Presentation For:

Warner's Pond Dam Rehabilitation

Concord, Massachusetts

PUBLIC MEETING

March 2, 2006

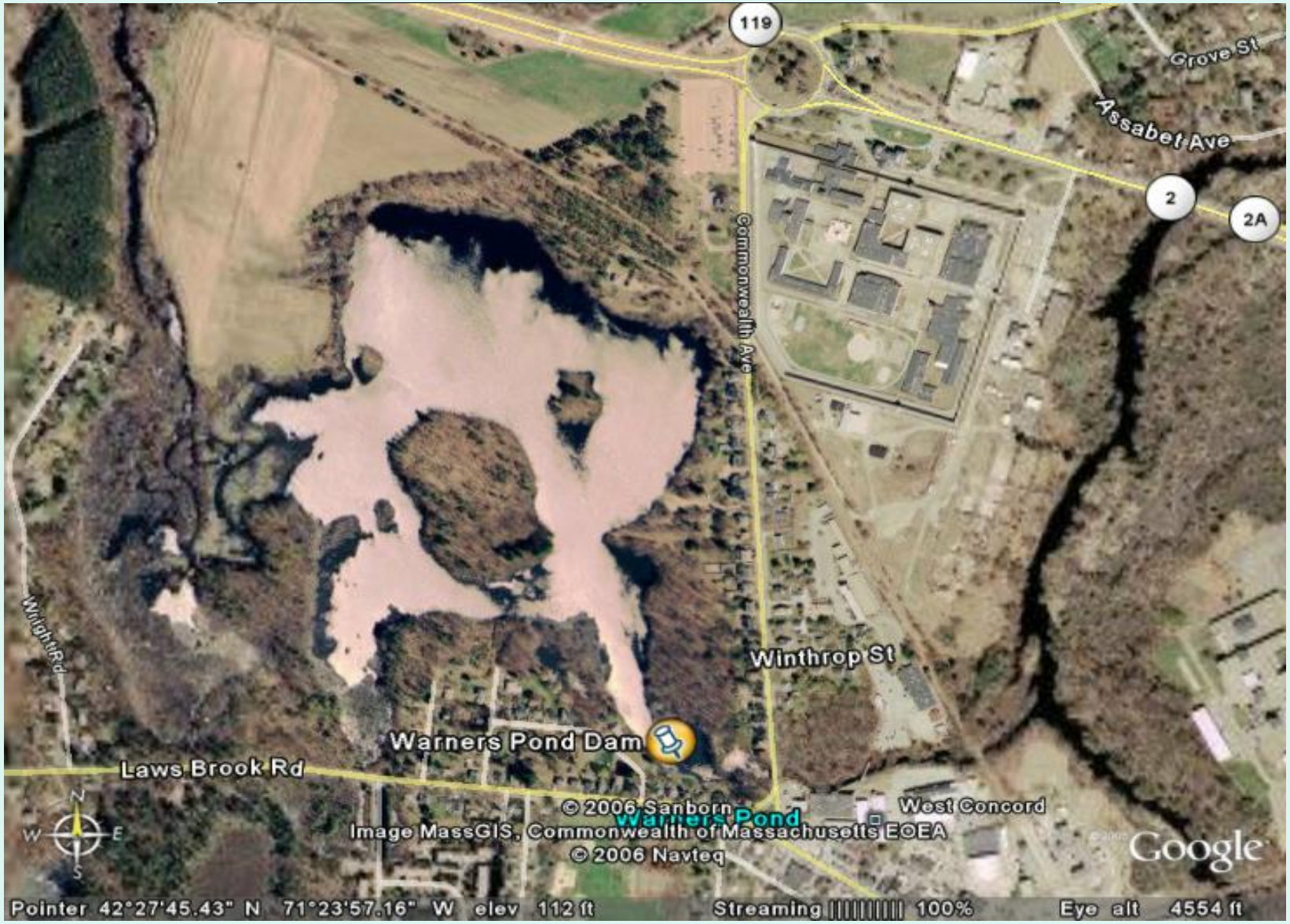
Project Team

- *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
  - Victor Olson; Structural Design and Plans Preparation

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*

Project Schedule

- *Kickoff Meeting*
  - *December 6, 2005*
- *Preliminary design*
  - *Through Mid Winter 2006*
  - *March 6, 2006 Public presentation (TONIGHT)*
- *Final design*
  - *Late Winter to Spring 2006*
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  - *Late Summer/Fall 2006*

Meeting Purpose

- *To update public on what has been accomplished since the Dec. 6, 2005 meeting.*
- *Present conceptual design plans and drawings.*
- *To obtain feedback from public.*

Since Dec. 6, 2005 Meeting

- *Complete base field investigations*
- *Completed dam inspection report*
  - *Evaluated deficiencies*
  - *Recommendations for improvements*
- *Evaluated environmental impacts of proposed improvements*
- *Prepared conceptual design plans*

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

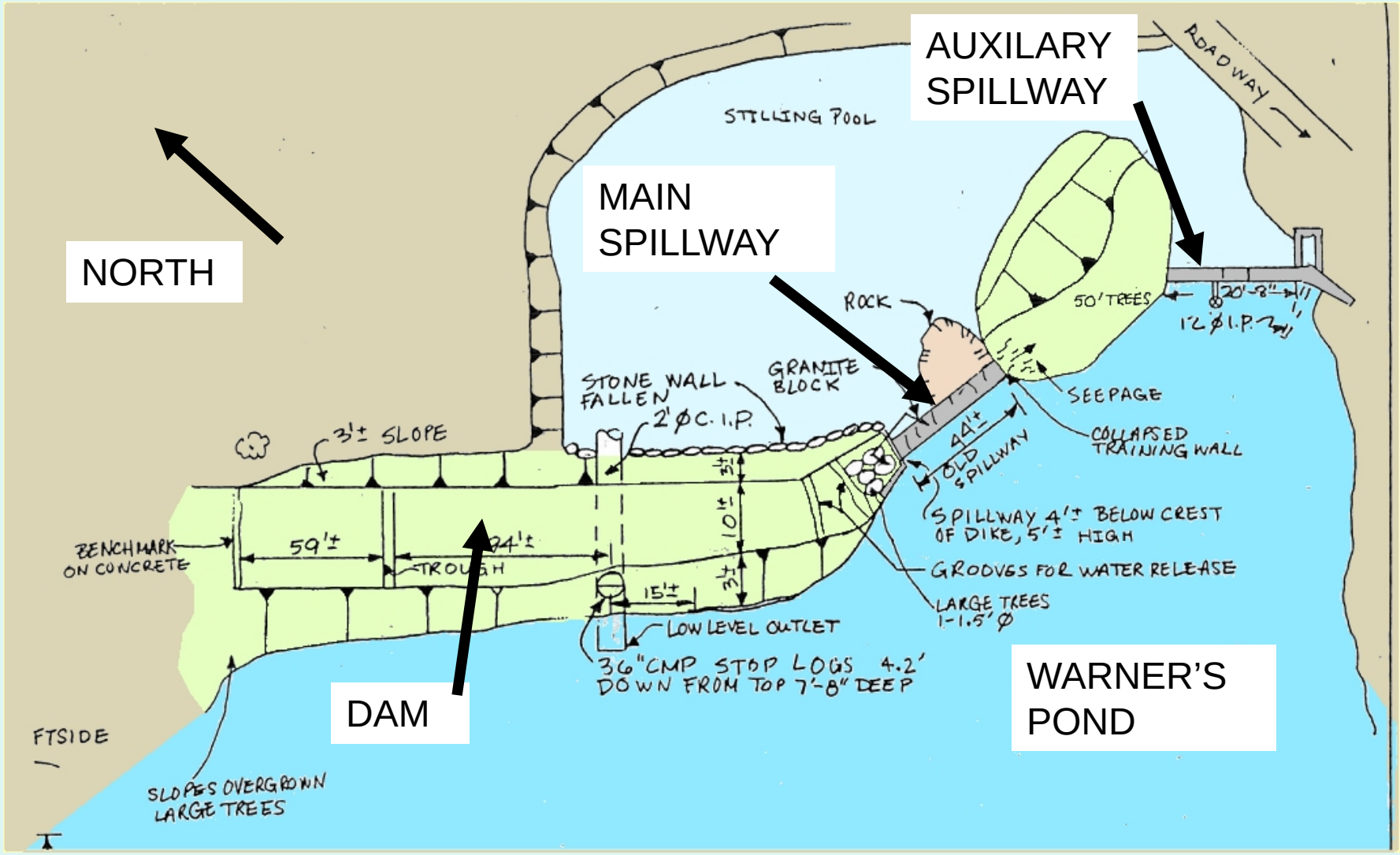
Key Deficiencies / Issues

Heavy tree and brush growth on earth embankments

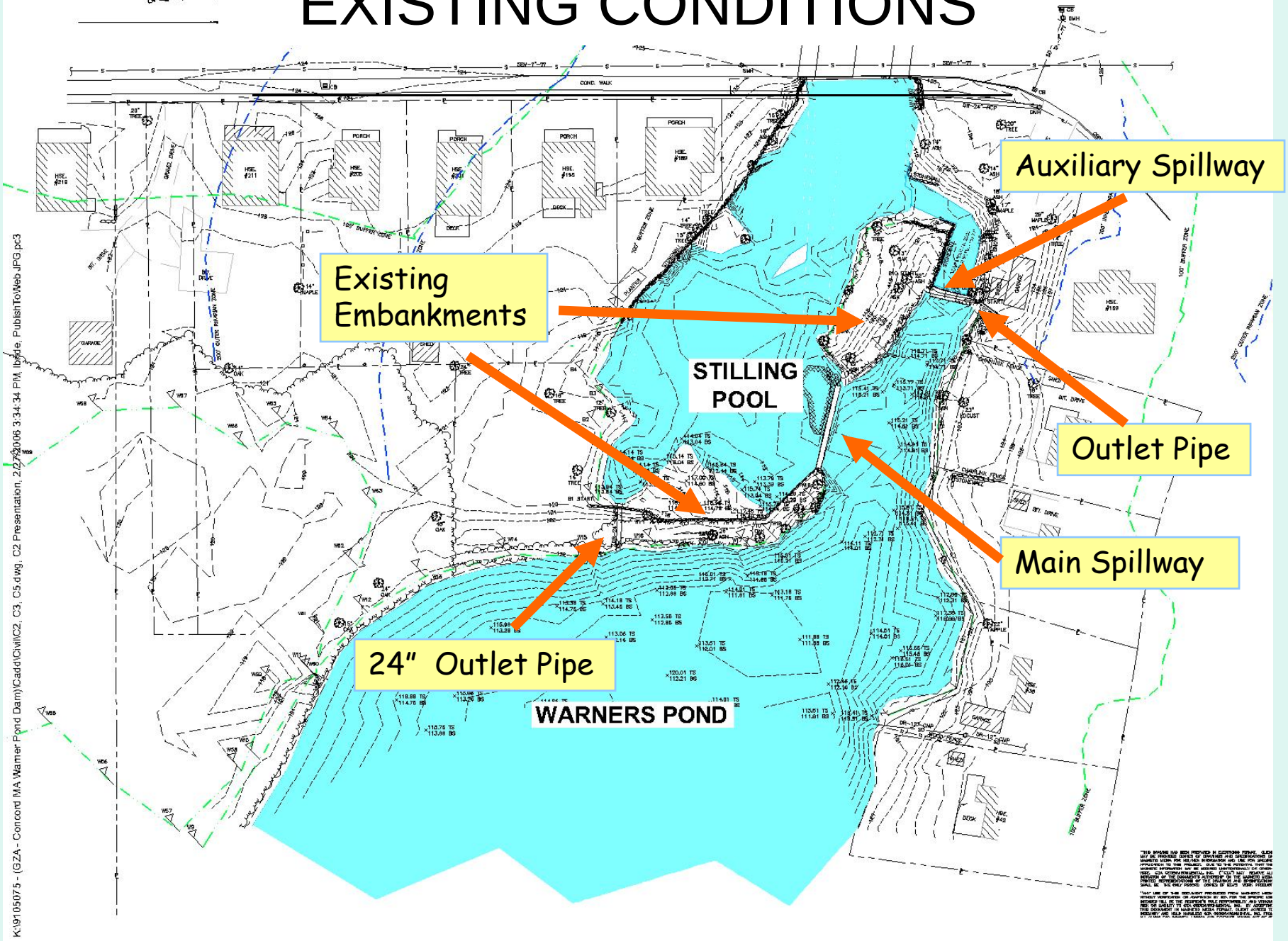
Hydrology & Hydraulic Analysis

- *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.*
- *Low Point North of Dam*

Existing Conditions



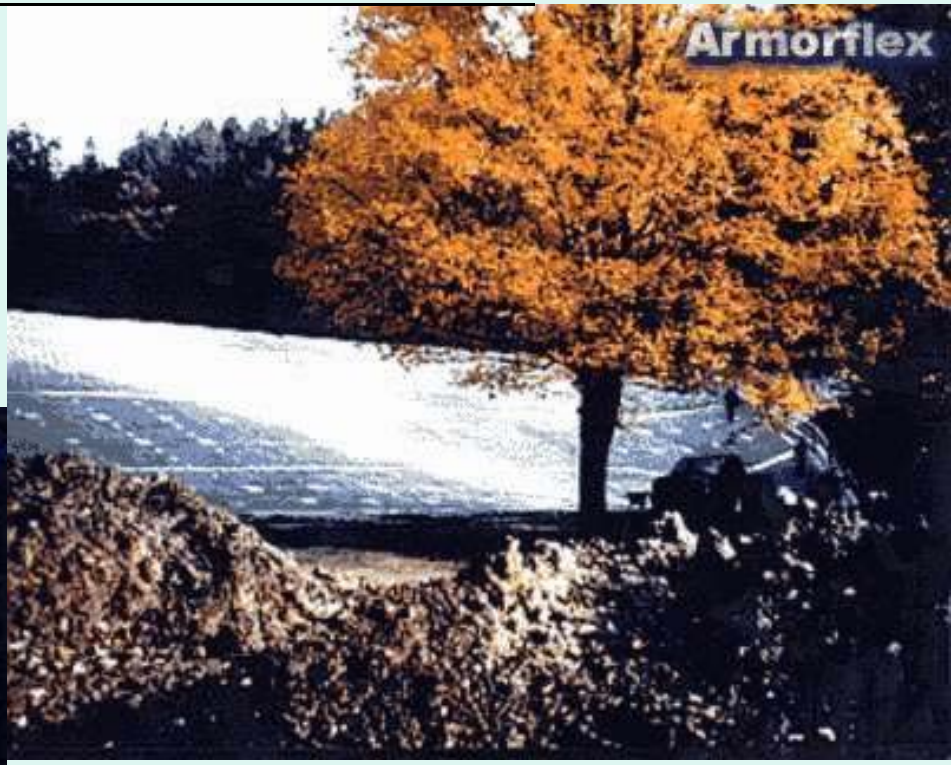
EXISTING CONDITIONS



Ways to Increase Spillway Capacity

- *Increase Spillway Length*
  - ➢High Cost and downstream impacts
- *Raise Dam*
  - ➢High Cost and upstream impacts
- *Overtopping Protection*
  - ➢Cost Effective
  - ➢Articulated Concrete Blocks
  - ➢Rip Rap
  - ➢Turf Reinforcement Mats
  - ➢Low Point North of Dam

ARTICULATED CONCRETE BLOCKS



RIP RAP SLOPE

TURF REINFORCEMENT MATS

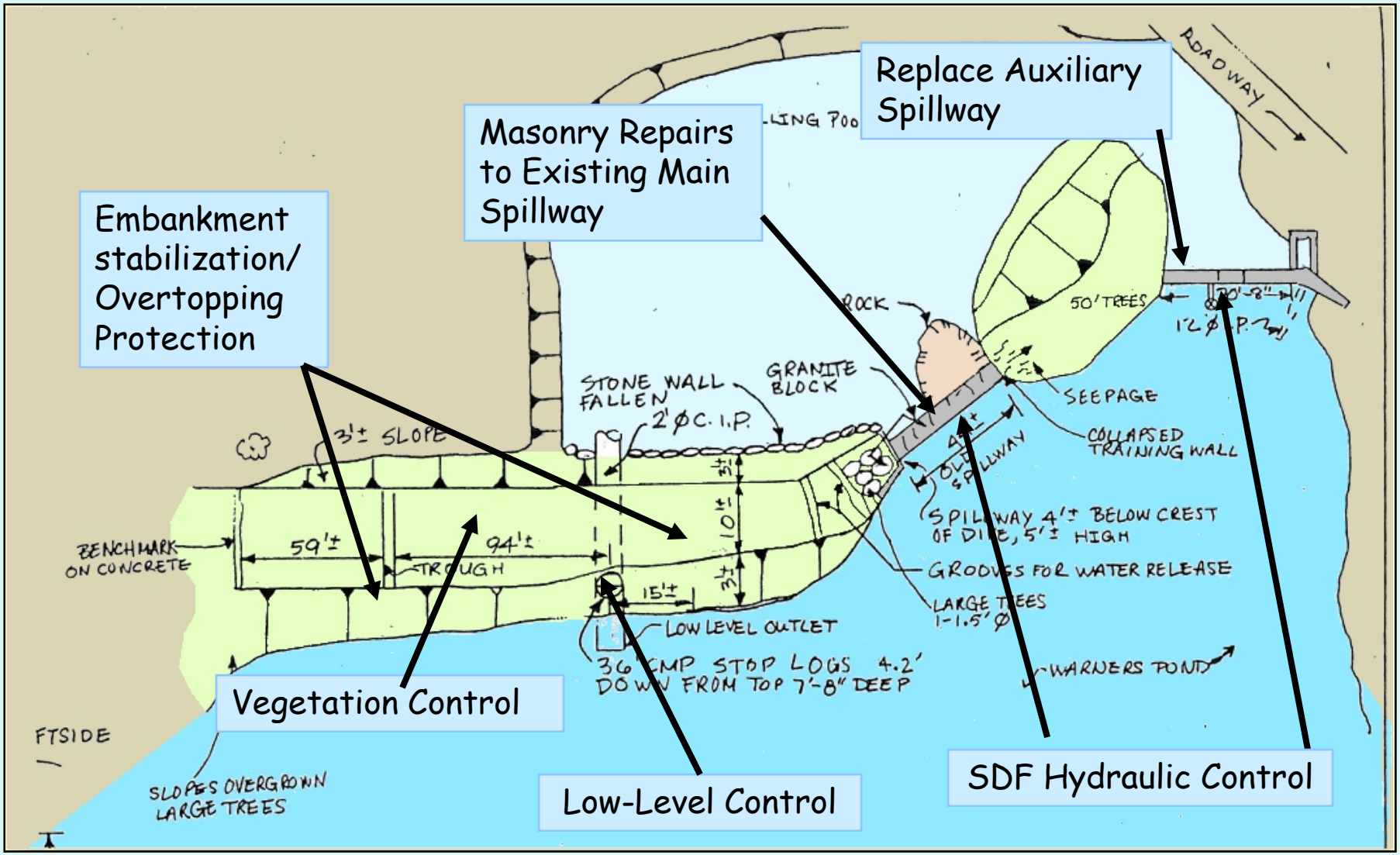
TURF REINFORCEMENT MATS

OVERTOPPING PROTECTION

Turf Reinforcement Mats selected for:

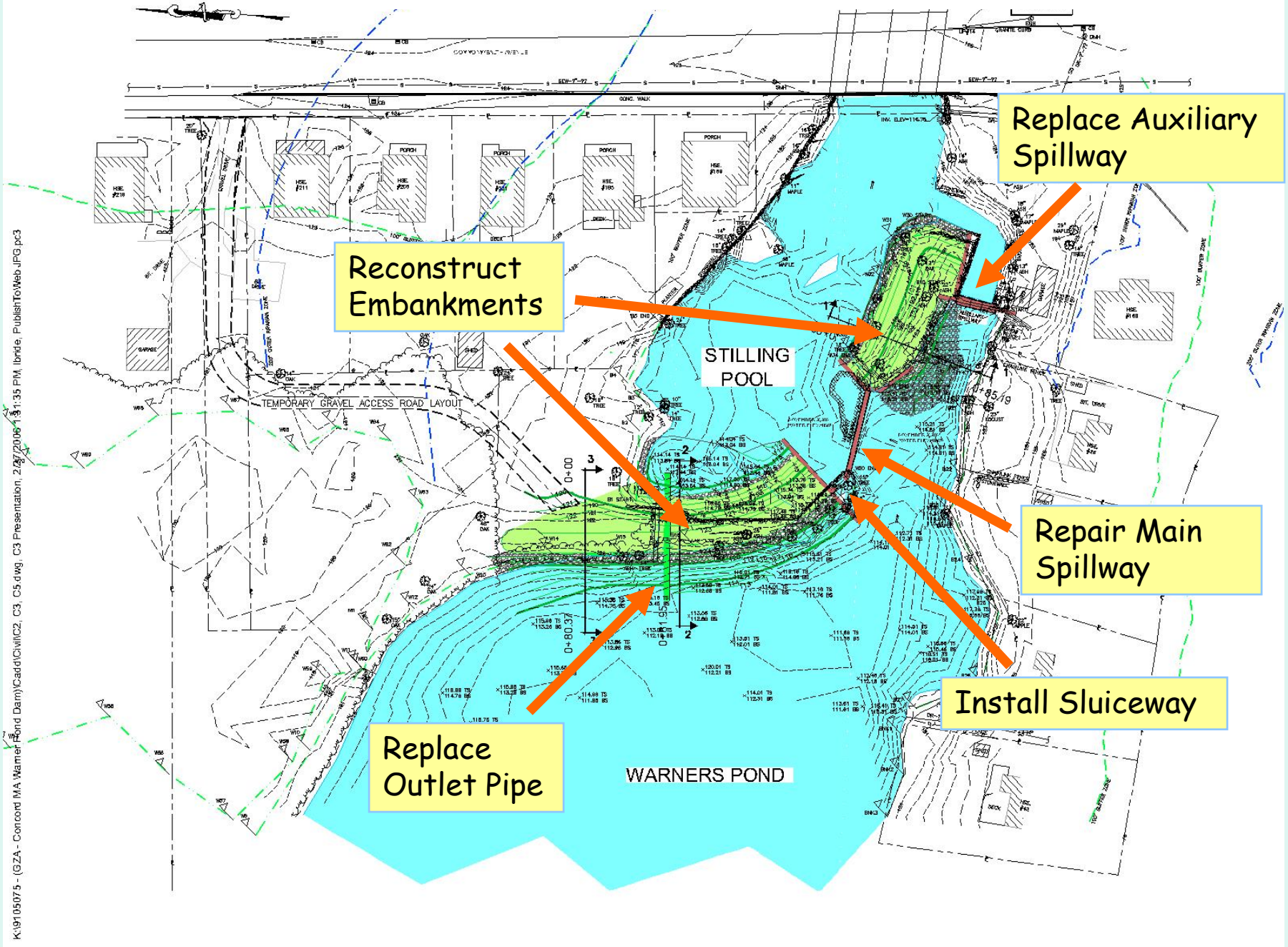
- *Aesthetics*
- *Cost*
- *Relatively low flow rates and velocities*

PROPOSED IMPROVEMENTS

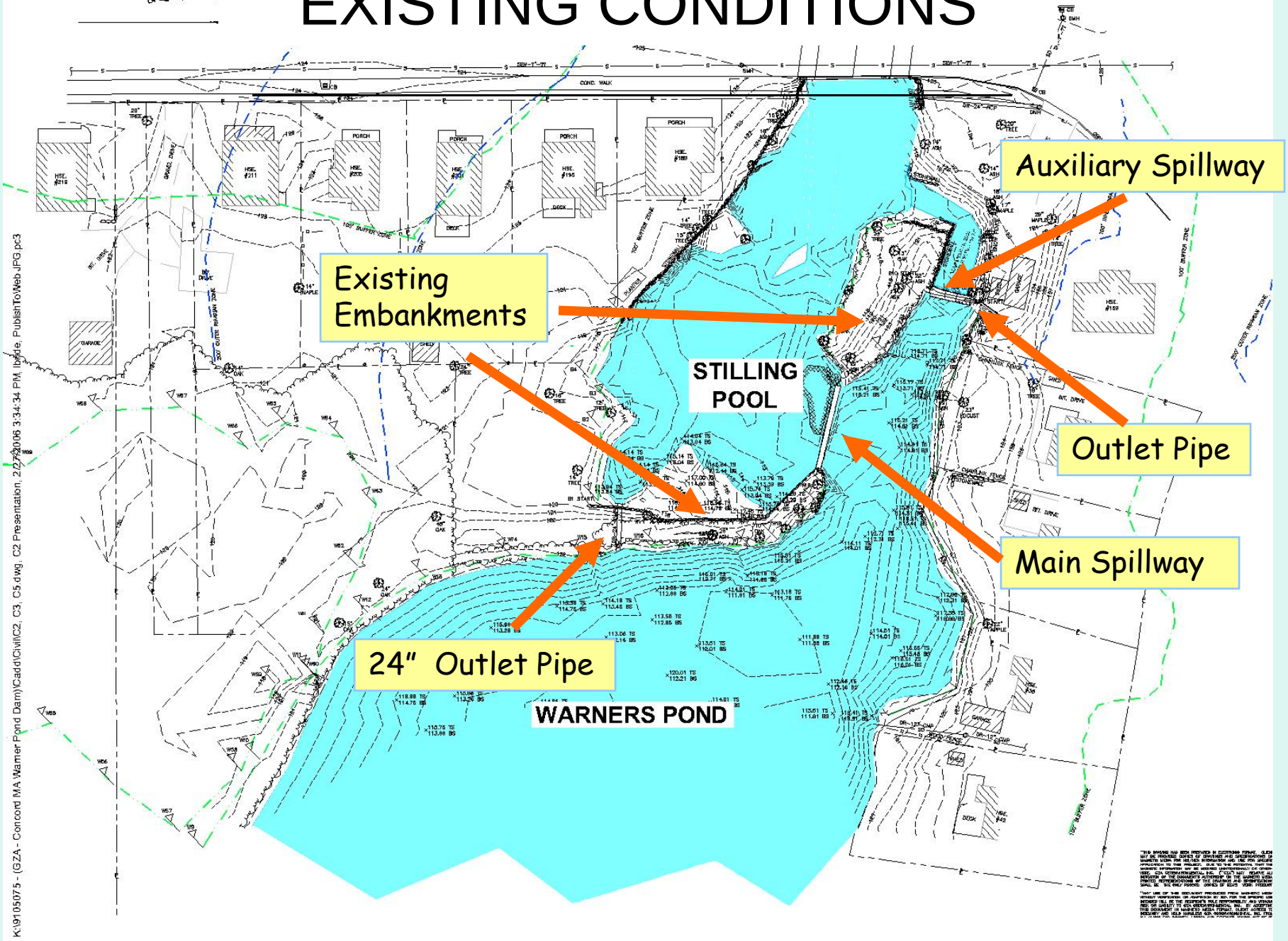


Sketch based on Haley & Aldrich's April 30, 1999 Dam Safety Inspection Report

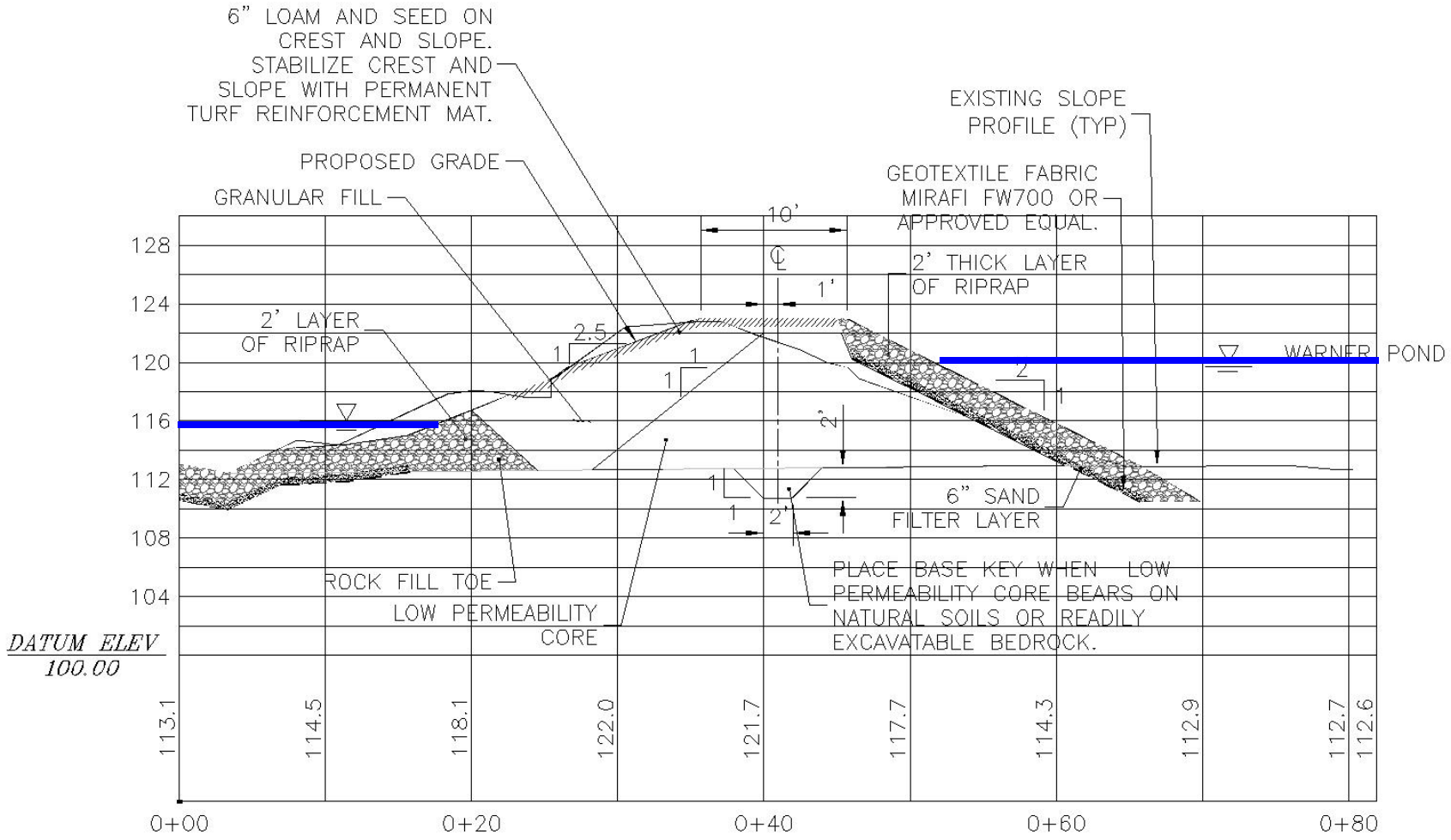
PROPOSED IMPROVEMENTS



EXISTING CONDITIONS



TYPICAL EMBANKMENT CROSS SECTION



SECTION 2

SCALE: 1"=10'

PROJECT BENEFITS

- *Improve Dam Safety*
- *Preservation Of Pond Resources*
- *Functional Water Controls*
  - ➢*Allows for seasonal draw downs*
  - ➢*Allows for emergency draw down*
- *Improve Water Quality in Auxiliary Spillway Area*
- *Enhance view of Pond from Comm. Ave.*

ADDITIONAL COMMENTS

FISH LADDER

- *A review of available fisheries information was performed.*
- *A fish ladder at Warners Pond Dam would not likely be effective until other obstacles are removed or fitted with fish passage.*
- *If other obstacles are addressed, fish ladder may be retrofitted into auxiliary spillway at Warners Pond Dam.*
- *Additional study needed.*

HYDROPOWER FEASIBILITY

Theoretical Available Energy Production and Associated Savings

		Median Annual Flow (cfs)	**Median August Flow (cfs)**
		48.83	11.21
Operating Head (ft) =	2.97		
	Power (KW)	10	2
	Time Available to Produce Power in a Year (hours)	4,380	7,476
	Energy Produced in a Year (KW-hr)	45,722	17,915
	Annual Avoided Energy Cost ($)	4,572	1,792
	Estimated Cost to Design and Build ($)	350,000	200,000
	Payback Period (years)	77	112

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PLEASE PROVIDE COMMENTS/QUESTIONS TO:

SEAN DIVOLL, P.E.

PUBLIC WORKS ENGINEER

Concord Public Works

133 KEYES ROAD

CONCORD, MA 01742

Phone: 978-318-3210

Email: sdivoll@concordnet.org

OPEN DISCUSSION