

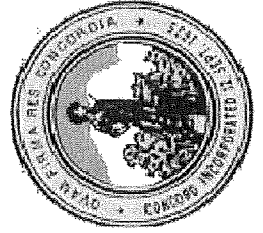
Presentation For:

Warner's Pond Dam Rehabilitation

Concord, Massachusetts

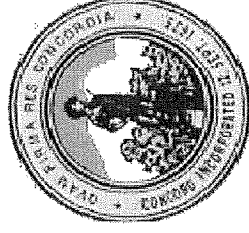
PUBLIC MEETING

December 6, 2005

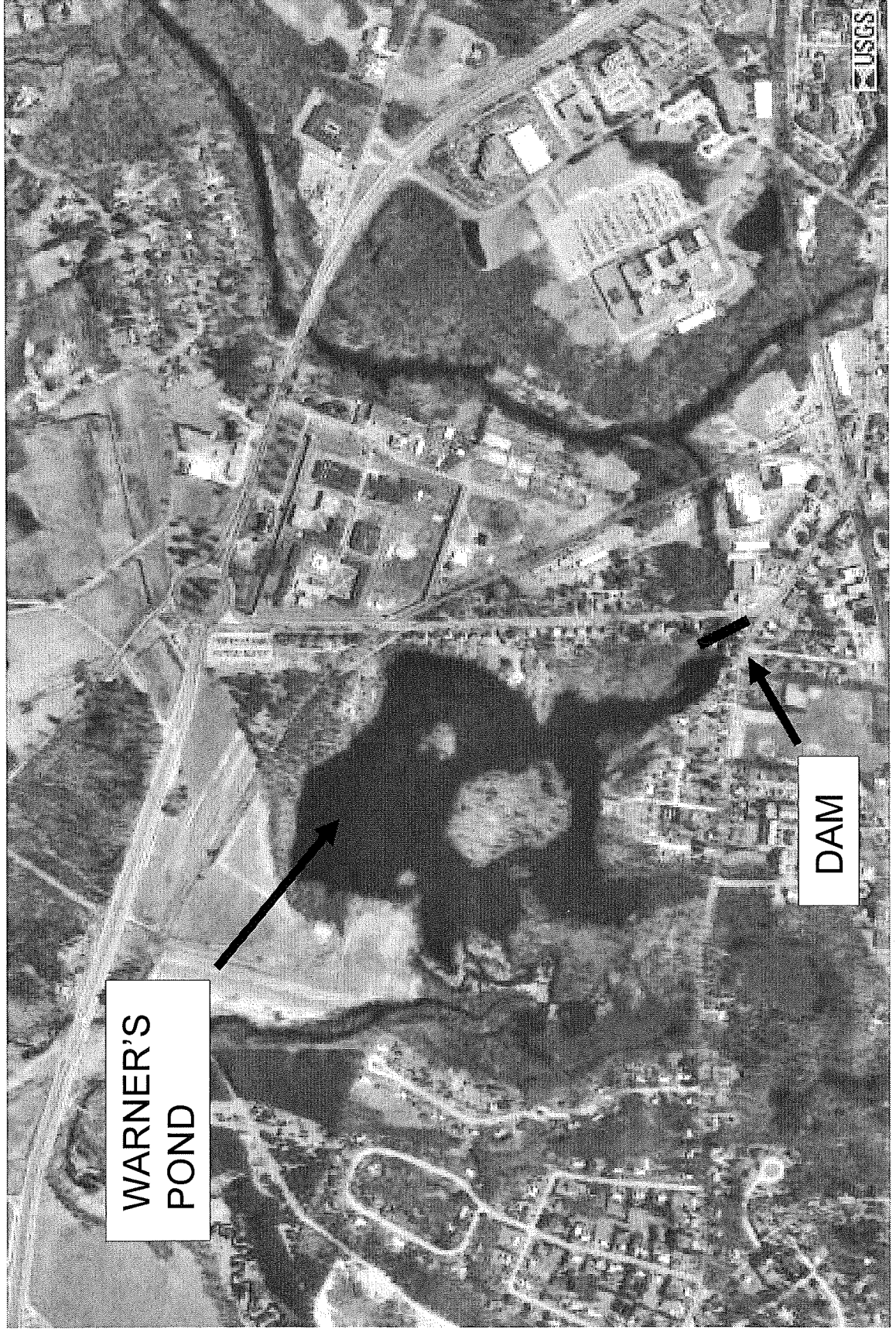


Project Team

- *Concord Public Works*
 - Bill Edgerton – Public Works Director
 - Jim Shuris; Town Engineer
 - Sean Divoll; Public Works Engineer; Town Contact
- *GZA GeoEnvironmental, Inc.*
 - Peter Baril-Principal-in-Charge
 - Chris Haker-Project Manager; Lead Designer
- *Dufresne-Henry*
 - Randall Christensen; Environmental Permitting
 - Nicole Sanford; Environmental Permitting
 - Michael Brady; Survey

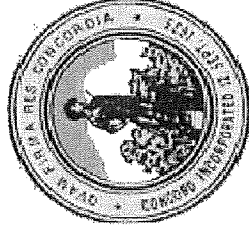


Where's the Dam?



Project Goals

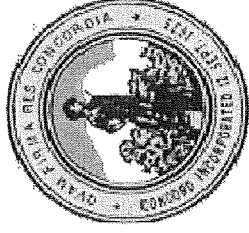
- *Assess condition of dam.*
- *Improve Dam Safety in accordance with state regulations.*
- *Protect pond and associated resources*
- *Improve site access.*
- *Construct improvements in a timely manner.*



Project Scope

- *Existing conditions assessment*
- *Engineering design*
- *Permitting*
- *Preparation of contract documents and specifications (Bidding)*
- *Complete construction of improvements*
- *Preparation of operation and maintenance*

plan

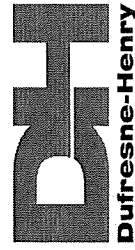
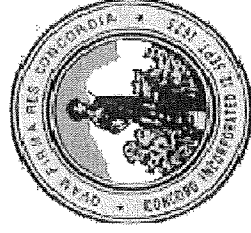


Meeting Purpose

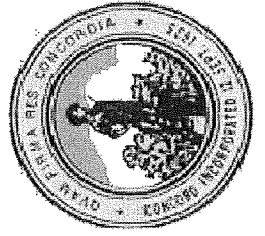
- *To obtain input from project stakeholders.*
- *To obtain this input prior to project design so concerns and recommendations are considered during the design process.*

Project Schedule

- *Preliminary design*
 - *Through Mid Winter 2006*
 - *Public presentation and comment period*
- *Final design*
 - *Mid Winter to Spring 2006*
 - *Public presentation*
- *Permitting*
 - *Mid Winter to Spring/Early Summer 2006*
 - *Public comment during permit process*
- *Construction*
 - *Summer/Fall 2006*



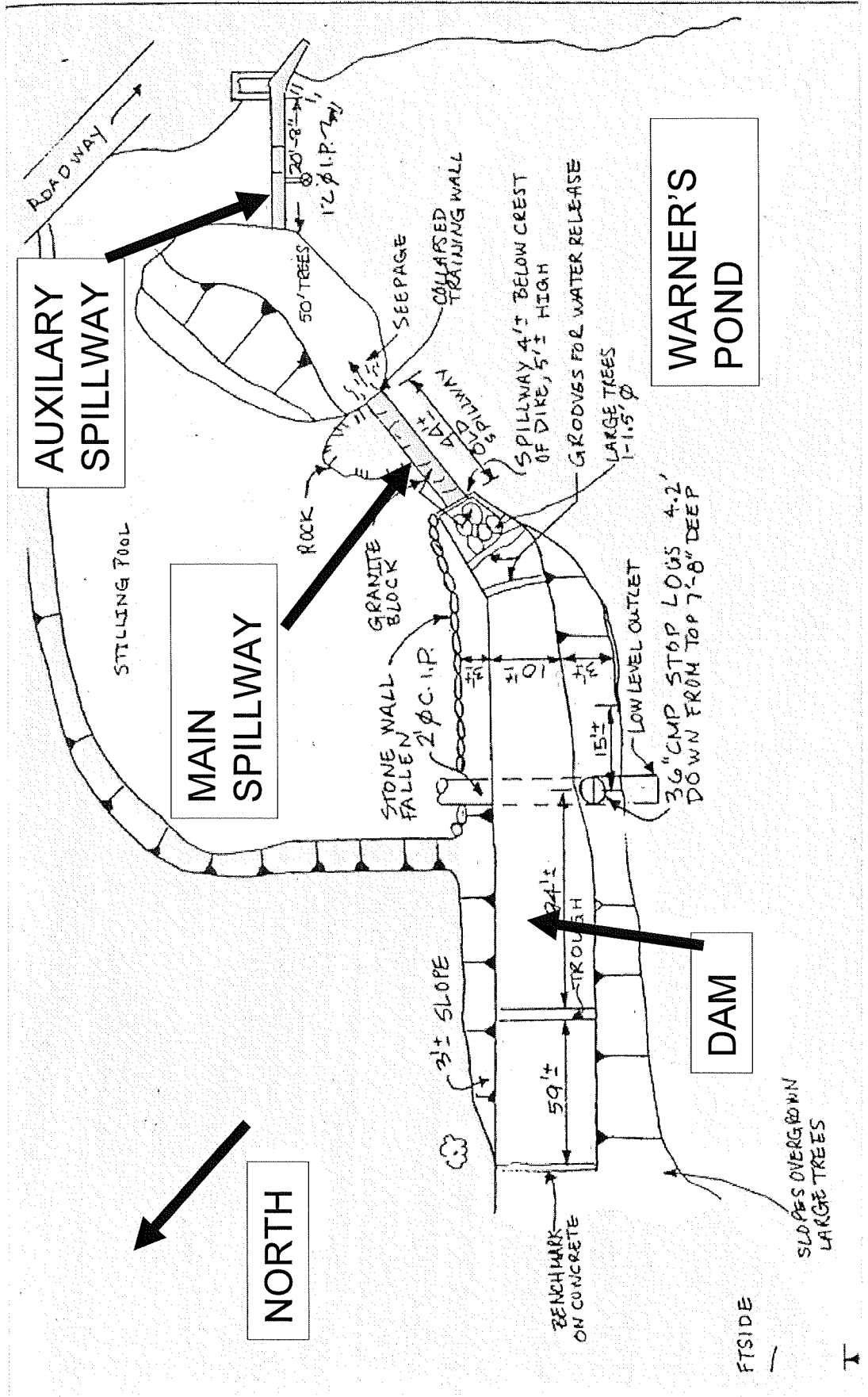
Questions?



Field Investigations

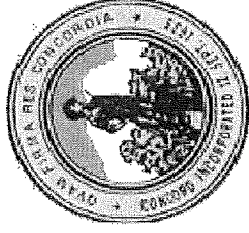
- *Wetland delineation (completed)*
- *Topographic survey (completed)*
- *Dam safety inspection (completed)*
- *Right-of-way evaluation (on-going)*
- *Bathymetric survey (soon)*

Field Investigations



November, 2005 Dam Safety Inspection

- *Current Dam Deficiencies / Issues*
 - Failure of right (east) spillway training wall.
 - Severely eroded earth embankment with signs of previous overtopping.
 - Inoperable outlet controls
 - Lack of emergency site access
 - Heavy tree and brush growth on earth embankments.



Key Deficiencies / Issues

Failure of right
(east)
spillway
training wall.
Severely eroded
earth
embankment
with signs of
previous
overtopping.



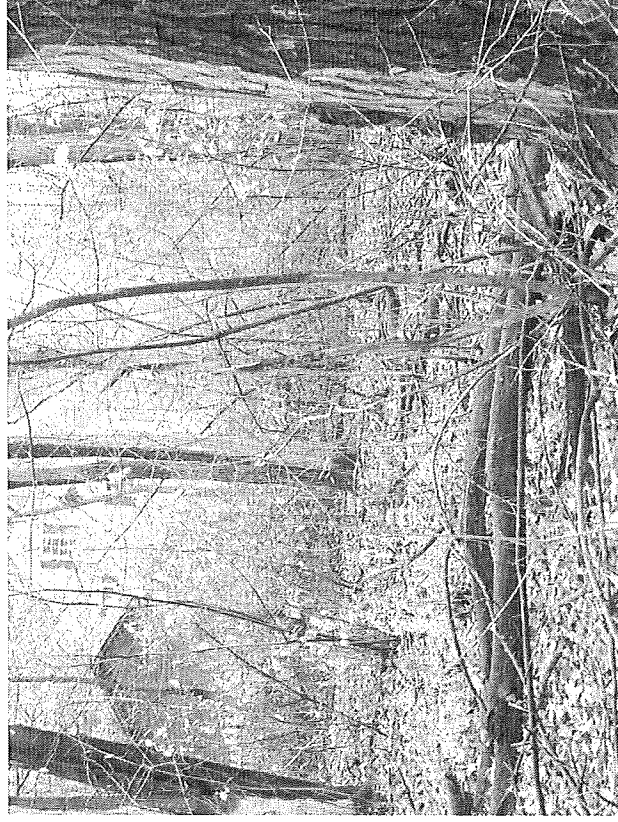
Key Deficiencies / Issues

Inoperable outlet
controls



Key Deficiencies / Issues

Site access

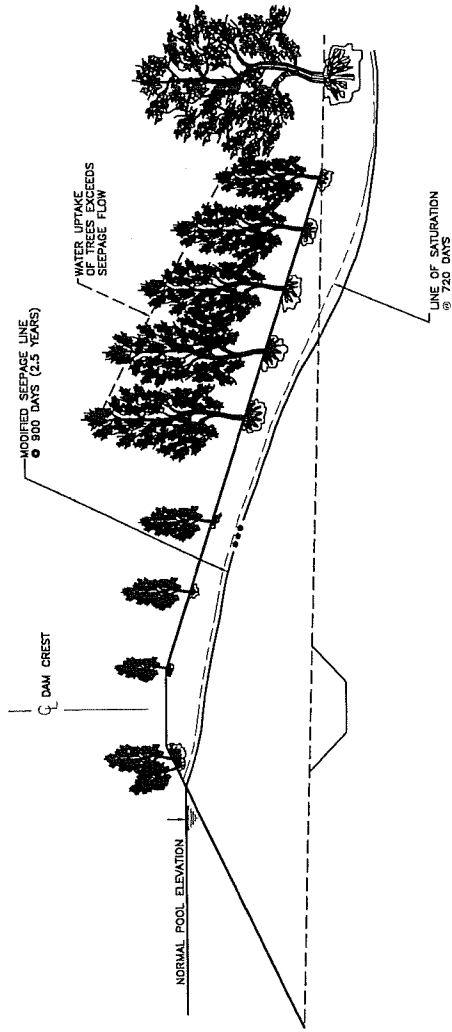


Key Deficiencies / Issues

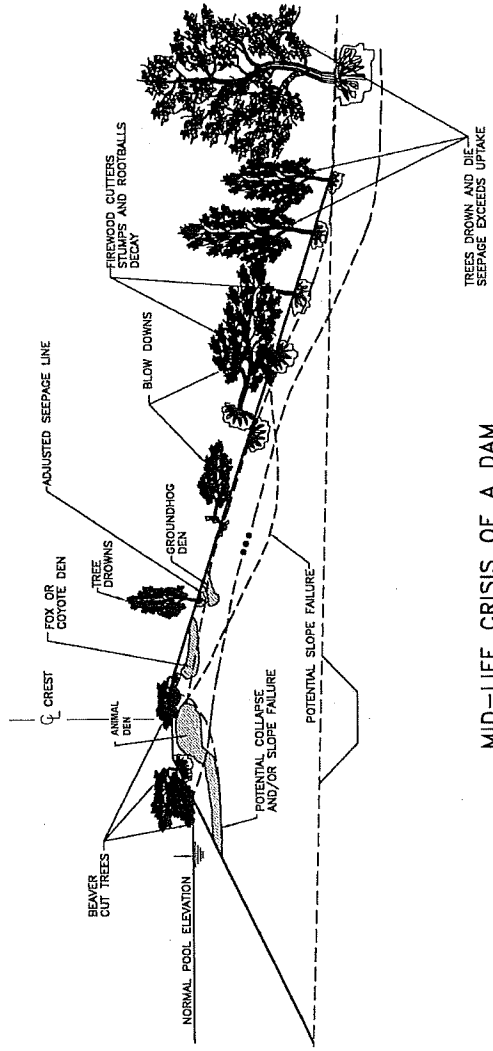
Heavy tree and
brush growth
on earth
embankments



Vegetation Control on Dams: Purpose and Need



MODIFICATION OF SEEPAGE LINE WITH TREES & WOODY VEGETATION

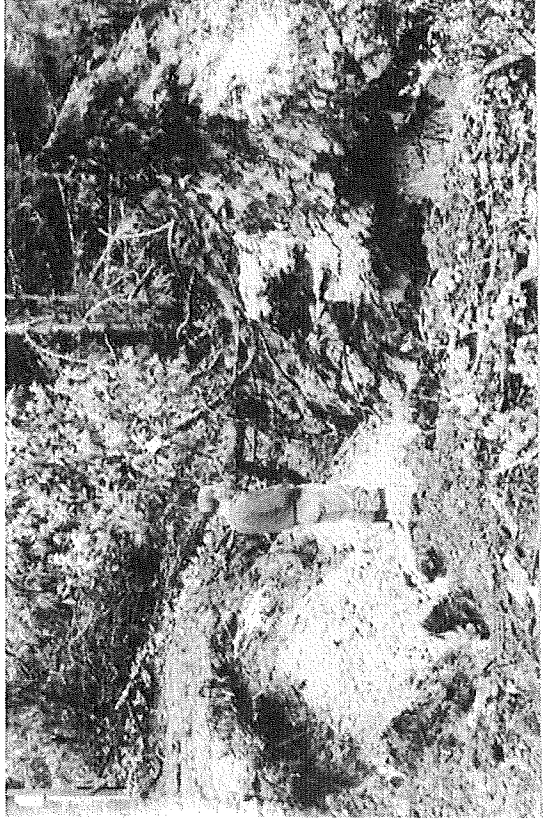


MID-LIFE CRISIS OF A DAM PLANT (TREE) AND ANIMAL PENETRATION PROBLEMS

Vegetation Control on Dams: Case Studies



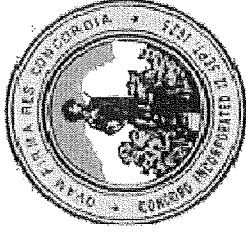
Tree root induced scouring on crest and downstream face of Coffey dam in Kansas



Serious damage by uprooted tree to embankment stability at a dam in Oregon

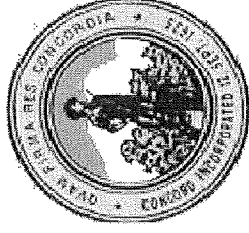
What Does This All Mean?

- *Dam is considered to be in poor and failing condition.*
- *Findings are same (or worse) than those from 1999 Dam Safety Report.*
- *Dam must be rehabilitated per dam safety regulations.*
- *Town is financially responsible for dam repairs (State does not provide aid).*
- *Concord has engaged GZA/D-H to engineer dam rehabilitation, which has begun.*



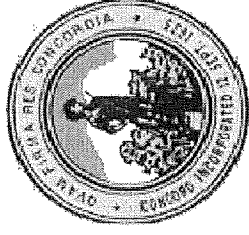
Preliminary Hydrology & Hydraulic Analysis

- *Inadequate Spillway Capacity to Pass the 100 – Year Design Flood.*
- *Backwater from Assabet River submerges dam crest under 50- & 100-year floods.*
- *Additional spillway capacity may be needed to pass less intense, more frequent storms/floods.*



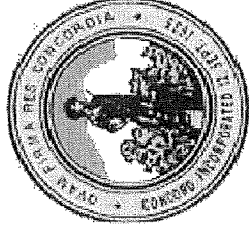
Ways to Increase Spillway Capacity

- *Increase Spillway Length*
 - Length increased to safely pass Spillway Design Flood (SDF) without overtopping embankments.
 - Increases downstream flows during lesser flood events causing potential downstream flooding.
- *Raise Dam*
 - Embankments raised to safely pass SDF without overtopping embankments.
 - Raises upstream water levels causing potential upstream flooding and flow re-routing (overflow along east/north/ pond rim).

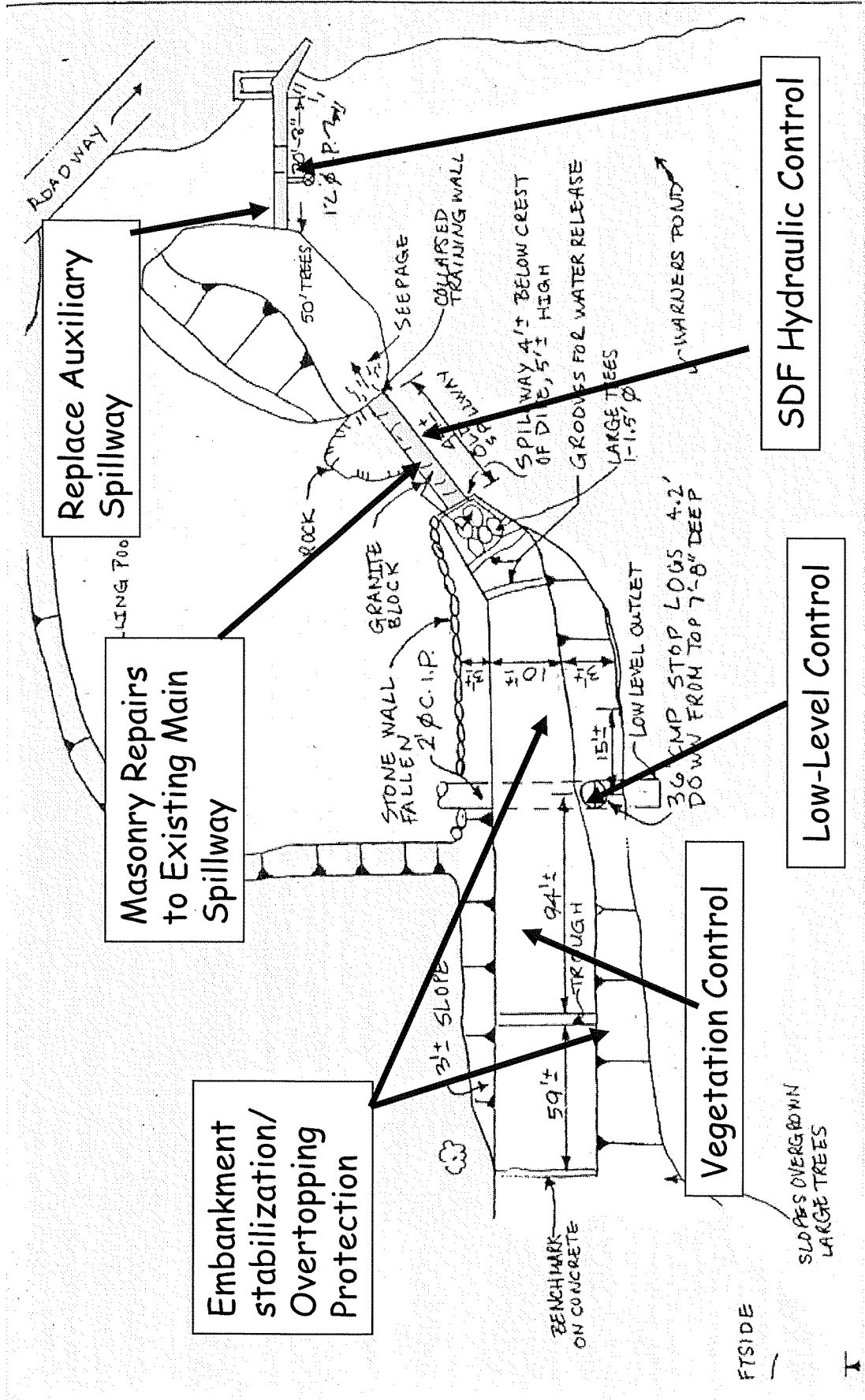


Ways to Increase Spillway Capacity

- *Increase Spillway Length & Raise Dam*
 - Combination of the two alternatives
 - Changes in upstream and downstream flooding impacts still exist
- *Embankment overtopping protection*
 - Leave embankment and spillway geometries essentially the same and allow the embankments to overtop.
 - Embankments must be “armored”/protected such that the embankment remains intact during overtopping.

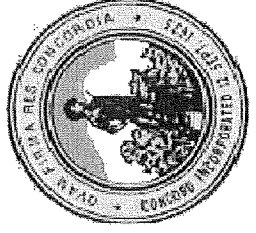


PROPOSED IMPROVEMENTS

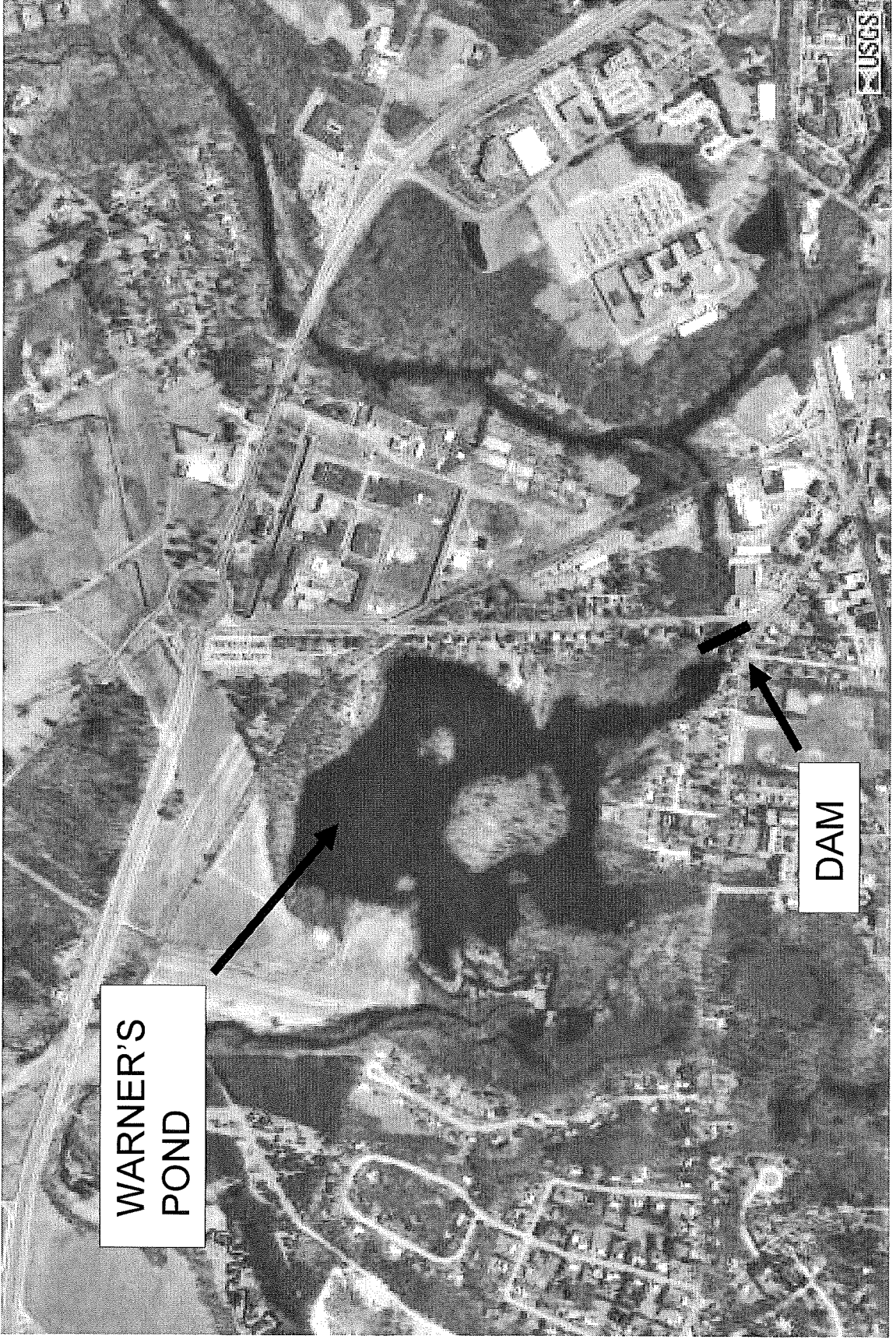


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OPEN DISCUSSION



PLEASE PROVIDE COMMENTS/QUESTIONS TO:

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