

Ames Mill Dam Replacement Feasibility Study

City Council September 12, 2023



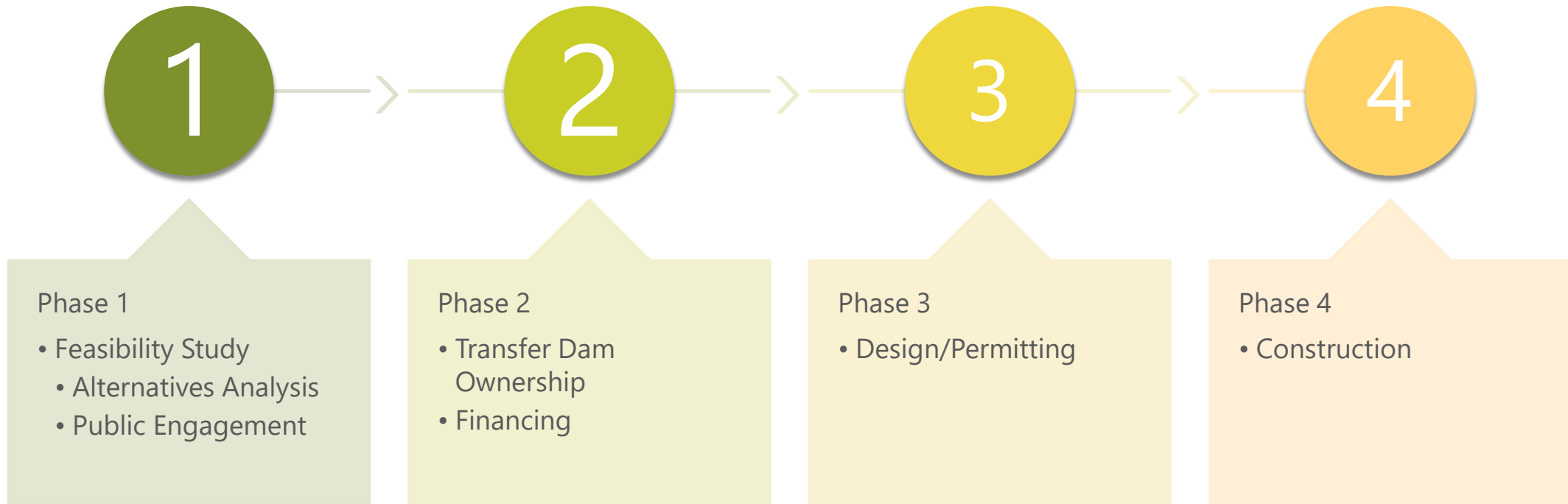
Overview

- Project Status
- Overview of options
- Evaluation of options
- Next Steps
- Discussion



Process

We are here.



City goals and priorities

- Improve public safety
- Realize riverfront plan
- Honor historic structures
- Enhance recreation opportunities
- Improve river ecology





ORTHFIELD'S CANNON RIVER REGIONAL PARK EXPERIENCE

THE 2020 RIVERFRONT
ENHANCEMENT ACTION PLAN

AMES MILL DAM RECONSTRUCTION FEASIBILITY STUDY

There is growing enthusiasm about the possibility that the Ames Mill Dam might play an important role in reinforcing the health, continuity and variety of the Cannon River State Water Trail. Designated as a wild and scenic river, the Cannon still suffers from environmental degradation and human intervention. The Ames Mill Dam, admittedly an attractive feature downtown, inhibits the natural processes of the river and limits recreational possibilities. A reconstruction of the existing dam has the potential to be both a restorative feature and significant recreational regional attraction.

A preliminary study of the dam reinforces the idea that an exciting and new whitewater experience could be created with the combination of a smaller, navigable dam and weir and a constructed whitewater course. Research has begun that outlines the potential for transferring the privately held dam to the City of Northfield. More study needs to be completed and discussion with Post properties should be ongoing to fully evaluate the implications of an eventual transformation.



Achieving the maximum potential for the dam provides an opportunity to explore reconstruction options.



Ames Park - Natural Resource + Recreation
(coordinated with dam reconstruction project)

AMES PARK



BRIDGE SQUARE



DOWNTOWN RIVERWALK

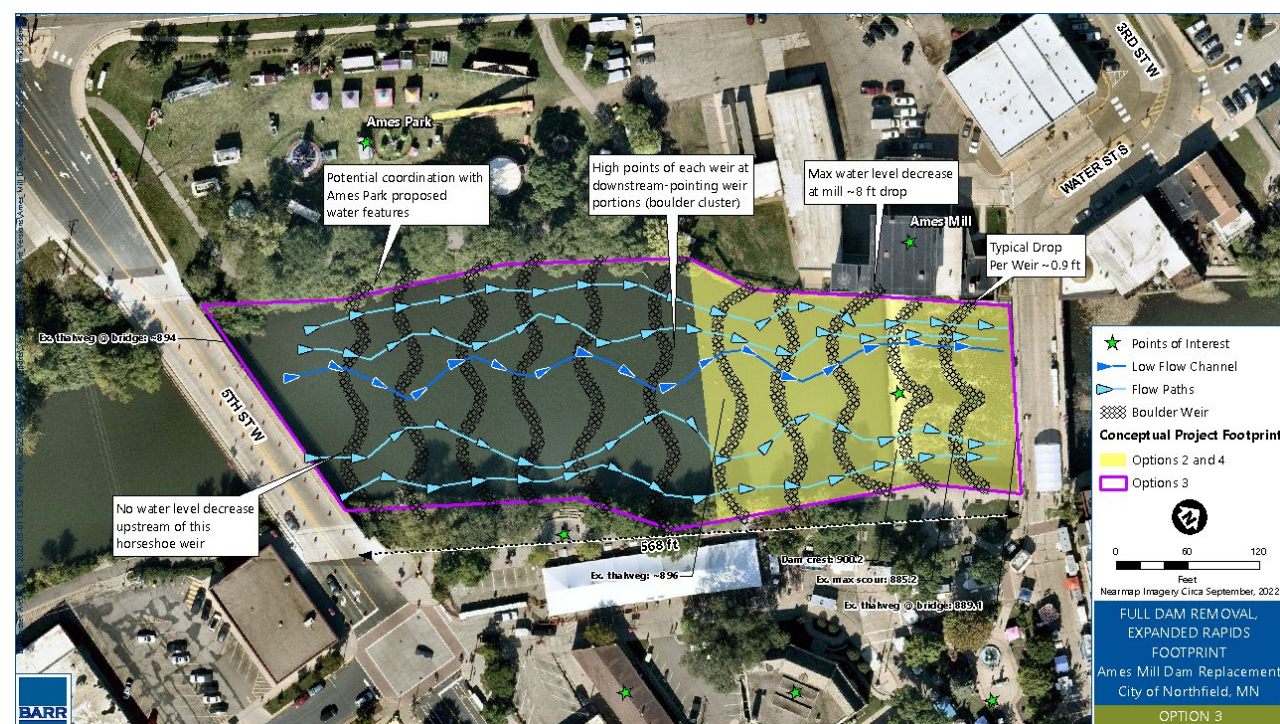
Status

Complete

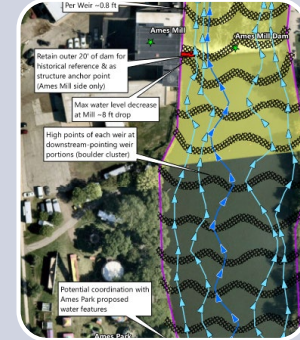
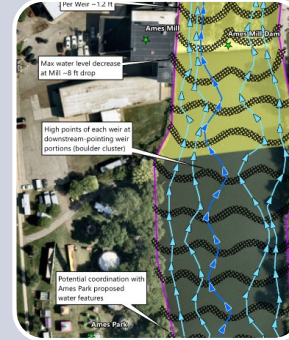
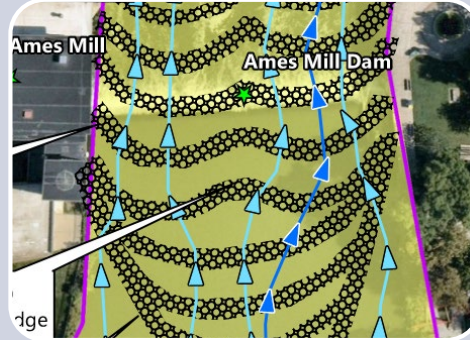
- Evaluated options
- Estimated planning level costs

Next Steps

- Meet with stakeholders
- Select a preferred option
- Initiate ownership transfer?
(depends on selected alternative)



Dam Replacement Options Evaluated



Option 1 No Action

- keep dam

Option 2 Short Rock Rapids

- full removal

Option 3 Long Rock Rapids

- full removal

Option 4 Long Rock Rapids

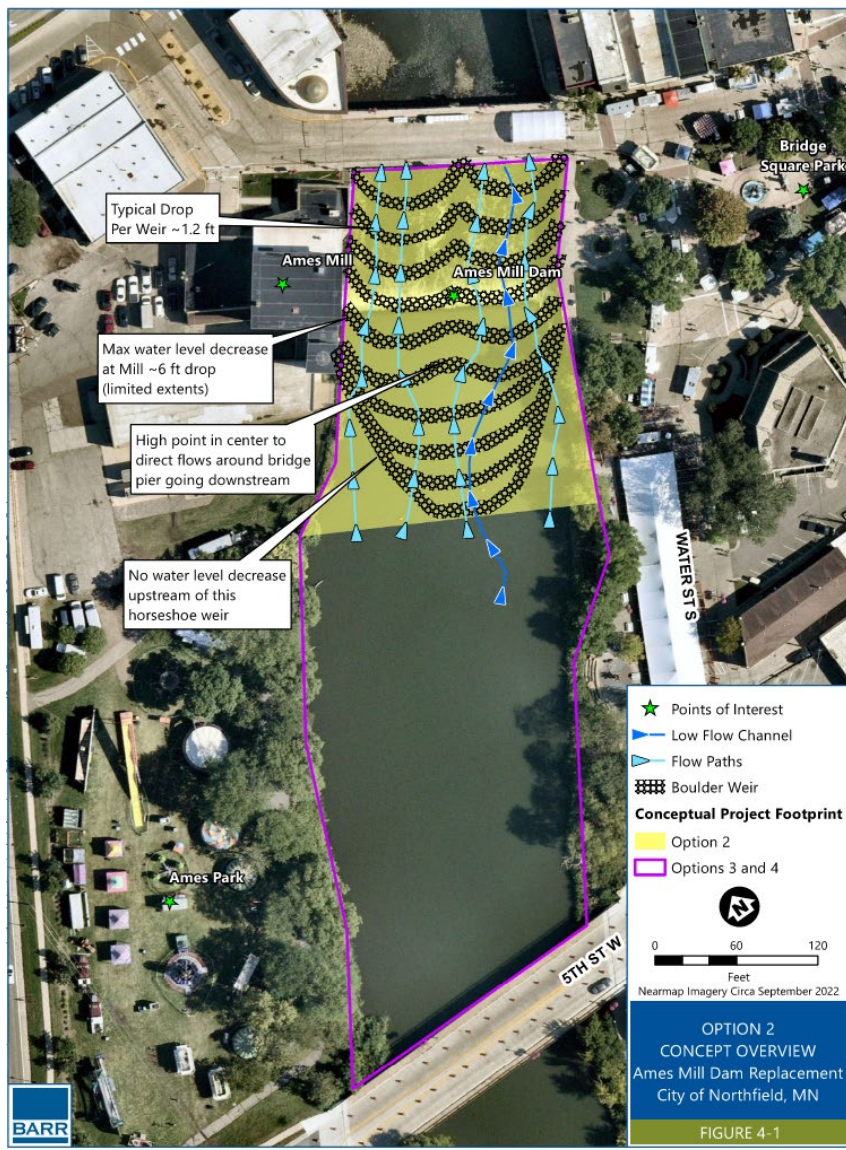
- partial
removal

Ames Mill Dam Options

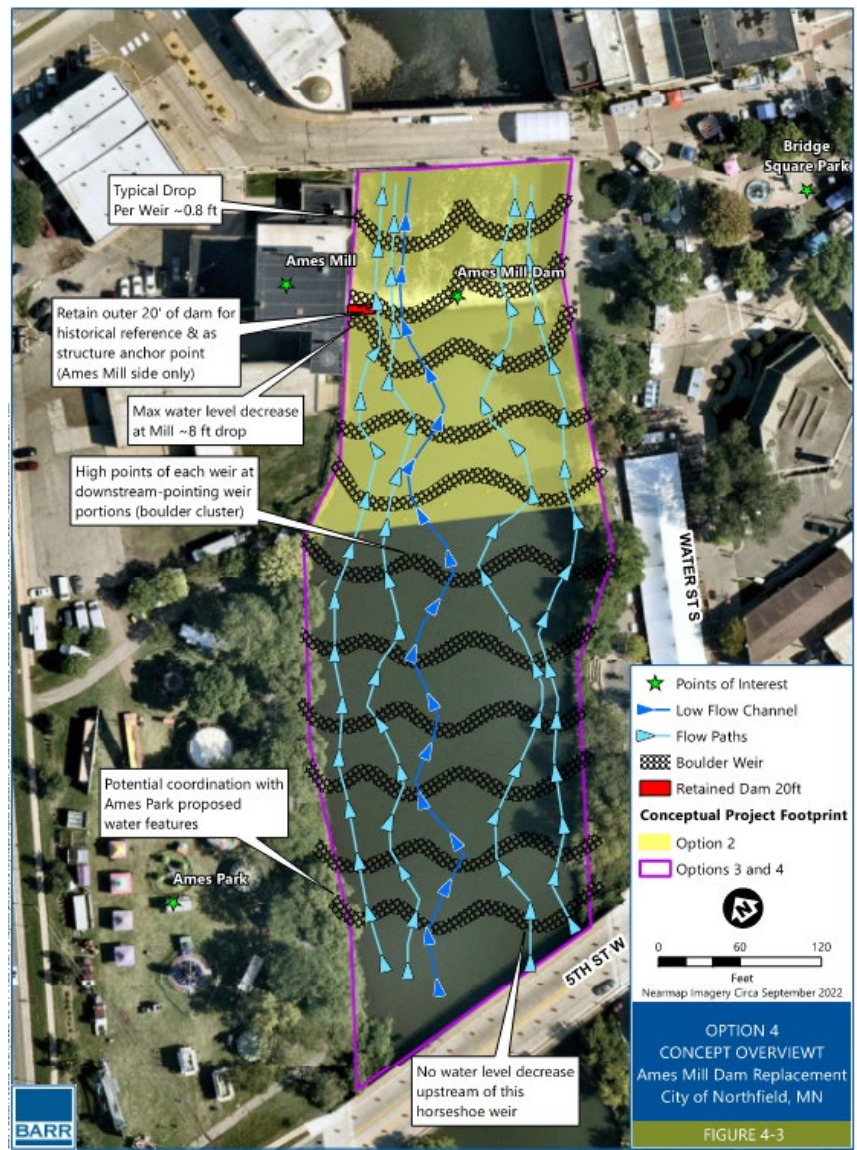
Option 1



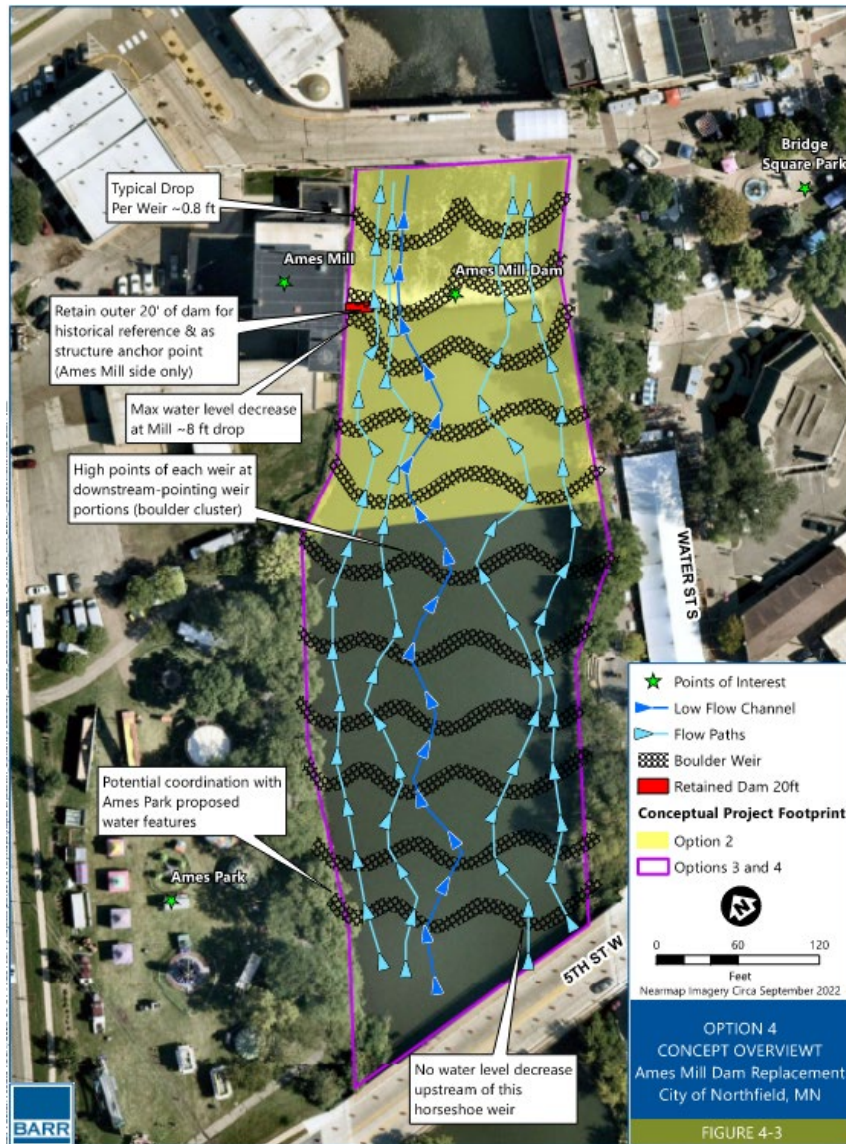
Option 2



Options 3 and 4



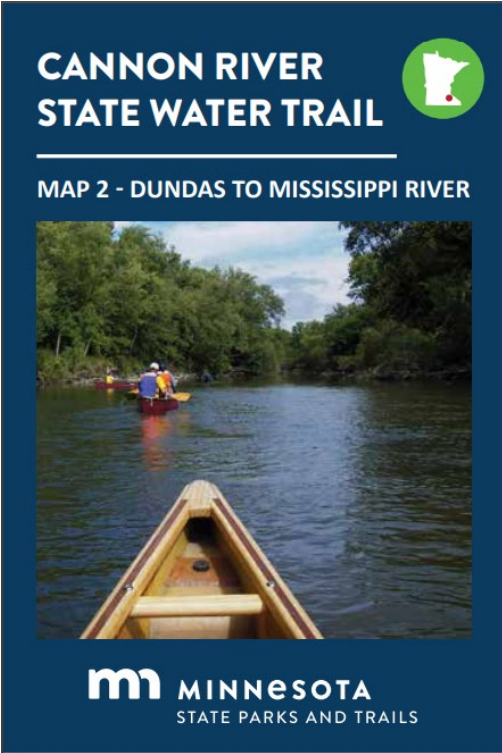
Evaluation of options



1. River hydrology and hydraulics
2. Design and construction
3. **Public recreation & safety**
4. **Aquatic organism passage**
5. Groundwater drawdown and subsidence
6. Adjacent infrastructure
7. Cultural resources
8. Permitting and environmental review
9. **Funding sources**

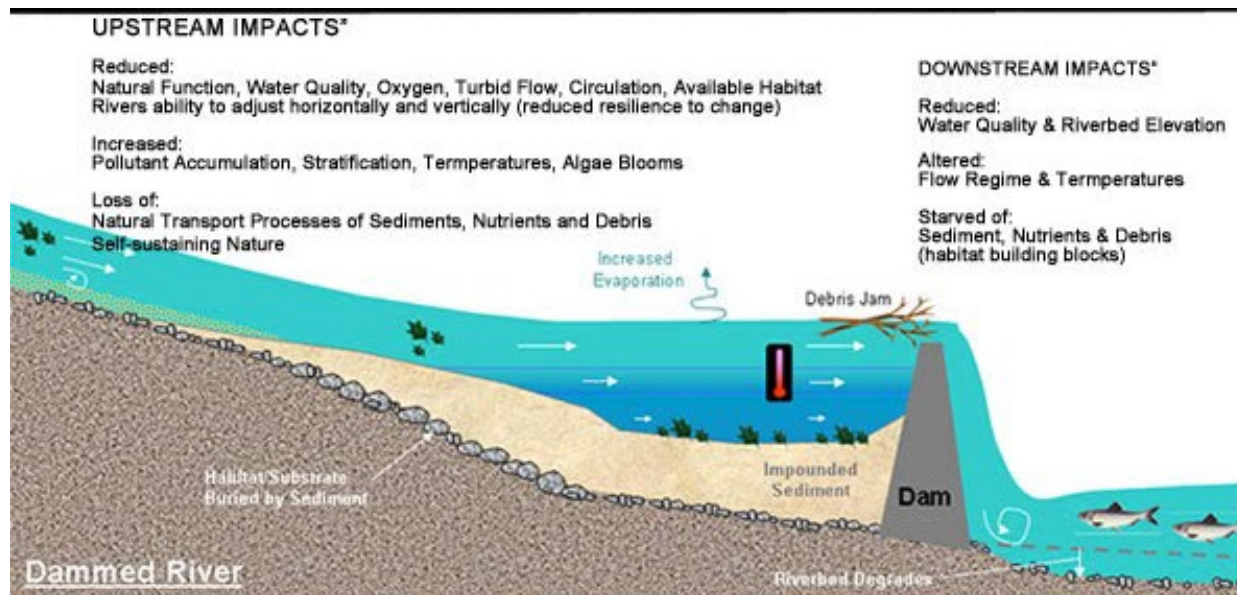
3. Public Recreation

Recreation Criteria	<i>Option 1</i> No Action	<i>Option 2</i> Short Rock Rapids	<i>Option 3</i> Long Rock Rapids	<i>Option 4</i> Long Rock Rapids, partial dam removal
Integration with Ames Mill Park	Poor	Good	Best	Best
In-water recreation	Poor	Better	Best	Best
Safety	Poor	Good	Best	Better

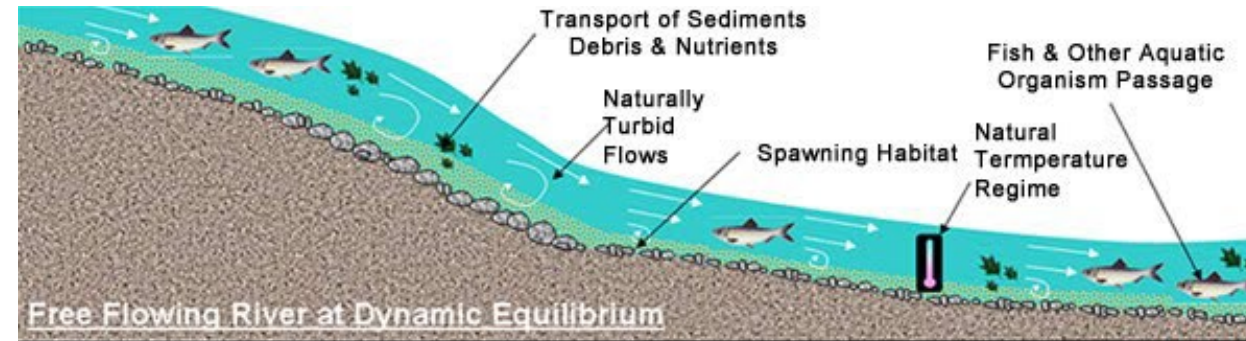


4. Aquatic Organism Passage (AOP)

Flow conditions	<u>Option 1</u> No Action	<u>Option 2</u> Short Rock Rapids	<u>Option 3</u> Long Rock Rapids	<u>Option 4</u> Long Rock Rapids, partial dam removal
Low flow	Very Unlikely	Likely	Very Likely	Very Likely
Average flow	Very Unlikely	Depends on Construction	Likely	Likely
Flood flow	Very Unlikely	Unlikely	Unlikely	Unlikely

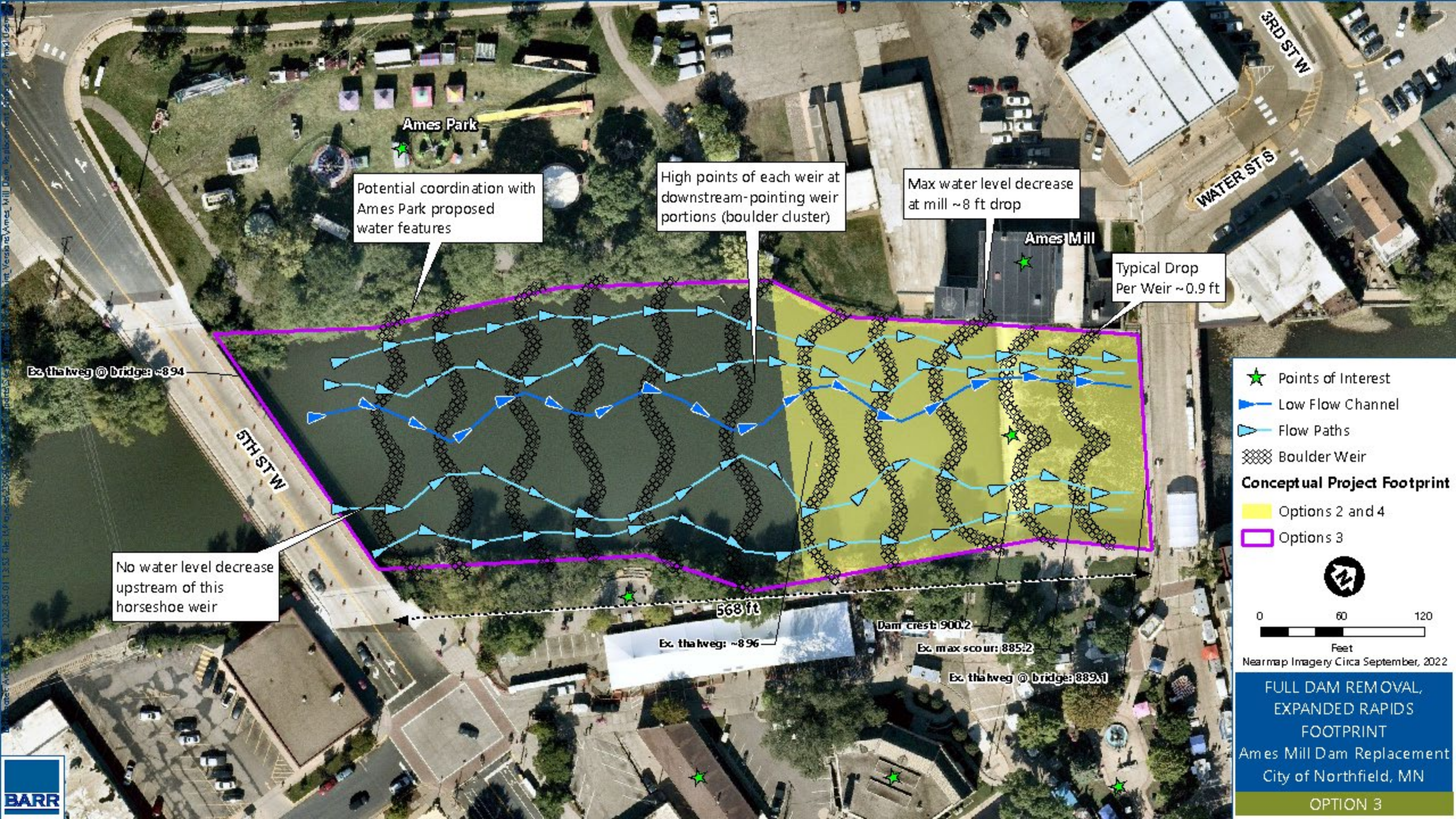


<https://sites.google.com/a/maine.edu/constraints-on-river-restoration-potential/anadromous-fish/barriers-to-fish-passage>



9. Potential Funding Sources

Funding Source	Amount	Favored alternative
MnDNR Dam Safety Grant	\$25k to \$1M	2, 3 or 4
Outdoor Heritage Fund/ Conservation Partners Legacy	No min or max for general funding \$5k to \$500k Conservation Partners Legacy Program grants	3 or 4 (for aquatic organism passage)
MN Environment and Natural Resources Trust Fund	No min or max	3 or 4 (for aquatic organism passage)
US Fish and Wildlife Service National Fish Passage Program	Up to \$2M	3 or 4 (for aquatic organism passage)



Potential coordination with Ames Park proposed water features

High points of each weir at downstream-pointing weir portions (boulder cluster)

Max water level decrease at mill ~8 ft drop

Typical Drop Per Weir ~0.9 ft

Ex. thalweg @ bridge ~894

No water level decrease upstream of this horseshoe weir

Ex. thalweg: ~896

Dam crest: 900.2

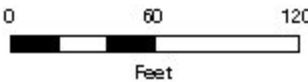
Ex. max scour: 885.2

Ex. thalweg @ bridge: 889.1

- ★ Points of Interest
- Low Flow Channel
- Flow Paths
- Boulder Weir

Conceptual Project Footprint

- Options 2 and 4
- Options 3



Nearmap Imagery Circa September, 2022

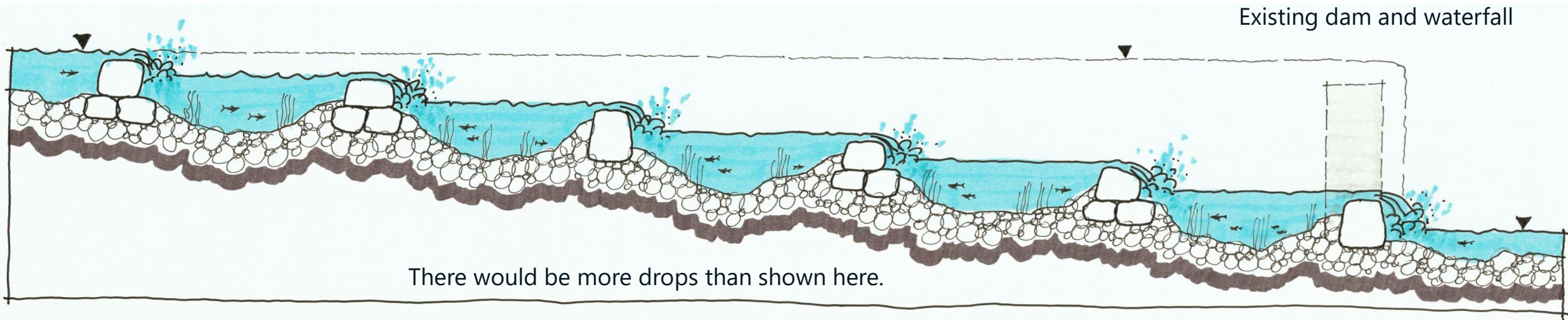
FULL DAM REMOVAL,
EXPANDED RAPIDS
FOOTPRINT
Ames Mill Dam Replacement
City of Northfield, MN

OPTION 3

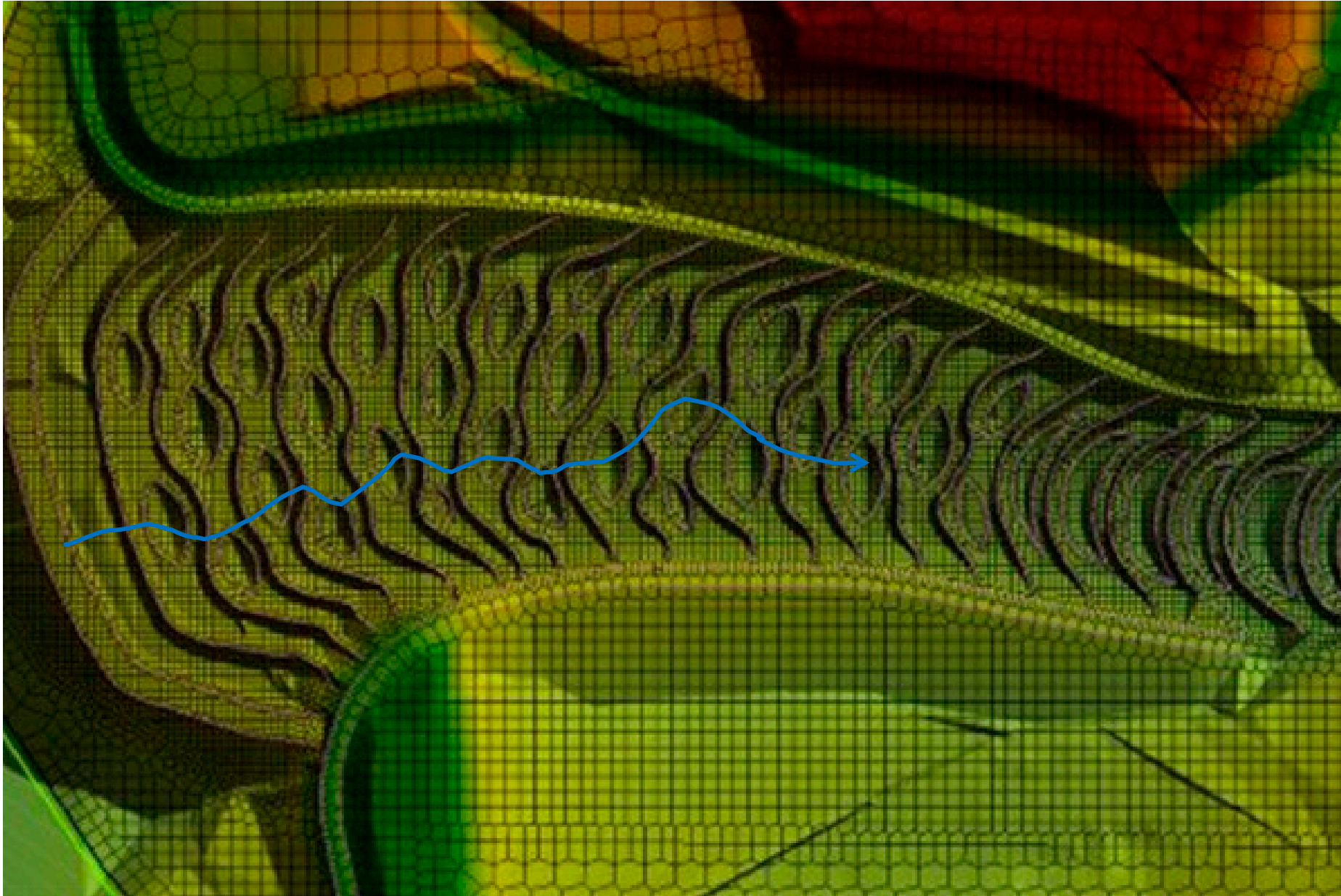


Rock Rapids Profile

Maintain existing 'upper
pool' elevation (+/- 1 foot)



Willow River design of rock weirs and pools



Willow River rock rapids



Willow River rock rapids at low flow



Willow River rock rapids construction



In-river work for boulder placement and sediment removal



Not this...



Nor this...



Hutchinson rock rapids





Deschutes River rock rapids



Deschutes River rock rapids



Ames Mill Rock Rapids Rendering



Estimate of Probable Cost

Description	<u>Option 2</u> Short Rock Rapids	<u>Option 3</u> Long Rock Rapids, Full Removal	<u>Option 4</u> Long Rock Rapids, Partial Removal
Estimate of Probable Cost	\$3.5M	\$6.4M	\$6.4M
Cost Range (-25% to + 50%)	\$2.5M to \$5.5M	\$5M to \$10M	\$5M to \$10M

Stakeholder engagement

- Stakeholder meetings
 - Agencies: Jul 27
 - Post: Aug 9
 - City Council: Sep 12
 - Public Listening Sessions: Sep/Oct
- Select a preferred option



Q&A/Discussion

Contact Info:

Public Works Director/City Engineer

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