

# Village of Paw Paw Briggs Dam

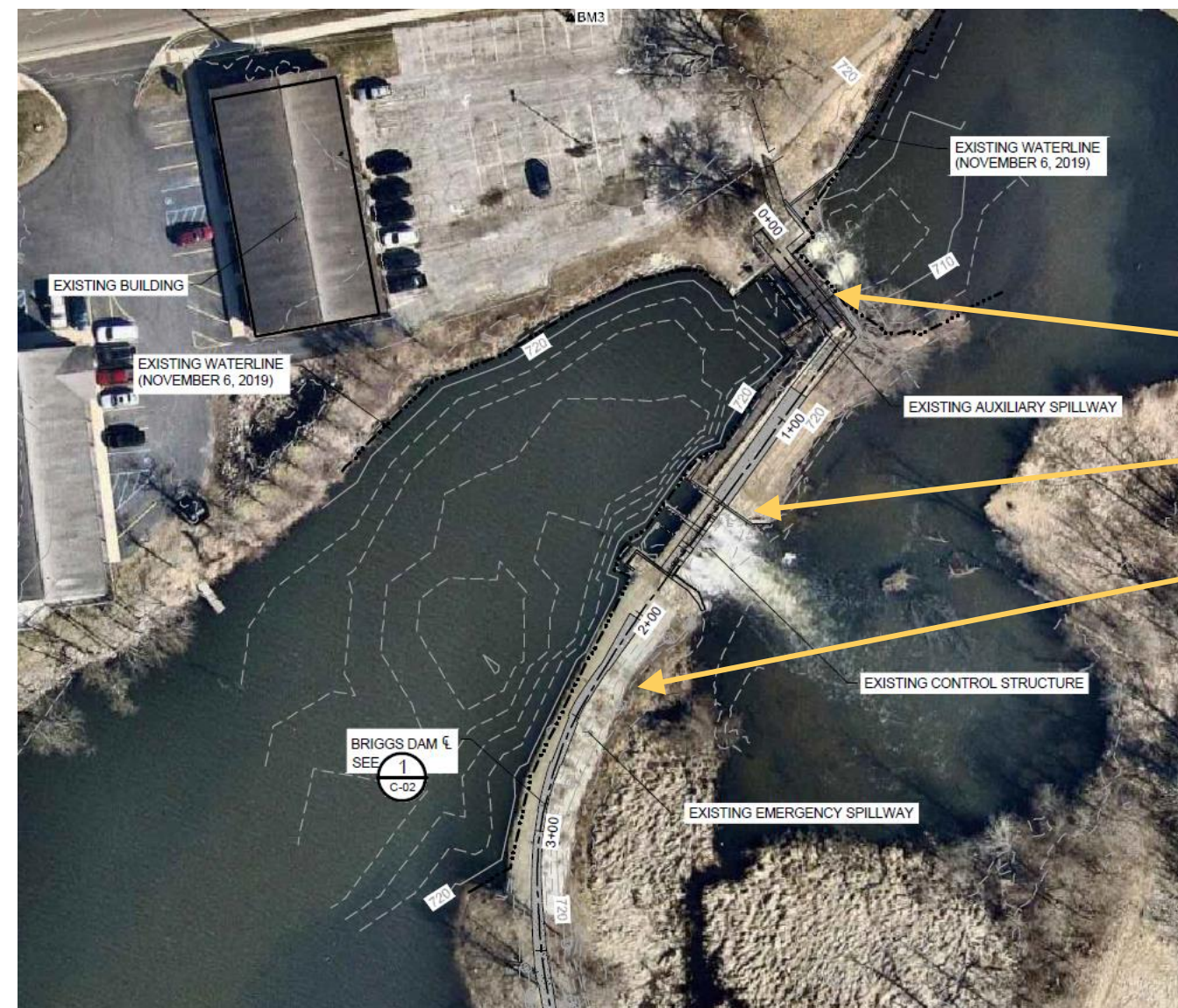
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Spillway Alternatives Analysis

December 9, 2019

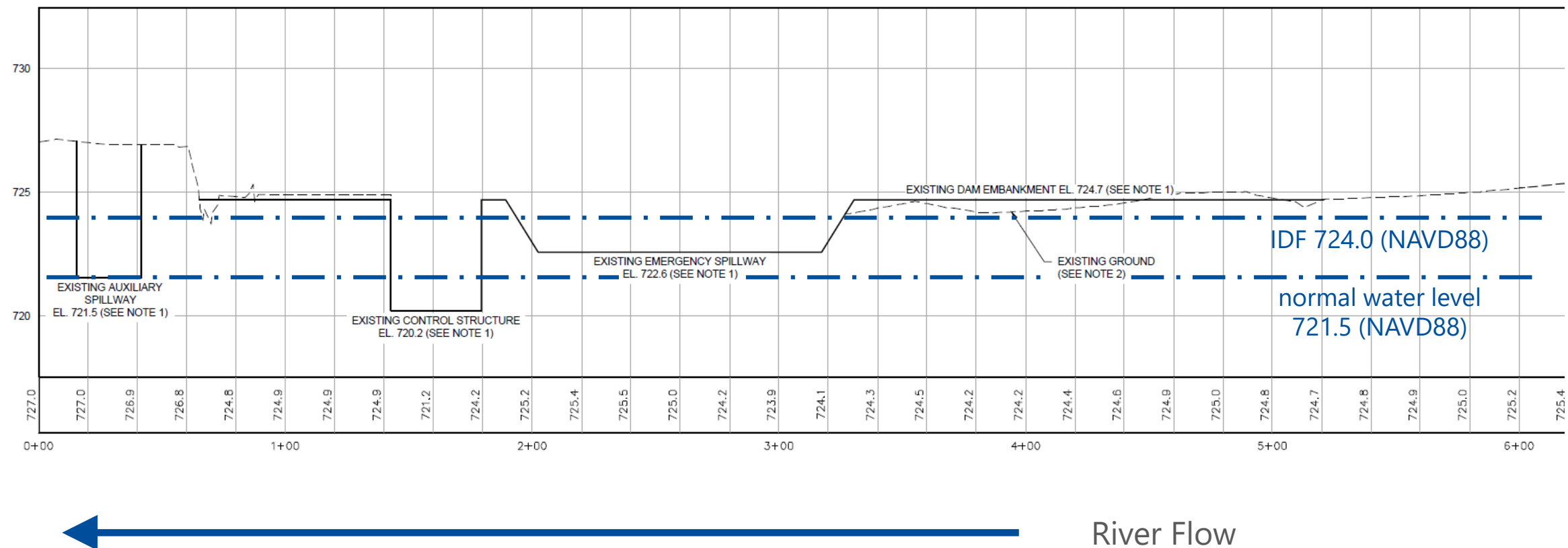


# Briggs Dam Overview/Nomenclature



- Earthen dam (repaired 2018)
- Auxiliary spillway (pipes)
- Control structure (gated)
- Emergency spillway (constructed 2018)

# Site Overview – Dam Profile



All elevations in NAVD88

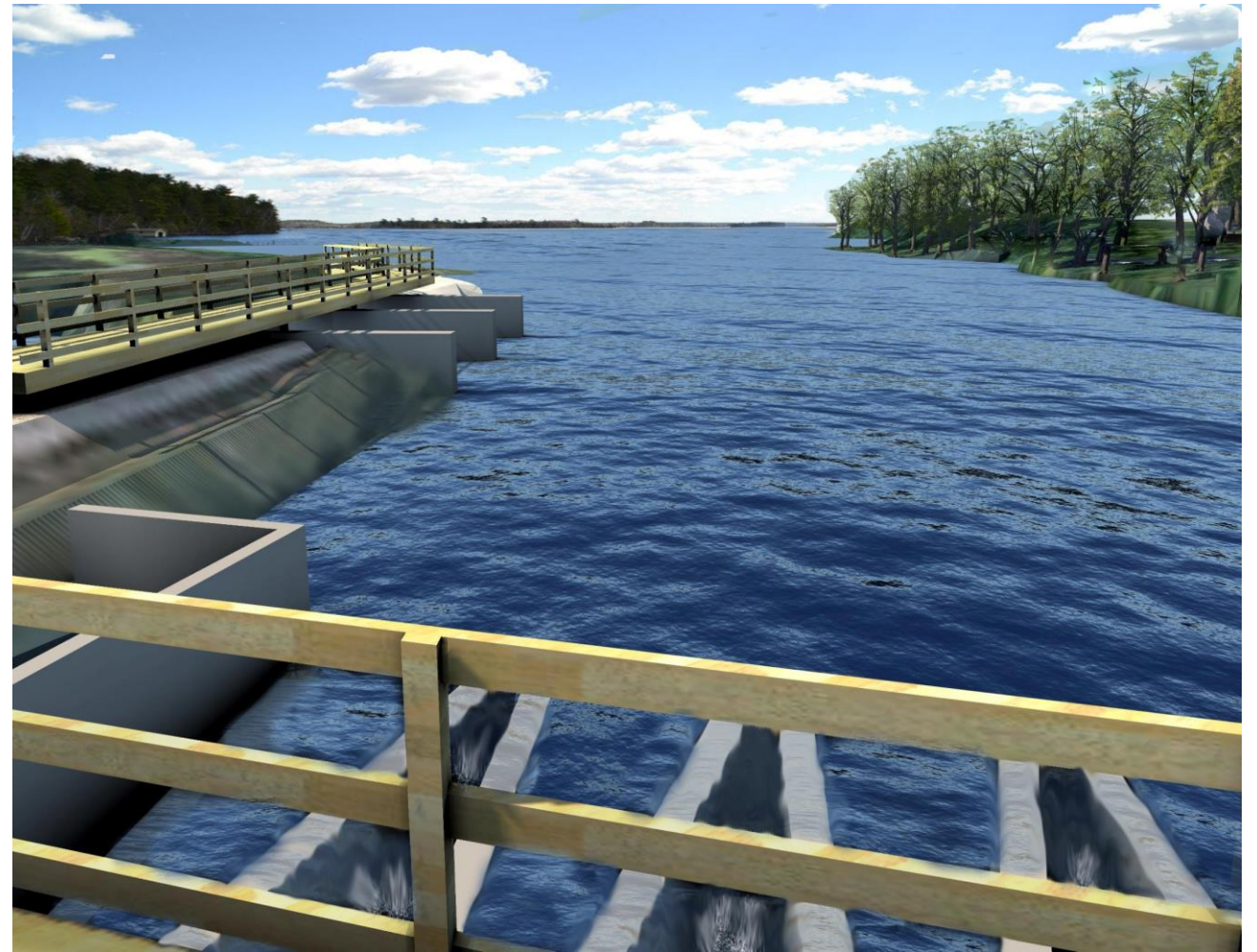
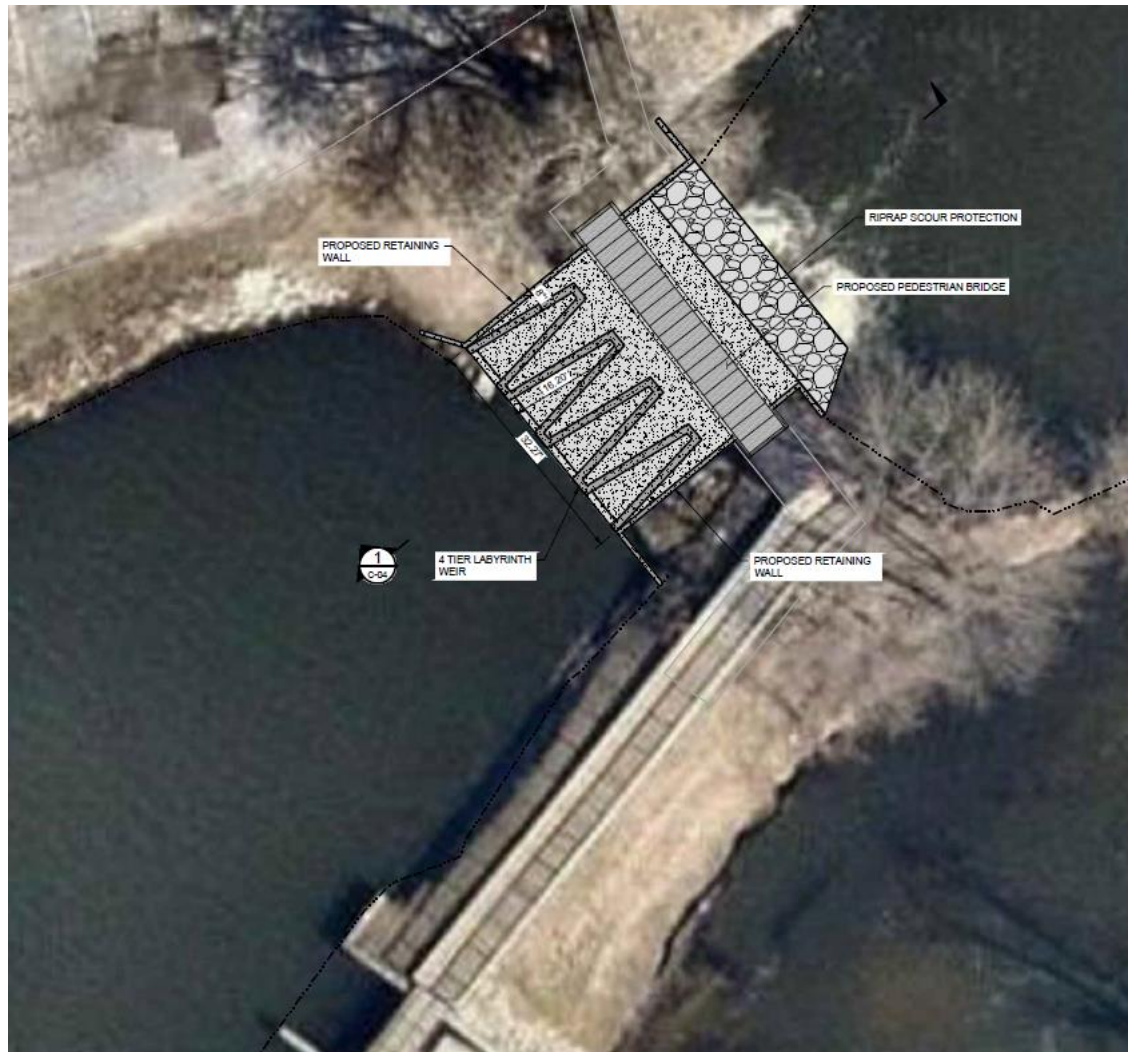
# Spillway Alternatives Analysis – Design Objectives

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- Safely pass inflow design flood (IDF) through existing control structure & proposed auxiliary spillway
- Maintain current normal water level
- Passive system – no added gates
- Maintain recreational uses (pedestrian access, aesthetics, historical references)
- Long term solution

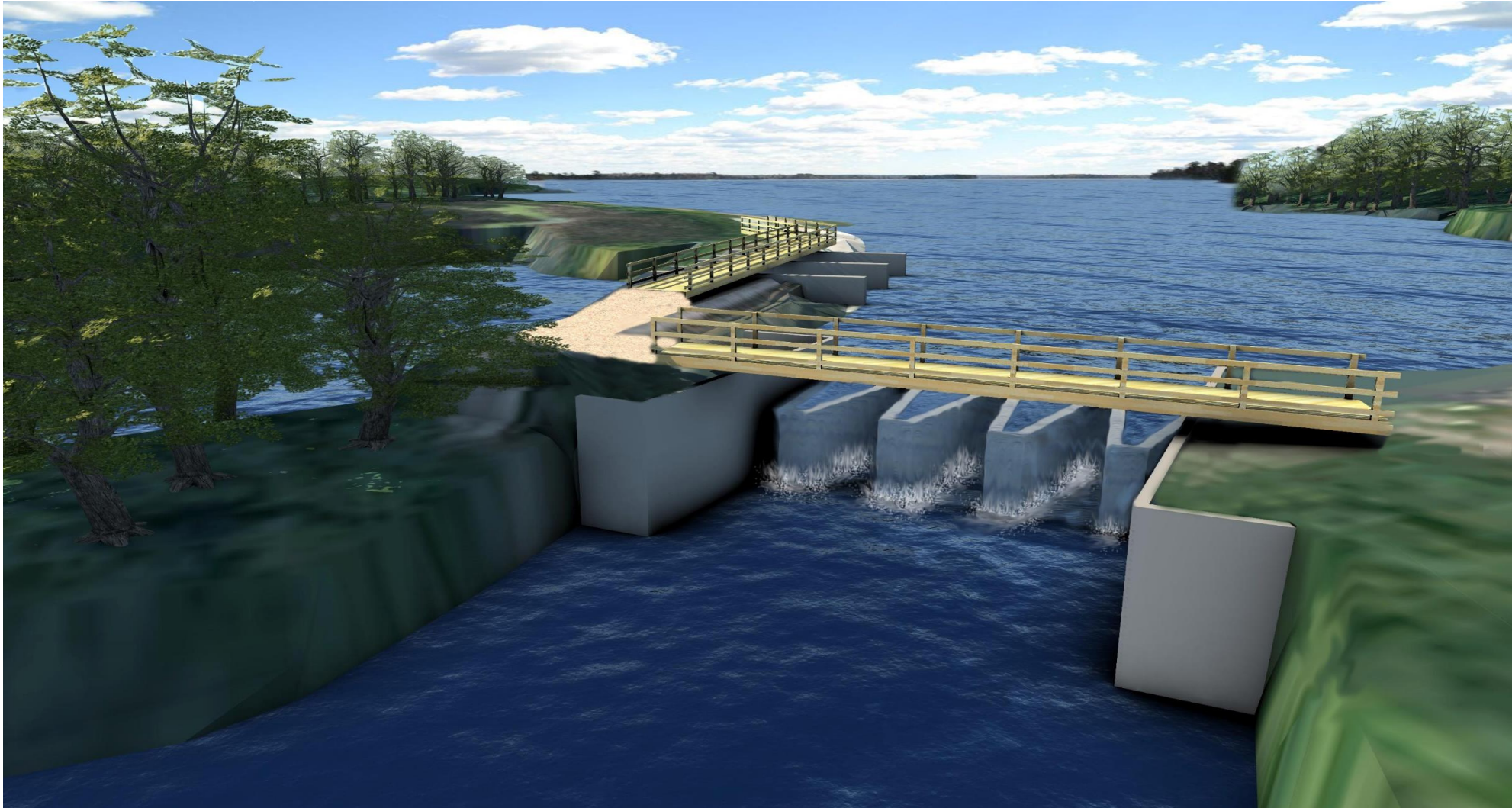


# Alternative 1 – Replace Spillway with Labyrinth Weir



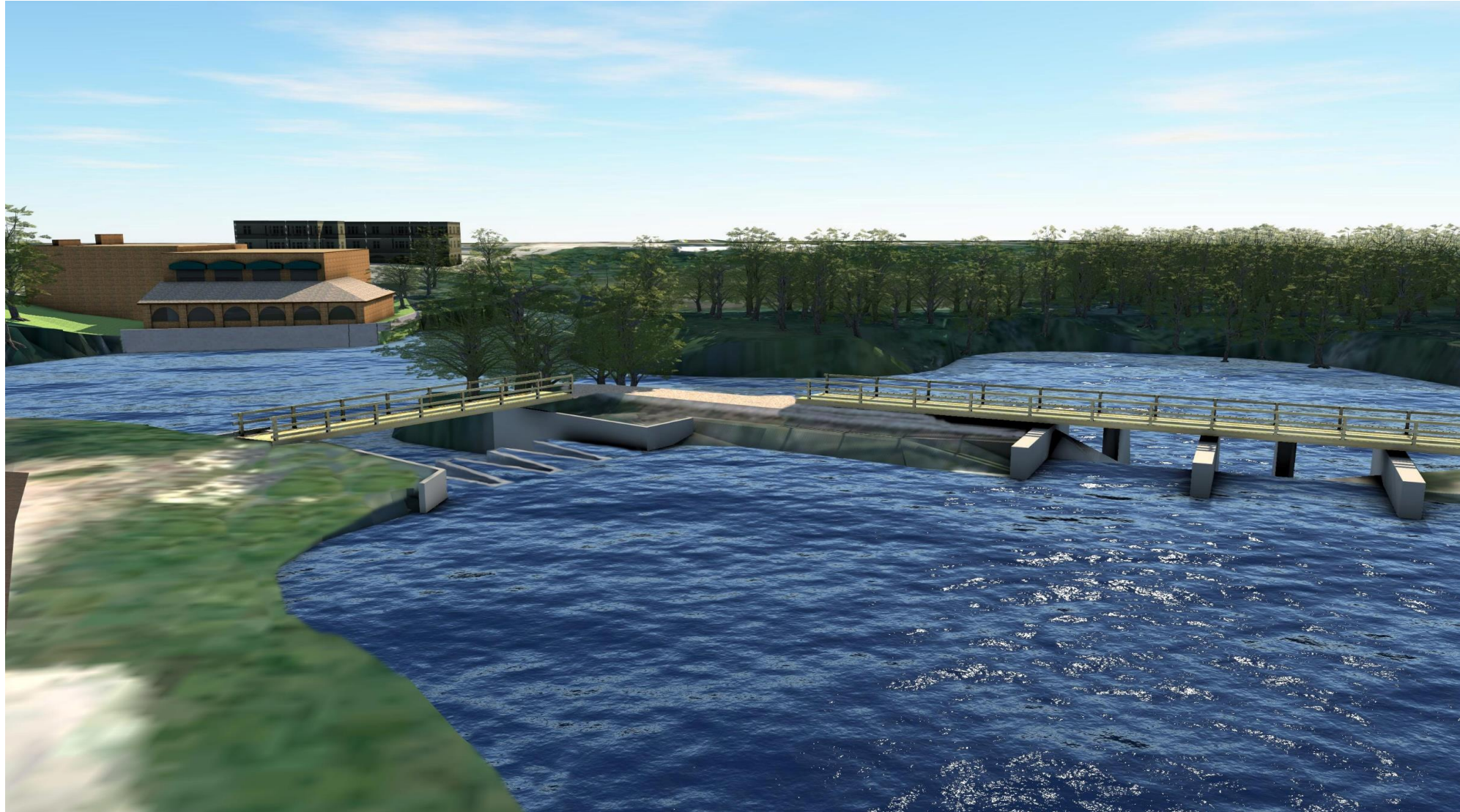


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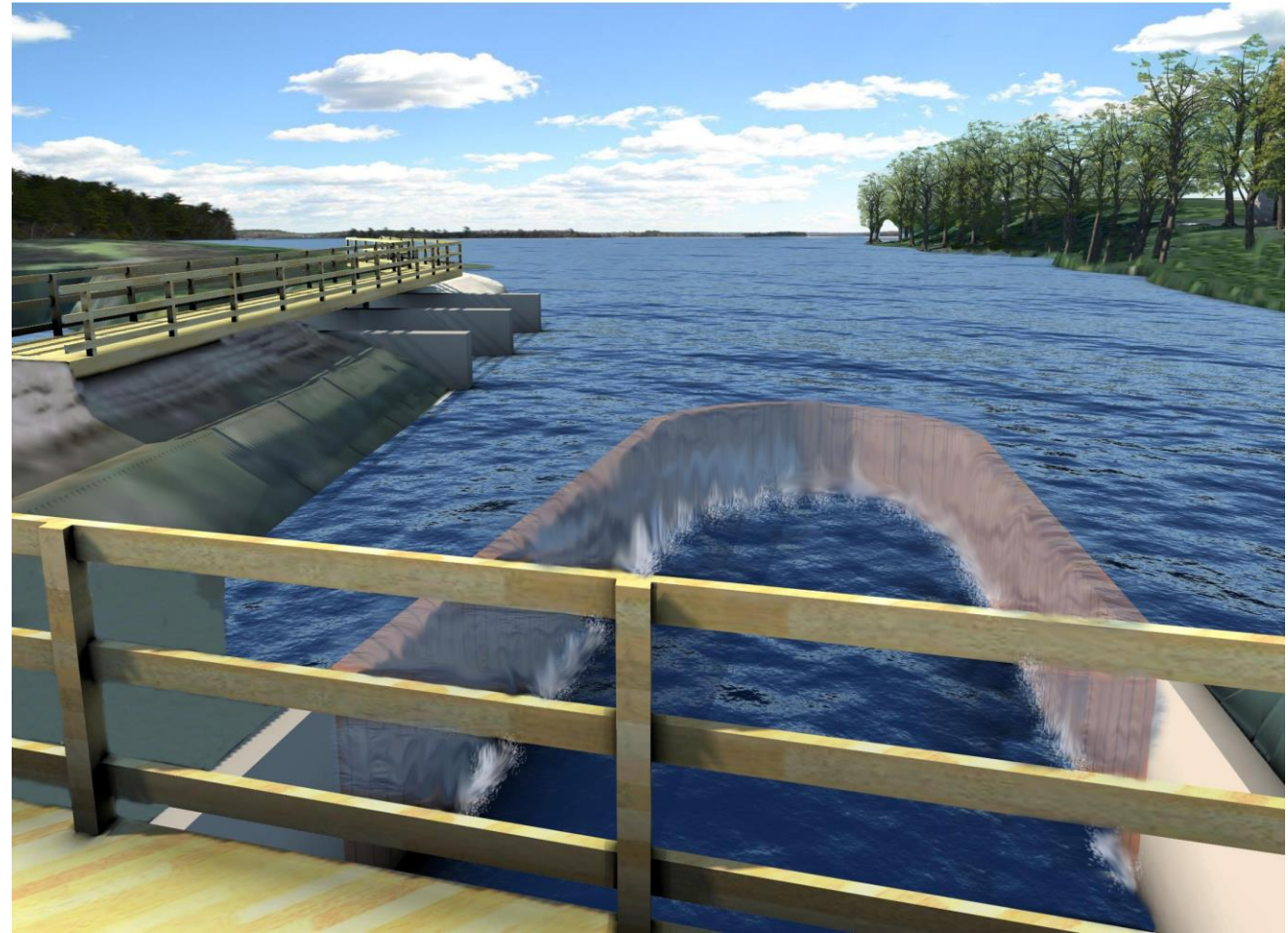


# Labyrinth Weir Examples cast-in-place concrete





# Alternative 2 – Replace Spillway with Arched Weir



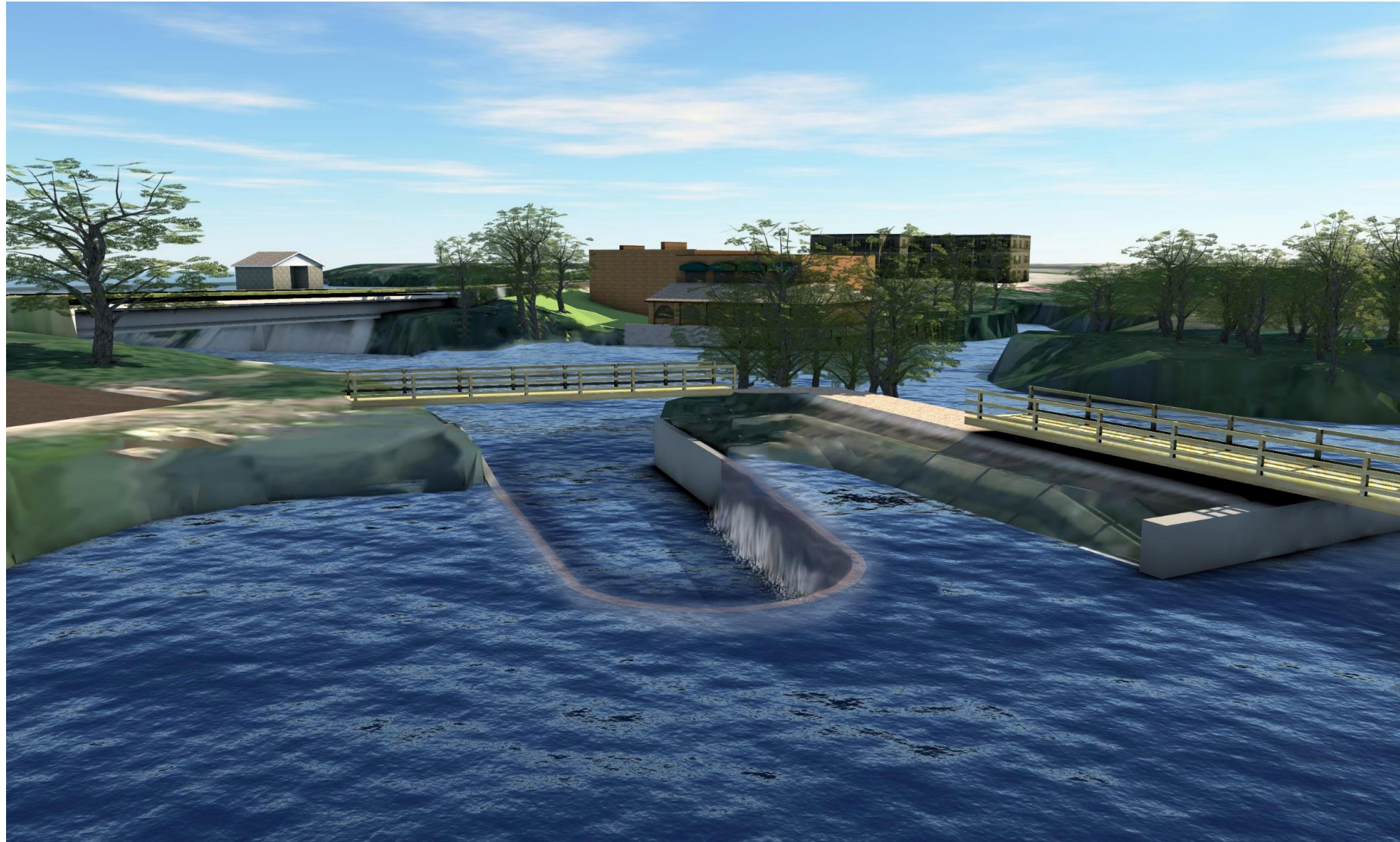


## Alternative 2 – Replace Spillway with Arched Weir





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# Arch Weir Examples

steel sheet pile with steel cap\* or concrete overlay

\* assumed





# Pedestrian Bridge Examples



# Alternative Construction Cost Comparison

	Alt 1 – Labyrinth Weir	Alt 2 – Arch Weir
Spillway Construction	\$150,000 - \$240,000	\$170,000 - \$270,000
Mobilization, water mgt., demolition	\$160,000 - \$260,000	\$150,000 - \$250,000
Retaining walls, restoration	\$60,000 - \$100,000	\$150,000 - \$240,000
Pedestrian bridge	\$40,000 - \$70,000	\$40,000 - \$60,000
Emergency spillway raise	\$40,000 - \$70,000	\$40,000 - \$70,000
Contingency	\$100,000 - \$150,000	\$110,000 - \$190,000
<b>Total</b>	<b>\$550,000 - \$890,000</b>	<b>\$660,000 - \$1,070,000</b>

## Significant assumptions

- Both alternatives preliminarily designed for IDF (200-yr flood)
- Emergency spillway raised ~1' in both alternatives, reuse existing Flexamat surfacing
- Arch weir assumed to be steel sheet pile with steel cap (concrete facing adds \$50,000 - \$100,000)



# Alternative 1 – Labyrinth Weir – Pro/Con

## Advantages

- Smaller footprint (smaller area to manage in construction)
- Falling water more visible
- Visually unique, can be colored/stamped
- Integral erosion protection
- Labyrinth retaining walls can be used to stabilize shorelines
- Can be optimized (adding capacity) with small added width (at additional cost)
- Lower risk of construction modifications
- Fewer investigations needed

## Disadvantages

- More potential for plugging
- Long-term maintenance of concrete
- Increasing size increases bridge length requirements
- Lower capacity for extreme events (above IDF)

# Alternative 2 – Arch Weir – Pro/Con

## Advantages

- Less potential for plugging
- Could add concrete cap & aesthetic features (at additional cost)
- Larger capacity for extreme events (above IDF)
- Minimal long-term maintenance for steel sheet piles
- Could add riffles downstream, potentially fish passage (at additional cost)
- Shapes other than horseshoe are possible

## Disadvantages

- Larger footprint (to manage in construction)
- More extensive investigations for pile driving
- Difficult construction tolerances with sheet pile driving (potential imperfect arch)
- Large interior area for erosion protection
- Reduces pond area, could impact flows to control structure
- Potential leaking during low flows
- Flowing water less visible during low flows
- Greater safety risk due to larger approach length & downstream roller



# Requested Feedback from Village

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- Preferred alternative to advance to 30% design
- Architectural/landscape requirements
  - Aesthetic considerations
  - Pedestrian bridge accessibility/use
  - Landscape/parks features to include