CAP 205: MERAMEC RIVER AT FENTON, MO

Flood Risk Management Study

Public Meeting for the Draft Report January 9, 2024 5:00 – 6:30pm

Michelle Kniep, Study Lead Matt Jones, Project Manager





Project website: <u>www.mvs.usace.army.mil/missions/programs-</u> project-management/fenton-mo-frm/





AGENDA

- Introductions and meeting format
- Overview of the study & the study area
- The study process and what's been done so far
- The Tentatively Selected Plan
- Path forward & the importance of public input
- Comments & questions





LOCAL SPONSOR: City of Fenton, Missouri



AGENCY COORDINATION









STUDY AUTHORITY

U.S. Army Corps of Engineers Continuing Authorities Program (CAP) Section 205, Flood Control Act of 1948, as amended. 33 USC 701s

What is CAP?

A suite of nine authorities under which the Corps can plan, design, and implement certain types of water resources projects without additional project specific congressional authorization.

Section 205 is for small flood risk management projects that are relatively small in size, scope, and complexity with limitations on costs and scope.







MERAMEC FLOODING IN THE STUDY AREA



Winter 2015 - 2016

Spring 2017









USACE PROCESS

- 1. Generally identify the flooding problems and determine objectives for flood risk reduction
- 2. Identify the existing conditions in detail and estimate future conditions
- 3. Develop several alternatives to reduce flood risk
- 4. Evaluate the effectiveness and impacts of each alternative
- 5. Compare the alternatives to each other
- 6. Select the best plan
- Stakeholder involvement throughout
- Gather evidence throughout







PRIOR RELATED STUDIES

- 2018 USACE and local communities developed a Lower Meramec Multi-Jurisdictional Floodplain Management Plan with mitigation techniques.
- 2022 Yarnell Creek PAS Flood Risk Evaluation for City of Fenton; Federal Interest Determined under the Corps' CAP Program; Feasibility Cost Sharing Agreement signed by City of Fenton.
- This Study:
 - Completed Federal Interest Determination (FID) in March 2022.
 - 2023 Federal and sponsor funds received to initiate Feasibility Study; study kick-off.





EXISTING CONDITIONS -POPULATION & STRUCTURES

- In the Meramec River 1% AEP (100-year) floodplain in the City of Fenton there are approximately 87 flood prone structures which include:
 - Commercial 58
 - Residential 12
 - Public 1
 - Industrial 16
- The average depth of flooding on these structures for the 1% AEP event varies from 1.1 to 3.6 feet.







EXISTING CONDITIONS - ECONOMIC RISK

Fenton, Missouri								
Damages by Probability Event								
Probability	Return Period	Number of	Existing Conditions					
Event	Terminology	Structures	Damages (\$)					
50%	2-year	0	0					
20%	5-year	1	158,190					
10%	10-year	9	793,850					
4%	25-year	18	3,219,350					
2%	50-year	37	19,623,930					
1%	100-year	87	80,774,780					
0.5%	200-year	119	166,230,900					
0.2%	500-year	190	262,393,730					





EXISTING CONDITIONS - LIFE RISK

Model Used: Life-Safety Risk Indicator (LSRI)

Events modeled: 1% and 0.2% AEP

Results:

 The green hexagon areas do not have direct life-risk concerns in either the 1% or 0.2% AEP events in the LSRI models.







FUTURE WITHOUT PROJECT CONDITION

50-year Period of Analysis

Flood Conditions – No change

- Large upstream watershed with no known large development
- No known plans for changes to bridges, culverts, or crossings in or near Fenton
- Lack of clear consensus on future hydrologic changes due to climate change

Economic Damages – Small change

- City is largely developed and has reasonable restrictions on development
- Wastewater treatment plant to be abandoned in near future removed from models

Life Risk – No Change

• City is largely developed, unlikely to be any significant changes to the population, critical infrastructure and evacuation routes

Environmental and Cultural Resources - No change





EXISTING CONDITIONS: ENVIRONMENTAL RESOURCES

- Water Quality
 - Meramec River Priority Waters, Sensitive Aquatic Species, & Spawning Reaches
 - Clean Water Act Section 305b Impaired Rivers and Streams:
 - Fenton Creek: E. coli, Chloride
 - Meramec River: Lead
- Environmental Quality Concerns: Phase 1 Environmental Site Assessment completed
- Threatened & Endangered Species:
 - Gray, Indiana, Northern Long-eared, Tricolored Bats;
 - Pick Mucket, Spectaclecase, Scaleshell, Snuffbox Mussels;
 - Eastern hellbender; Decurrent False Aster; Monarch Butterfly





EXISTING CONDITIONS: CULTURAL AND TRIBAL RESOURCES

USACE is working with the State Historic Preservation Office, Native American Tribes, and other consulting parties through the Section 106 process of the National Historic Preservation Act of 1966, which mandates federal projects account for their effects on historic properties.

- There are several known archaeological sites and one known historic property. The historic property is not inundated by the 0.2% AEP event.
- There are several structures potentially eligible for inclusion on the National Register of Historic Places
- There are several known tribal resources.







PROBLEMS & OPPORTUNITIES

Problems:

- Flooding of residences and businesses
- Flooding of public structures and critical infrastructure
- Indirect life safety risk associated with flooding of transportation and emergency corridors

Opportunities:

- Increase flood risk awareness in the city
- Increase recreation and educational opportunities associated with flood risk reduction features
- Increase environmental improvement opportunities associated with flood risk reduction features





STUDY GOAL & OBJECTIVES

Goal: Reduce life safety risk and economic damages due to flooding of the Meramec River in Fenton, Missouri.

Objectives:

- Reduce life safety risk
- Reduce economic damage
- Increase recreational opportunities (if applicable)



FLOOD RISK REDUCTION MEASURES

Structural

- Detention structures
- Diversion structures
- Channel modifications
- Levees/Floodwalls

Non-Structural

- Floodproofing (wet and dry)
- Elevating structures in-place
- Buyouts or permanent relocations
- Flood forecasting/warning system
- Risk communication/education
- Ordinances/regulations

Nature-Based

- Floodplain restoration
- Watershed restoration/ conservation







PLAN FORMULATION – ALTERNATIVES AND FINAL ARRAY

The following alternatives were developed and carried forward for development and evaluation:

- No Action Alternative
- Alternative 2: Levees
- Alternative 3: Nonstructural
- Alternative 4: Combination of Levees and Nonstructural





ALTERNATIVE 2 – LEVEES / FLOODWALLS

- Levees/floodwalls were considered in the FID (March 2022)
 - All were analyzed for the 1% AEP event
 - Highest benefit-to-cost ratio (BCR) was 0.23
- Study team considered if shorter levees addressing more frequent events might be more cost-effective
 - Levee 2 selected for analysis because had highest FID BCR (0.23)
 - 4% AEP was selected for analysis
 - 5.5 feet height reduction
 - Still needed some floodwalls and closure structures
 - If all damages through the 4% event were eliminated by the levee, the maximum supportable project cost would be \$3.9M
- Given anticipated construction, real estate and mitigation costs, the PDT concluded there is likely no cost-effective levee plan







ALTERNATIVE 3 – NON-STRUCTURAL FORMULATION

Grouped structures by:

- Structure type
- Flood risk depth, frequency
- Left/right bank (of Yarnell Creek)
- Physical separation (major roads)
- Overlap with prior levee alternatives

Results:

- 8 Initial Reaches
- 3 reaches screened out that had minimal flood damages through the 1% event
- Retained for analysis:
 - Reach 1 large purple area to the north
 - Reach 2 green area directly south of reach 1
 - Reach 3 brown area directly south of reach 2
 - Reach 5 neon green area just south of Hwy 30 (Gravois)
 - Reach 8 purple area in Fenton City Park







ALTERNATIVE 3 – NON-STRUCTURAL EVALUATION

	Net Benefits \$ (in thousands)					
AEP						
Event	Reach 1	Reach 2	Reach 5	Reach 6	Reach 8	Total
10%	0	0	85.92	0	33.55	119.47
4%	0	0	175.73	0	32.76	208.49
2%	-401.87	-13.03	152.99	0	32.76	-229.15
1%	-2308.7	-22.82	141.86	0	32.76	-2156.89
0.5%	-3457.8	-65.71	57.18	0	32.76	-3433.52
0.2%	-4349.8	-302.33	-63.49	-227.09	32.76	-4909.9





EVALUATION OF FINAL ARRAY – CRITERIA AND COSTS

Primary Evaluation Criteria: Meets Planning Objectives Economic costs and benefits

Alternative	Project First Cost
No Action Alternative	\$0
Alternative 2 – Levees	NA
Alternative 3 – Non-Structural	\$3,349,000



TSP - ALTERNATIVE 3 – NON-STRUCTURAL

Nonstructural Plan				
Nonstructural Action				
Floodproofing	13 Commercial, 0 Residential			
Acquisition	0 Commercial, 0 Residential			
Elevation	1 Residential			
Costs				
Total Project Cost	\$3,349,000			
Annual O&M Costs	\$0			
Annualized Costs	\$127,000			
Economic Benefits				
Annual Damages Reduced				
(Benefits)	\$332,000			
Net Benefits	\$205,000			
Benefit to Cost Ratio	2.6			
Environmental Impacts	None			
Cultural Impacts	TBD			
Real Estate	14 properties - \$348,000			
Residual Risk				
Life Safety	Unchanged - minimal			
Economic Damages	\$2,082,000			
Critical Infrastructure	Unchanged - minimal			







WET FLOODPROOFING (NON-STRUCTURAL)













ELEVATION (NON-STRUCTURAL)



Images: USACE



CULTURAL RESOURCES

- Archaeological and architectural surveys are planned to determine if any historic properties are eligible for listing on the National Register of Historic Properties are present and, if so, how the planned nonstructural actions may need to be modified.
- If any eligible historic properties are identified, the project will try to avoid the properties. If the properties cannot be avoided any adverse effects would be assessed and mitigated.
- Tribal coordination will continue.

THIS PROPERTY HAS BEEN PLACED ON THE **NATIONAL REGISTER OF HISTORIC PLACES** BY THE UNITED STATES DEPARTMENT OF THE INTERIOR







OVERALL STUDY TIMELINE







REMAINING TASKS TO REPORT APPROVAL

- 1. Document and consider all public, agency and Tribal comments on the draft report
- 2. Refine the TSP and complete a detailed cost estimate
 - Refine structure information to confirm nonstructural actions
 - Consider inclusion of a flood warning system
 - Consider emergency corridors
- 3. Finish environmental compliance tasks
 - Identify National Register eligible properties and coordinate with SHPO
 - Coordinate with Tribes
 - Complete environmental coordination
- 4. Complete District and Agency technical, policy and legal reviews
- 5. Report approval





WHAT INFORMATION ARE WE LOOKING FOR FROM YOU?

- 1. Does the study's assessment of existing and future conditions match your experience?
- 2. Are there viable solutions (risk reduction actions) that the planning team failed to consider?
- 3. Are there studies, reports, or data that you know of that could further help the study as the recommendation and final report is being prepared?
- 4. What is your reaction to the Tentatively Selected Plan? Is this something you would support? Is there anything you would change?
- 5. Anything else you would like the planning team to know!





COMMENTS & QUESTIONS



Comments or information can also be provided to:

Matthew.A.Jones@usace.army.mil

Or by mail to: U.S. Army Corps of Engineers, St. Louis District C/O Mr. Matthew Jones 1222 Spruce Street St. Louis, MO 63103

Project website: www.mvs.usace.army.mil/missions/programs-project-management/fenton-mo-frm/





Thank You for Coming!

