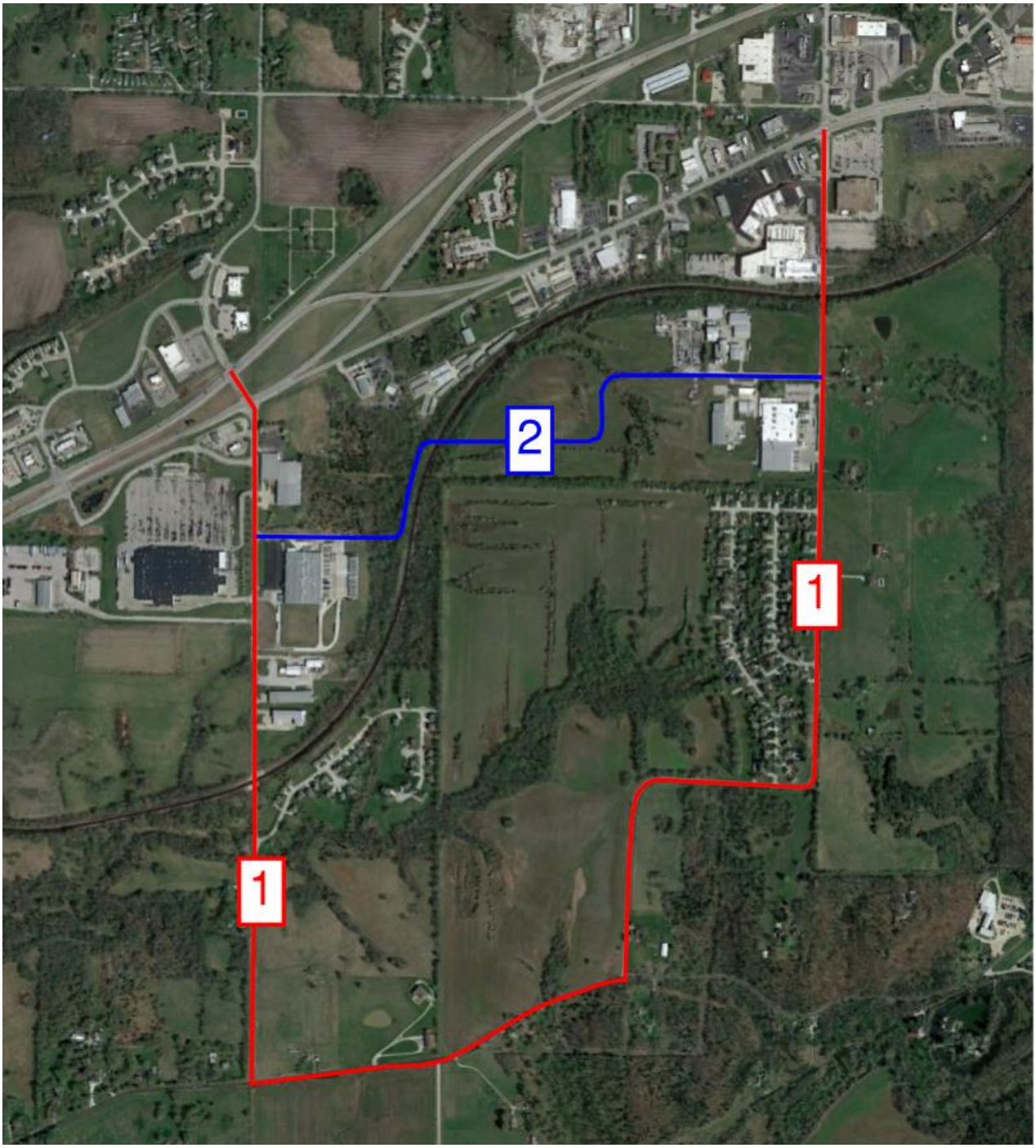

Figure 4-2 – Alternatives Considered Map (In addition to no-project alternative)

B. Construction and Average Annual O&M Cost for Each Alternative

The annual operation and maintenance cost for each alternative varies greatly, as each alternative has similar routine City infrastructure maintenance (pavement, stormwater drainage facilities, etc.).

The following table summarizes the preliminary construction cost estimates for each alternative:

Alternative	Construction Cost*	Annual O&M Cost**
1 – Johnson Industrial Drive	$6,154,209	-
2 – No Project	$0	-
3 – Corum Road Bypass	$383,061	-

* Excludes Design, Survey, Construction Administration, and Construction Observation but includes material testing

** Infrastructure maintenance, covered by Street and Sewer Funds

Table 4-1 – Alternative Construction Costs

5 RECOMMENDED ALTERNATIVE FOR PROPOSED PROJECT

A. Preferred Alternative

The alternative route via Corum Rd, St. Louis Ave, and McCleary Ave (and vice versa for traffic movements) is the preferred alternative. This alternative is the most cost-efficient of all options and will still improve traffic safety and reduce project limits and improvement extents.

Constructing this route design will have the least to no impact on existing businesses and residents in the area and will require minimal right-of-way acquisition.

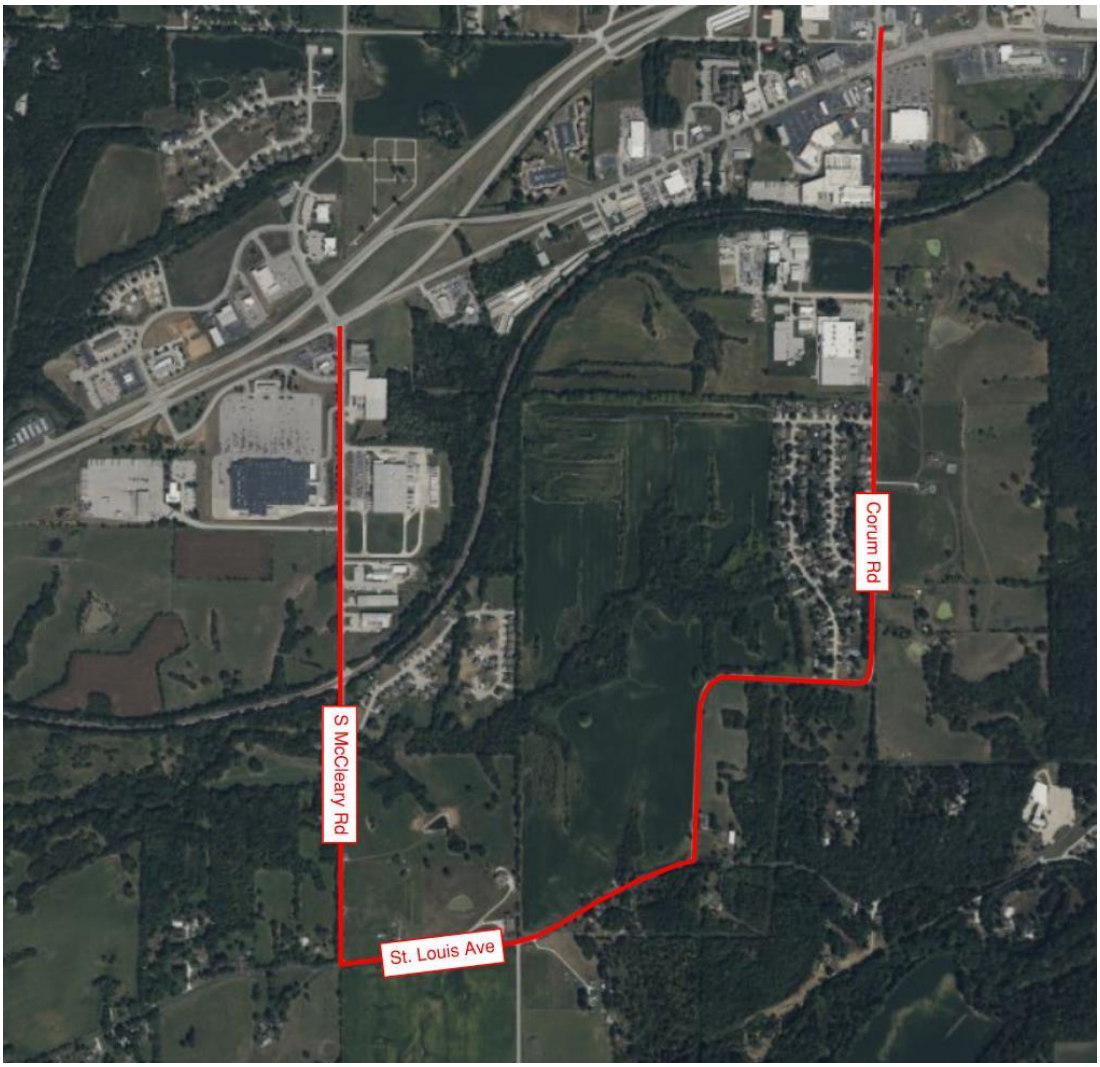

Figure 5-1 – Preferred Alternative (Bypass Via Corum Rd)

The preferred alternative will require the intersections of St. Louis Ave and S McCleary Road, and St Louis Ave and Corum Rd to be improved to accommodate semi-truck traffic. The improvements include larger intersection radii as shown in Figures 5-2 and 5-3 below. Figure 5-4 shows grade approach improvements at the existing railroad crossing.

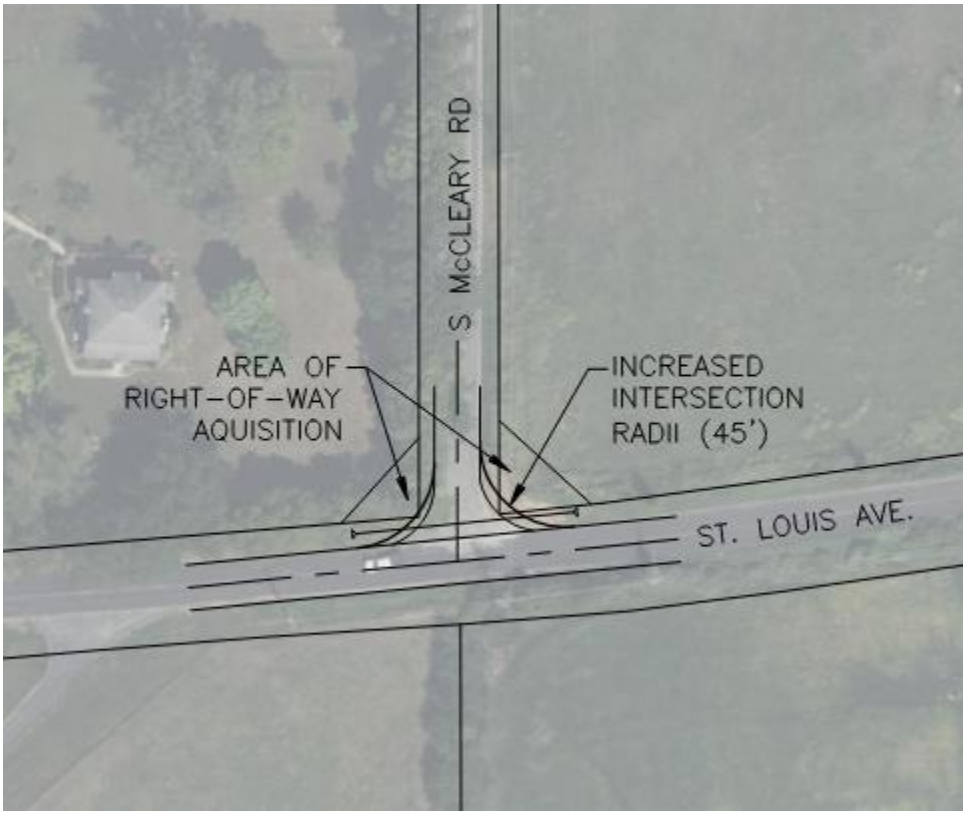

Figure 5-2 – Intersection Improvements (S McCleary Rd and St. Louis Ave)

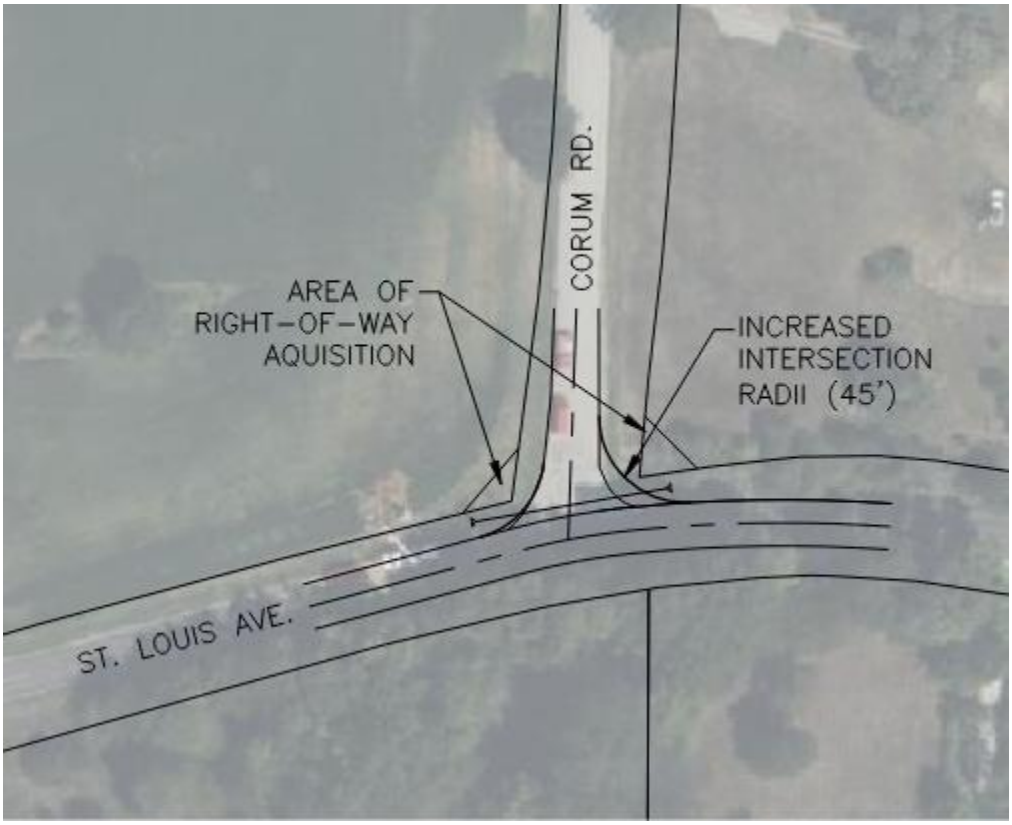

Figure 5-3 – Intersection Improvements (Corum Rd and St. Louis Ave)

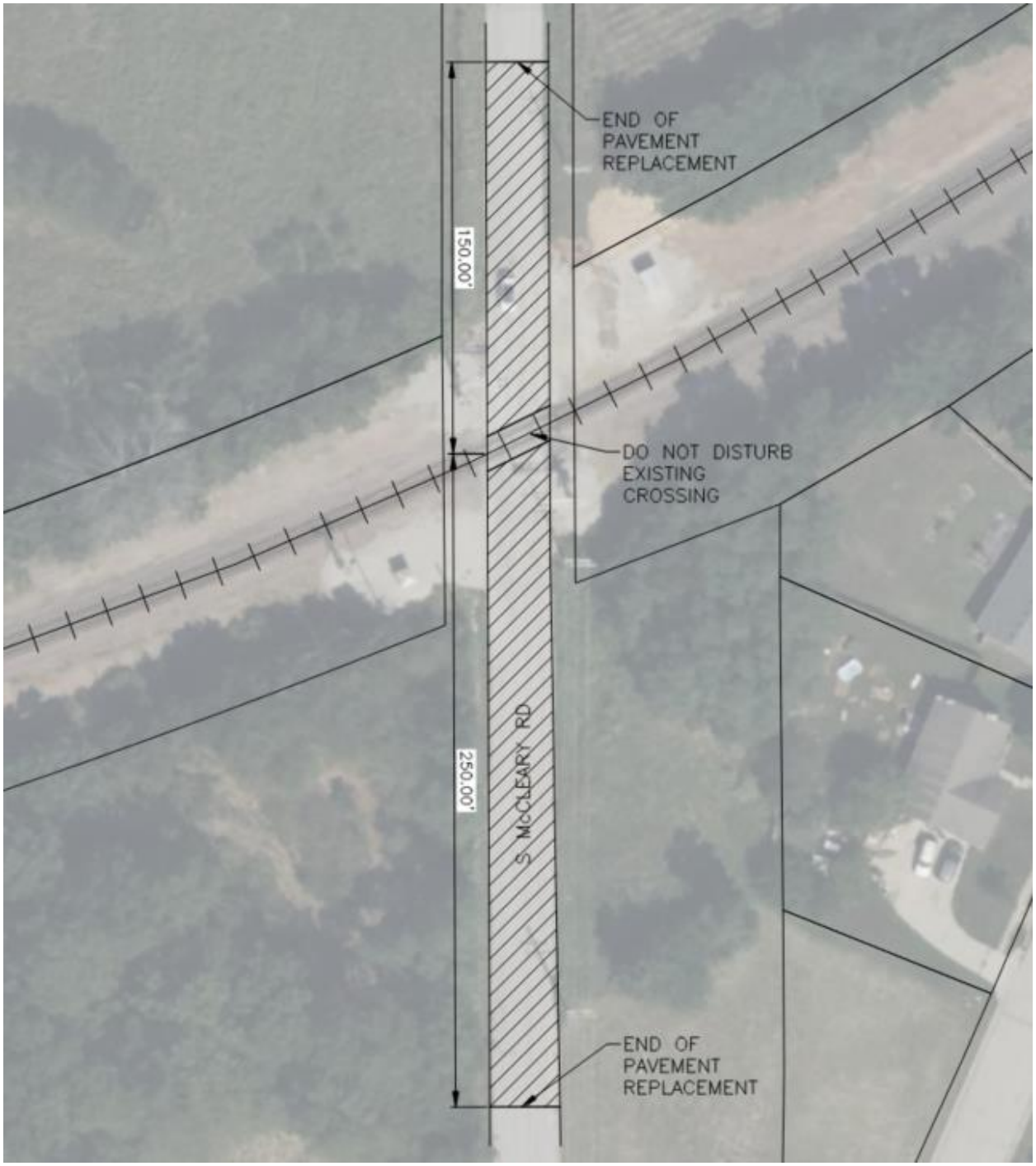

Figure 5-4 – Railway Crossing Approach Improvements (S McCleary Road)

6 PROJECT COST AND PROJECT FINANCING

A. Total Project Cost (All Sources)

The engineer's construction cost estimate is $377,400. Engineering, surveying, right-of-way acquisition agent, construction administration, and part-time construction observation is $76,932. Material testing is budgeted at $5,661. The City's project administration budget is $35,253.

B. Anticipated Annual Operation & Maintenance (O&M) Cost for Proposed Project

Covered as part of the City's routine infrastructure maintenance, funded by Street and Sewer Funds.

C. Technical, Managerial, Administrative Capacity of Owner / Applicant

The City is capable of performing grant administration. The administration and reporting costs are considered in the total project budget.

D. Funding Source(s) for all Project Costs, Additional O&M, and Replacement Costs

Funding Source	Amount
CDBG	$417,027
City	$78,219
Total	$495,246

Table 6-1 – Summary Funding Source Contributions

E. Status of Funding – Contingencies by Any Sources; Anticipated Receipt of Funding

Applications are in process.

7 ENVIRONMENTAL REVIEW / IMPACTS

A. General Impacts to Natural & Manmade Environments

The project will add approximately 2,000 square feet of impervious area, based on the recommended/preferred alternative. Increased runoff will be minimal and will not have a significant impact on existing drainage swales and stormwater conveyance systems. The primary areas of improvement are located in undeveloped/agricultural areas that will minimize hazards to the public.

B. Environmental Clearances Needed

None; see Environmental Permits paragraph below.

C. Environmental Permits Needed; Timeline for Obtaining Permits

No environmental permits will be required. Land disturbance on the project will be less than one acre, which is below the threshold for a Missouri Department of Natural Resources Land Disturbance Permit.

Proposed intersection and railroad improvements will not impact Waters of the United States, therefore a US Army Corps of Engineers Nationwide Permit will not be required.

D. Environmental Impacts for No Project Alternative

Not applicable.

E. Maps, Photos, Environmental Studies and Narratives

Figure 7-1 – FEMA Flood Map

Flood map 29047C0159E, and 29047C0178E effective 8/03/2015

The project is located in unshaded-Zone X, which are areas determined to be outside of the 0.2% annual chance floodplain, areas of 1% annual chance flood with average depth less than one foot, or with drainage areas of less than one square mile.

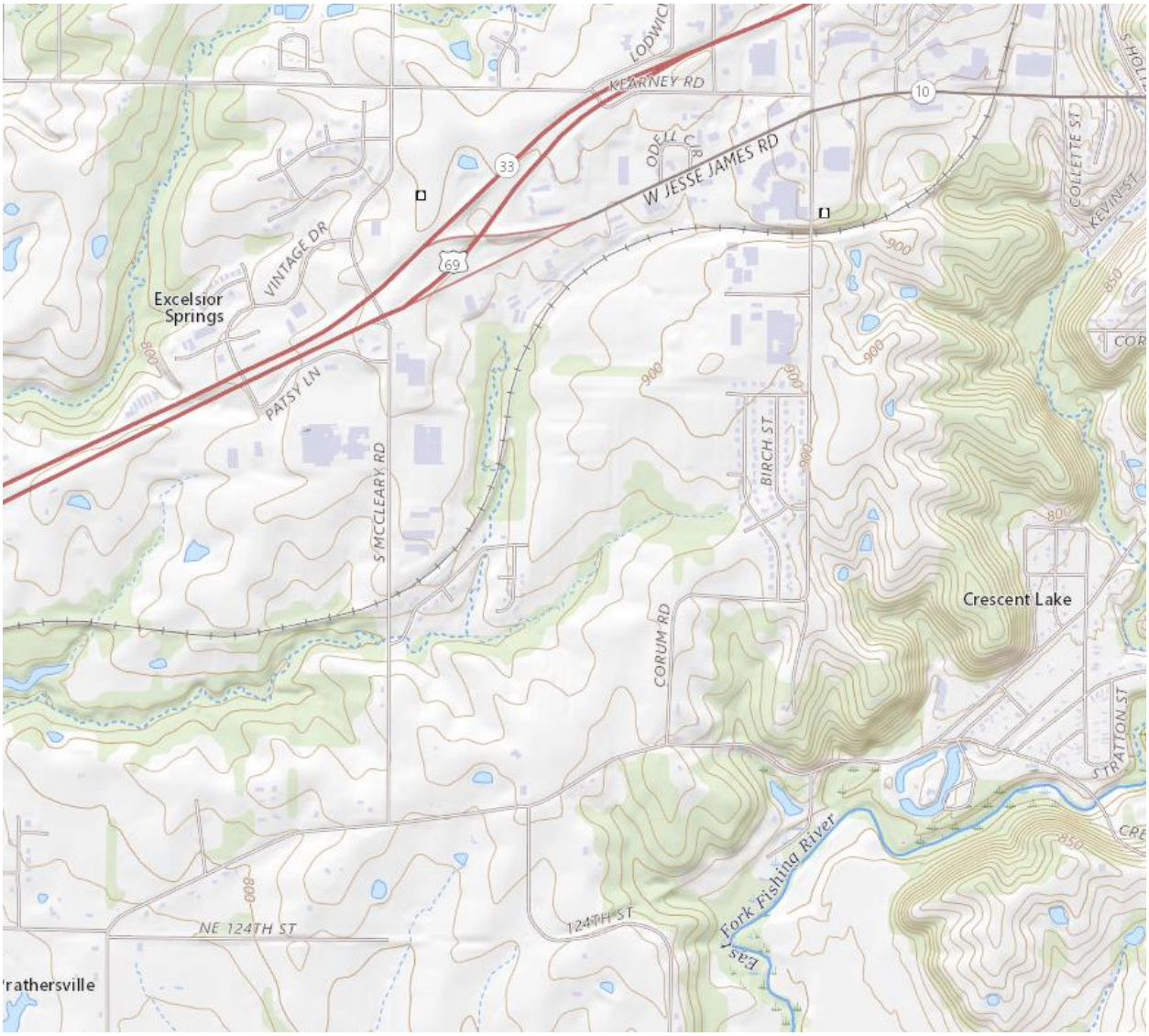

Figure 7-2 – USGS Geological Survey Map

This is a 2014 USGS topographic map.

F. Location, Significance, and Anticipated Impacts to Important Resources

Impacts to important resources near the project site will be minimal, as most of the proposed project infrastructure improvements are enhancements to existing infrastructure. Best management practices will be utilized for erosion and sediment control to protect existing drainage ways.

G. Land Use Compatibility and Planning and Zoning

The Future Land Use Map identifies Mixed Use and Civic Uses along the proposed route. The proposed improvements will not hinder that plan and vision.

H. Construction Best Management Practices and Construction Staging Controls

An erosion control plan will be developed that includes best management practices to keep construction sediment and pollutants from getting into waterways. Proper construction staging will be implemented to reduce sediment.

I. Stormwater Drainage NPDES Permitting and SWPPP

As land disturbance activities will not exceed one acre, a Missouri Department of Natural Resources land disturbance permit will not be required for the project. An erosion control plan will be developed that includes best management practices to keep construction sediment and pollutants from getting into waterways.

8 CONCLUSION

A. Final Recommendation

The intersection widening and railway crossing regrading improvements are recommended to provide secondary access to US-69 for Magna Seating Factory and improve traffic operations and safety for the community to support increased semi-truck traffic.

B. Additional Information and Explanations

None.

LAMP RYNEARSON

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Date: 10/11/2023

Conceptual Engineer's Construction Cost Estimate
Highway 69 Alternative Routes
Johnson Industrial Drive
City of Excelsior Springs, MO

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Total
1	Mobilization	L.S.	1	$ 100,000.00	$ 100,000.00
2	Clearing, Grubbing, Demolition	L.S.	1	$ 50,000.00	$ 50,000.00
3	Asphaltic Concrete Surface (2") (Type 5 Modified)	S.Y.	15,800	$ 10.00	$ 158,000.00
4	Asphaltic Concrete Base (8") (Type 5 Modified)	S.Y.	15,800	$ 45.00	$ 711,000.00
5	Aggregate Base (6") (MoDOT Type 5)	S.Y.	18,800	$ 12.00	$ 225,600.00
6	Curb and Gutter (CG-1)	L.F.	9,000	$ 32.00	$ 288,000.00
7	Commercial Driveway (8")	S.Y.	900	$ 100.00	$ 90,000.00
8	Curb Inlet (6'x4')	EA.	24	$ 8,500.00	$ 204,000.00
9	Area Inlet (5'x5')	EA.	4	$ 8,000.00	$ 32,000.00
10	Junction Box	EA.	6	$ 8,000.00	$ 48,000.00
11	Storm Pipe (24" RCP) (Average Pipe Size)	L.F.	3,800	$ 200.00	$ 760,000.00
12	Concrete Headwall	Ea.	2	$ 20,000.00	$ 40,000.00
13	Box Culvert	LF	135	$ 1,250.00	$ 168,750.00
14	Bridge (Railroad Crossing)	L.S.	1	$ 1,250,000.00	$ 1,250,000.00
15	Earthwork	L.S.	1	$ 250,000.00	$ 250,000.00
16	Seeding, Fertilizing, and Mulching	L.S.	1	$ 30,000.00	$ 30,000.00
17	Pavement Marking and Signage	L.S.	1	$ 15,000.00	$ 15,000.00
18	Traffic Control	L.S.	1	$ 10,000.00	$ 10,000.00
19	Erosion Control	L.S.	1	$ 20,000.00	$ 20,000.00
20	Construction Staking	L.S.	1	$ 30,000.00	$ 30,000.00

Subtotal:	$	4,480,350
Contingency (30%):	$	1,344,105
Escalation for 2024 Construction (6%):	$	268,821
Total Construction Cost:	$	6,093,276
Engineering & Surveying (10%):	$	609,328
Right-of-Way Acquisition Agent:	$	9,000
Construction Administration / Part-Time Observation (6%):	$	365,597
Testing (1%):	$	60,933
City Project Administration:	$	35,253
Total Cost:	$	7,173,386

Notes:

1 Assumes no easement or right-of-way acquisition costs (assumes donated).
2 Excludes sanitary sewer or water main improvements.

LAMP RYNEARSON

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LampRynearson.com

Date: 10/11/2023

Conceptual Engineer's Construction Cost Estimate
Highway 69 Alternative Routes
Corum Road Bypass
City of Excelsior Springs, MO

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Total
1	Mobilization	L.S.	1	$ 25,000.00	$ 25,000.00
2	Clearing, Grubbing, Demolition	L.S.	1	$ 20,000.00	$ 20,000.00
3	Asphalt Mill (2")	S.Y.	250	$ 6.00	$ 1,500.00
4	Asphaltic Concrete Surface (2") (Type 5 Modified)	S.Y.	1,500	$ 10.00	$ 15,000.00
5	Asphaltic Concrete Base (8") (Type 5 Modified)	S.Y.	1,250	$ 45.00	$ 56,250.00
6	Aggregate Base (6") (MoDOT Type 5)	S.Y.	1,250	$ 11.00	$ 13,750.00
7	Storm Sewer Pipe (24" RCP)	L.F.	250	$ 200.00	$ 50,000.00
8	Flared End Section (24" RCP)	EA.	4	$ 1,500.00	$ 6,000.00
9	Seeding, Fertilizing, and Mulching	L.S.	1	$ 8,000.00	$ 8,000.00
10	Earthwork	L.S.	1	$ 50,000.00	$ 50,000.00
11	Pavement Marking and Signage	L.S.	1	$ 8,000.00	$ 8,000.00
12	Traffic Control	L.S.	1	$ 12,000.00	$ 12,000.00
13	Erosion Control	L.S.	1	$ 7,500.00	$ 7,500.00
14	Construction Staking	L.S.	1	$ 4,500.00	$ 4,500.00

Subtotal:	$	277,500
Contingency (30%):	$	83,250
Escalation for 2024 Construction (6%):	$	16,650
Total Construction Cost:	$	377,400
Engineering & Surveying (12%):	$	45,288
Right-of-Way Acquisition Agent:	$	9,000
Construction Administration / Part-Time Observation (6%):	$	22,644
Testing (1.5%):	$	5,661
City Project Administration:	$	35,253
Total Cost:	$	495,246

Notes:

1 Assumes no easement or right-of-way acquisition costs (assumes donated).

Public Works
Capital Improvements Authority Meeting - 1/8/2024

To:	Authority Members
From:	Chad Birdsong, Director of Public Works
Date	1/4/2024
RE:	Approval: Transportation Trust Financials from July to December of 2023

Chad Birdsong, Director of Public Works

ATTACHMENTS:

Description	Type	Upload Date
Trans Trust Financials July-Dec. 2023	Cover Memo	1/4/2024

TRANSPORTATION TRUST SALES TAX				
Transactions for December 2023				
Beginning Balance			**$1,826,418.69**	
Total Cash			**$1,826,418.69**	
Revenues:				
City Sales Tax	$93,499.14			
City Use Tax	$16,229.70			
Interest Income				
Investment Interest				
Total Revenue			$109,728.84	
Disbursements:				
Bank Charges	-$37.80			
Infrastructure Repairs	-$2,886.00			
Misc Concrete repairs	-$898.85			
Pavement Scanning	-$2,770.40			
Total Expense			-$6,593.05	
Ending Balance			**$1,929,554.48**	
Committed Funds: (12/11 Meeting)				
Infrastructure Repairs	-$6,953.00			
Misc Concrete Repairs	-$43,898.42			
Snow Removal	-$19,080.00			
Transporation Medical Operations	-$25,000.00			
Operating Transfers to Finance				
2023 Overlay	-$41,263.50			
2024 Streetscape Engineering	-$53,300.00			
Bus Purchase	-$15,000.00			
Pavement Scanning	-$12,374.57			
Total Committed Funds			-$216,869.49	
Total Spendable Cash Balance			**$1,712,684.99**	

TRANSPORTATION TRUST SALES TAX				
Transactions for November 2023				
Beginning Balance			**$2,298,940.58**	
Total Cash			**$2,298,940.58**	
Revenues:				
City Sales Tax	$85,515.27			
City Use Tax	$15,289.76			
Elms TIF	-$990.97			
Golf TIF	-$30.38			
Interest Income				
Investment Interest				
Total Revenue			$99,783.68	
Disbursements:				
Bank Charges	-$37.80			
Infrastructure Repairs	-$1,327.19			
Misc Concrete repairs	-$659.53			
2023 Overlay	-$538,894.85			
Pavement Scanning	-$31,386.20			
Total Expense			-$572,305.57	
Ending Balance			**$1,826,418.69**	
Committed Funds:				
Infrastructure Repairs	-$9,839.00			
Misc Concrete Repairs	-$44,797.27			
Snow Removal	-$19,080.00			
Transportation Medical Operations	-$25,000.00			
Operating Transfers to Finance				
2023 Overlay	-$41,263.50			
Bus Purchase	-$15,000.00			
Pavement Scanning	-$15,144.97			
Total Committed Funds			-$170,124.74	
Total Spendable Cash Balance			**$1,656,293.95**	

TRANSPORTATION TRUST SALES TAX				
Transaction for October 2023				
Beginning Balance			**$2,206,249.41**	
Total Cash			**$2,206,249.41**	
Revenues:				
City Sales Tax	$87,034.85			
City Use Tax	$13,552.58			
TIF Elms	-$1,345.24			
TIF Golf	-$54.62			
Interest Income	$655.18			
Investment Interest				
Total Revenue			$99,842.75	
Disbursements:				
Bank Charges	-$37.80			
Infrastructure Repairs	-$5,904.59			
Misc Concrete repairs	-$1,209.19			
Transfers				
Total Expense			-$7,151.58	
Ending Balance			**$2,298,940.58**	
Committed Funds:				
Infrastructure Repairs	-$11,166.19			
Misc Concrete Repairs	-$45,456.80			
Snow Removal	-$19,000.00	19080.10		
Transportation Medical Operations	-$25,000.00			
Operating Transfers to Finance				
2023 Overlay	-$580,158.35			
Bus Purchase	-$15,000.00			
Pavement Scanning	-$46,531.17			
Total Committed Funds			-$742,312.51	
Total Spendable Cash Balance			**$1,556,628.07**	

TRANSPORTATION TRUST SALES TAX				
Transactions for September 2023				
Beginning Balance			**$2,343,375.55**	
Total Cash			**$2,343,375.55**	
Revenues:				
City Sales Tax	$100,504.15			
City Use Tax	$14,029.25			
Golf TIF	-$84.14			
Elms TIF	-$4,839.40			
Interest Income	$1,764.39			
Investment Interest	$1,470.00			
Total Revenue			$112,844.25	
Disbursements:				
Bank Charges (March & Sept)	-$75.60			
Infrastructure	-$48,638.50			
Misc Concrete Repairs	-$22.64			
Snow Removal				
2023 Overlay	-$189,233.65			
Transportation Operations				
Operating Transfers To Finance	-$12,000.00			
Bus Purchase				
Pavement Scanning Project				
Total Expense			-$249,970.39	
Ending Balance			**$2,206,249.41**	
Committed Funds:				
Infrastructure	-$17,070.78			
Misc Concrete Repairs	-$46,663.99			
Snow Removal	-$19,080.00			
Transportation Medical Operations	-$25,000.00			
Operating Transfers to Finance	$0.00			
2023 Overlay	-$580,158.35			
Bus Purchase	-$15,000.00			
Pavement Scanning	-$46,531.17			
Total Committed Funds			-$749,504.29	
Total Spendable Cash Balance			**$1,456,745.12**	

TRANSPORTATION TRUST SALES TAX				
Transactions for August 2023				
Beginning Balance			**$2,225,864.15**	
Total Cash			**$2,225,864.15**	
Revenues:				
City Sales Tax	$91,634.87			
City Use Tax	$25,100.55			
Golf TIF	-$82.85			
Investment Interest				
Interest Income	$2,055.37			
Total Revenue			$118,707.94	
Disbursements:				
Bank Charges	-$37.80			
Infrastructure	-$45.98			
Misc Concrete Repairs	-$1,112.76			
Snow Removal				
2023 Overlay				
Transportation Operations				
Operating Transfers To Finance				
Bus Purchase				
Pavement Scanning Project				
Total Expense			-$1,196.54	
Ending Balance			**$2,343,375.55**	
Committed Funds:				
Infrastructure	-$65,709.28			
Misc Concrete Repairs	-$46,686.63			
Snow Removal	-$19,080.00			
Transportation Medical Operations	-$25,000.00			
Operating Transfers to Finance	-$12,000.00			
2023 Overlay	-$769,392.00			
Bus Purchase	-$15,000.00			
Pavement Scanning	-$46,531.17			
Total Committed Funds			-$999,399.08	
Total Spendable Cash Balance			**$1,343,976.47**	

TRANSPORTATION TRUST SALES TAX				
Transactions for July 2023				
Beginning Balance			**$2,120,620.63**	
Total Cash			**$2,120,620.63**	
Revenues:				
City Sales Tax	$100,062.31			
City Use Tax	$16,972.10			
TIF Elms				
TIF Golf	-$99.74			
Interest Income	$1,832.28			
Investment Interest				
Total Revenue			$118,766.95	
Disbursements:				
Bank Charges	-$37.80			
Infrastructure	-$1,133.39			
Misc Concrete Repairs	-$3,402.24			
Snow Removal				
2023 Overlay	-$8,950.00			
Transportation Operations				
Operating Transfers To Finance				
Bus Purchase				
Pavement Scanning Project				
Total Expense			-$13,523.43	
Ending Balance			**$2,225,864.15**	
Infrastructure	-$65,755.26			
Misc Concrete Repairs	-$47,799.39			
Snow Removal	-$19,080.00			
Transportation Medical Operations	-$25,000.00			
Operating Transfers to Finance	-$12,000.00			
2023 Overlay	-$769,392.00			
Bus Purchase	-$15,000.00			
Pavement Scanning	-$46,531.17			
Total Committed Funds			-$1,000,557.82	
Total Spendable Cash Balance			**$1,225,306.33**	

City Council Meetings
Capital Improvements Authority Meeting - 1/8/2024

To:	Authority Members
From:	Chad Birdsong, Director of Public Works
Date	1/2/2024
RE:	Approval: Trans Trust Budget for Fiscal Year 2024

Chad Birdsong, Director of Public Works

ATTACHMENTS:

Description	Type	Upload Date
2024 Trans Trust Budget	Backup Material	1/4/2024

Transportation Trust Budget for 2024 Fiscal Year

1/8/2024

Ending balance as of December 2023			$1,929,554.48	
Budgeted funds for Projects		**Description**	**Balance**	**Requested allocation**
$	150,000.00	Misc. concrete Repair Fund	$ 43,898.42	$106,101.58
$	45,000.00	Snow Removal fund	$ 19,080.00	$25,920.00
$	100,000.00	Infrastructure Fund	$ 6,953.00	$93,047.00
$	800,000.00	2024 Streetscape	$ 53,300.00	$746,700.00
$	50,000.00	Santec traffic study	$ 12,374.57	$0.00
$	800,000.00	Overlay Program for 2023	$41,263.50	
$	15,000.00	Transportation bus purchase	$ 15,000.00	$0.00
$	12,000.00	operating Transfers to finance	0.00	$12,000.00
$	25,000.00	Trans. Department Medical Operations	$ 25,000.00	$0.00
				$983,768.58

Total Committed funds balance	$ 216,869.49
Total spendable cash balance	$ 1,712,684.99
minus requested allocation	$983,768.58
Total spendable cash balance after allocation	$ 728,916.41