



*Welcome to the*  
Third Annual Public Meeting

Penn Lake Dam & Spillway  
Improvement Project



## New Developments with Penn Lake Dam and Spillway Improvement Project

### Updated October 1, 2022

#### 2022 Public Meeting Announcement

The third annual public meeting regarding the Dam and Spillway Improvement project was held on Saturday, October 1, 2022 at noon at the Penn Lake Community Building.

Topics discussed at the meeting include:

- Quick Historical Background
- Summary of Engineers' Findings & Recommendations – Best Options
- Follow the Money – Grant Funding, Tax Revenue & Line of Credit
- Where Are We with DEP?
- Next Steps

The slides presented at the meeting are available [here](#).

#### Get E-Mail Updates

Sign up at the bottom of this page to receive e-mail updates about the Dam and Spillway Improvement project.

Click images to enlarge.

#### Drained Lake Gallery 2006





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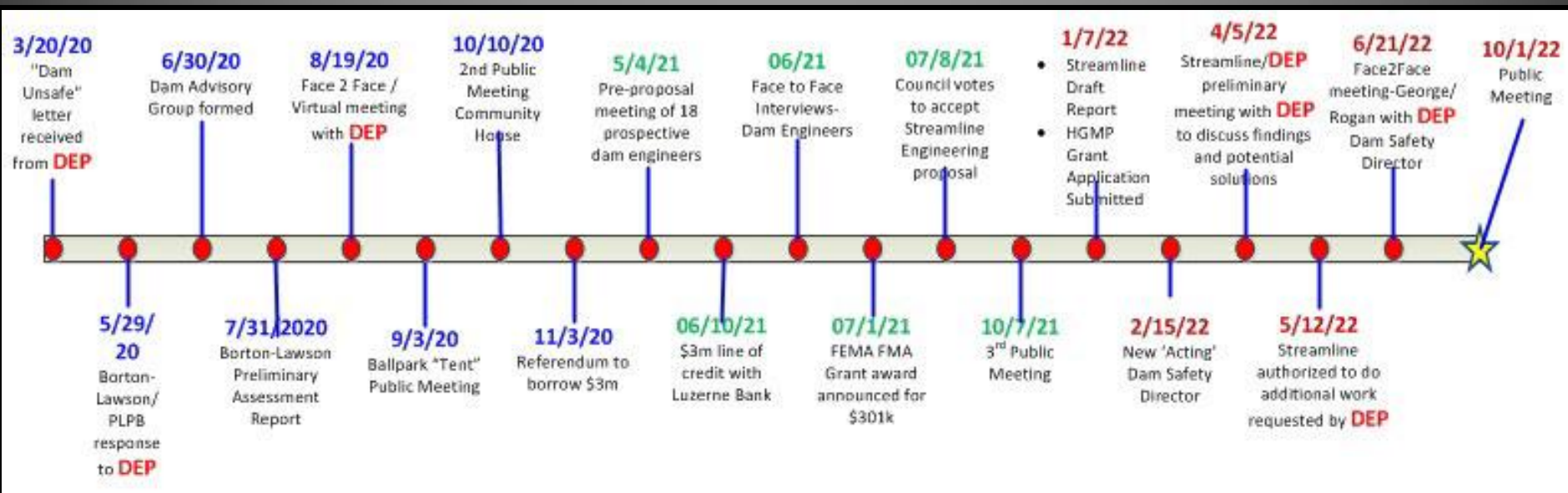


# Today's Agenda

- Quick Historical Background
- Summary of Engineers' Findings & Recommendations – Best Options
- Follow the Money – Grant Funding, Tax Revenue & Line of Credit
- Where Are We with DEP?
- Next Steps
- Questions & Answers



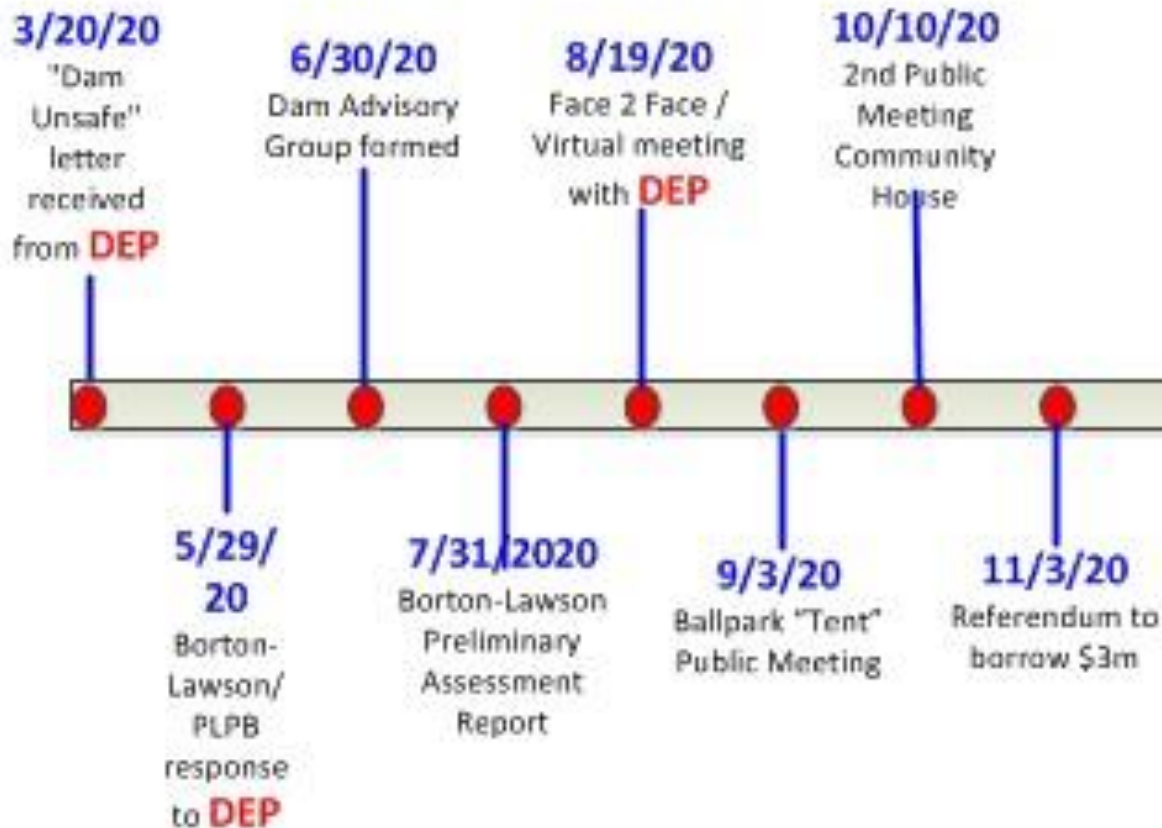
# Timeline of Events





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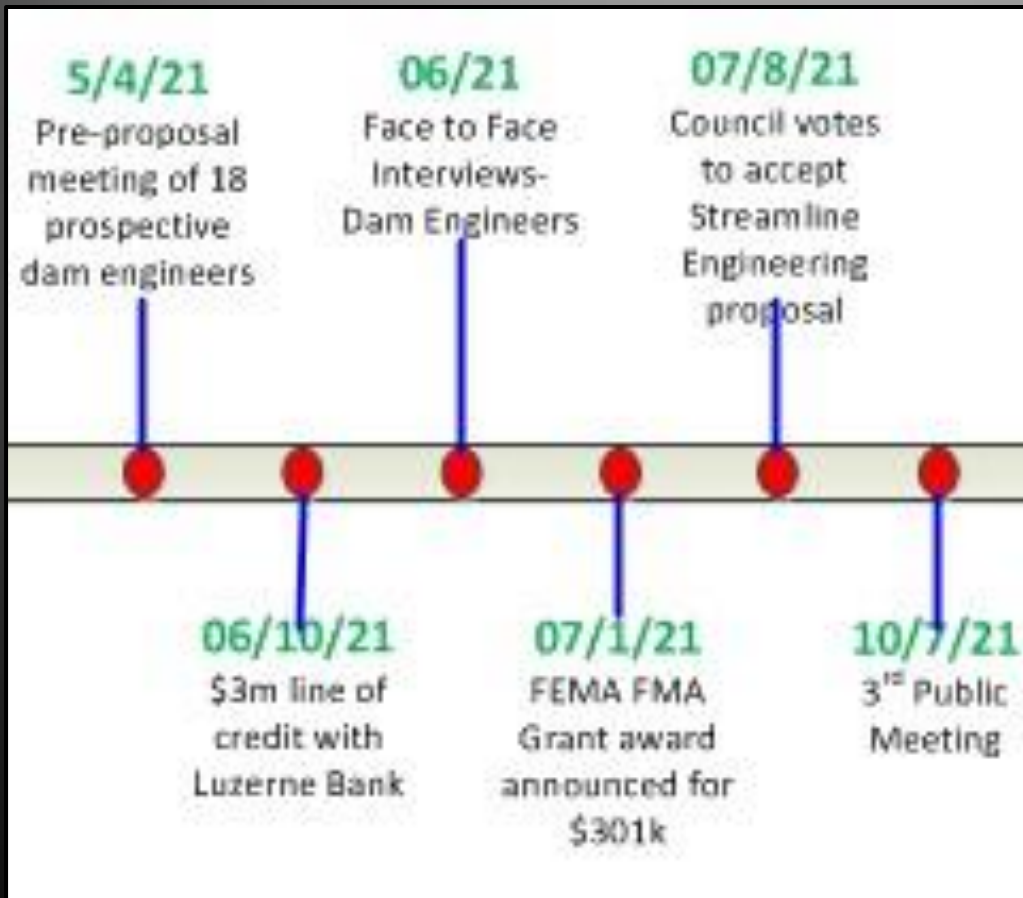
2020





# Timeline of Events

# 2021





# Timeline of Events

2022



# Penn Lake Dam Safety Concerns



## Key Involvement:

### Community

- Penn Lake Community
- Penn Lake Borough
- Downstream business and property owners

### Regulatory Entities

- Pennsylvania Department of Environmental Protection

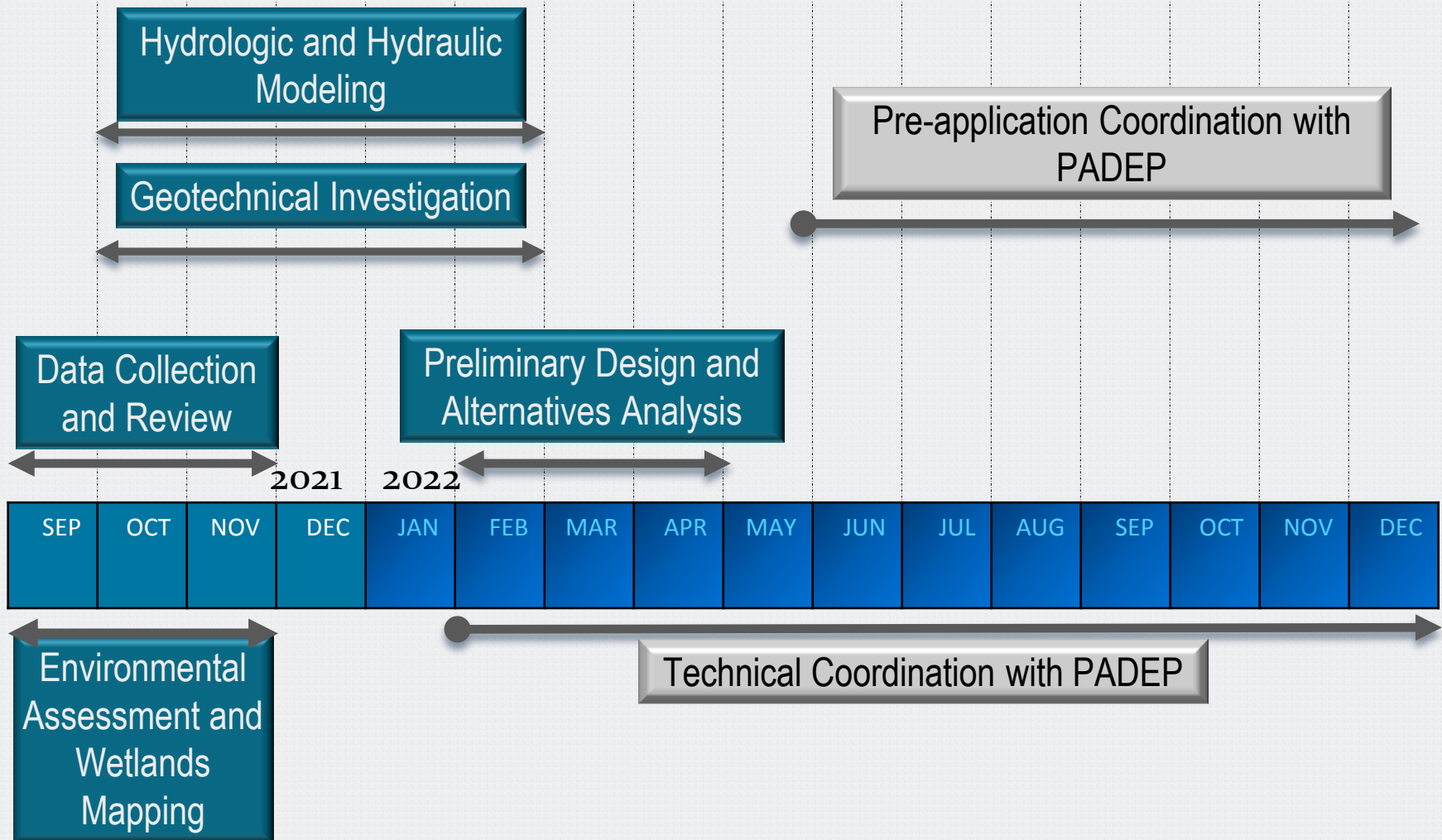
All are looking for a long-term solution NOT another band-aid

Engineering  
Study and  
Design

**Long-term solution**

A dam in compliance with PA Code 25 Chapter 105 with a minimum risk of dam breach and no additional risk to Penn Lake residents

# Engineering Work Done to Date

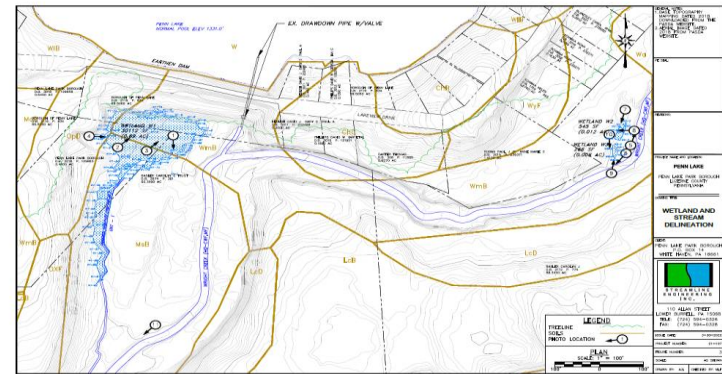


# Mapping and Field Measurements

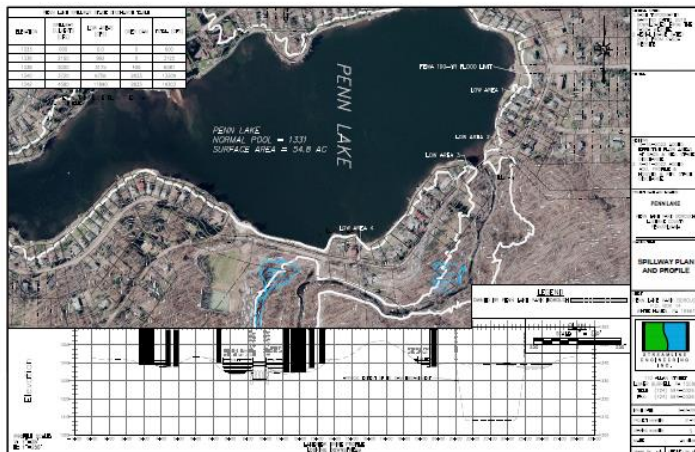
## Penn Lake Bathymetry to Verify Depth and Lake Storage Capacity



## Wetlands Mapping and Environmental Investigation



## Lakeview Drive Profile and Sag Areas



## Spillway Capacity



# Geotechnical Evaluation of Existing Dam



**Work Completed**

Electric Resistivity Imaging (7 scans) in September 2021.

Geotechnical Drilling in October 2021 to complete 4 borings along the crest of embankment.

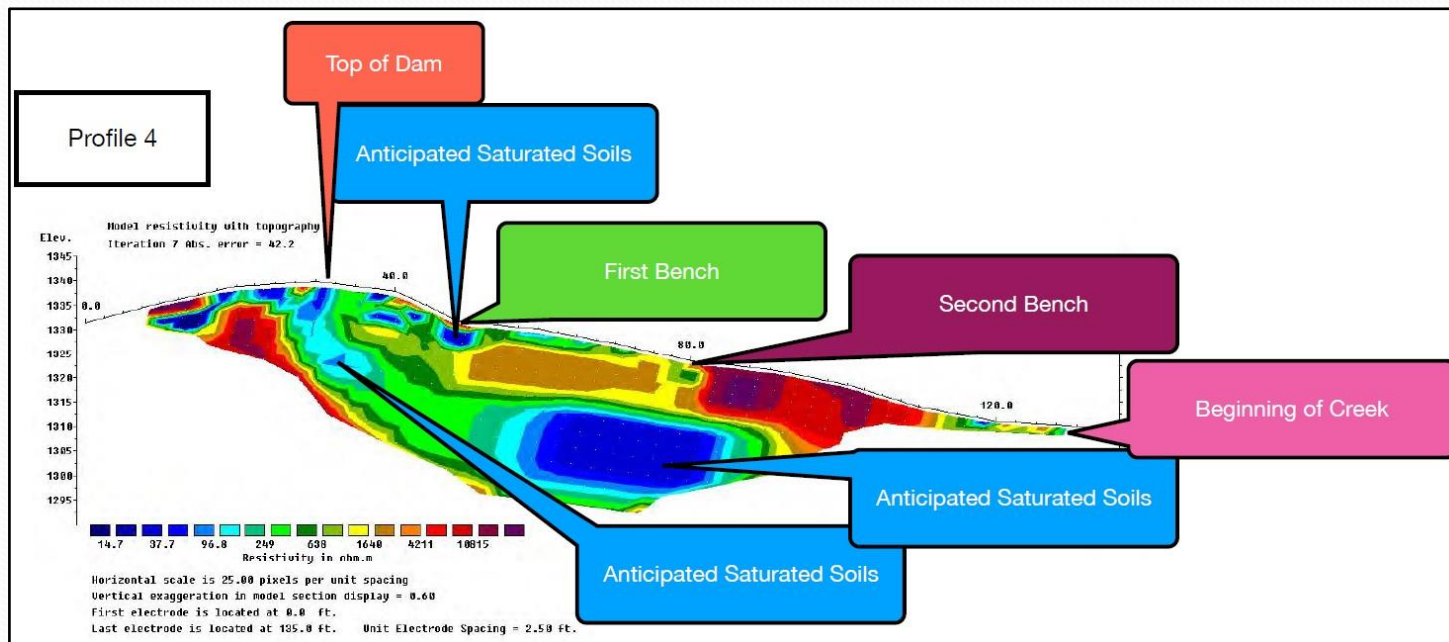
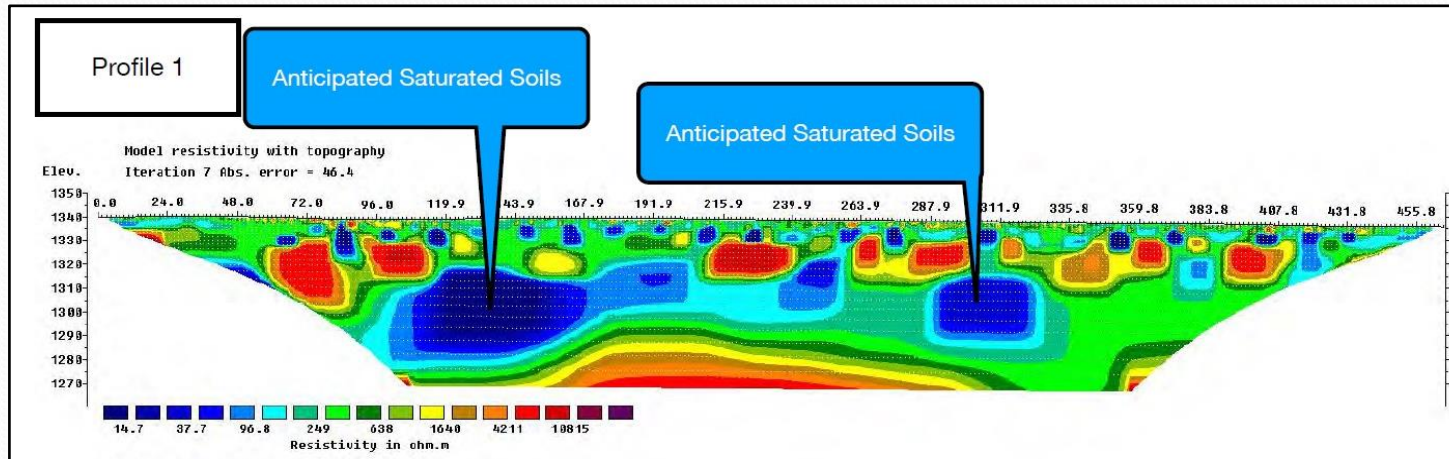
Geotechnical Drilling in December 2021 to complete 2 additional borings.

## CONCLUSIONS

Embankment stable under normal pool and earthquake conditions

Embankment **NOT** stable under dam **overtopping** conditions

# Geotechnical Evaluation: Electric Resistivity Imaging (ERI)



**THOROUGHbred**  
DESIGN | ENGINEER | CONSTRUCT

ERI  
produced  
high-  
resolution  
images of  
the  
subsurface  
conditions  
for Profiles  
1&4

# Hydrologic and Hydraulic Analysis

<b>24 hours Precipitation Event</b> <b>7.72 inches of rain in 24 hrs = 100-Year Flood *</b>	<b>Local Storm, 24 hours Precipitation Event</b> <b>25 inches of rain in 24 hrs = Probable Maximum Flood (PMF)</b>																
<b>Max Water Elevation</b> <b>1335.1 ft/NO Dam Overtopping</b>	<b>Max Water Elevation</b> <b>1339.5 ft/ Partial Dam Overtopping</b>																
<p style="text-align: center;"><b>Peak Discharge (cfs)</b></p> <table> <tr> <td>Non-leveled Dam Crest</td><td>not activated</td></tr> <tr> <td>Spillway with Sags 2&amp;3</td><td>2126</td></tr> <tr> <td>Sag1</td><td>not activated</td></tr> <tr> <td>Sag4</td><td>not activated</td></tr> </table>	Non-leveled Dam Crest	not activated	Spillway with Sags 2&3	2126	Sag1	not activated	Sag4	not activated	<p style="text-align: center;"><b>Peak Discharge (cfs)</b></p> <table> <tr> <td>Non-leveled Dam Crest</td><td>2065</td></tr> <tr> <td>Spillway with Sags 2&amp;3</td><td>9100</td></tr> <tr> <td>Sag1</td><td>187</td></tr> <tr> <td>Sag4</td><td>77</td></tr> </table>	Non-leveled Dam Crest	2065	Spillway with Sags 2&3	9100	Sag1	187	Sag4	77
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*\* 100-Year flood statistically has 1 (one) percent chance of occurring in any given year.*

# Impacts Assessment

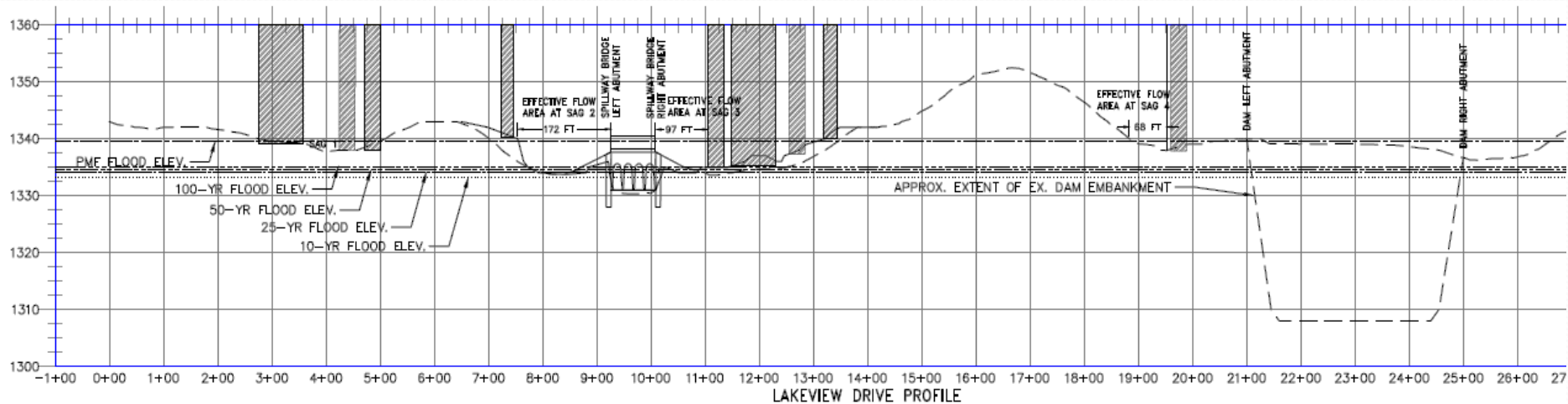


PMF Inundation Map



Impact is anticipated to downstream structures and residential properties.

# Lake Outflow Hydraulic Capacity



Flow occurs through the sags when the lake level exceeds the ground elevations increasing the lake outflow hydraulic capacity.

For PMF event sags convey flow.

Sag1 - Darby Drive

Sag4 – Near Left Abutment of the Dam

Sag2 - Left of Spillway

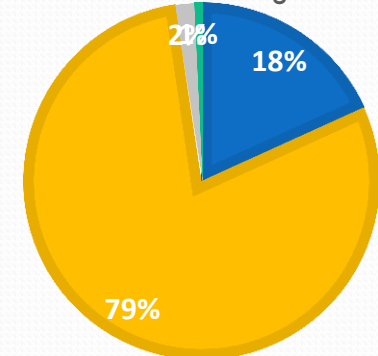
Sag3 – Right of Spillway

## PMF LAKE OUTFLOW

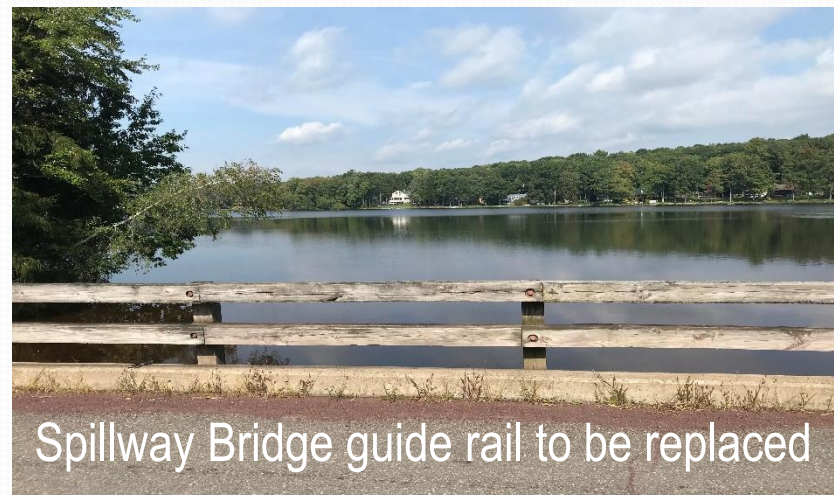
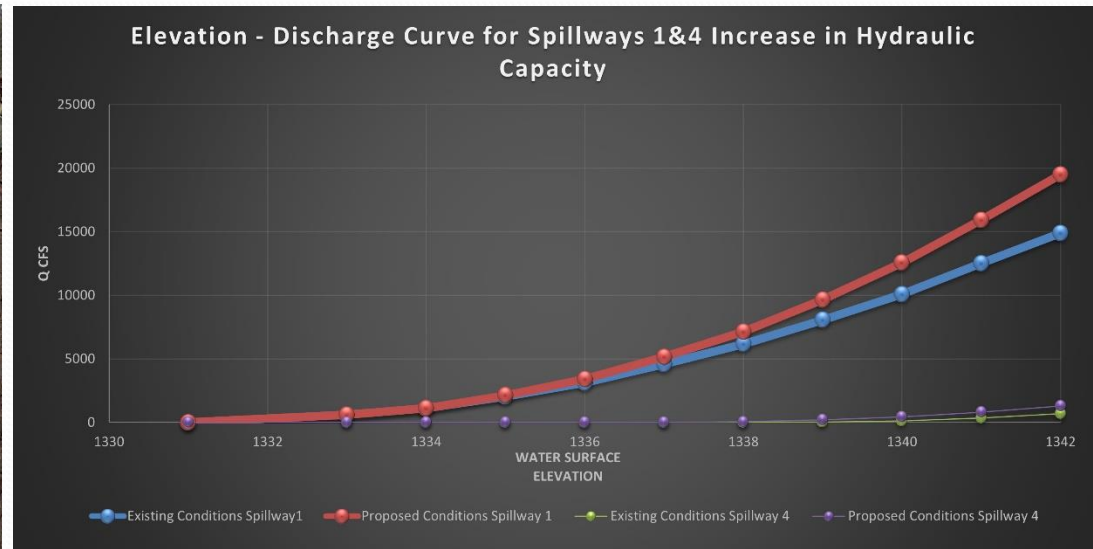
■ Non-leveled Dam Crest ■ Spillway + Sags 2&3

■ Sag 1

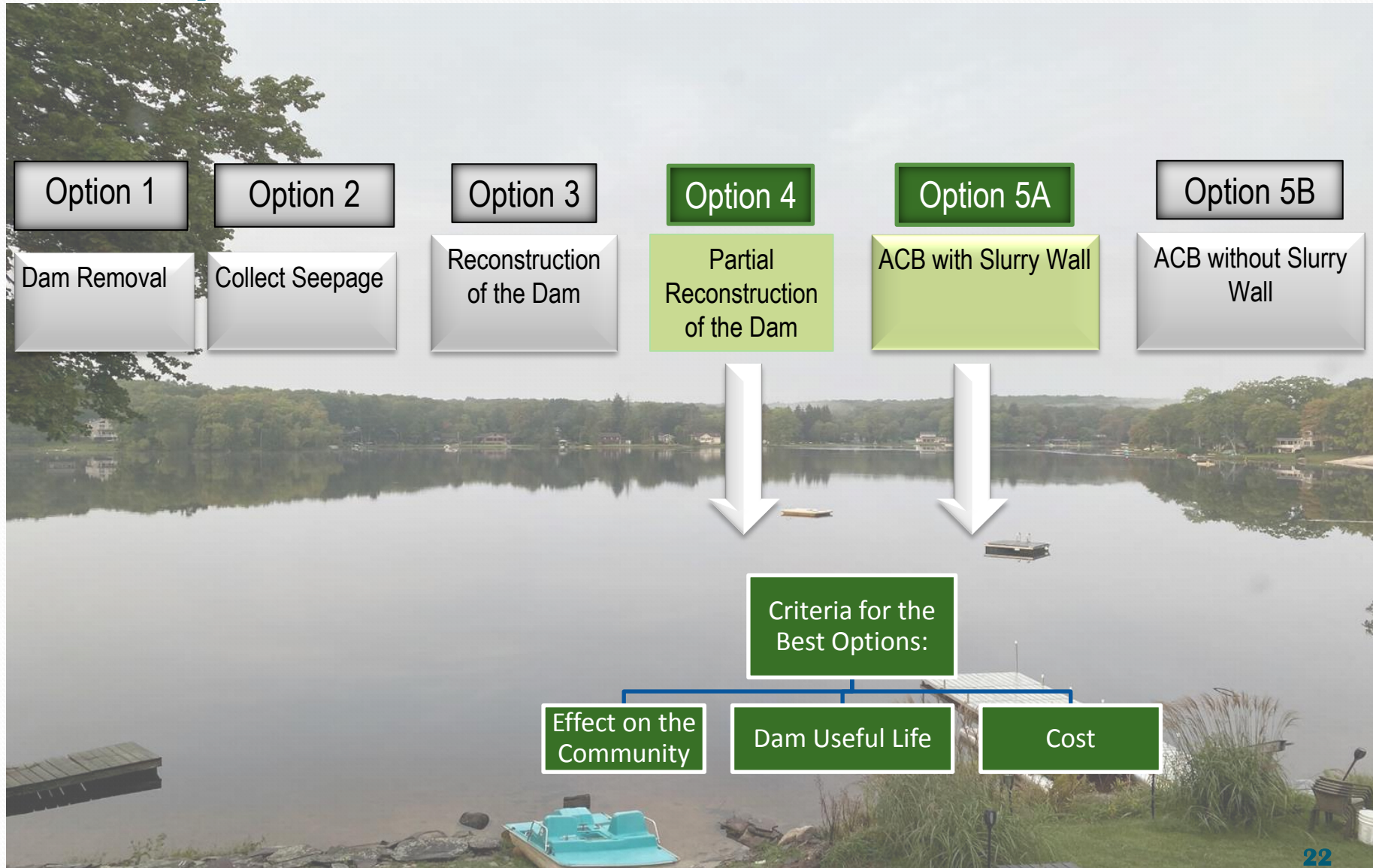
■ Sag 4




# Improving Hydraulic Efficiency of Spillway and Sag Areas

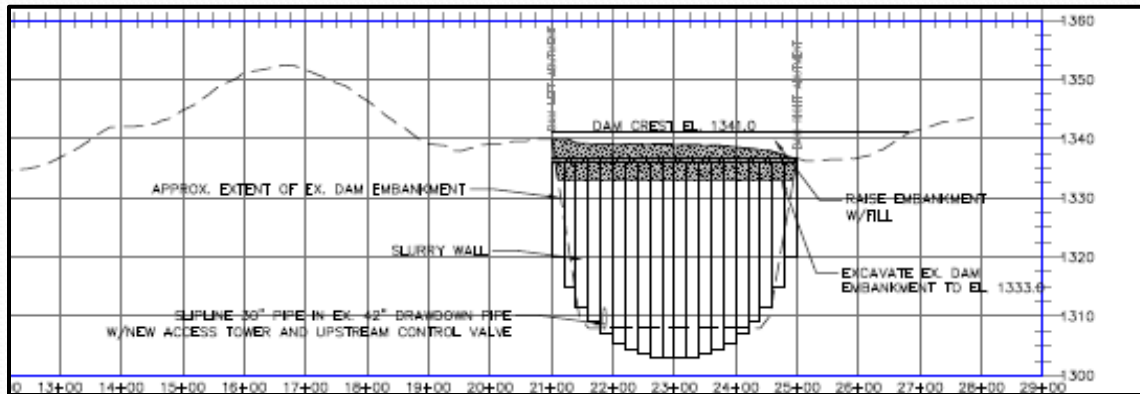
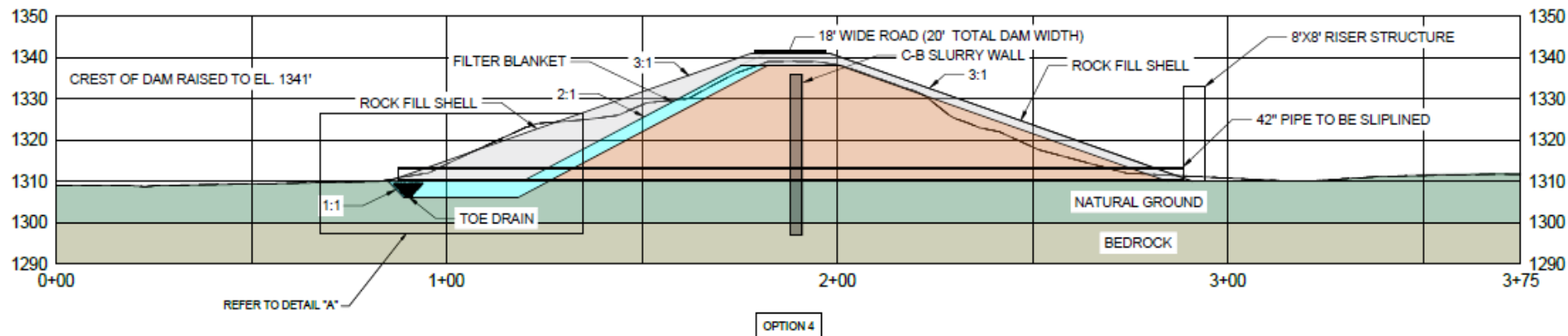


# Options to Address Dam Deficiencies



- 
- All options include a drawdown of the lake
  - Cofferdam still under consideration
    - no decision made at this point

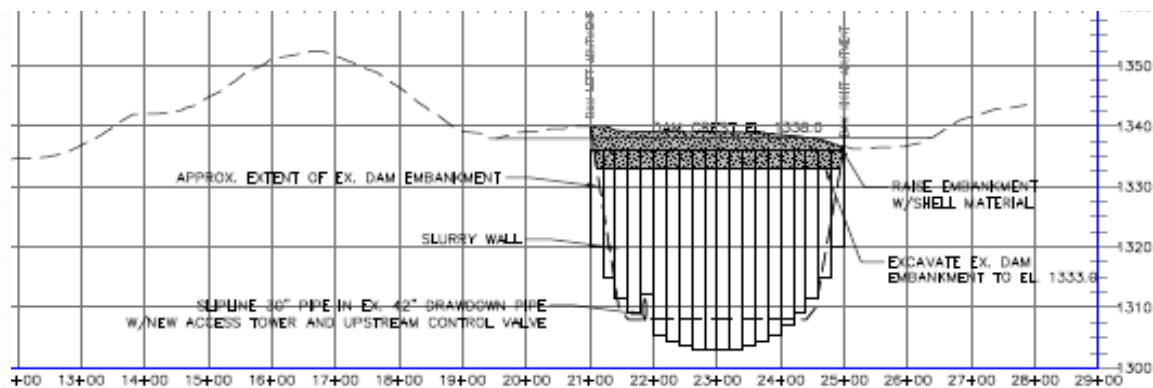
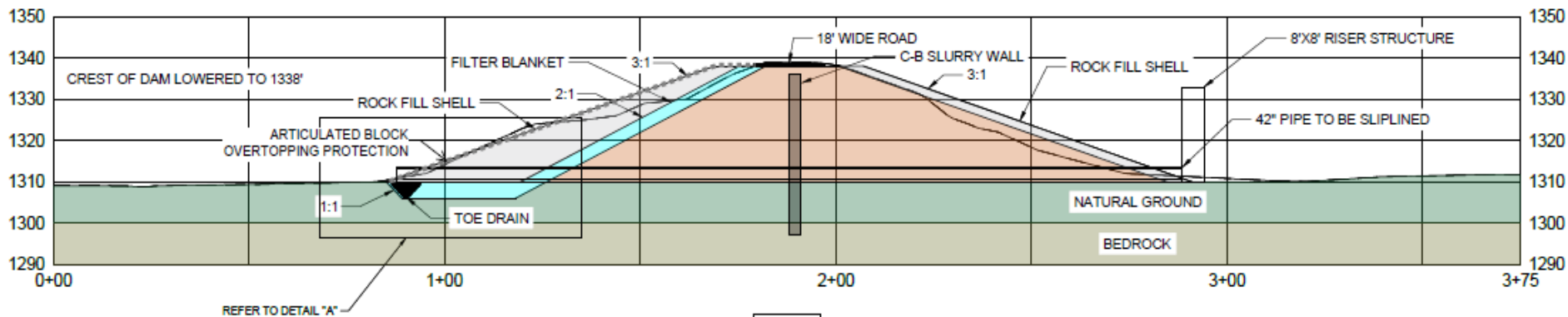
# Option 4: Partial Reconstruction with Slurry Wall



Bureau of Reclamation for illustration purposes only Biopolymer slurry trench (Reach 11 Dikes, Arizona).

Engineering Cost Estimate \$3 Million (02/2022)

# Option 5A: Articulated Concrete Block with Slurry Wall



National Engineering Handbook, for illustration purposes only

Engineering Cost Estimate \$4.4 Million (02/2022)

- Mailing Address  
21 Sunrise Drive  
Leechburg, PA 15656-1524

- Office Address  
110 Allan Street  
Lower Burrell, PA 15068

724-594-0326 Office  
724-991-4541 Cell  
724-594-0328 Fax  
[mfrech@streamlineengineering.net](mailto:mfrech@streamlineengineering.net)



[www.streamlineengineering.net](http://www.streamlineengineering.net)





# Follow the Money

## Grant Applications

### 2020 Grant Applications

- FEMA BRIC Grant - \$9.9m
- FEMA FMA Grant \$301K (YES!)

### 2021 Grant Applications

- FEMA BRIC Grant – \$9.5m
- FEMA FMA Grant \$410K (Yes ...)
- HMGP Grant \$410K, \$9.5m

How to Get Access to the \$\$\$



# Follow the Money

Tax Revenue Generated to Date  
*(Earmarked solely for dam improvement)*

## Revenue

- 2021 -- \$207,000
- 2022 -- \$208,000
- TOTAL -- \$415,000

Balance: \$192,000

## Expenses

*(Engineering, Grant  
Writing, Legal)*

- 2021 -- \$124,000
- 2022 -- \$ 99,000
- TOTAL -- \$223,000



# Follow the Money

## \$3 million Line of Credit

- Effective 06/10/2021 at 2.75% for 120 months; Reset capped at 4%
- Took small amount to pay for attorneys' fees, bond counsel
- Balance must be drawn down by 06/23
- Exploring what would be most advantageous for the balance



# Current Status with DEP

PADEP declared dam “unsafe” with classification of C-1 (high hazard)



PADEP has to approve dam studies and authorize construction.



In May of 2022 a pre-application meeting has been solicited – as per today **no answer was received from PADEP** regarding the date



# Next Steps

*After DEP concurrence (Q4-2022)*

- Detailed design (Q1-2023)
- Permit preparation and submittal (Q2-2023 to Q1-2024)
- Preparation of bidding documents (Q2-2024)
- Construction (Q4-2024)



# Questions & Answers