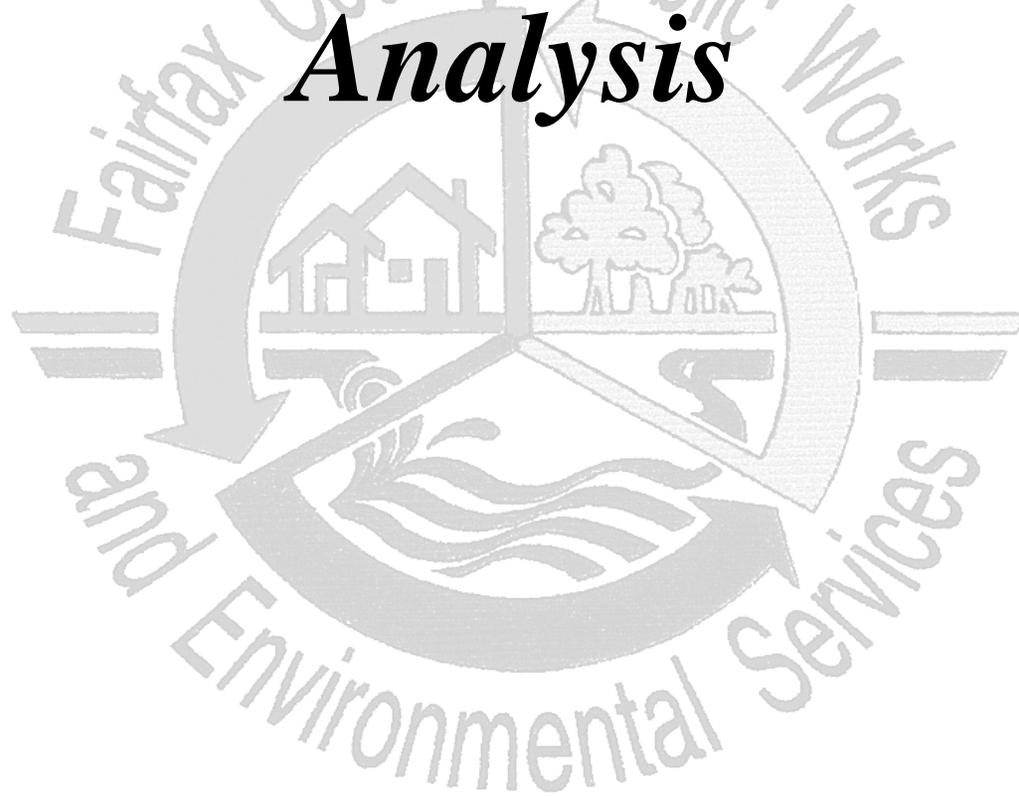
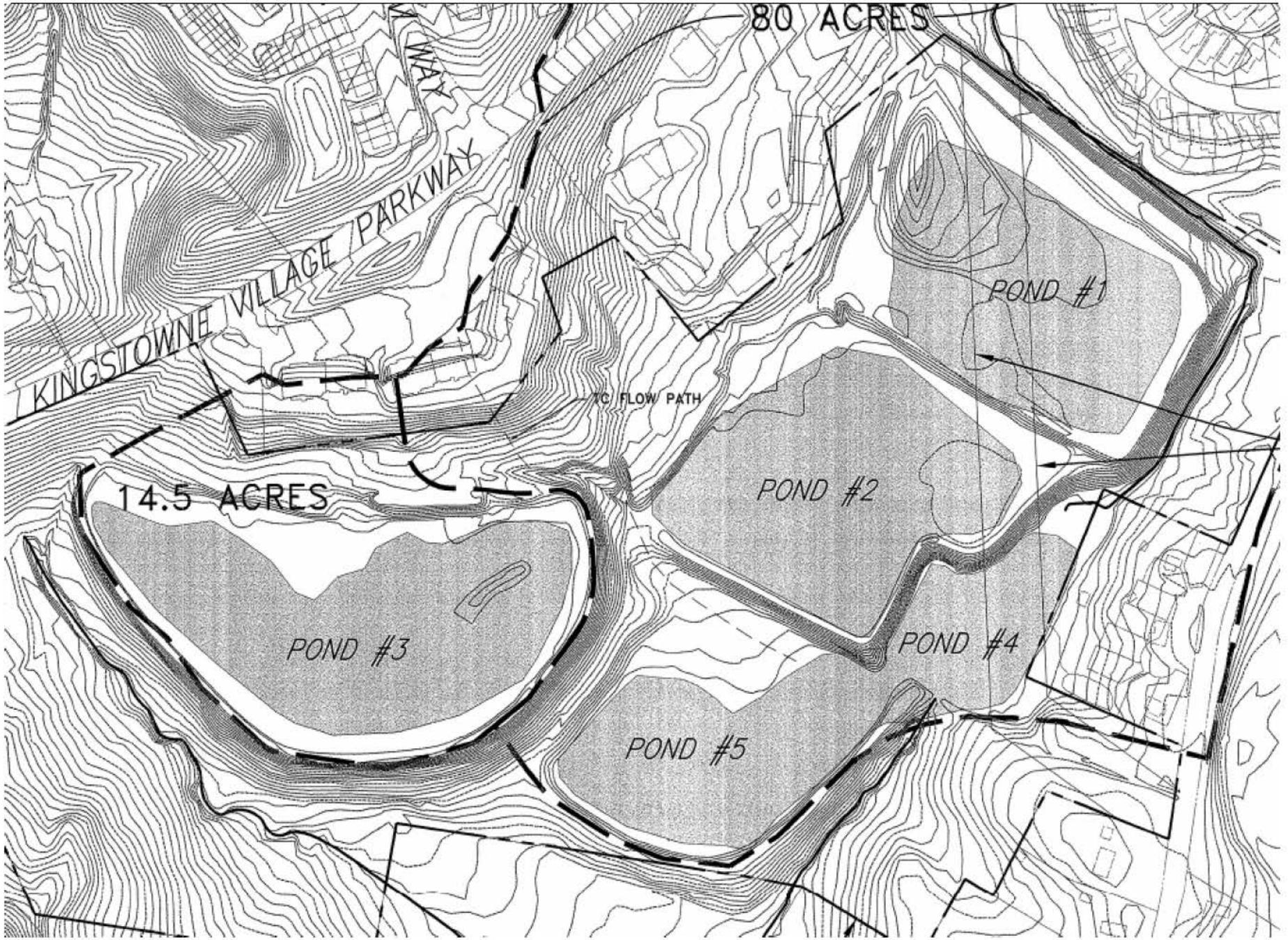




*Kingstowne Park Condition  
Assessment and Alternatives  
Analysis*



August 2011



# Pond 4 Dam Failed on 9/30/10



# Stabilization Substantially Complete

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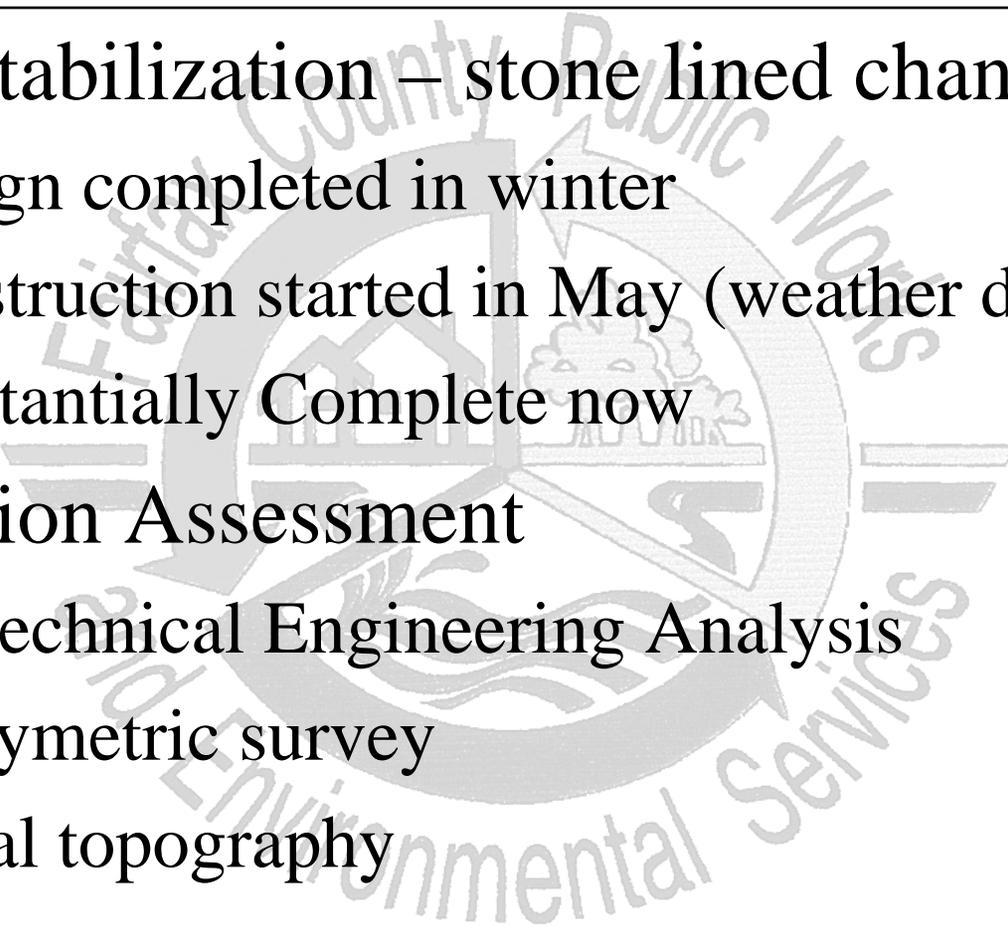






# Kingstowne Park Dam

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- Dam Stabilization – stone lined channels
    - Design completed in winter
    - Construction started in May (weather delay)
    - Substantially Complete now
  - Condition Assessment
    - Geotechnical Engineering Analysis
    - Bathymetric survey
    - Aerial topography
  - Alternatives Analysis
- 





# Condition Assessment Findings

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- Overall
  - Investigation was limited due to trees and brush on the dams
  - “...Ponds 1, 2, 3, 4, and 5 in their current state appear to be marginally to adequately stable from a geotechnical perspective.” (ECS 4/15/11 Subsurface Report p. 13)
  - Maintenance needs
    - Control structures
    - Principle spillway pipes
    - Trees on dams
    - Erosion areas
    - Debris removal

# Pond 2 Control Structure

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Pond 3 Top of Embankment



Pond 3 Embankment Erosion – Estimate Item 3.03  
*—to be repaired*



Pond 3 Outlet Pipe – Estimate Item 3.04



Ex. CMP Culvert from Pond 2 to Pond 4 – Estimate Item 2.04  
*—to be grouted*



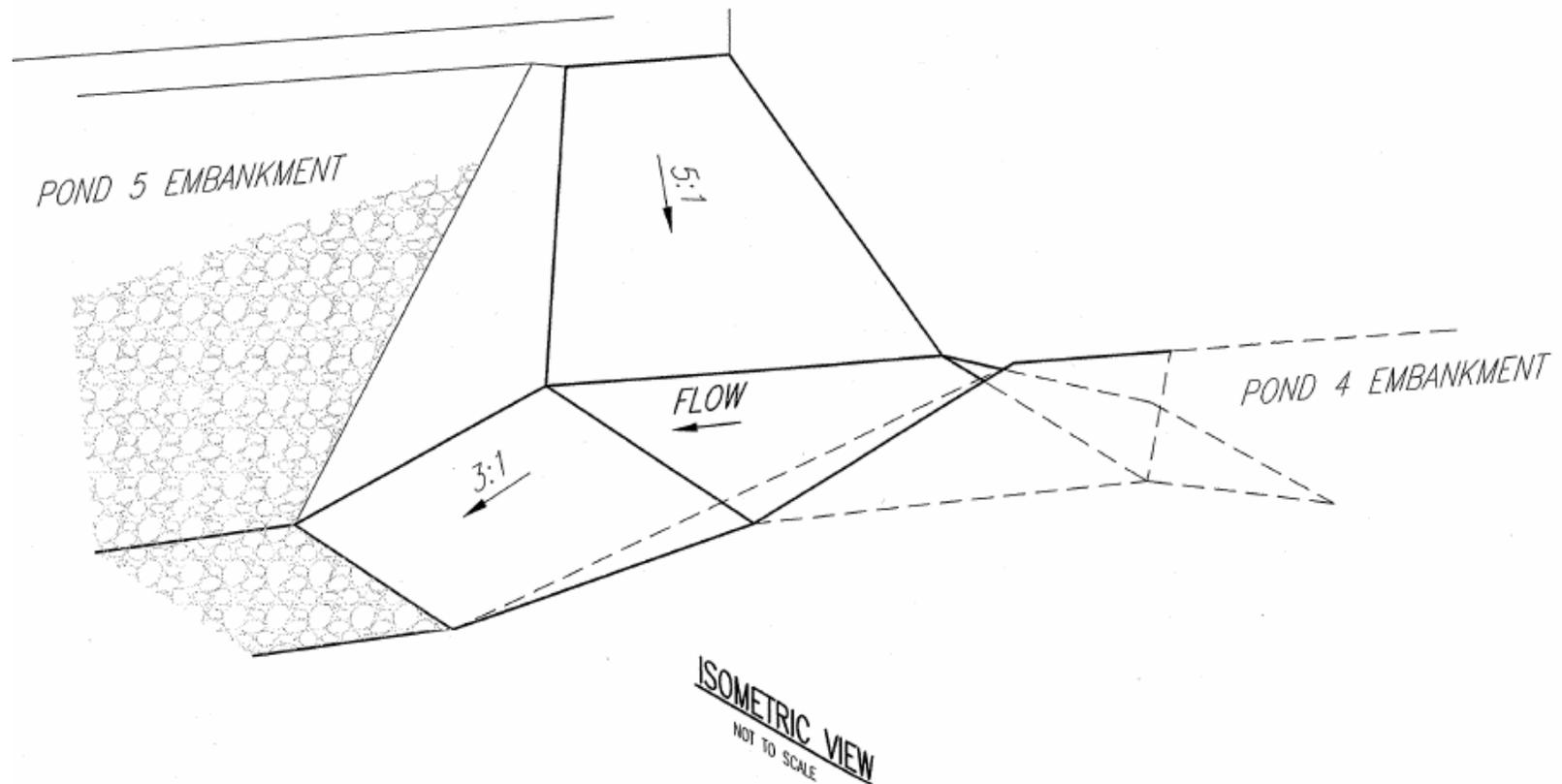


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***Conceptual Design  
Alternatives  
Ponds 4 and 5***



# Trapezoidal Weir Options



# Trapezoidal Weir

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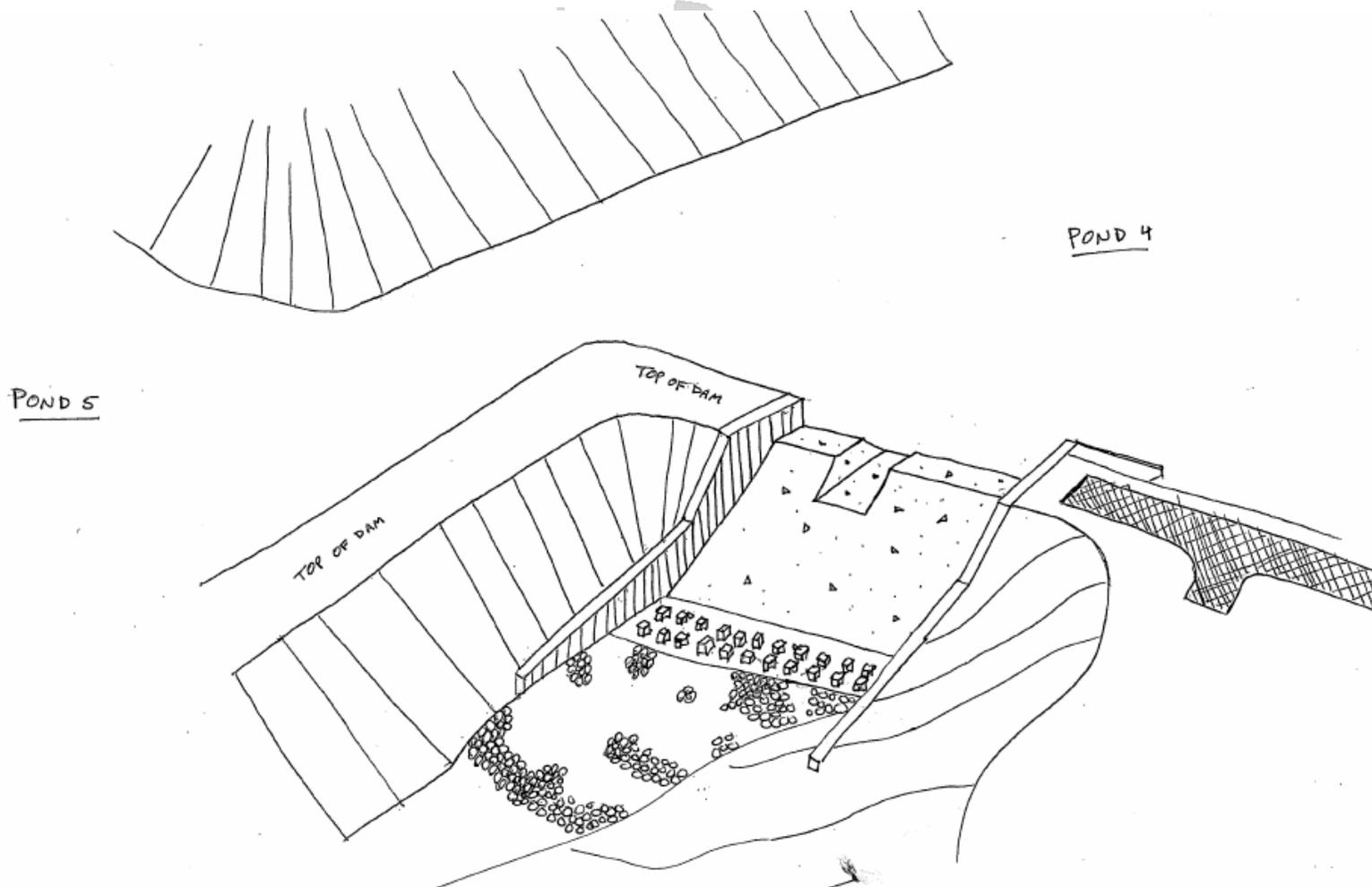


# Trapezoidal Weir Options

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- ❑ “Yugo” Options (Group 1)
- ❑ Typically used as emergency spillways, not principle spillways
- ❑ Would utilize much of the stabilization riprap
- ❑ Several options restore the former Pond 4/5 water level
- ❑ No stormwater management function
  - No TMDL or MS4 permit benefits
- ❑ Subject to undermining and possible failure
- ❑ Require regular maintenance
- ❑ Cost estimate: \$700,000 to \$800,000 TPE

# Chute Spillway Options



# Chute Spillways



Public Works



Environment

# Drop Spillway (Alternate Concept)



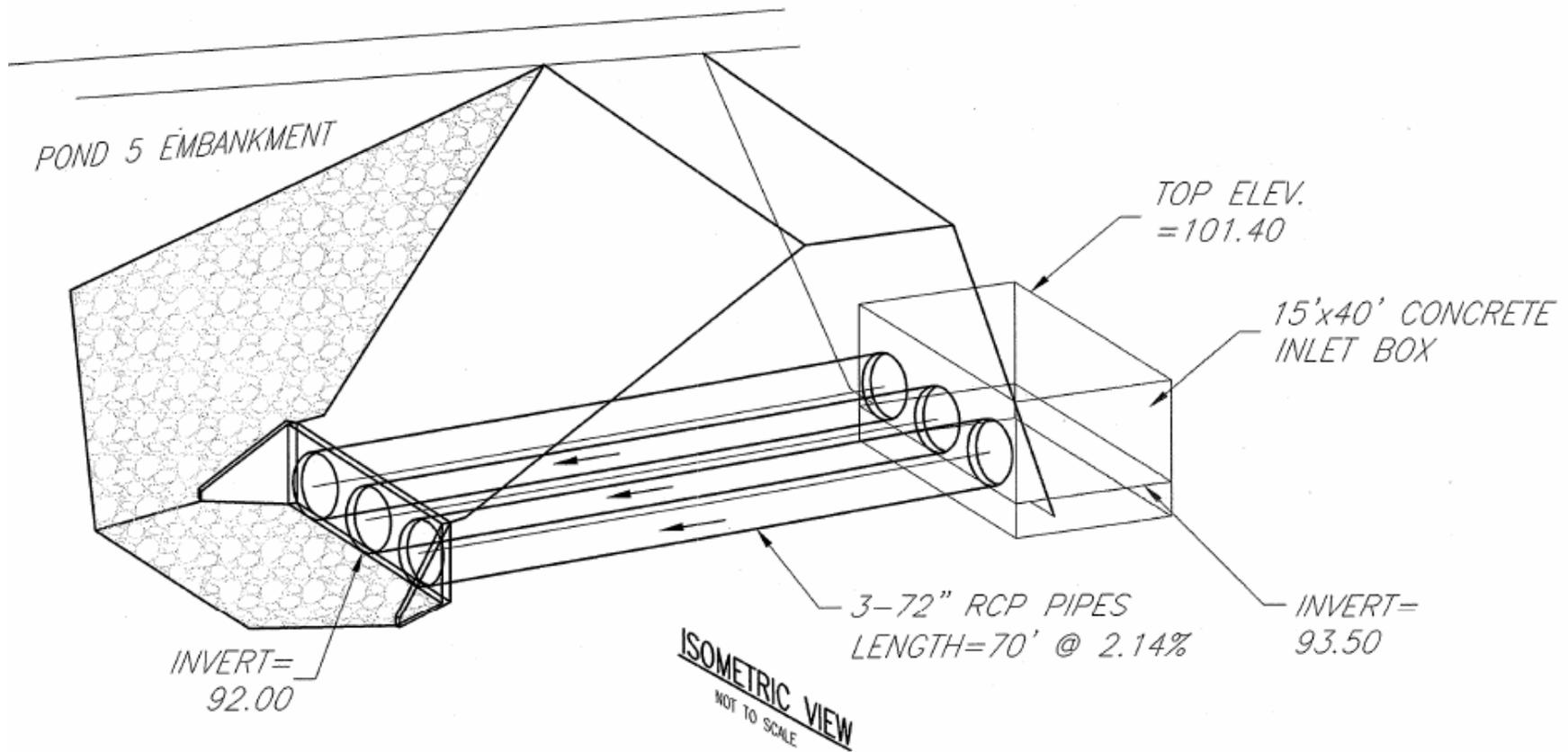


# Chute/Drop Spillway Options

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- “GMC” or “Ford” Truck Options
- Could reestablish original function without stormwater controls (Option Group 1)
- Include stormwater management for MS4 and TMDL credits (Option Group 4)
  - Various concept designs to restore Pond 4/5 and provide water quality and quantity controls
  - Stormwater “penny” funding possible
- Durable from a maintenance standpoint
- Cost estimate: \$2.3 to 2.5 million TPE

# Riser Option



# Riser Control Structure

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# Riser Option

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- ❑ “GMC” or “Ford” Truck
- ❑ In Option Group 4
- ❑ Can restore the previous Pond 4/5 lake level and provide stormwater management
- ❑ MS4 and TMDL credit
- Stormwater “penny” funding possible
- ❑ Durable from a maintenance standpoint
- ❑ Provides for a trail connection to the Pond 5 dam
- ❑ Cost estimate: \$1.7 million TPE



# Other Alternatives

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- Option Group 2 – Improvements to Ponds 1-3
  - Itemized maintenance recommendations for each pond
  - Various combinations of options
- Option 3 – Relocation of the Ponds 1-3 wetlands mitigation areas to an offsite location(s)
  - Includes breaching of the dam embankments
  - Avoids long term dam maintenance costs and possible failure
  - Total Project Estimate: \$600,000 to \$5,000,000 (banking option)



# Other Alternatives

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- Option 5 – Leaving Ponds 1-3 “as is”
  - Some risk of failure
- Option 6 – Leaving Ponds 4/5 “as is”
  - Stabilization designed for 10-year storm event
  - Larger events would begin to erode this channel and lower the Pond 4 and 5 water levels
- Option 7 – Stream Restoration
  - Breaching the Pond 4 and 5 dams to allow for stream restoration
  - TPE: \$1.8 million

# DPWES Recommended Improvements

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- Ponds 4/5 Regional Stormwater Management facility for water quality and possible detention to provide TMDL and MS4 credit
  - Develop and implement Option 1E (riser) or 1F (chute spillway)
  - TPE \$1.7 to \$2.3 million
  - Qualifies for Stormwater “penny” funds subject to prioritization with other projects
- Necessary maintenance repairs on Ponds 2, 3, and 5
  - Pond 2 TPE: \$350,000
  - Pond 3 TPE: \$530,000
  - Pond 5 TPE: \$140,000
- Leave most trees on the dams for Ponds 1 to 4 at this time with a “wait and see” approach. (May need to remove more later for maintenance)
- Some trees may need to be removed from the Pond 5 dam to meet County dam standards
- TPE for all recommended improvements: \$2.7 to 3.3 million