



Piqua Hydraulic Canal and Dam Safety Design Project

Community Summit – October 3rd, 2022

Agenda

1. Welcome and Introductions
2. Project Overview
3. Quick Facts
4. Review project study areas and scenarios
5. Next Steps

*****BREAK INTO OPEN HOUSE*****

6. Informational Stations and Boards with assigned staff



City of
PIQUA  *Chi*



Today we ask...

- **Hold your questions** for the open house portion after the presentation
- Keep in mind the City is responding to ODNR...this is **not a City initiated project**
- **Your opinion matters** ...please share it
- **Respect** City Staff and other participants, there is no right or wrong feedback today

Project Overview

Project Purpose

WHY ARE WE HERE?

To meet ODNR requirements for the probable maximum flood (PMF) of 27 inches in 24 hours.





**KEEP
CALM
... THERE'S
MORE
TO COME**

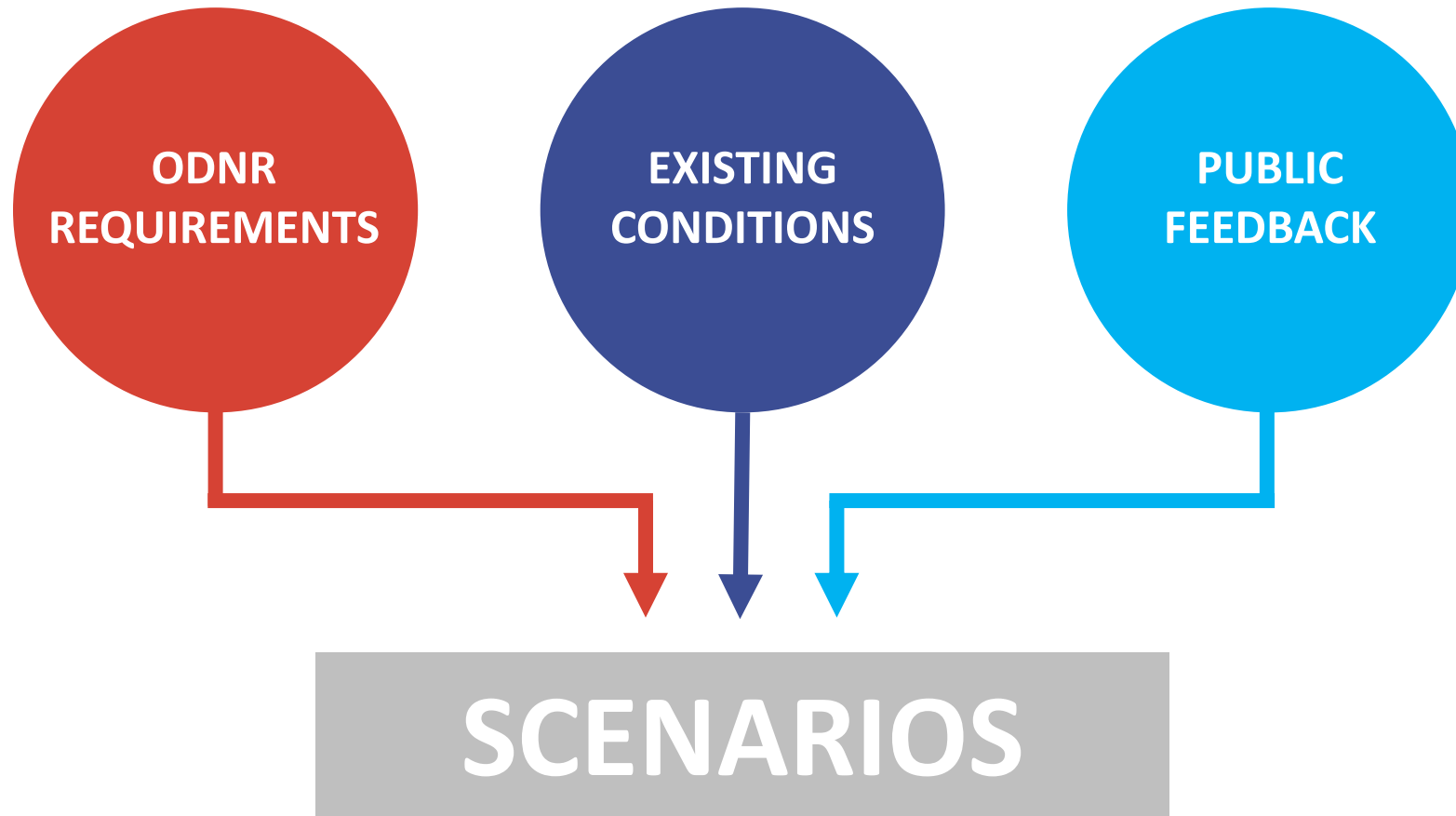
Project Purpose

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

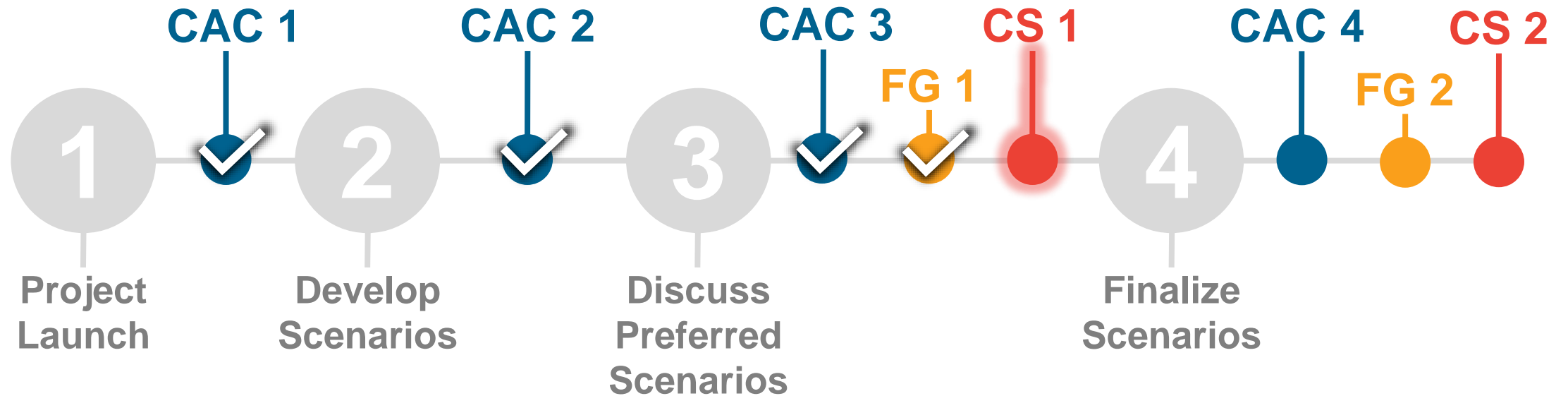
Goals:

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

Creating the Scenarios



Project 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

About the Requirements

ODNR Requirements



- Design of Piqua's dams needs to accommodate a high hazard storm event
- Needs to accommodate the probable maximum precipitation (PMP) of 27 inches of rain in 24 hours.
- PMP was developed by Applied Weather and Assoc. hired by ODNR
- ODNR has accepted this study and this sets the PMP for all areas across Ohio and is geographic specific

ODNR Requirements



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

- This meeting and project is **NOT** about changing the ODNR standards and guidelines
- This City is currently meeting / talking with ODNR to get the standards lowered, but likely not to a degree that will significantly change the task at hand

Quick Facts

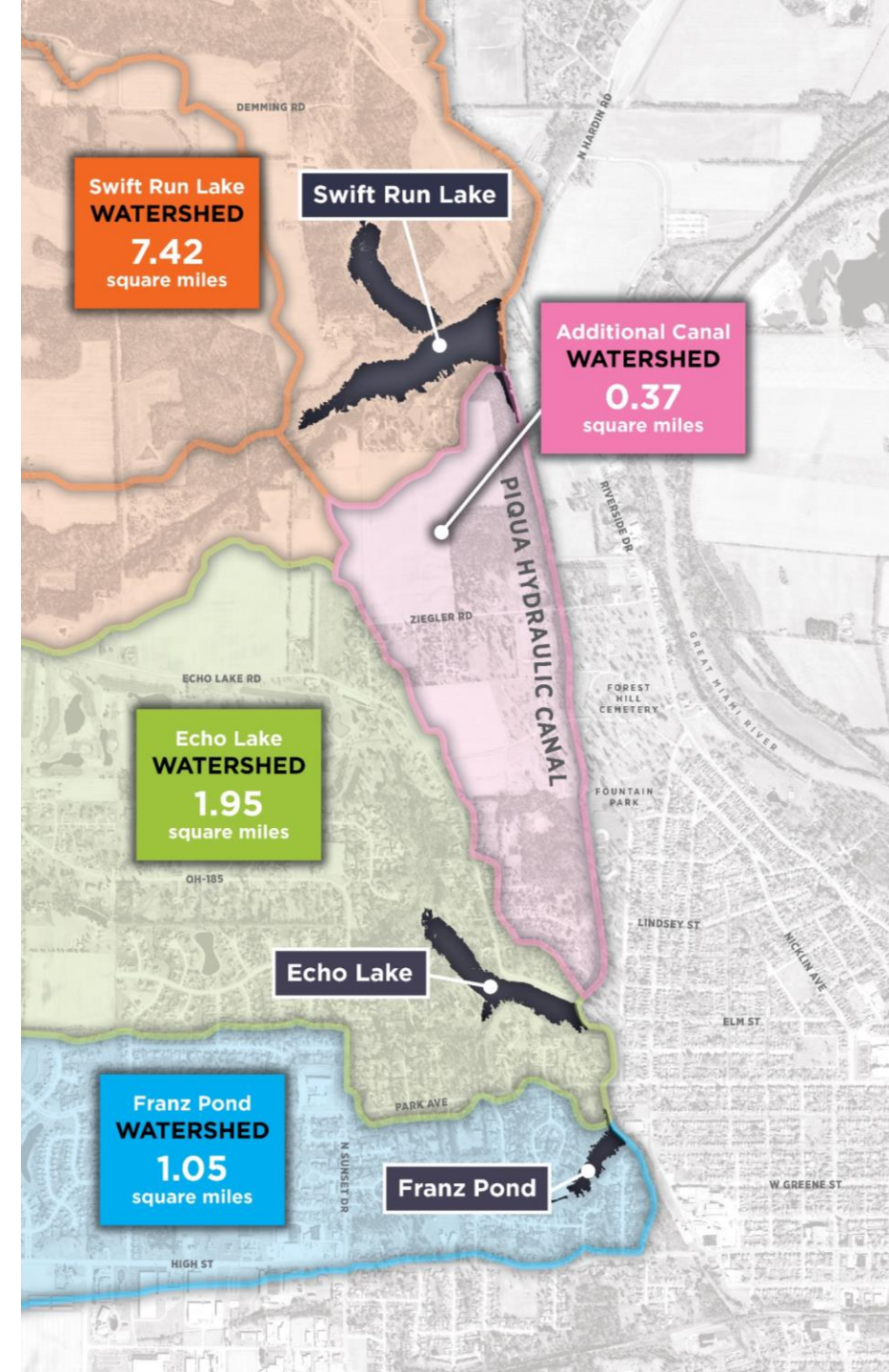
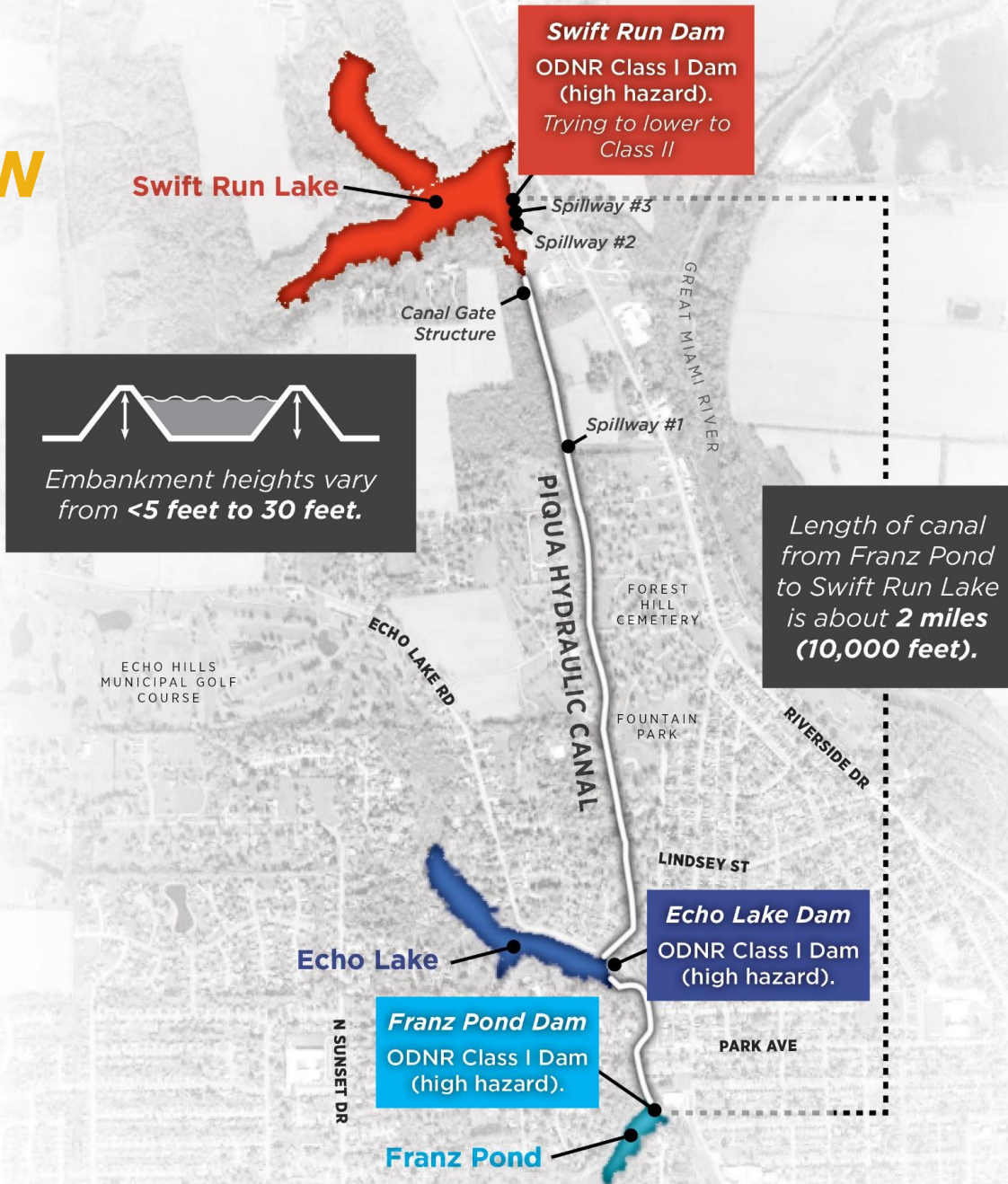
History

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.

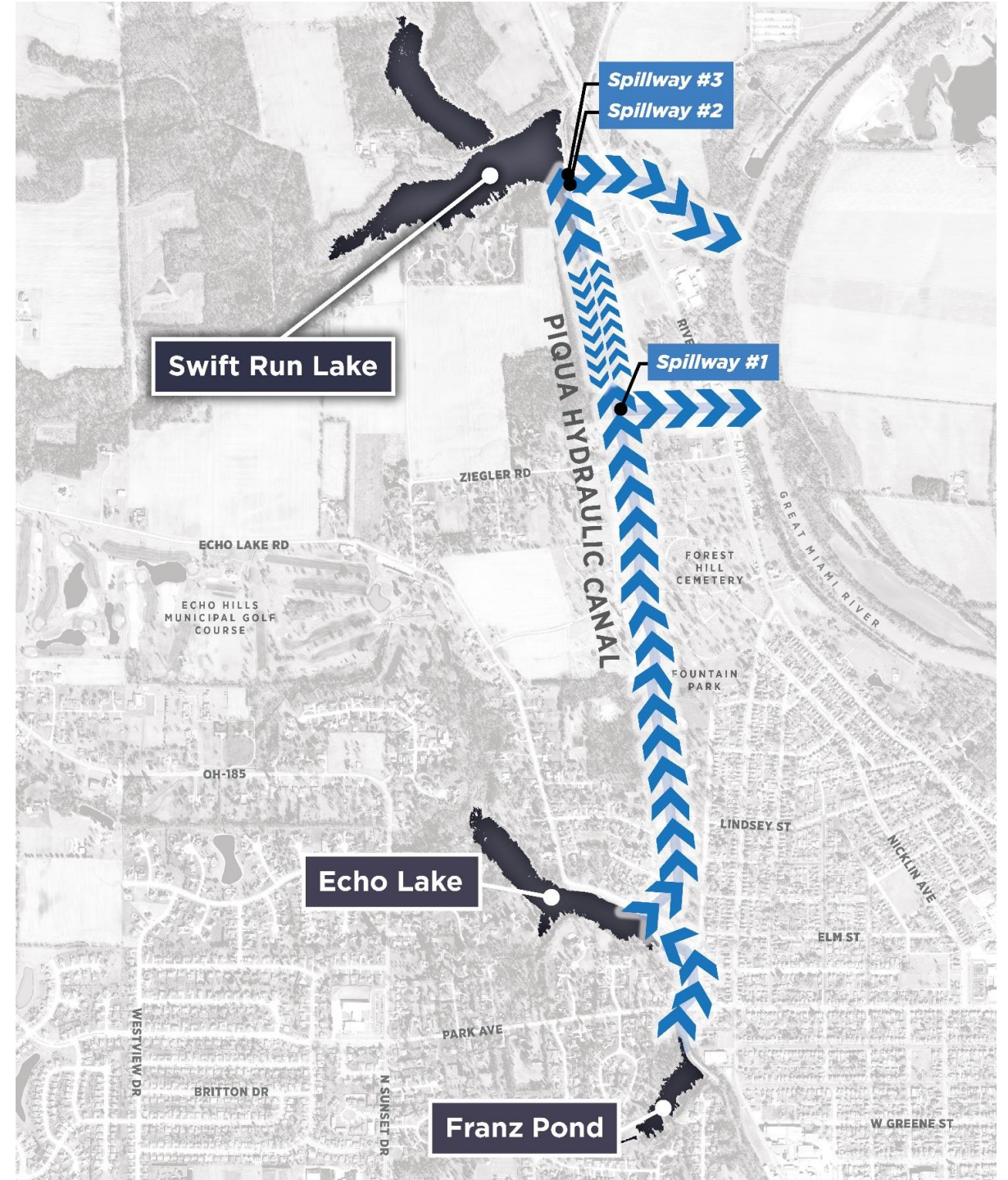
System Overview



How It Works

What the System is Designed for Now

- Can accommodate approximately 6 inches of rainfall in 24 hrs.
- Needs to accommodate 27 inches in 24 hrs.



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

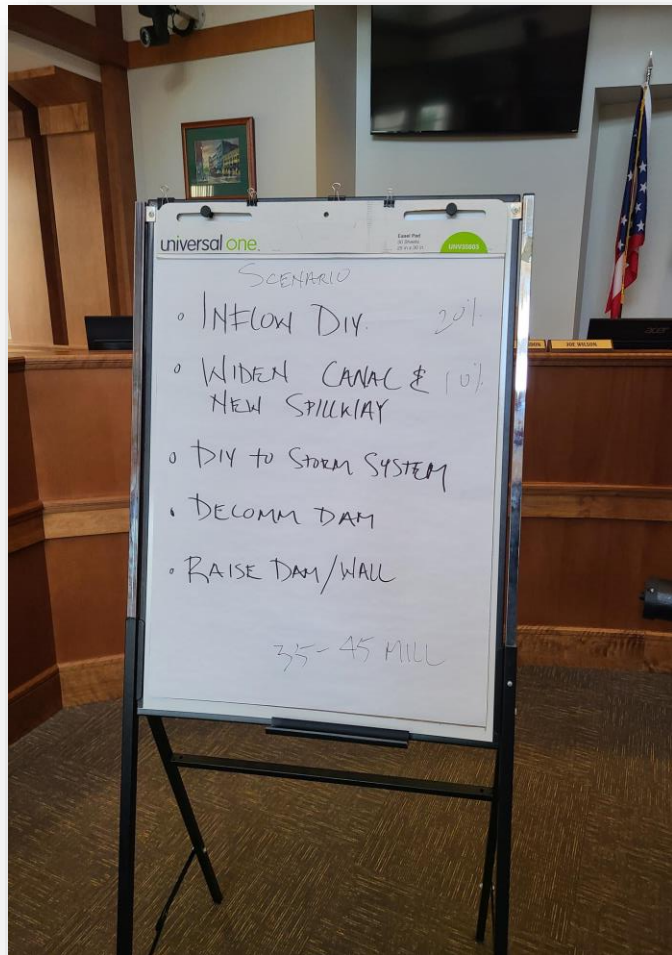
- Flatten Canal Downstream Slopes / Modify Upstream Slopes
- Conduit Canal System – Widening
- Conduit Canal System – Deepening
- Crest Wall Installation
- Additional Flow Control (new gates, etc.)
- Overtopping Protection (RCC)
- Property Acquisition

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"> Due to downstream hazards. No flow paths available through city. 	<ul style="list-style-type: none"> IDEAL LEAD UNDER COUNCILING STREET
New Spillways at Alternate Locations	High	<ul style="list-style-type: none"> Evaluating at multiple park locations. 	<ul style="list-style-type: none"> PARK IMPACTS PROPERTY IMPACTS
New Culvert System	Low	<ul style="list-style-type: none"> Due to significant capacity required. 	<ul style="list-style-type: none"> DRAIN PLAN
New Auxiliary/Emergency Spillway	Medium	<ul style="list-style-type: none"> Still have downstream hazards. No optimal locations. 	<ul style="list-style-type: none"> APPLIES TO SWIFT NEED TO REMOVE
Raise Dam/Canal Embankments	Medium	<ul style="list-style-type: none"> Modification of the hydraulic canal is a budget concern due to their lengths and heights. 	<ul style="list-style-type: none"> WOULD HAVE TO RAISE BRIDGES (SOME) COSTLY!!! IMPACTS TO PATH Doesn't work in some AREAS Not a lot of ideal locations
Overtopping Protection (Reinforced concrete)	Medium	<ul style="list-style-type: none"> At selected locations as part of a combination of multiple improvements. Acceptable with ODNR Dam Safety. Reduces improvements to downstream flood inundation. 	
Short Wall (Selected locations or none)	Medium	<ul style="list-style-type: none"> Still have concerns with stability of hydraulic canal embankments. 	
Control Inflow (Large diversion ditches)	Medium	<ul style="list-style-type: none"> Only solves part of the storage capacity 	<ul style="list-style-type: none"> HELPS BUT REALLY DOESN'T SOLVE THE 27 PROBLEM
Property Acquisition	High	<ul style="list-style-type: none"> May not be public friendly. Includes home on Echo Lake Dam, Fountain Park, other downstream properties. 	<ul style="list-style-type: none"> WHAT % OF TO BE SOLVED

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

Modified Natural Flows



Scenario 4

Franz Decommission (flow through city) + Echo Spillway



Scenario 2

Raise Dam Wall + Widen Canal + New Spillway



Scenario 5

Roller Compacted Concrete



Scenario 3

Divert Storm Flows Through New Storm Sewers



Scenario 6

Deepen Franz + Widen Spillway



Swift Run

Swift Run Lake

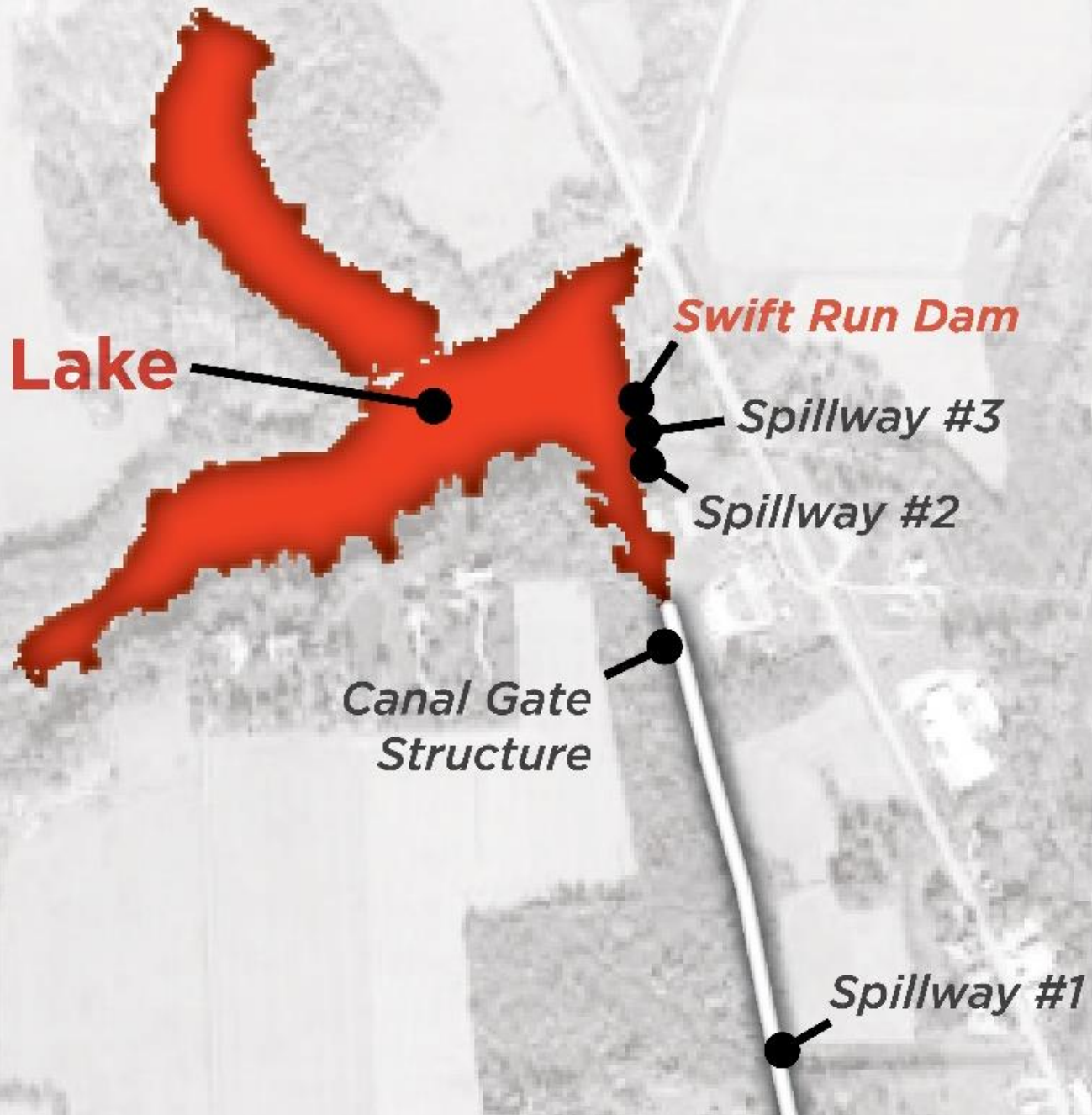
Swift Run Dam

Spillway #3

Spillway #2

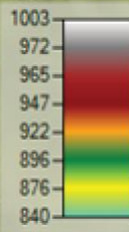
Canal Gate Structure

Spillway #1





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



Scenario 1

Modified Natural Flows



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Scenario 1 - Details



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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 - Details



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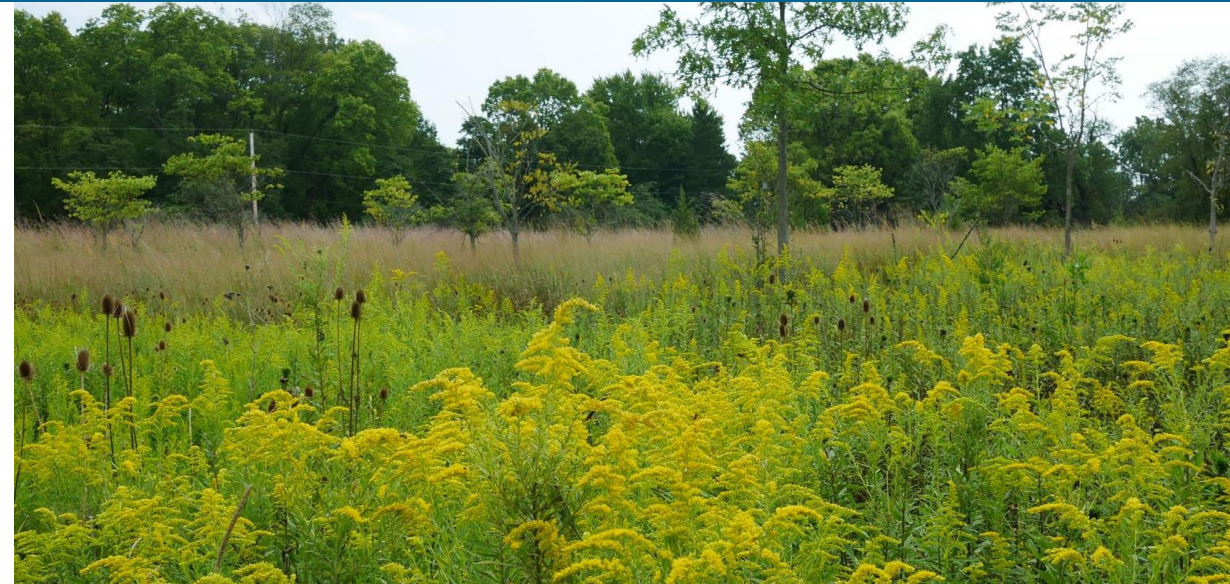
RAISE
DAM WALL



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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

Raise Dam Wall + Widen Canal + New Spillway



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Scenario 2 - Details



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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



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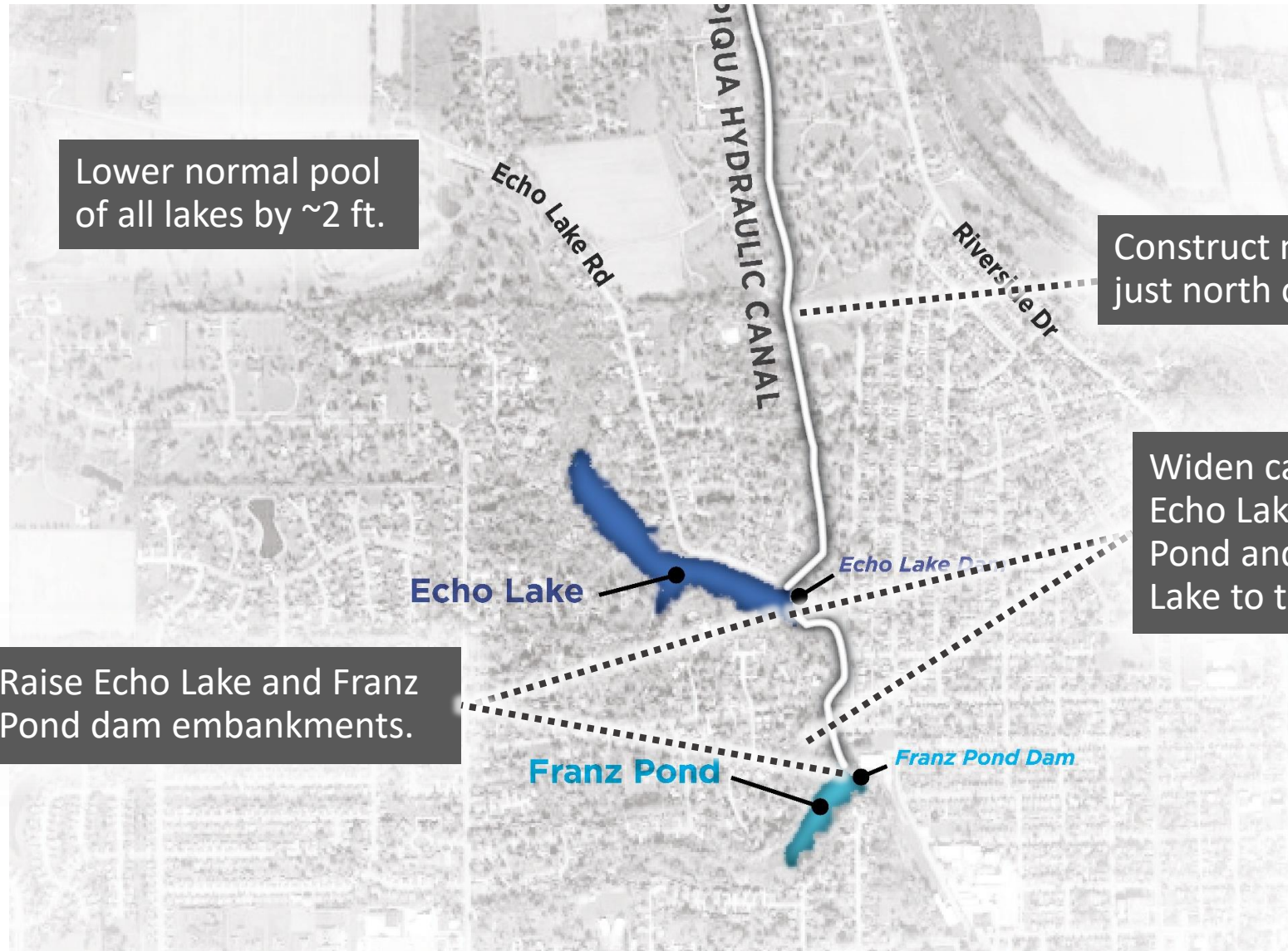
RAISE
DAM WALL



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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.



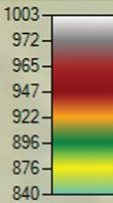
Echo Lake Drive will need to be replaced with a new bridge (minimal hydraulic restriction)

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

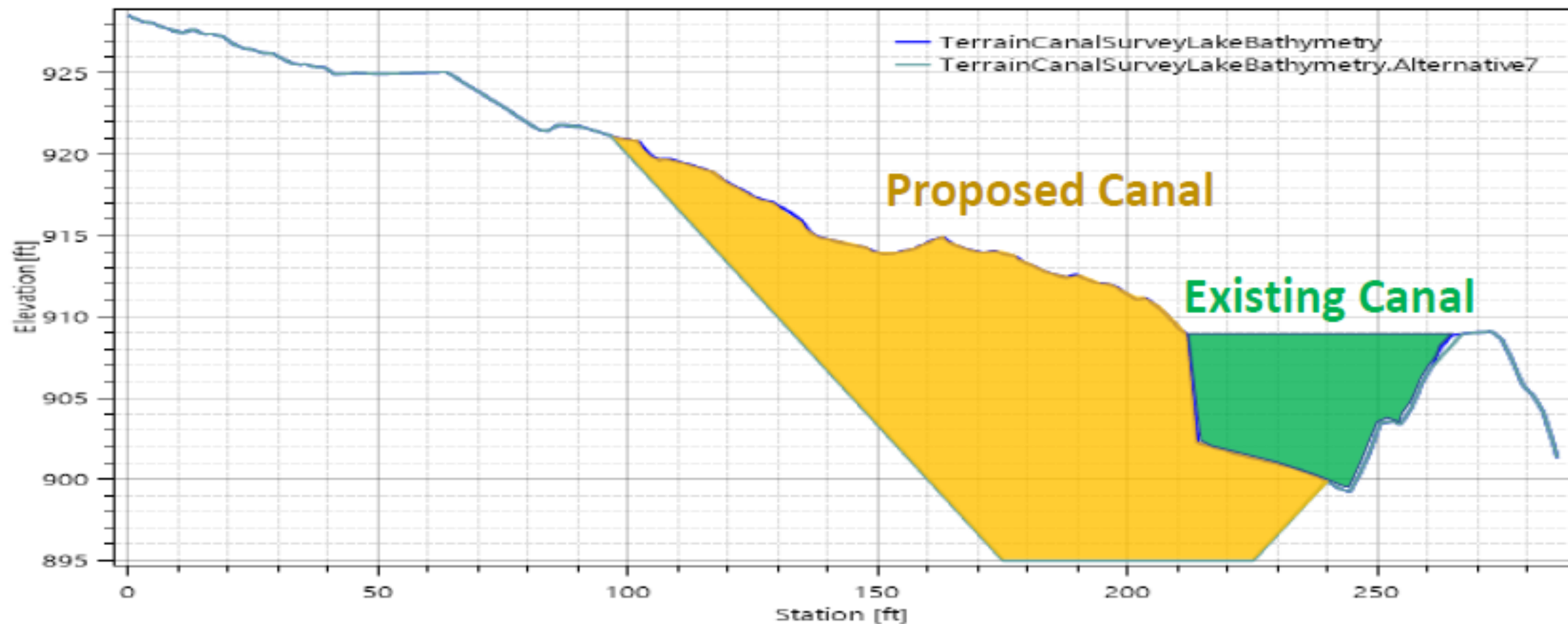
Widen / deepen canal downstream of Echo to new spillway location (currently showing 70 ft bottom width with 3:1 side slopes)

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 Storm Flows Through New Storm Sewers



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Scenario 3 - Details



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DAM WALL



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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



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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



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DAM WALL



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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

Franz Decommission (flow through city) +
Echo Spillway



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*RAISE
DAM WALL*



***WIDEN
CANAL***



*ROLLER COMPACTED
DAMS AND CANAL*

Scenario 4 - Details



DIVERT
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RAISE
DAM WALL



WIDEN
CANAL



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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



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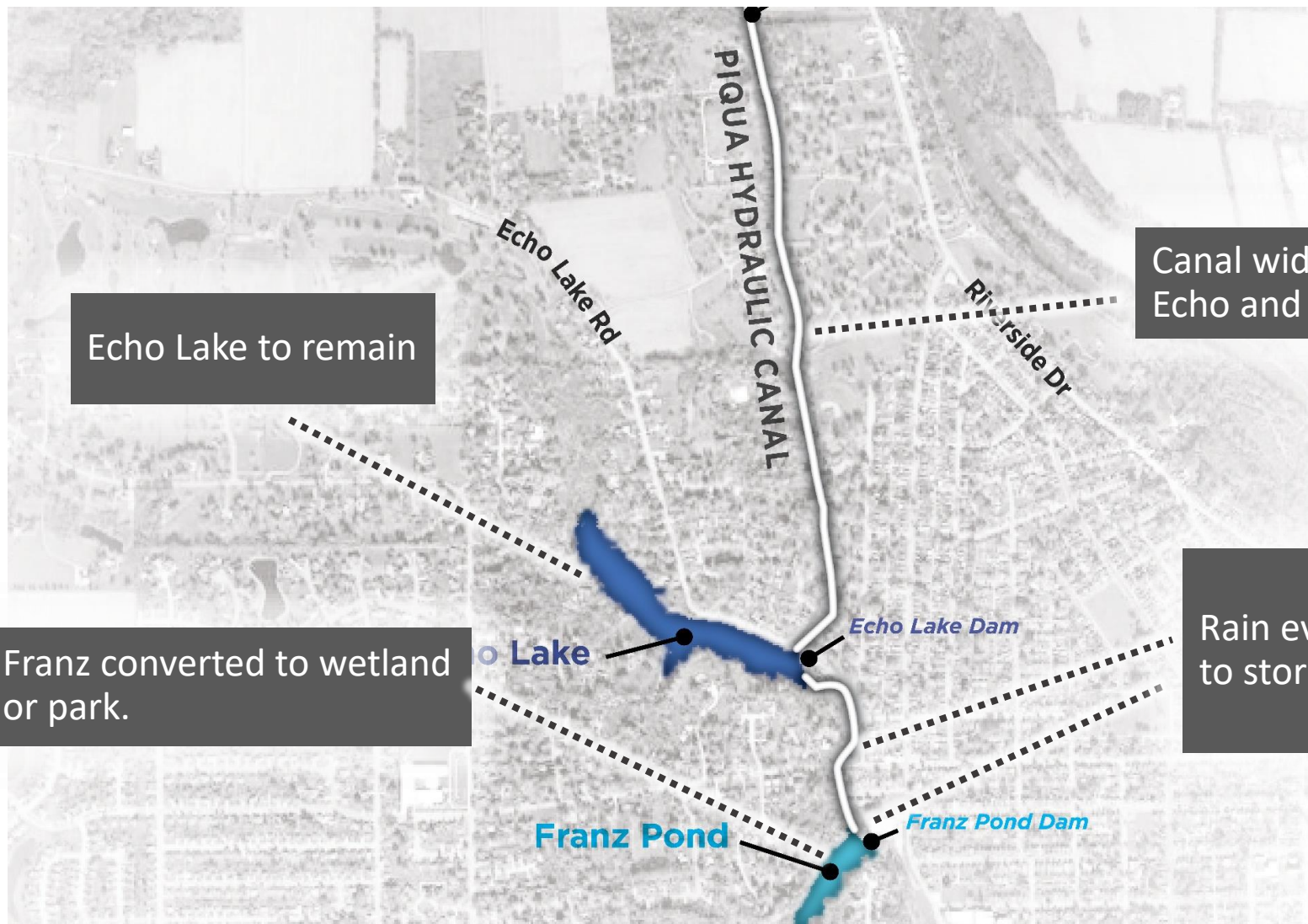
RAISE
DAM WALL



WIDEN
CANAL



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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.

o Lake

Echo Lake Dam

Franz Pond

Franz Pond Dam

Echo Lake Rd

Riverside Dr

PIQUA HYDRAULIC CANAL



Replace Ziegler Rd bridge

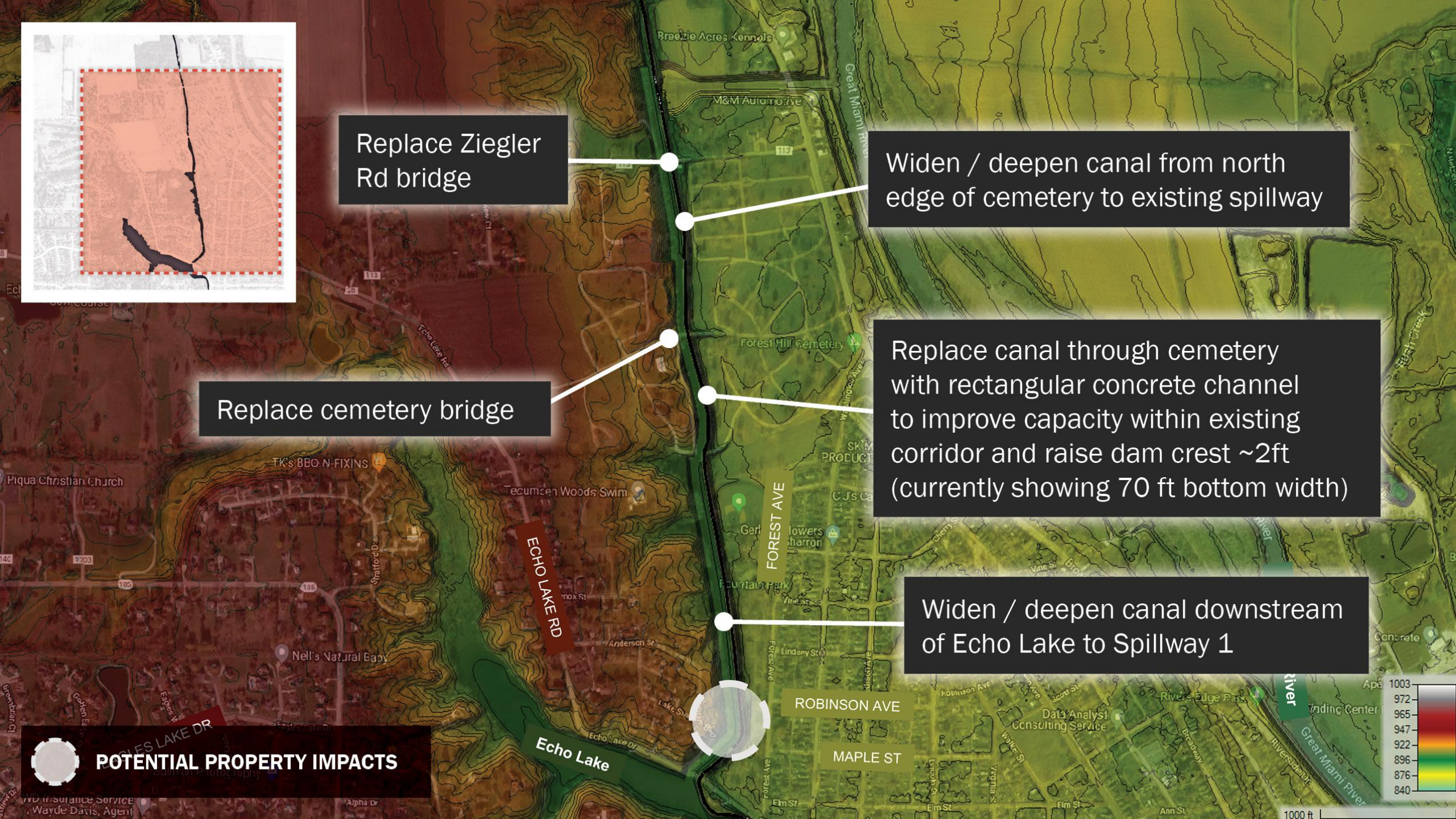
Widen / deepen canal from north edge of cemetery to existing spillway

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



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DAM WALL



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CANAL



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DAMS AND CANAL



Scenario 4 - Details



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RAISE
DAM WALL



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CANAL



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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

Roller Compacted Concrete



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Scenario 5 - Details



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DAM WALL



WIDEN
CANAL



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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



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RAISE
DAM WALL



WIDEN
CANAL



ROLLER COMPACTED
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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

Deepen Franz + Widen Spillway



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*RAISE
DAM WALL*



***WIDEN
CANAL***



*ROLLER COMPACTED
DAMS AND CANAL*



Scenario 6 - Details



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DAM WALL



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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 - Details



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DAM WALL



WIDEN
CANAL



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DAMS AND CANAL



Scenario 6 – Pros and Cons

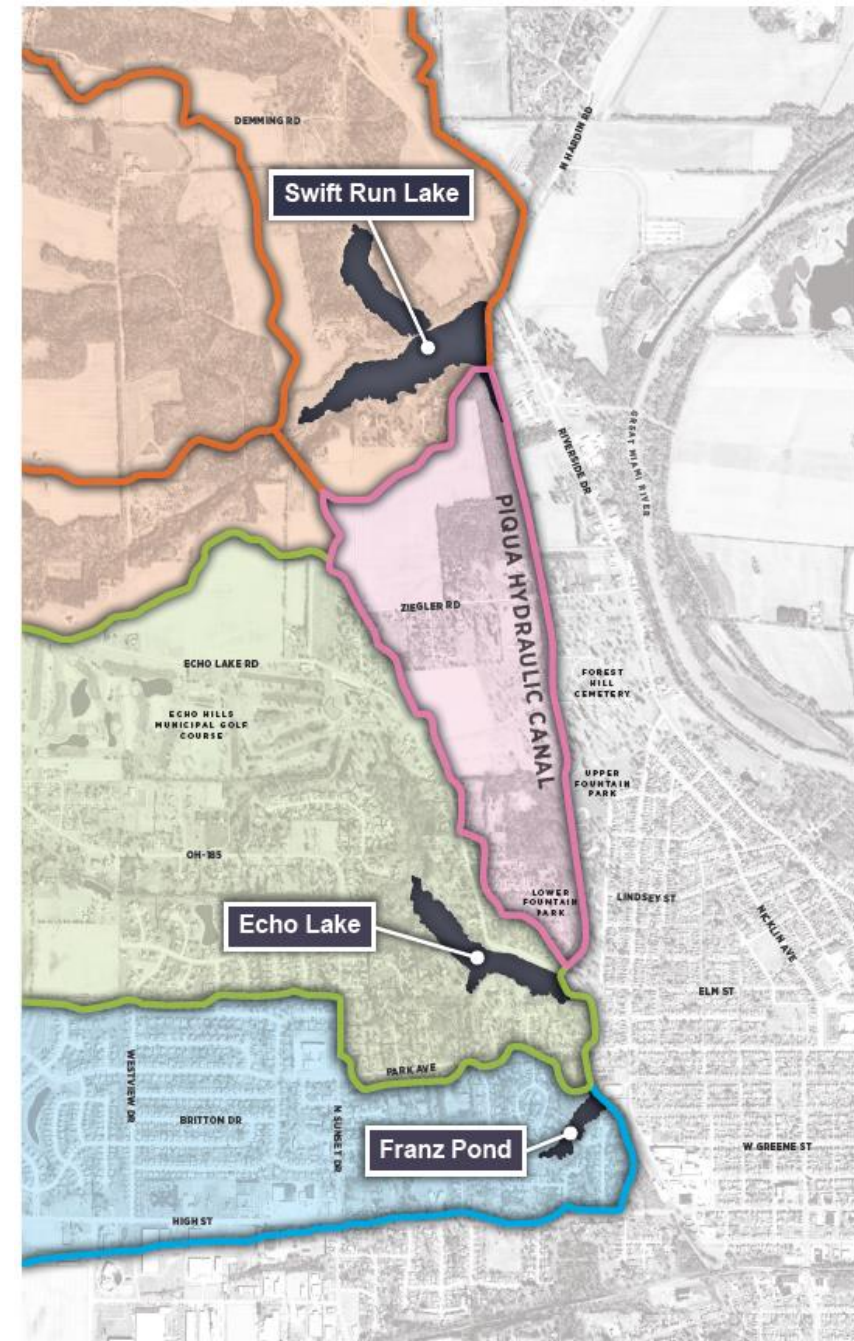
PROS

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

Modified Natural Flows



Scenario 4

Franz Decommission (flow through city) + Echo Spillway



Scenario 2

Raise Dam Wall + Widen Canal + New Spillway



Scenario 5

Roller Compacted Concrete



Scenario 3

Divert Storm Flows Through New Storm Sewers



Scenario 6

Deepen Franz + Widen Spillway



Cost

Scenario 1: Modified Natural Flows

\$23,000,000 - \$28,000,000

Scenario 2: Raise Dam Wall + Widen Canal + New Spillway

\$70,000,000 - \$77,000,000

Scenario 3: Divert Storm Flows Through New Storm Sewers

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

Scenario 4: Franz Decommission (flow through city) + Echo Spillway

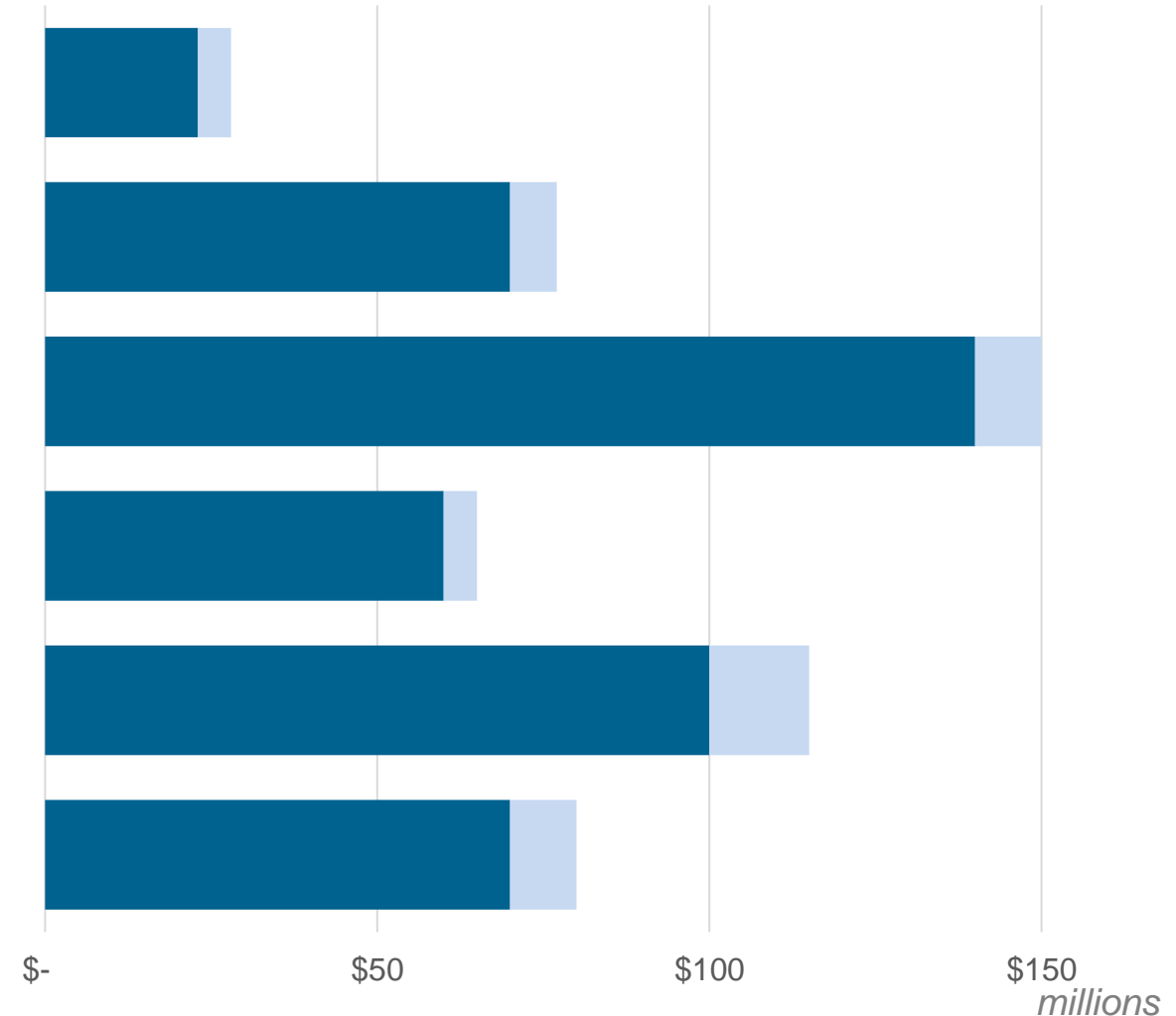
\$60,000,000 - \$65,000,000

Scenario 5: Roller Compacted Concrete

\$100,000,000 - \$115,000,000

Scenario 6: Deepen Franz + Widen Spillway

\$70,000,000 - \$80,000,000



Approximate 30-Year Cost to Homeowner

(in addition to current SW rate of \$6.70/month/ERU)

Scenario 1: Modified Natural Flows
\$3,000

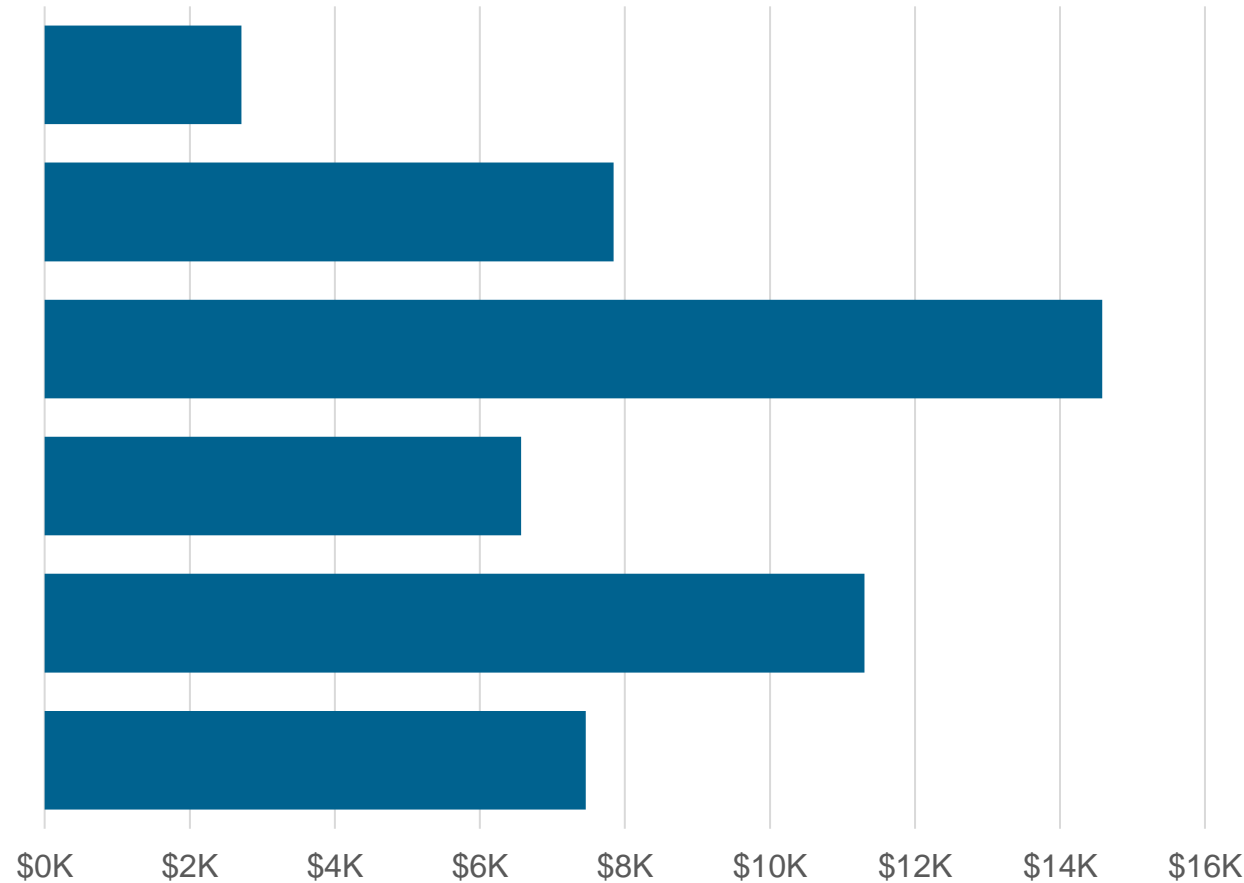
Scenario 2: Raise Dam Wall + Widen Canal + New Spillway
\$7,500

Scenario 3: Divert Storm Flows Through New Storm Sewers
\$15,800

Scenario 4: Franz Decommission (flow through city) + Echo Spillway
\$6,567

Scenario 5: Roller Compacted Concrete
\$11,303

Scenario 6: Deepen Franz + Widen Spillway
\$7,460



*Note: Costs indicated are for 1 ERU (Equivalent Residential Unit).
Business ERU's vary based on size (some greater than **50 ERU's**)*

Tell Us What You Think!



On your phone, scan the QR code above
or navigate to the webpage below:

<https://ahaslides.com/PIQUA>

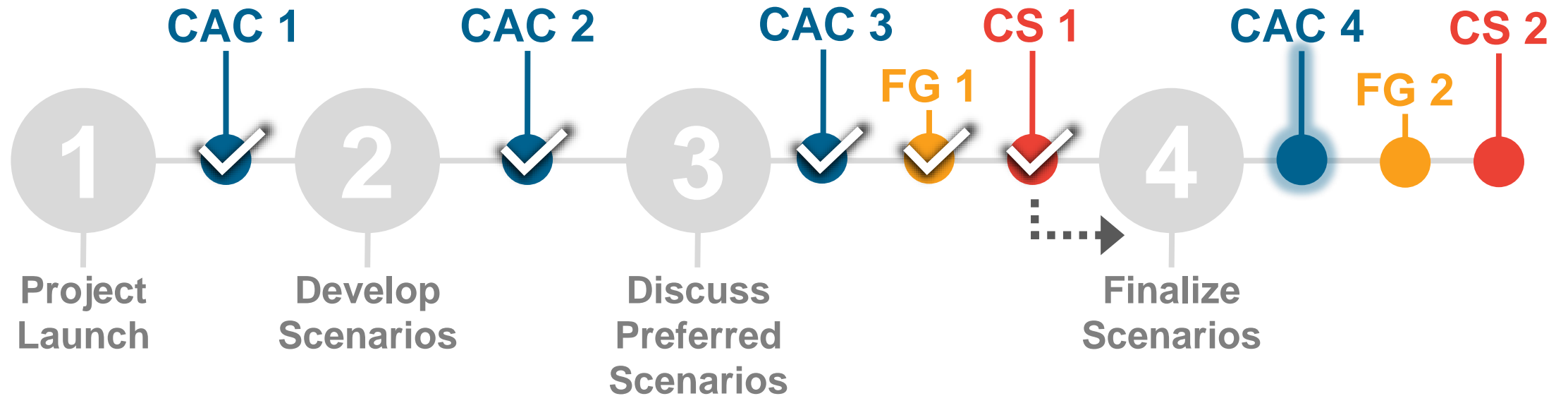
What did you rank highest in the scoring criteria?

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