

City of  
**PIQUA** 



**Stantec**



**OHM**

*Advancing Communities®*

# Piqua Hydraulic Canal and Dam Safety Design Project



Focus Group Meetings Round 1— August 29<sup>th</sup> 2022

# Agenda

1. Welcome and Introductions
2. Project Overview
  1. Purpose
  2. Scope
  3. Schedule
3. Quick Facts
4. Review project study areas and scenarios
5. Group discussion on scenarios for Echo Lake and Franz Pond





City of  
**PIQUA**  



# Project Overview



# Project Purpose

**"Identify design alternatives** for the hydraulic canal system which includes Swift Run Lake, Echo Lake and Franz Pond, which satisfy safety requirements of ODNR and **retains the quality of life of our residents, and is**  
**cost effective.**



# ODNR Requirements



- **Based on nationwide requirements**
  - Design of Piqua's dams (height, storage, and hazard) currently needs to **accommodate a high hazard storm event based on modeling by qualified meteorologists and approved by ODNR.** (For Class I Dams, the applicable storm event is the 100% PMP - Probable Maximum Precipitation)
  - **Needs to accommodate 27 inches of rain in 24 hours.**

# ODNR Requirements



- **ODNR performs evaluations every 5 years (2019)**
- **Current issues:**
  - Insufficient spillway capacity to pass design storm.
  - Ongoing maintenance of dams and hydraulic canal.

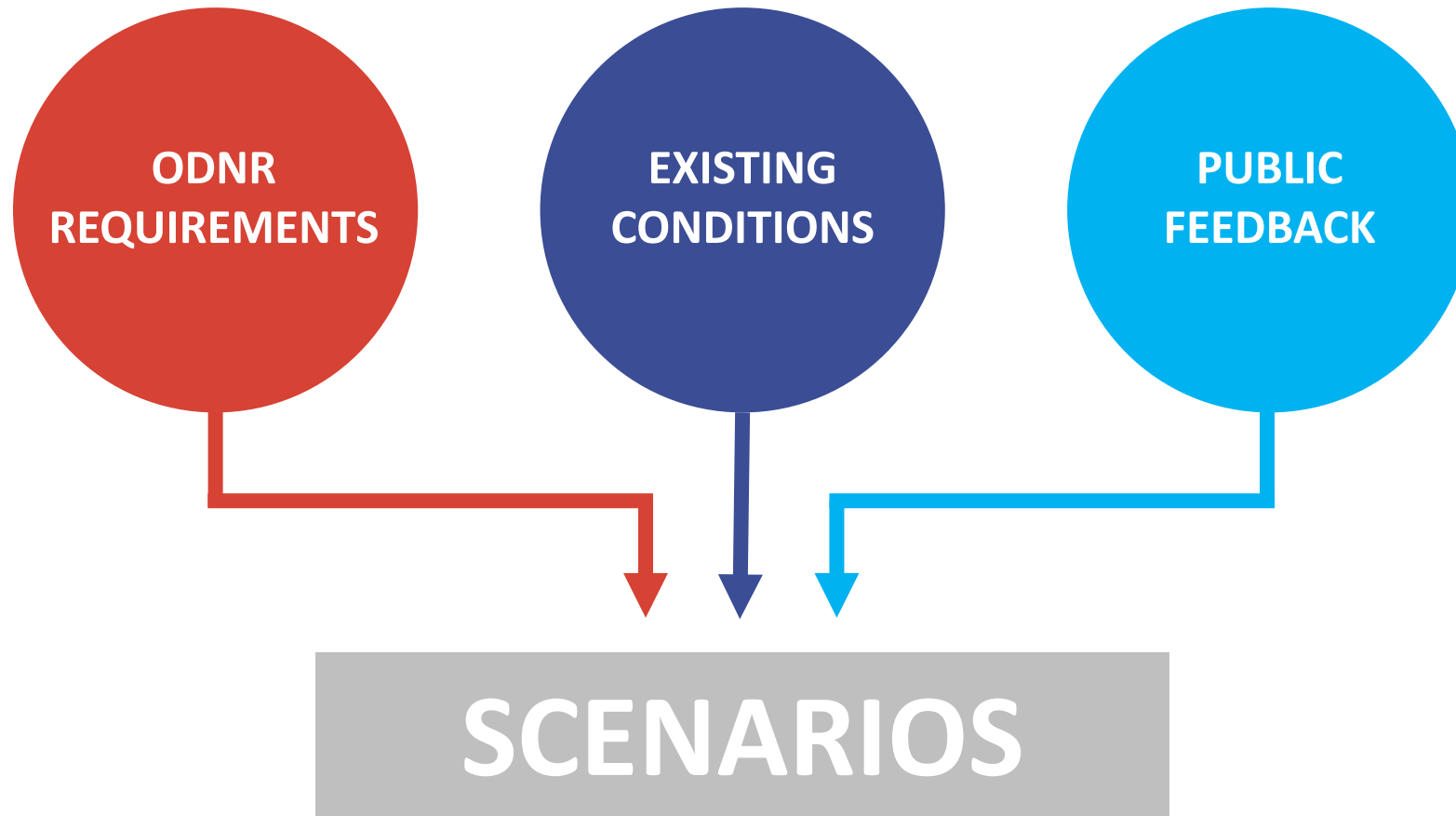


This Project Is **NOT** About Changing  
the ODNR Standards and Guidelines

## Goals:

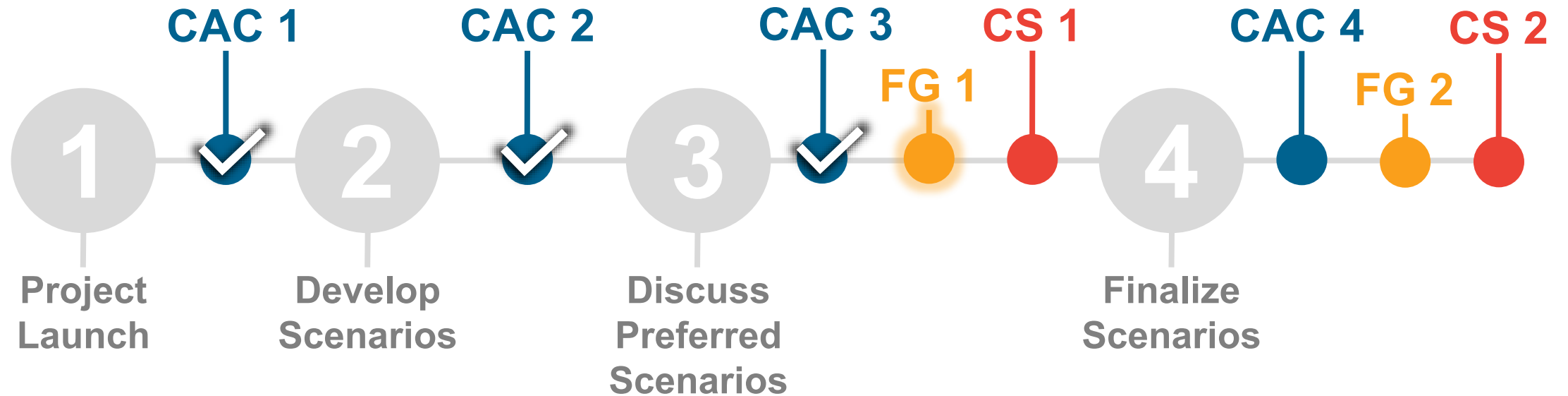
1. Slow and Right
2. Collaborative
3. Transparent
4. Thorough

# Project Overview





# Engagement Process



**CAC** – Citizen Advisory Committee

**FG** – Focus Group

**CS** – Community Summit

# Website Updates <https://piquadamstudy2022.com/>

Piqua Hydraulic Canal and Dam Safety Design Project

[Overview](#) [Resources](#) [Alternatives](#) [Get Involved](#)

[Contact Us](#)



**Hydraulic Canal  
and Dam Safety  
Design Project**

# Quick Facts



# History

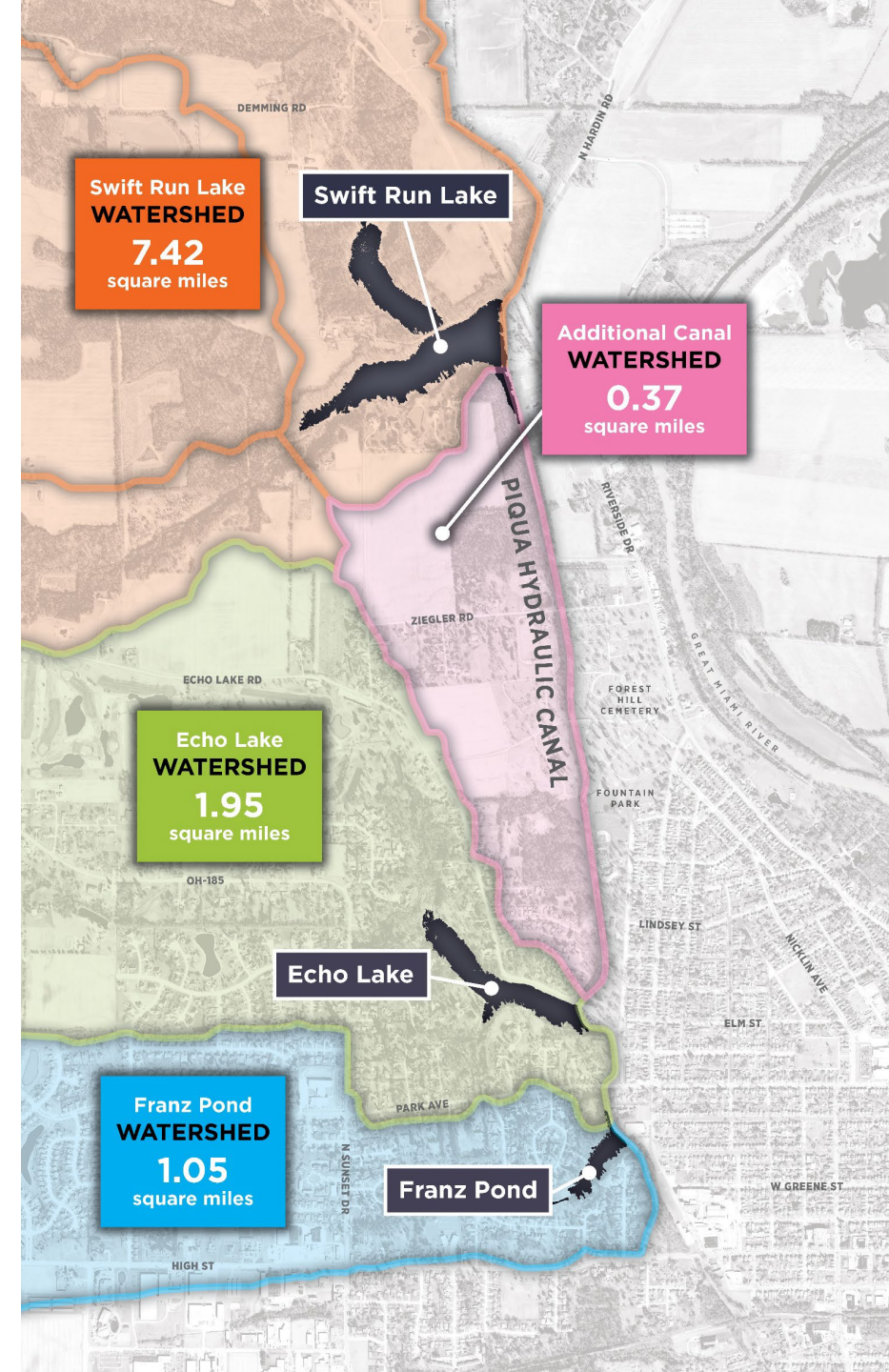
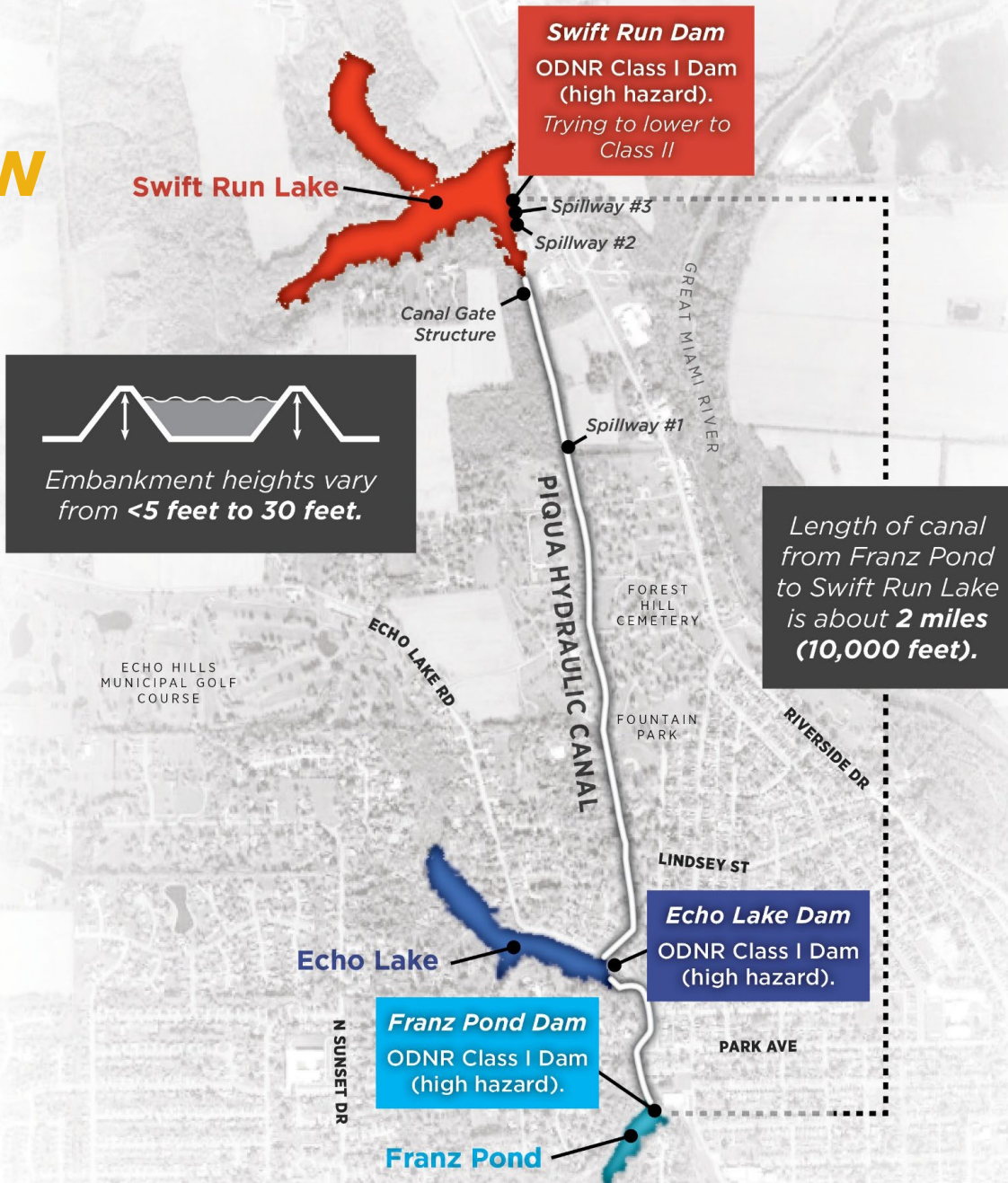
The hydraulic canal system was originally built in the 1860's and 1870's by the Piqua Hydraulic Company to provide power to downtown industries.



SUGAR LOAF AND SWIFT RUN LAKE, PIQUA, OHIO.



# System Overview

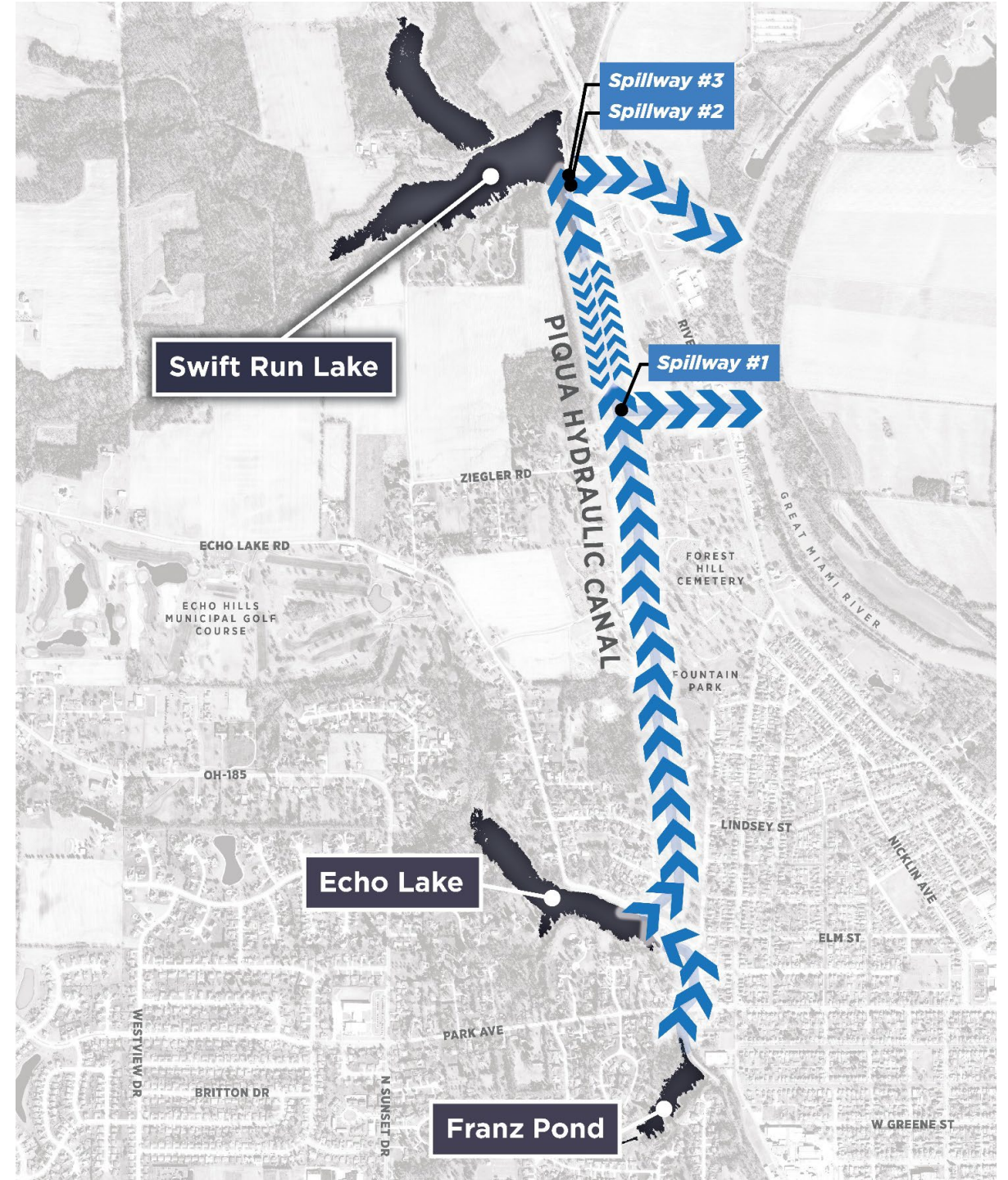




# How It Works

What the System is  
Designed for Now

Can accommodate 5.87  
inches of rainfall (*needs to  
accommodate 27 inches*)



# The Scenarios

# Scenarios Presented in Dec. 2021

## Swift Run

- Property Easements / Acquisition
- Additional Spillway Capacity
- New Auxiliary/Emergency Spillways
- Overtopping Protection (RCC)
- Re-Classification of Dam

## Echo Lake/Franz Pond

- New Spillway(s) at Dam Location(s)
- New Spillways at Alternate Locations
- New Culvert System
- New Auxiliary/Emergency Spillways
- Raise Dam/Canal Embankments
- Overtopping Protection (Roller Compacted Concrete)
- Short Wall (selected locations or entire)
- Control Inflow (large diversion ditches)
- Property Acquisition
- Upstream Lake Control (interior berm, supplemental dam, etc.)
- Decommission Dam / Lower Pool Levels and/or Fill in portion of Lake

## Hydraulic Canal

- Flatten Canal Downstream Slopes / Modify Upstream Slopes
- Conduit Canal System – Widening
- Conduit Canal System – Deepening
- Crest Wall Installation
- Additional Flow Control (new gates, etc.)
- Overtopping Protection (RCC)
- Property Acquisition



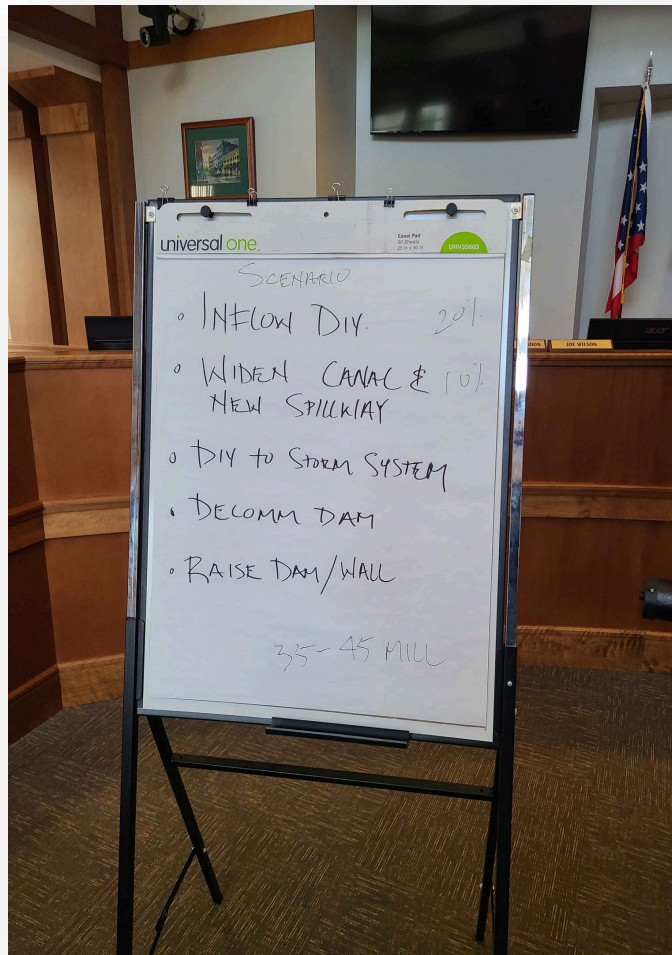


# Outcomes of CAC Meetings

Reviewed all scenarios

Modified scenario table

Identified scenario toolbox



TO DO: ① # SIZE & MAP OF CULVERT

PIQUA HYDRAULIC CANAL AND DAM SAFETY DESIGN PROJECT | JULY 10, 2022  
City of PIQUA  
Citizen Advisory Committee Meeting #2

SOLUTION	FEASIBILITY	CONSULTANT TEAM OBSERVATIONS	CAC OBSERVATIONS / COMMENTS
New Spillway(s) at Dam Location(s)	Not Feasible	<ul style="list-style-type: none"> <li>Due to downstream hazards.</li> <li>No flow paths available through city.</li> </ul>	<ul style="list-style-type: none"> <li>SPILL SEWER UNDER CONCERN STREETS</li> </ul>
New Spillways at Alternate Locations	High	<ul style="list-style-type: none"> <li>Evaluating at multiple park locations.</li> </ul>	<ul style="list-style-type: none"> <li>PARK IMPACTS</li> <li>PROPERTY IMPACTS</li> </ul>
New Culvert System	Low	<ul style="list-style-type: none"> <li>Due to significant capacity required.</li> </ul>	<ul style="list-style-type: none"> <li>② DRAIN PLAN</li> </ul>
New Auxiliary/Overflow Spillway	Medium	<ul style="list-style-type: none"> <li>Still have downstream hazards.</li> <li>No optimal locations.</li> </ul>	<ul style="list-style-type: none"> <li>APPLIES TO SWIFT NEED TO REMOVE</li> </ul>
Raise Dam/Canal Embankments	Medium	<ul style="list-style-type: none"> <li>Modification of the hydraulic canals is a budget concern due to their lengths and heights.</li> </ul>	<ul style="list-style-type: none"> <li>AESTHETICS</li> <li>WOULD HAVE TO RAISE BRIDGES (SOME)</li> <li>COSTLY!!! - INCREASE TO PATH</li> </ul>
Overtopping Protection (Reinforced concrete)	Medium	<ul style="list-style-type: none"> <li>At selected locations as part of a combination of multiple improvements.</li> <li>Acceptable with ODNR Dam Safety.</li> <li>Reduces improvements to downstream flood inundation.</li> </ul>	<ul style="list-style-type: none"> <li>Doesn't work in some AREAS</li> <li>NOT A LOT OF IDEAL LOCATIONS</li> </ul>
Short Wall (Reinforced concrete or other)	Medium	<ul style="list-style-type: none"> <li>Still have concerns with stability of hydraulic canal embankments.</li> </ul>	
Control Inflow (Large diversion ditches)	Medium	<ul style="list-style-type: none"> <li>Only solves part of the storage capacity</li> </ul>	<ul style="list-style-type: none"> <li>HELPS BUT REALLY DOESN'T SOLVE THE 27 PROBLEM</li> </ul>
Property Acquisition	High	<ul style="list-style-type: none"> <li>May not be public friendly.</li> <li>Includes home on Echo Lake Dam, Fountain Park, other downstream properties.</li> </ul>	<ul style="list-style-type: none"> <li>③ WHAT IF? PART OF MIX</li> </ul>

④ Existing loan is 12.0% OF



# Scenario Toolbox



**DIVERT  
INFLOW**



**DIVERT TO NEW  
STORM SEWER**



**DECOMMISSION  
DAM(S)**



**RAISE  
DAM WALL**



**WIDEN  
CANAL**



**ROLLER COMPACTED  
DAMS AND CANAL**



# Kit of Parts

# All Scenarios

## Scenario 1

Remove Spillway 1 + Convert Both Lakes



## Scenario 2

Raise Dam Wall + Widen Canal + New Spillway



## Scenario 3

Divert PMP Flows Through New Storm Sewers



## Scenario 4

Franz decommission (flow thru city) + Echo Spillway



## Scenario 5

Current function (Roller Compacted)



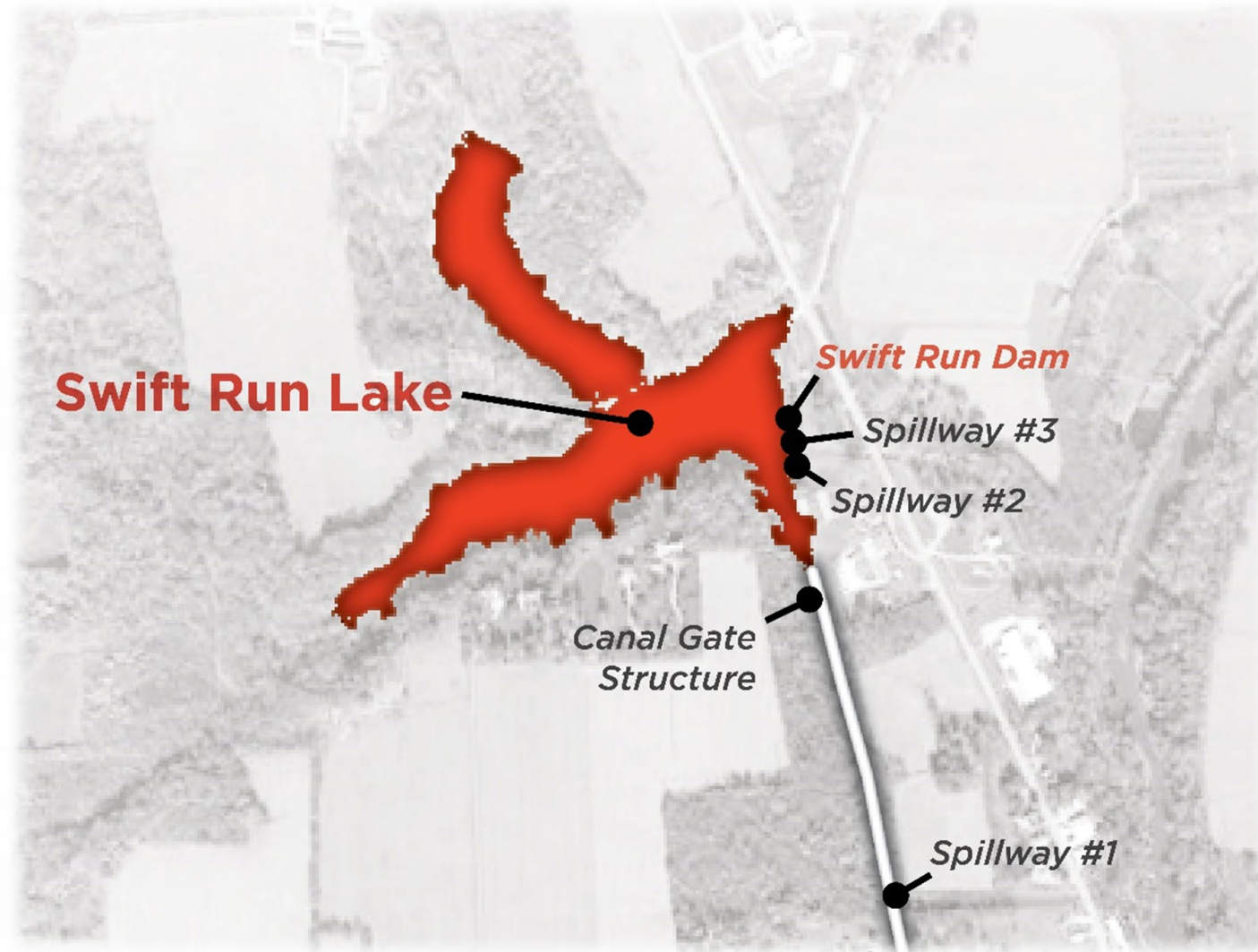
## Scenario 6

Deepening Franz + Echo Spillway



# Swift Run

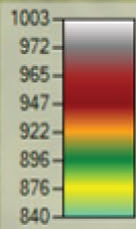
1. Modify Swift Run Lake spillway
2. General community support thus far
3. Work to reclassify 2 or 3
4. Helps address immediate ODNR concerns and reduces impact to spillway 1 allowing for capacity from Franz and Echo







- Modest dam improvements, slight lowering of dam
- Enhance spillway
- Water levels stay similar to existing condition



# Scenario 1



*DIVERT  
INFLOW*



***DIVERT TO NEW  
STORM SEWER***



***DECOMMISSION  
DAM(S)***



*RAISE  
DAM WALL*



***WIDEN  
CANAL***



*ROLLER COMPACTED  
DAMS AND CANAL*





# Scenario 1 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL

1. Decommission Echo Lake and Franz Pond
2. Remove all spillways
3. Lowering embankments along canal
4. Allow water to flow freely out to Great Miami River







# Scenario 1 – Pros and Cons

## PROS

1. Lake areas can be converted into a variety of landscape types
2. Trees will remain
3. Lowest cost scenario
4. No future ODNR Dam Safety Requirements or costs
5. Keeps bike path

## CONS

1. Loss of lakes the community values
2. Loss of fishing and other recreation opportunities on the lakes
3. Worst outcome for those who desired and purchased lakefront property



# Scenario 2



*DIVERT  
INFLOW*



*DIVERT TO NEW  
STORM SEWER*



*DECOMMISSION  
DAM(S)*



**RAISE  
DAM WALL**



**WIDEN  
CANAL**



*ROLLER COMPACTED  
DAMS AND CANAL*



# Scenario 2 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL

1. Echo Lake and Franz Pond may require normal pool lowering
2. Raise Echo Lake and Franz Pond dam embankments.
3. Construct new spillways just north of Echo Lake.
4. Widen canal between Echo Lake and Franz Pond and north of Echo Lake to the new spillway.

# Scenario 2 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



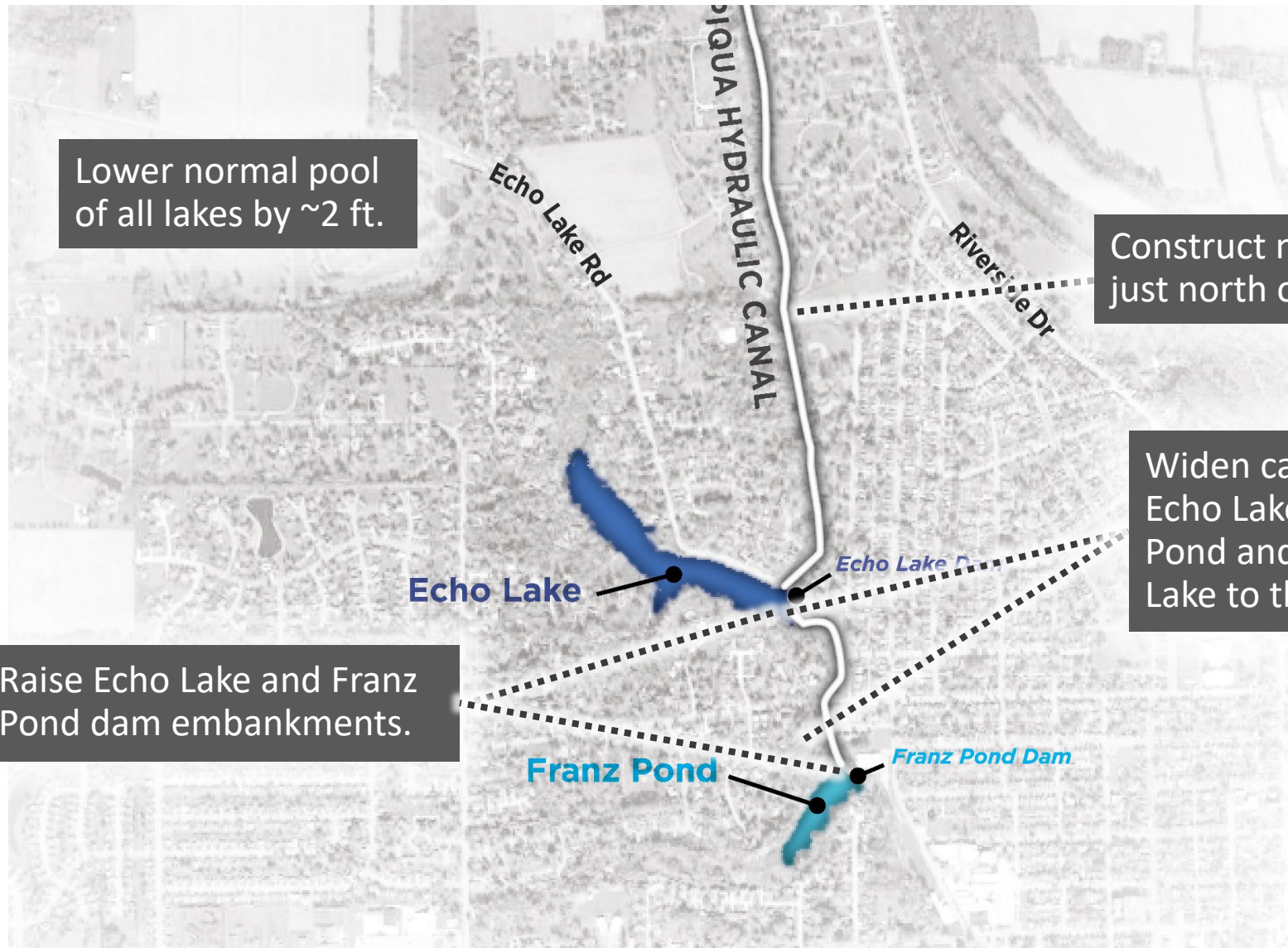
RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL



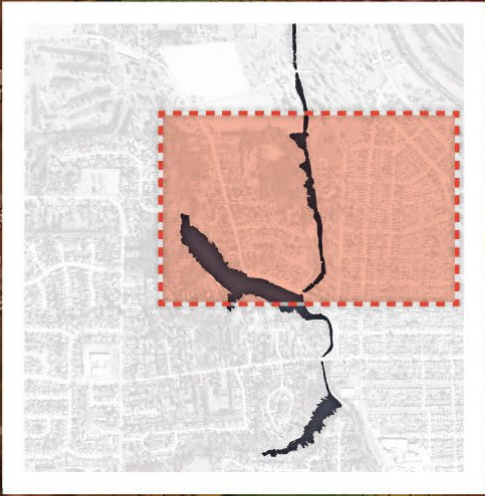
Lower normal pool  
of all lakes by ~2 ft.

Construct new spillway  
just north of Echo Lake.

Widen canal between  
Echo Lake and Franz  
Pond and north of Echo  
Lake to the new spillway.

Raise Echo Lake and Franz  
Pond dam embankments.





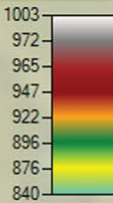
Echo Lake Drive will need to be replaced with a new bridge (minimal hydraulic restriction)

New 300 ft wide spillway to new discharge channel (see image below)

Widen / deepen canal downstream of Echo to new spillway location (currently showing 70 ft bottom width with 3:1 side slopes)

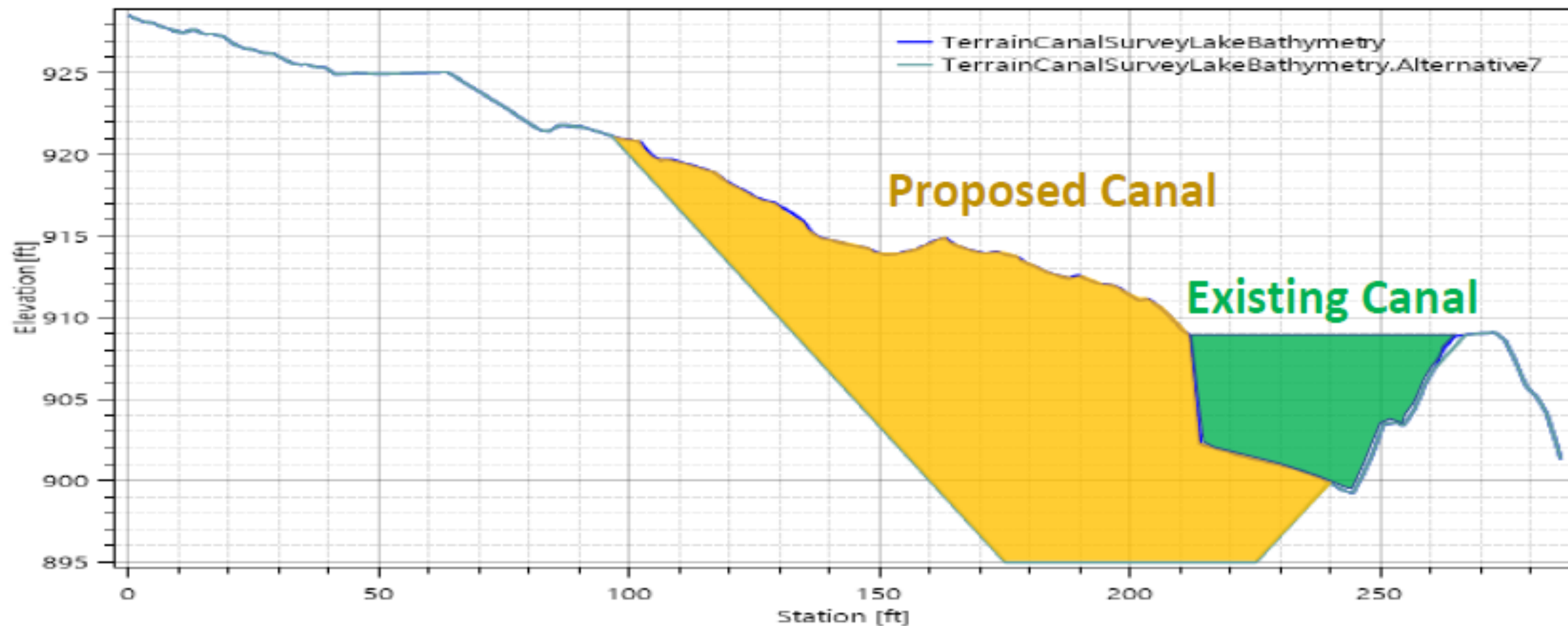
Raise dam crest (or add floodwall) ~3-4 ft to approximately elevation 913 ft

 **POTENTIAL PROPERTY IMPACTS**





**Terrain Profile Plot**



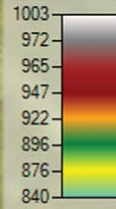




New 300 ft wide spillway to new discharge channel

New spillway channel to the Great Miami River, cutting through Fountain Park just south of the cemetery (shown as 60 ft bottom width with 3:1 side slopes and depth of approximately 15 ft)

 **POTENTIAL PROPERTY IMPACTS**





# Scenario 2 – Pros and Cons

## PROS

1. Water levels in lake remain similar
2. Bike path remains
3. Potential to keep select trees
4. Minimal impact to majority of Fountain Park

## CONS

1. Residential property acquisition
2. Cost
3. Significant impact to Hardman Field portion of Fountain Park
4. Loss of Veterans Memorial Park
5. Property impacts
  - Fountain Blvd, Nicklin, Forest, Washington, Broadway

# Scenario 3



DIVERT  
INFLOW



**DIVERT TO NEW  
STORM SEWER**



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL



# Scenario 3 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL

1. Divert stormwater into expanded stormwater system
  - Diversion prior to entering Franz (to be evaluated)
  - Diversion from Franz in high rain events (required)
2. Would require upgrading most of the downtown stormwater network
3. Upgrades would happen over time
4. May not be feasible
5. Disruption to businesses, residences, and existing service



# Scenario 3 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



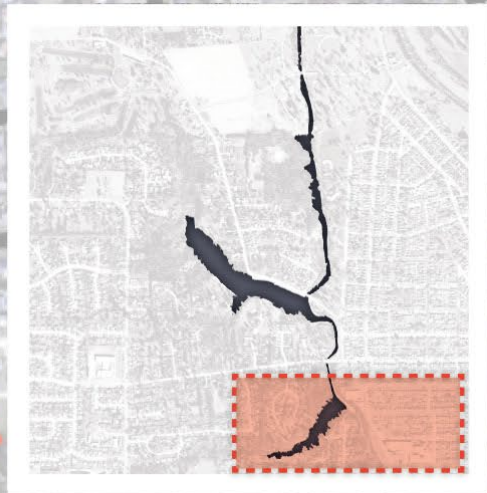
RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL



FRANZ  
POND

W North St

Park Ave

W Greene St

Broadway

N Main St

High St

W Water St

1 inch = 400 feet

**Piqua Stormwater Lines**

**SW\_GravityMain**

— All Other Stormwater Lines

**DIAMETER**

— 54" Stormwater Lines

US-36

Miami St

Young St

S College St



# Scenario 3 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL





# Scenario 3 – Pros and Cons

## PROS

1. Lake pool levels similar to existing
2. Parks have limited impacts
3. May require significantly less property acquisition

## CONS

1. High cost
2. Significant disruption to downtown businesses and residents
3. Does not have capacity in existing system
4. May not be feasible due to elevations of river / water levels
5. Utility disruptions



# Scenario 4



*DIVERT  
INFLOW*



***DIVERT TO NEW  
STORM SEWER***



***DECOMMISSION  
DAM(S)***



*RAISE  
DAM WALL*



***WIDEN  
CANAL***



*ROLLER COMPACTED  
DAMS AND CANAL*



# Scenario 4 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL

1. Franz Pond decommissioned and turned into wetland or park
2. Flows directed into storm system during rain events
3. Canal would need to be widened between Echo and Spillway 1
4. Bridge crossings would need upgraded
5. Widen Echo Lake bridge
6. Significant loss of trees

# Scenario 4 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



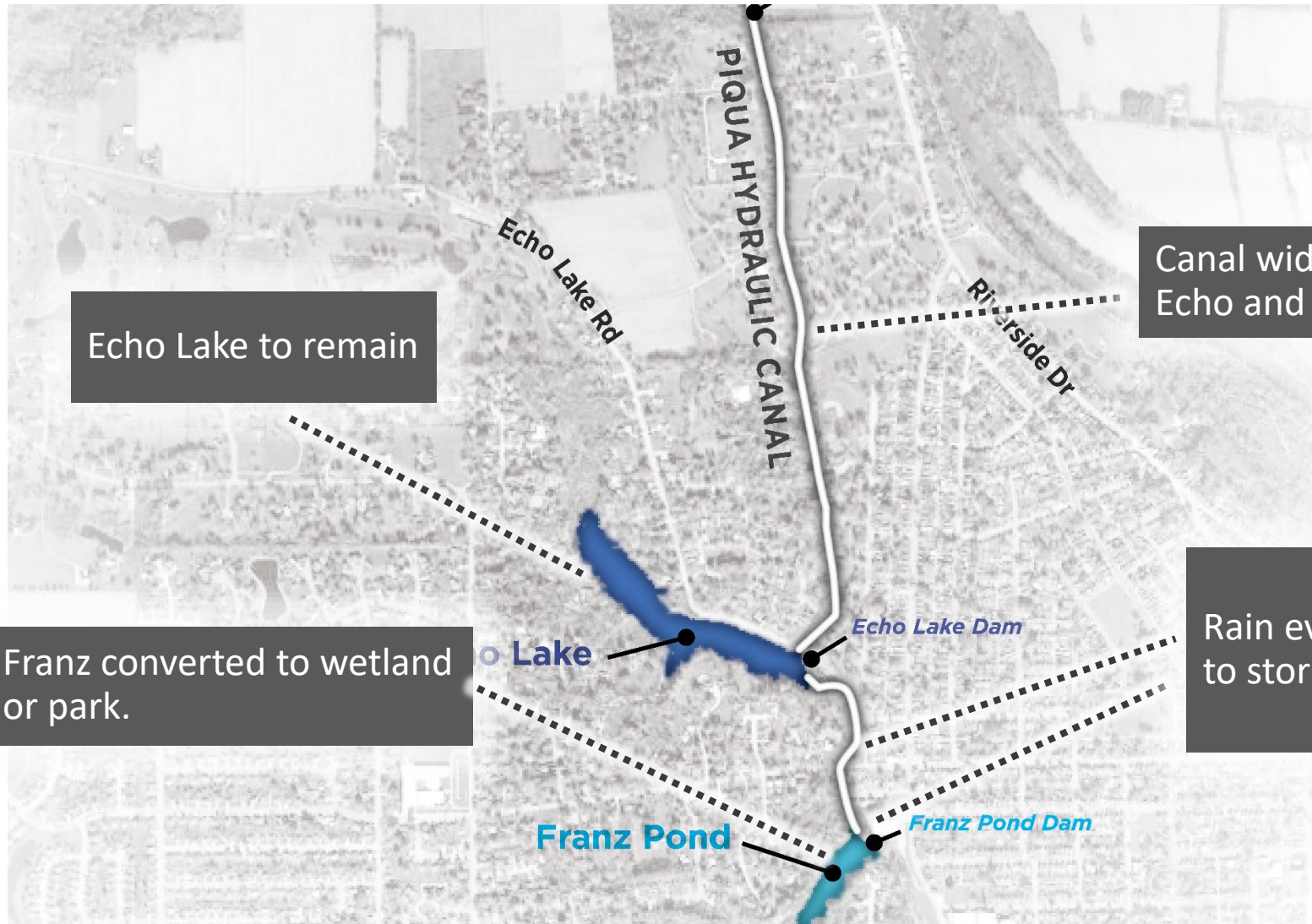
RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL



Echo Lake to remain

Canal widened between  
Echo and Spillway 1

Rain events rain diverted  
to storm system.

Franz converted to wetland  
or park.





Replace Ziegler Rd bridge

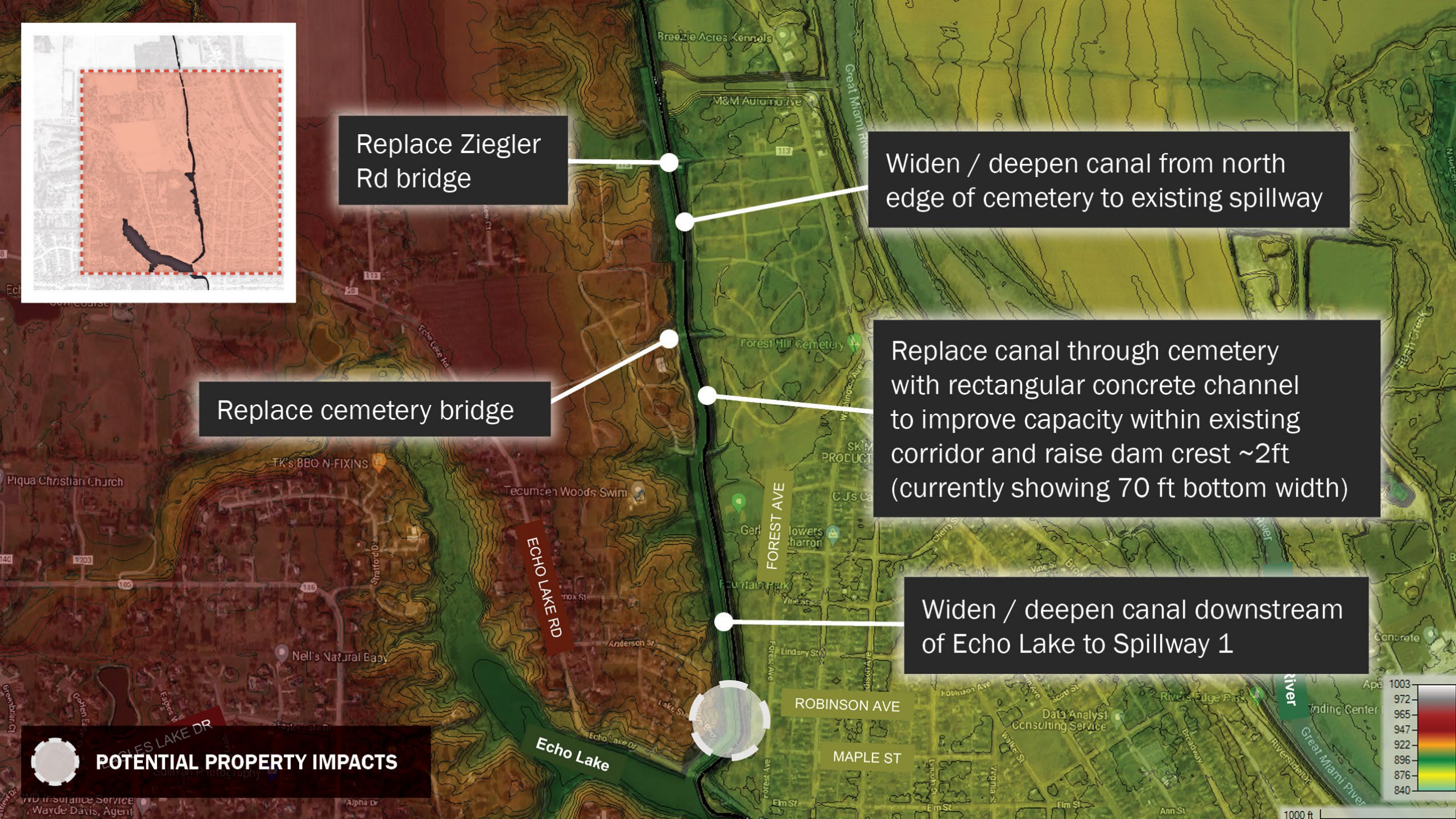
Widen / deepen canal from north edge of cemetery to existing spillway

Replace cemetery bridge

Replace canal through cemetery with rectangular concrete channel to improve capacity within existing corridor and raise dam crest ~2ft (currently showing 70 ft bottom width)

Widen / deepen canal downstream of Echo Lake to Spillway 1

**POTENTIAL PROPERTY IMPACTS**





# Scenario 4 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL





# Scenario 4 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL



# Scenario 4 – Pros and Cons

## PROS

1. Includes improvements to existing erosion
2. Creates natural amenity for public
3. Medium cost

## CONS

1. Changes condition of Franz (wetland or park)
2. Some private property impacts to properties west of Fountain Park
3. Widens canal system north of Echo
4. Three bridge widenings
5. Trees along remaining dam would be removed.
6. Potential private property impacts east of canals (Fisher Dr.)





# Scenario 5



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



**ROLLER COMPACTED  
DAMS AND CANAL**





# Scenario 5 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL

1. Reconstruct dams and canal system with new roller compacted concrete (covered with grass for aesthetics)
2. Increases strength and lowers failure probability
3. May still result in 'spill over' during high rain events, but minimizes potential for catastrophic failure

# Scenario 5 - Details



DIVERT INFLOW



DIVERT TO NEW STORM SEWER



DECOMMISSION DAM(S)



RAISE DAM WALL



WIDEN CANAL



ROLLER COMPACTED DAMS AND CANAL





# Scenario 5 – Pros and Cons

## PROS

1. Lakes remain similar to existing
2. Minimized probability for catastrophic failure
3. System looks and feels similar to what is there once complete (no trees)
4. May be acceptable to ODNR Dam Safety with limited modifications

## CONS

1. High cost / rebuilds entire canal and dam system
2. Still presents opportunities for overtopping/spill over
3. All trees removed from embankments/significant impacts to Fountain Park structures
4. Doesn't prevent flooding during high rain events
5. May not be accepted by ODNR (needs to be studied)
6. Private property impacts on Park Avenue / Forest (could be significant)
7. May require extensive property acquisition
8. May not be suitable on portions of dam/canal

# Scenario 6



*DIVERT  
INFLOW*



***DIVERT TO NEW  
STORM SEWER***



***DECOMMISSION  
DAM(S)***



*RAISE  
DAM WALL*



***WIDEN  
CANAL***



*ROLLER COMPACTED  
DAMS AND CANAL*





# Scenario 6 - Details



DIVERT  
INFLOW



DIVERT TO NEW  
STORM SEWER



DECOMMISSION  
DAM(S)



RAISE  
DAM WALL



WIDEN  
CANAL



ROLLER COMPACTED  
DAMS AND CANAL

1. Franz Pond retained, but deepened significantly to come under ODNR-regulated dam height
2. Franz Pond surface area decreased and deepened
3. Flows directed into storm system during rain events
4. Canal would need to be widened between Echo Lake and Spillway 1
5. Bridge crossings would need upgraded
6. Widen Echo Lake bridge
7. Trees retained on portions of dam not regulated by ODNR

# Scenario 6 – Pros and Cons

## PROS

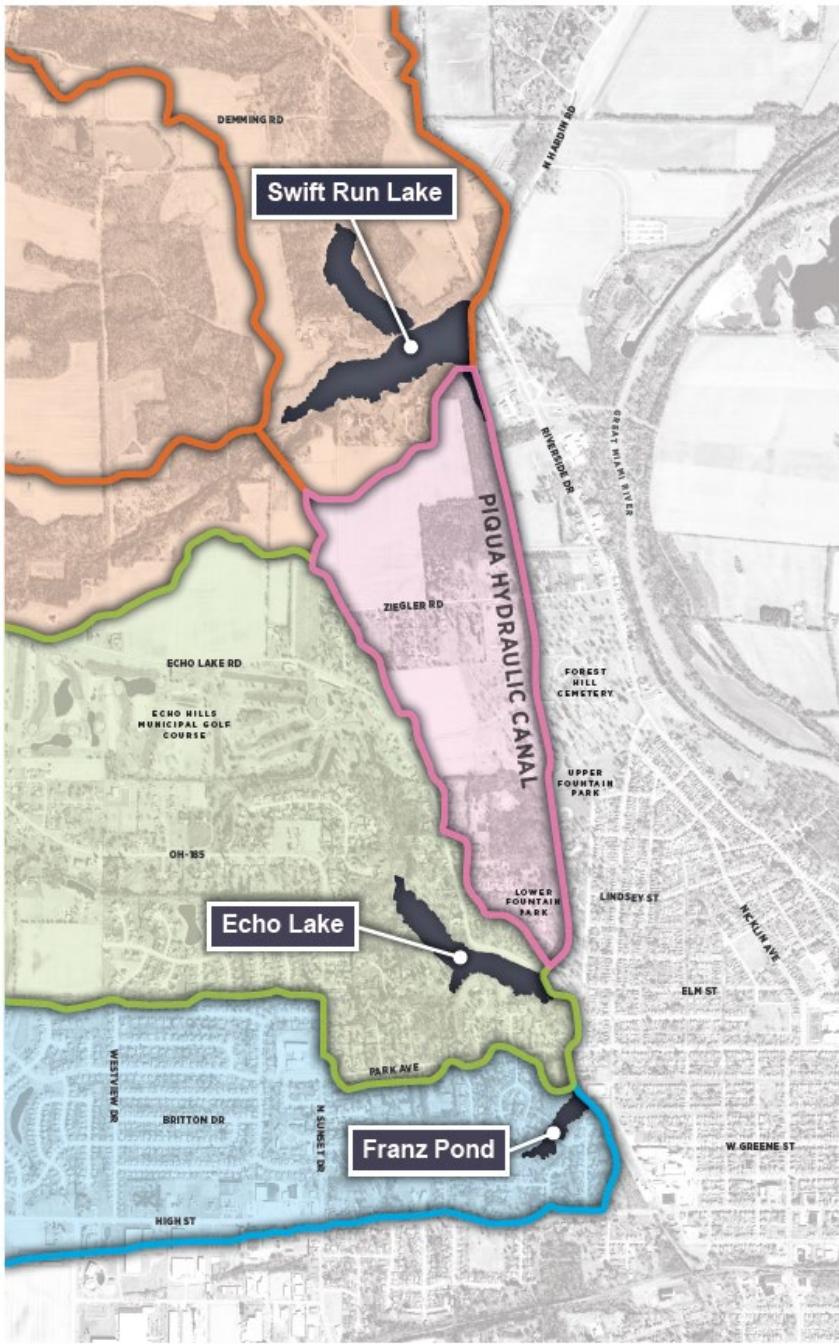
1. Echo Lake and Franz Pond remain
2. Keep Franz Pond depth and lower elevation
3. Keep bike path

## CONS

1. Lowers water level of Echo Lake by 1 ft -2 ft
2. Bike path has 4 ft wall on it for 2,250 ft
3. Higher cost
4. Property acquisitions and home/park removals
5. Traffic concerns on SR 66, Echo Lake Drive, Washington, and Nicklin during construction



# Reference Maps



# All Scenarios

## Scenario 1

Remove Spillway 1 + Convert Both Lakes



## Scenario 4

Franz decommission (flow thru city) + Echo Spillway



## Scenario 2

Raise Dam Wall + Widen Canal + New Spillway



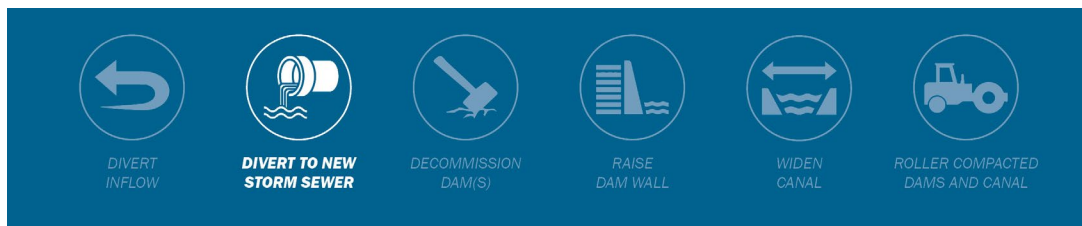
## Scenario 5

Current function (Roller Compacted)



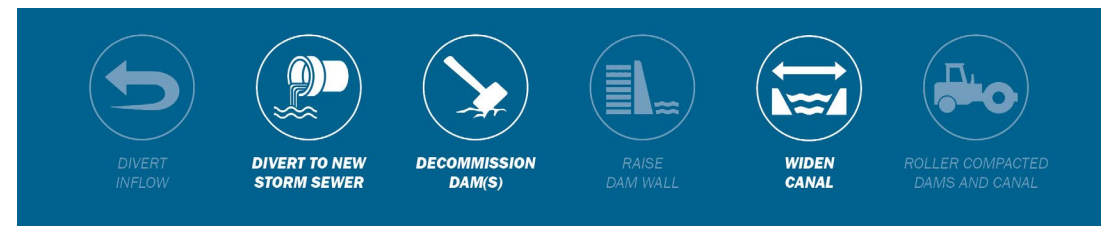
## Scenario 3

Divert PMP Flows Through New Storm Sewers



## Scenario 6

Deepening Franz + Echo Spillway





# Cost

Scenario 1:

**\$5,000,000 - \$10,000,000**

Scenario 2:

**\$50,000,000 - \$60,000,000**

Scenario 3:

**\$140,000,000 - \$150,000,000**

Scenario 4:

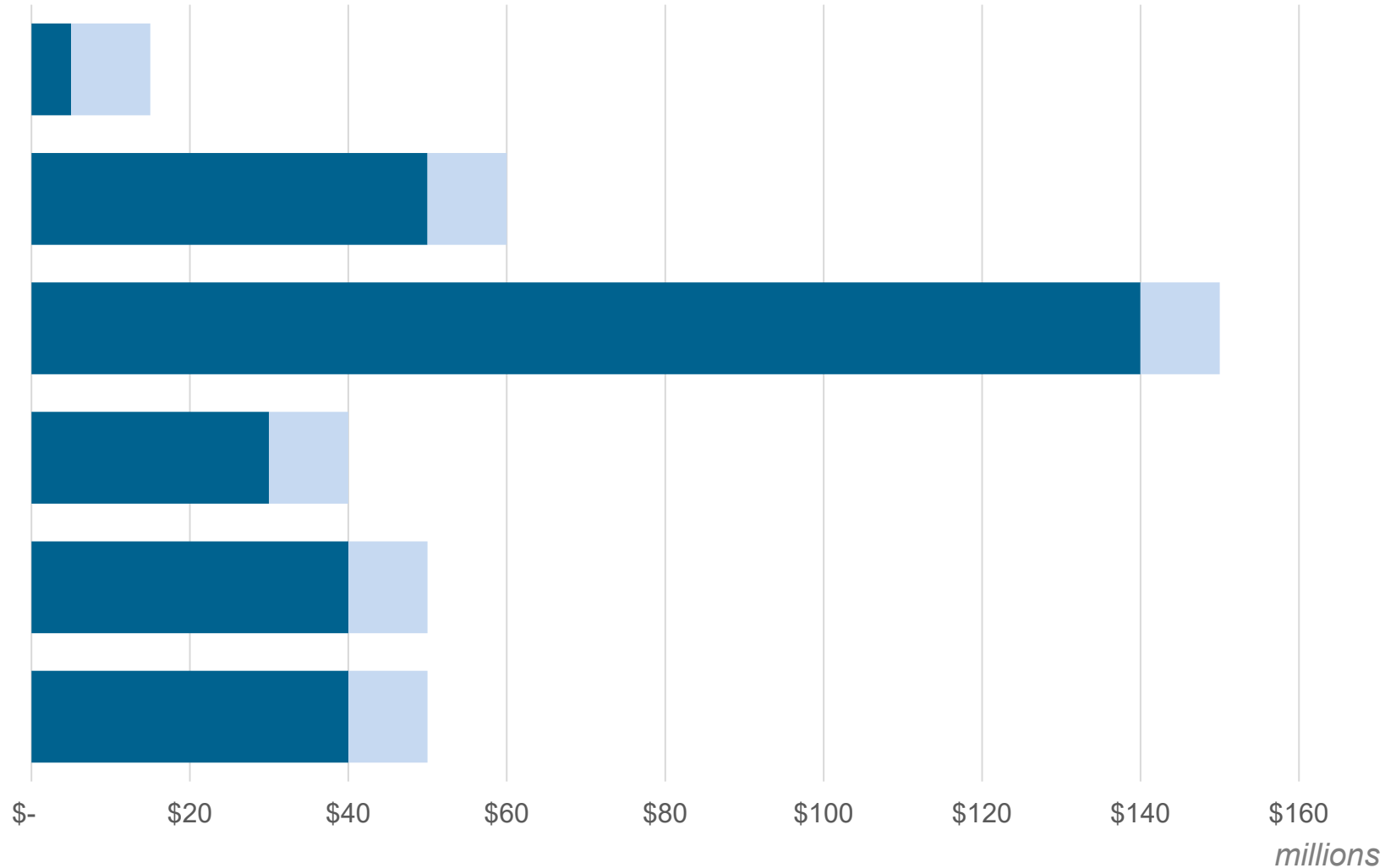
**\$30,000,000 - \$35,000,000**

Scenario 5:

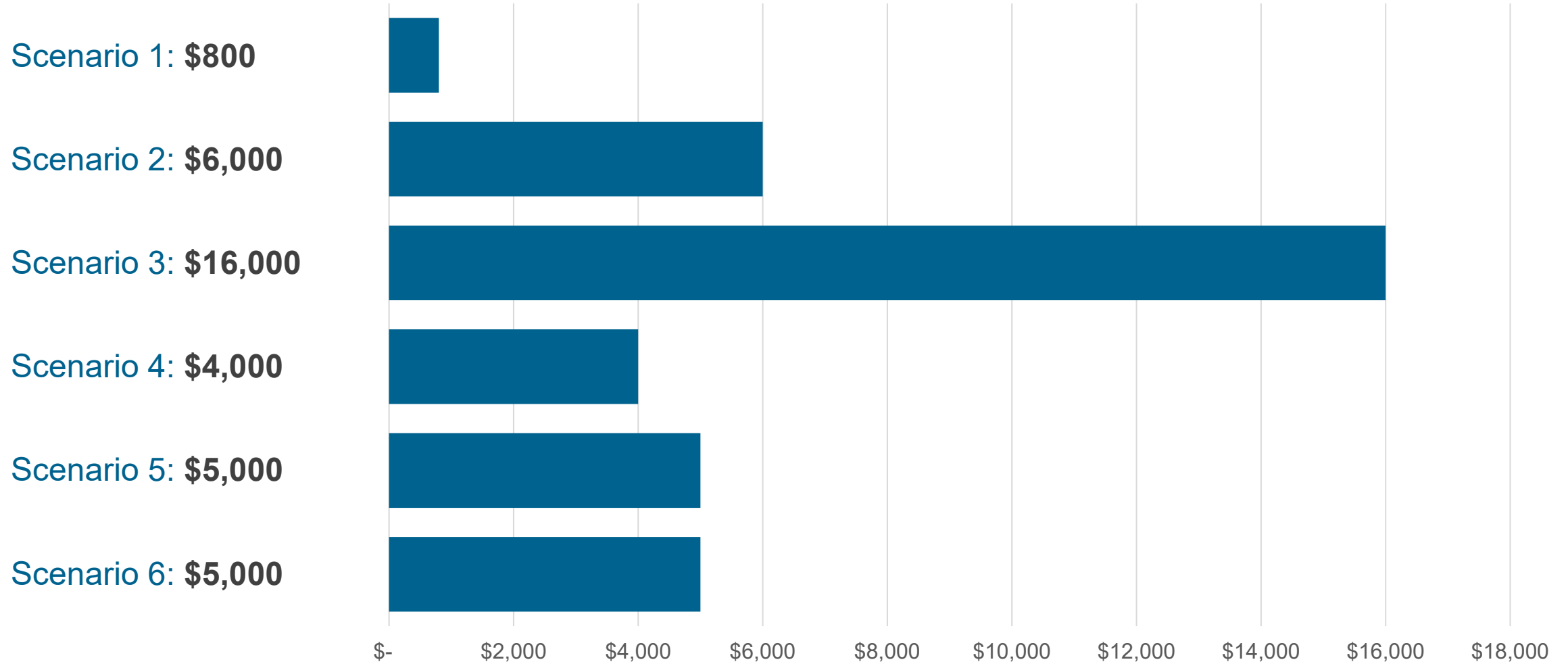
**\$40,000,000 - \$45,000,000**

Scenario 6:

**\$40,000,000 - \$45,000,000**



# 30-Year Cost to Homeowner





# Tell Us What You Think!



On your phone, navigate to the webpage below using the link below or the QR Code above.

<https://ahaslides.com/PIQUA>

**What did you rank highest in the scoring criteria?**

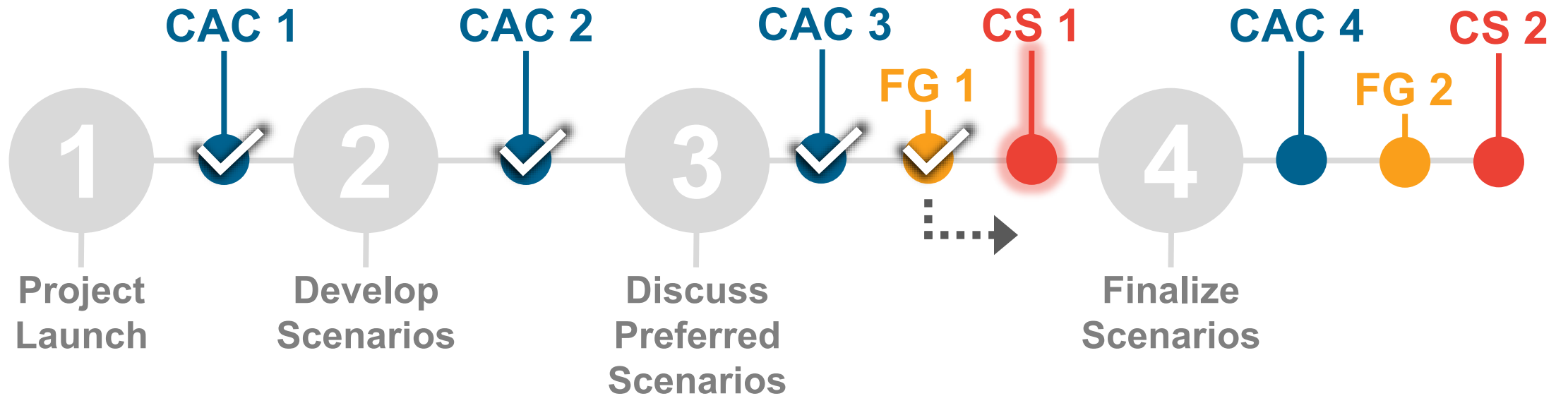
**Which scenarios did you like best and why?**

**What would you like to happen next?**



# Next Steps

# Next Steps



**CAC** – Citizen Advisory Committee

**FG** – Focus Group

**CS** – Community Summit