



Water Supply Citizens Advisory Group
MWRA Reservoir Operations Update

John J. Gregoire

03.09.20

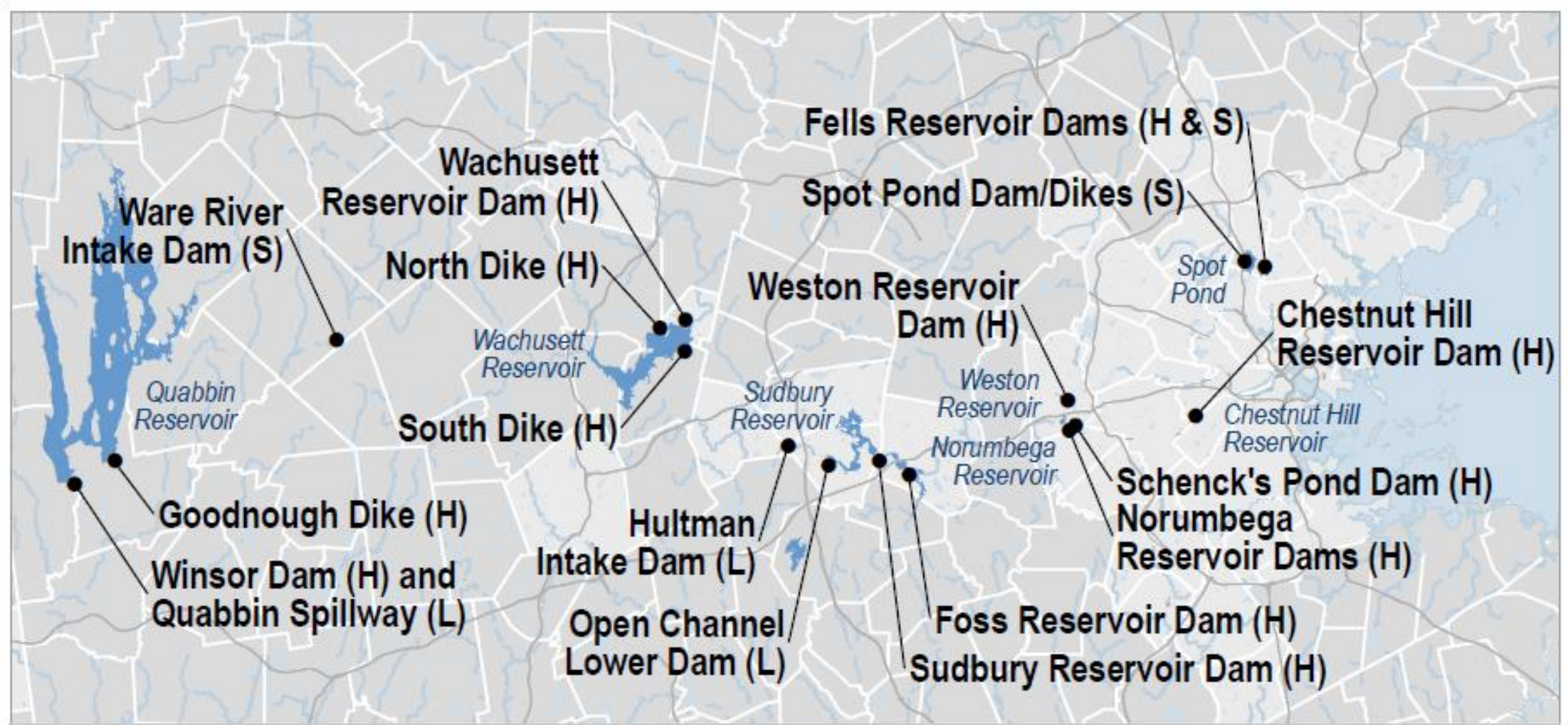


Topics for today

- Selected Water Supply Dams Projects Update
- Quinapoxet Dam Removal Update
- River Road Rehab
- Reservoirs Invasives Projects quick update



28 Dams and Dikes across 13 locations



■ MWRA Water Communities — Major Roads
■ MWRA Reservoirs

(H) - High Hazard Class
(S) - Significant Hazard Class
(L) - Low Hazard Class



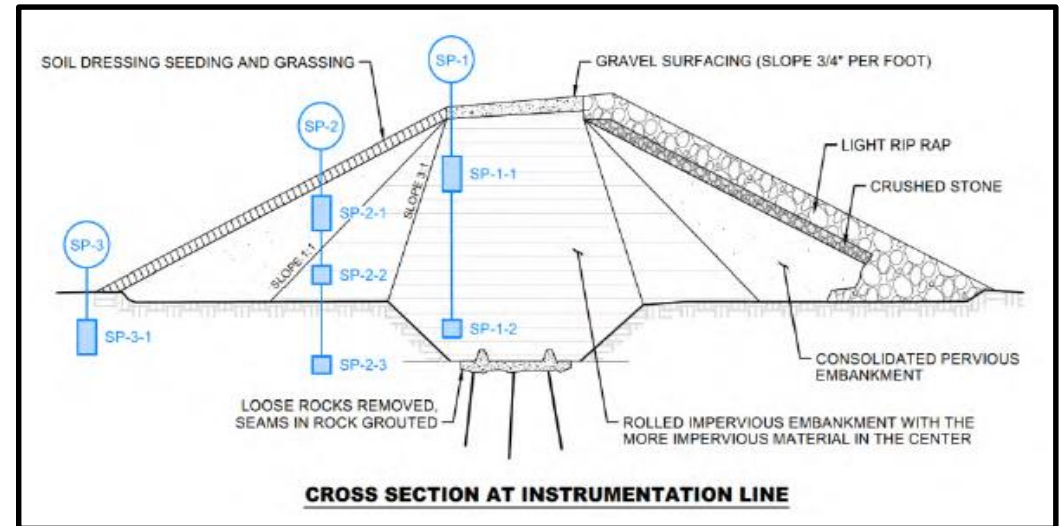
Status:

- Fall 2020 Regulatory Phase I Dam Safety biennial Inspections: Completed.
 - Submittal of Draft Phase I Inspection Reports: Underway.
 - Design on Weston and Chestnut Hill Dams instrumentation (piezometers). 90% Design submitted.
 - Allowance: GEI to evaluate Winsor Dam piezometer readout discrepancies, Geokon readout box calibration/maintenance (every 5 years = overdue) and instrument void repair spec. Underway.



Contract #7614 – Dams Design and ESDC Contract

- Update
 - Sudbury Spillway Masonry and vent pipe design: Inspection and design report submitted and returned. Design underway. Design for spillway masonry repairs underway.
 - North/South Dikes Piezometers:
 - Award contract W327 to NH Boring, Inc. NTP
 - meeting recently held. Preconstruction meeting scheduled.



- Foss Dam Overtopping Protection:
 - Design Report pending.
- North Dike Reconnection at LPS:
 - Design Report Finalized. Design underway.



#7614 Task 2 – North Dike Revised Overtopping Protection

Install 18" high parapet wall
For wave run-up protection.

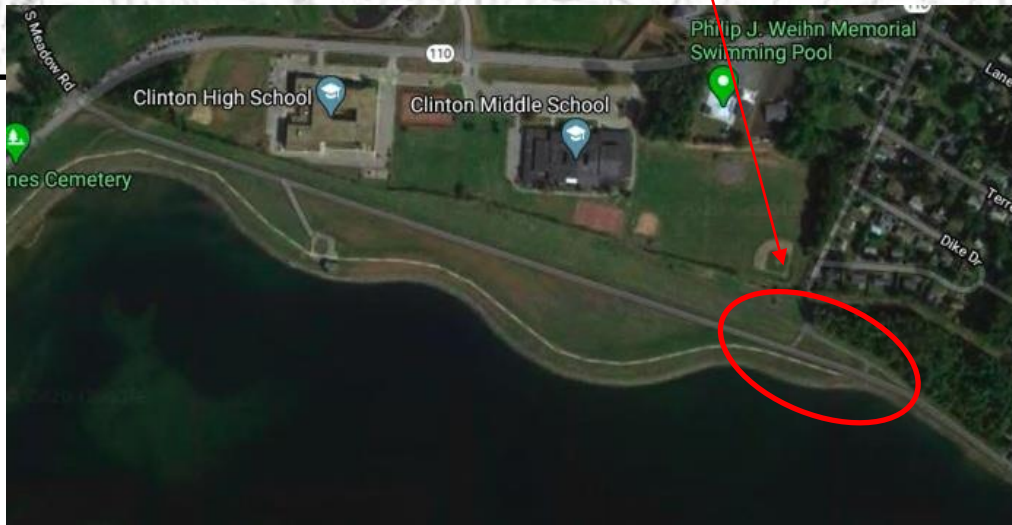


Parapet Wall along edge of pavement.
Extend wall to LPS stairs.
Existing parking lot grade el. 406.2+/-
Proposed top of wall el. 407.2

WATER ELEV. 12/9/2016=390.6
12/14/2016=390.6



#7614 Task 2 – North Dike Overtopping Protection



New repair approach: Install 0.5' – 1.8' fill to prevent wave end-around erosion where North Dike abuts natural ground.

Est cost both solutions \$50-\$100K

Next steps: Design, specs, procurement, bid support and ESDC.



Chestnut Hill Dam Seepage Repair Underway

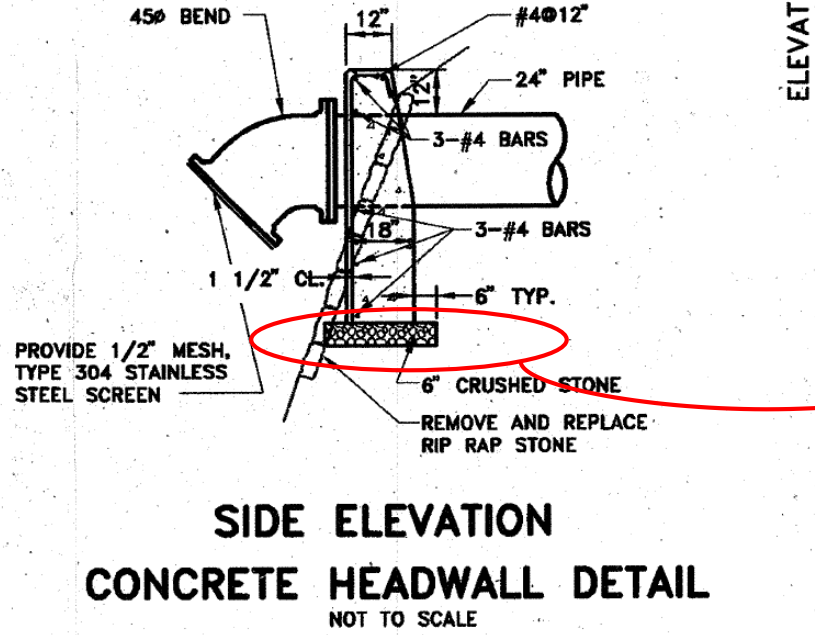
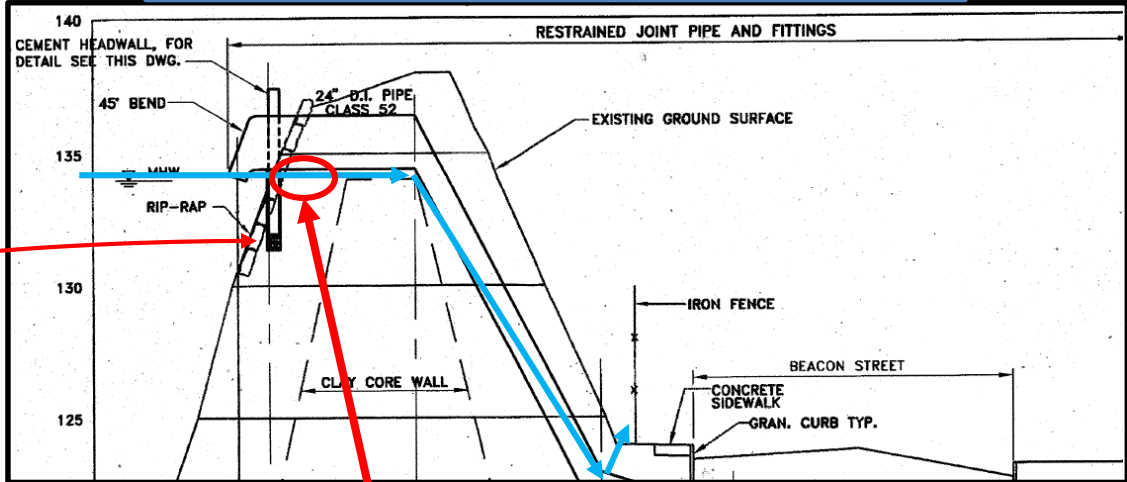


Chestnut Hill Dam Seepage Repair

Seepage surfacing 02.28.19 as defined boil and diffuse flow



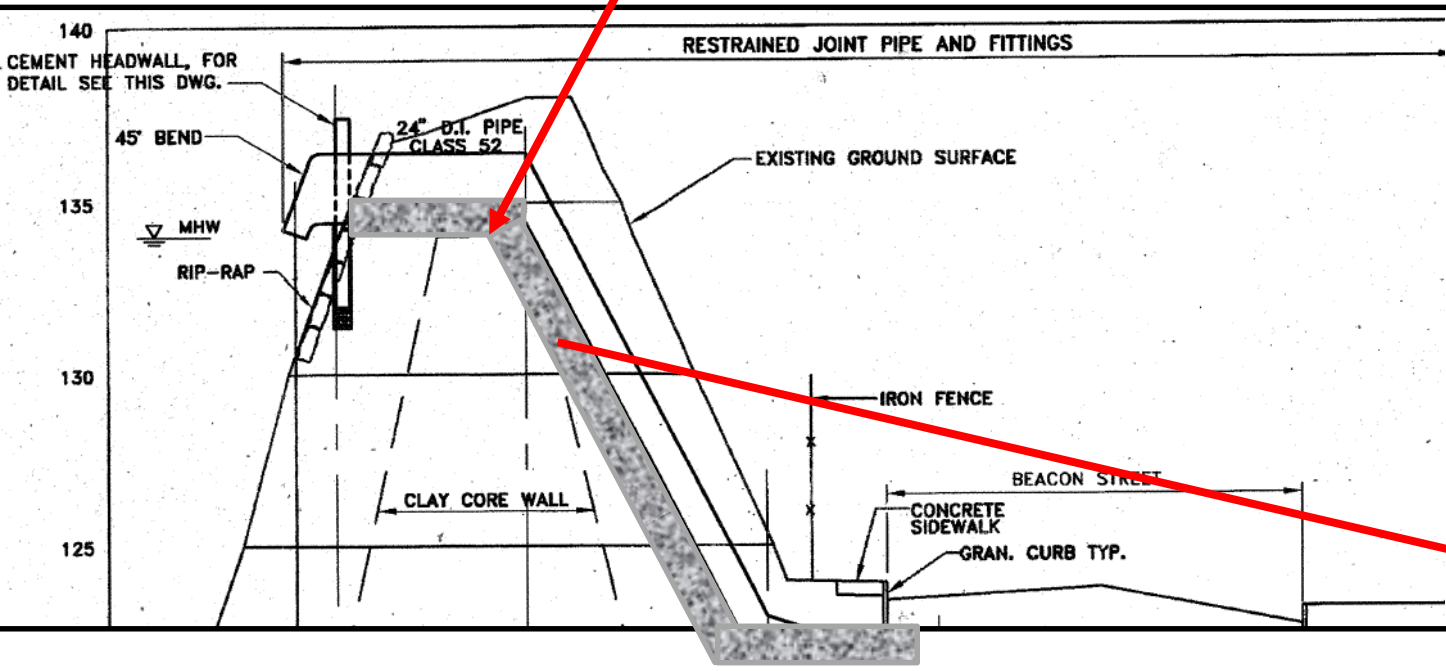
Seepage flow path along crushed stone



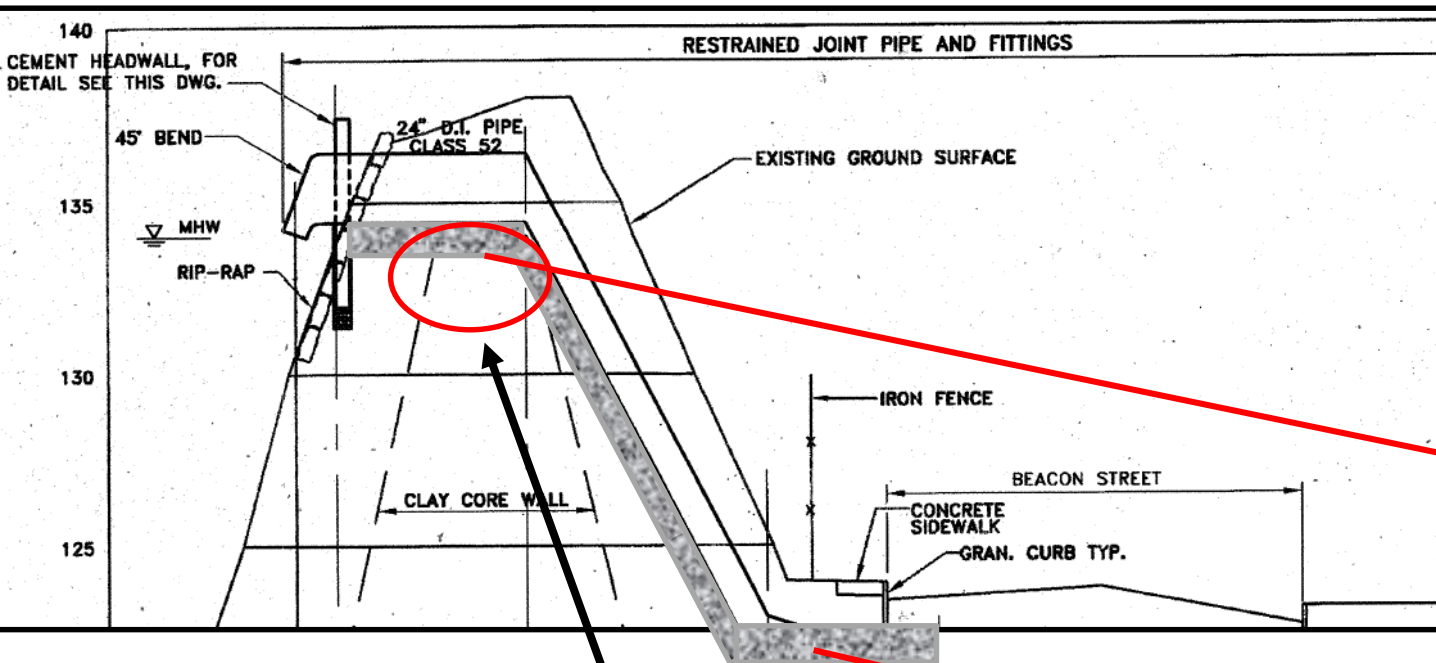
Blow-off 03.12.19



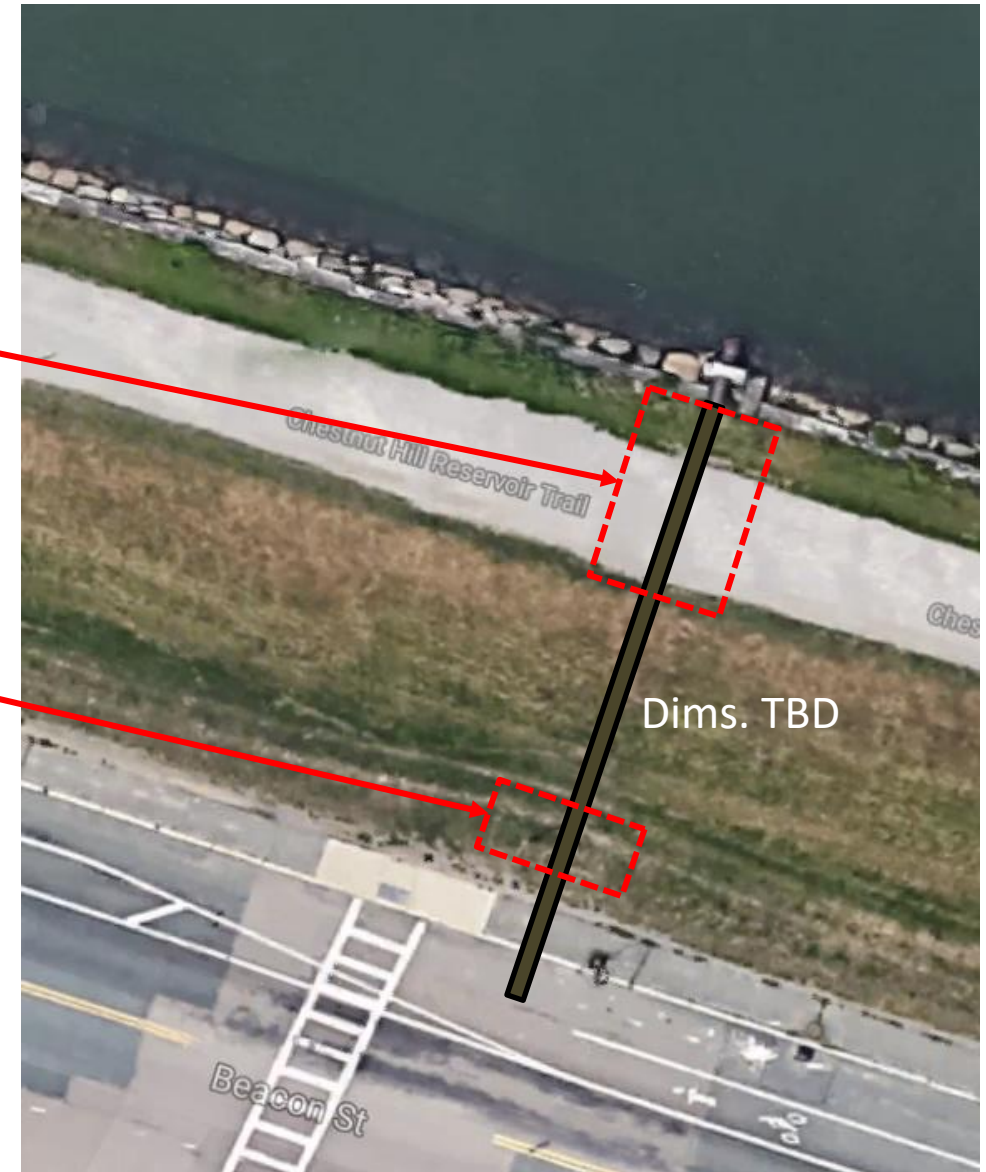
Findings: BO Pipe is bedded with ~13" crushed stone on 4ft. either side of pipe.



Repair design selected



1. Reestablish upper core zone at crest:
Excavate material under pipe, support
pipe, and replace with l/w concrete, flowfill,
foamed concrete or low perm. soil.
- +
2. Establish a filter blanket (at pipe
alignment near toe) of 2-3' of free-draining
coarse material.





Expose pipe, form, rebar and flow-fill for core restoration





Flowable fill and backfill





Compaction and testing

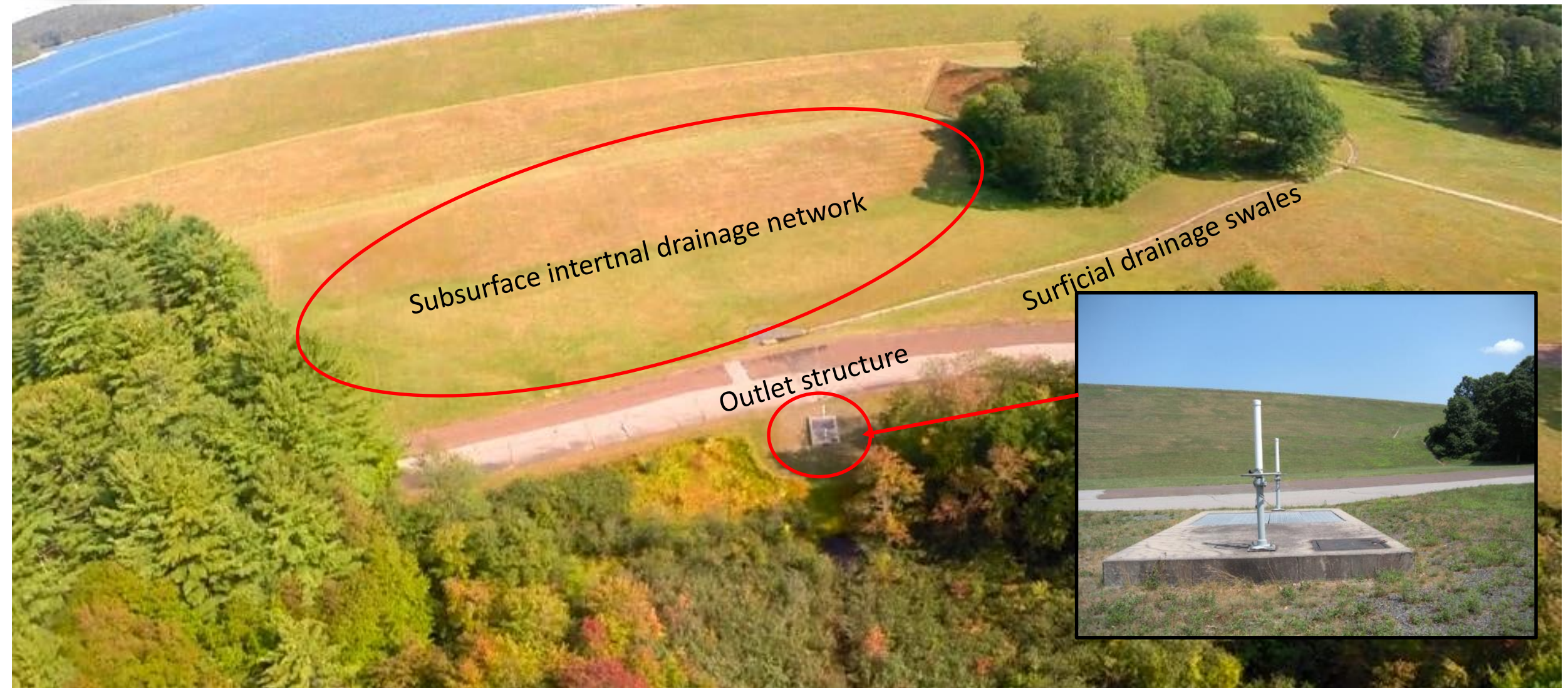




Quabbin – Goodnough Dike Internal Drainage Maintenance

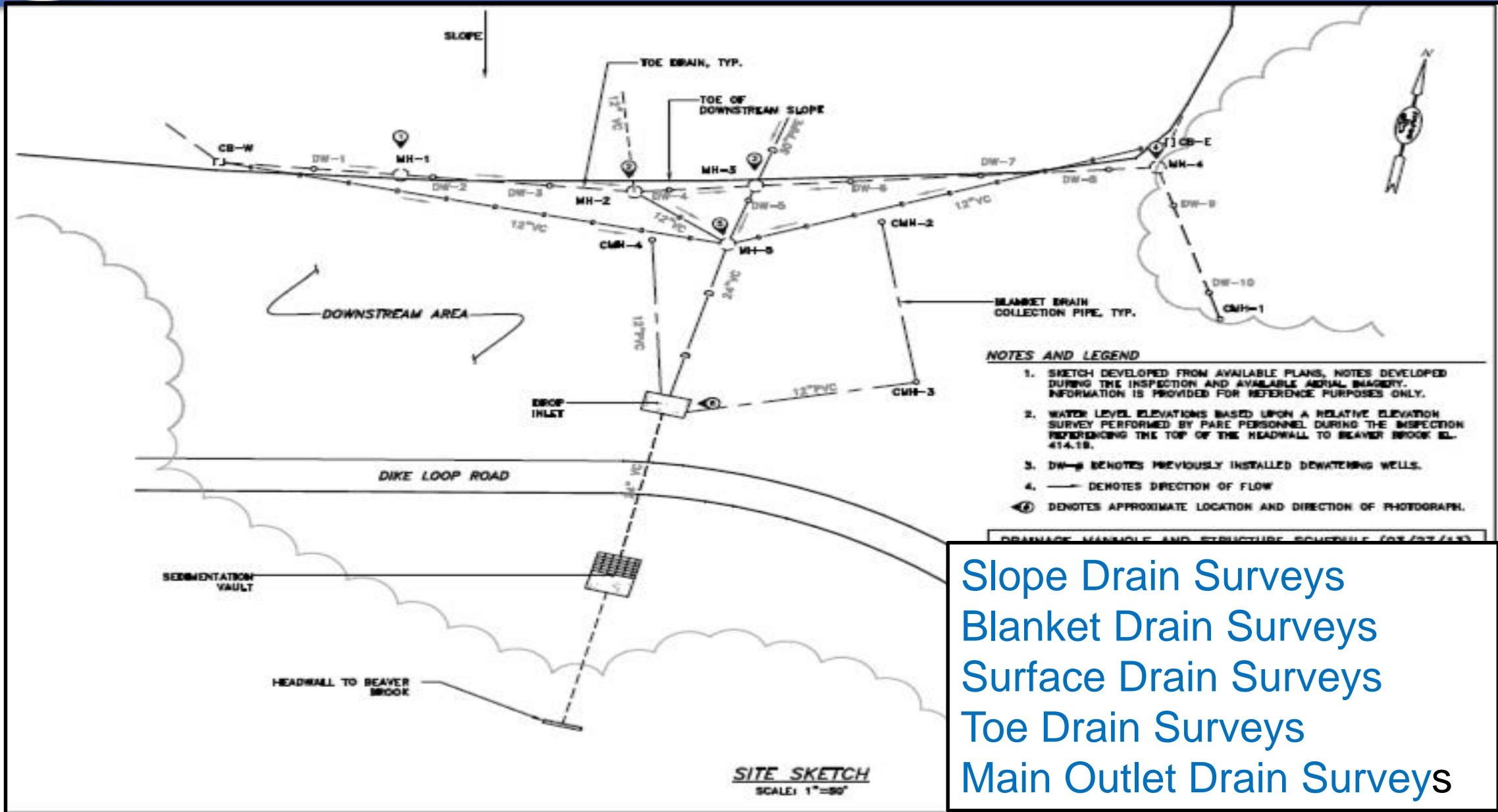


Goodnough Dike looking upstream





Goodnough Dike Internal Drainage Network – complex system



- Slope Drain Surveys
- Blanket Drain Surveys
- Surface Drain Surveys
- Toe Drain Surveys
- Main Outlet Drain Surveys



Example CCTV Inspection findings

Root infiltration

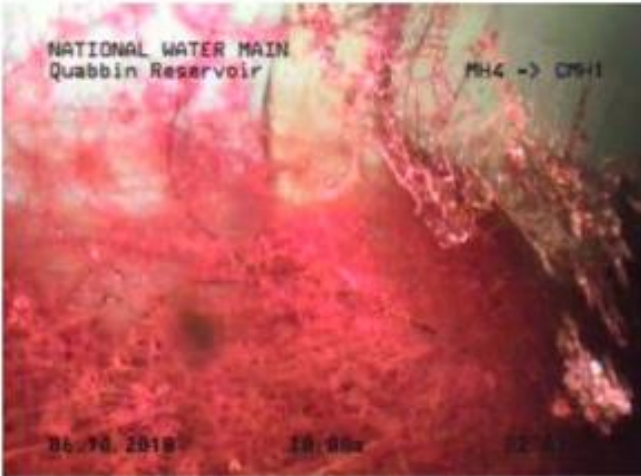


Photo 1: Heavy root infiltration through slots in pipe MH4->CMH1

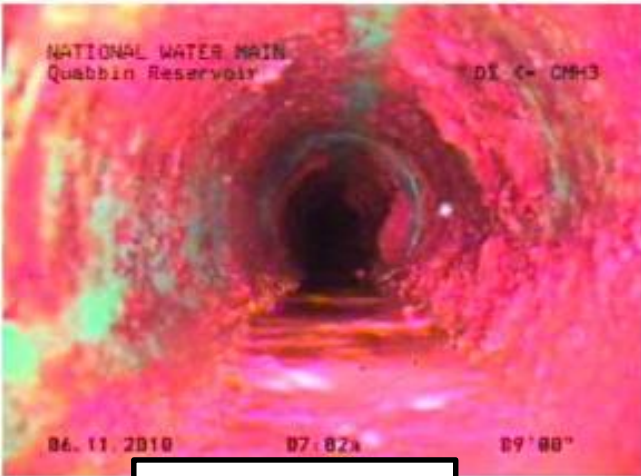


Photo 2: Heavy mineralization in pipe DI->CMH3

Mineralization



Photo 3: Example debris (CB5->CB4) section of full length of pipe.

Debris

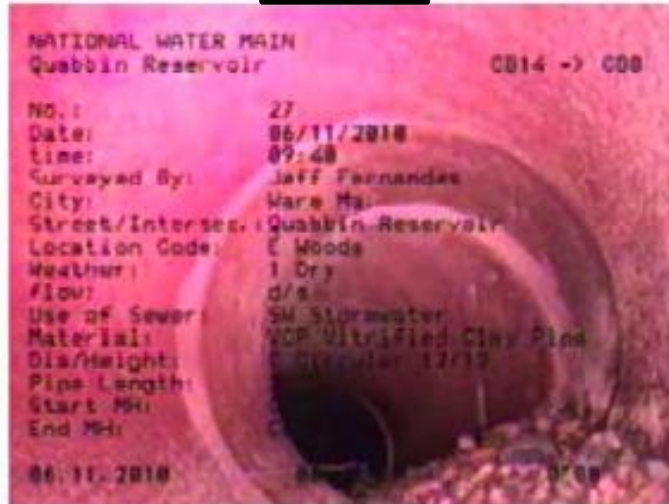


Photo 4: Example concrete debris located in some pipes.



Photo 5: Concrete debris in pipe CB18->CB12.

Partial blockage



Photo 6: Example concrete deposit/mortar protruding from joint.



Maintenance and cleaning scope – Goodnough Dike

- Clean (jet) main outlet pipes, blanket drain pipes, and surface drain pipes
- Replace failed sections of surface drain pipes (Local DCR Quabbin task)
- Redevelop relief wells.
 - The purpose of well development is to ensure removal of fine grained sediments from the vicinity of the well screen by jetting, surging or pumping. This allows the water to flow freely from the formation into the well and on to the drain
- Clean sediment from outlet structure and ensure functionality
- Inspect source of possible leakage at drop inlet of outlet structure

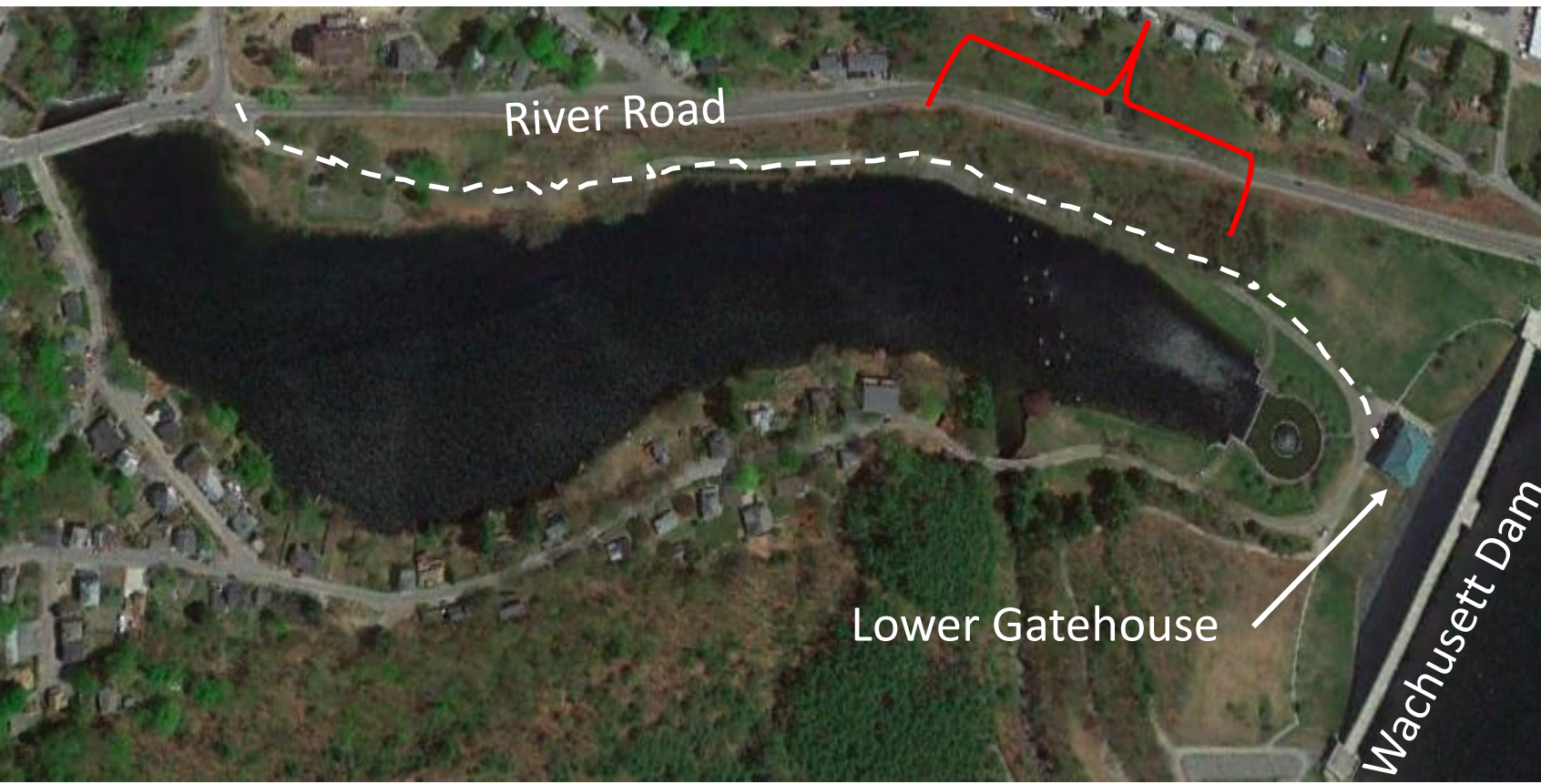


River Road Rehabilitation



Repair zone in landslide-prone area

Repair Zone ~ 900 LF





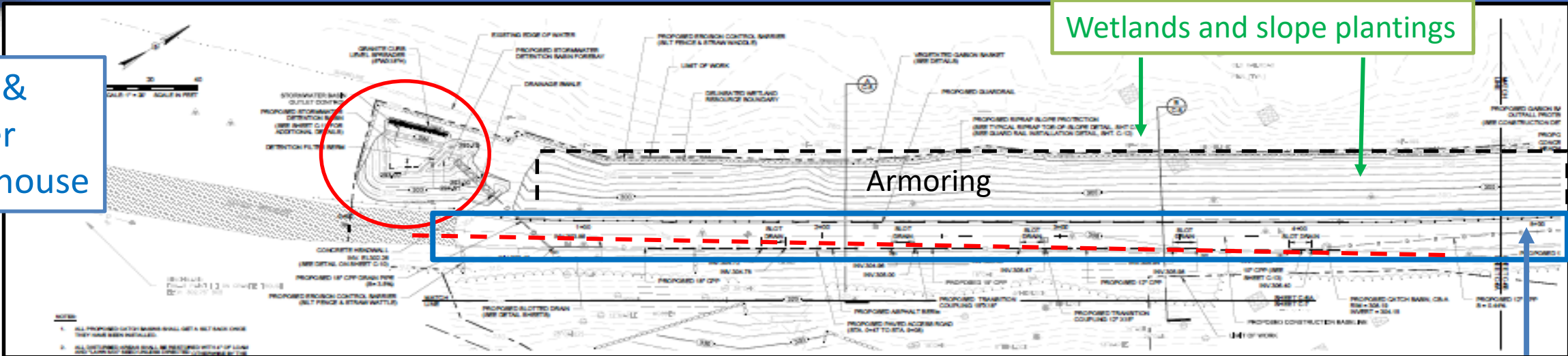
Recent land slide





Project Scope Overview

Dam & Lower Gatehouse

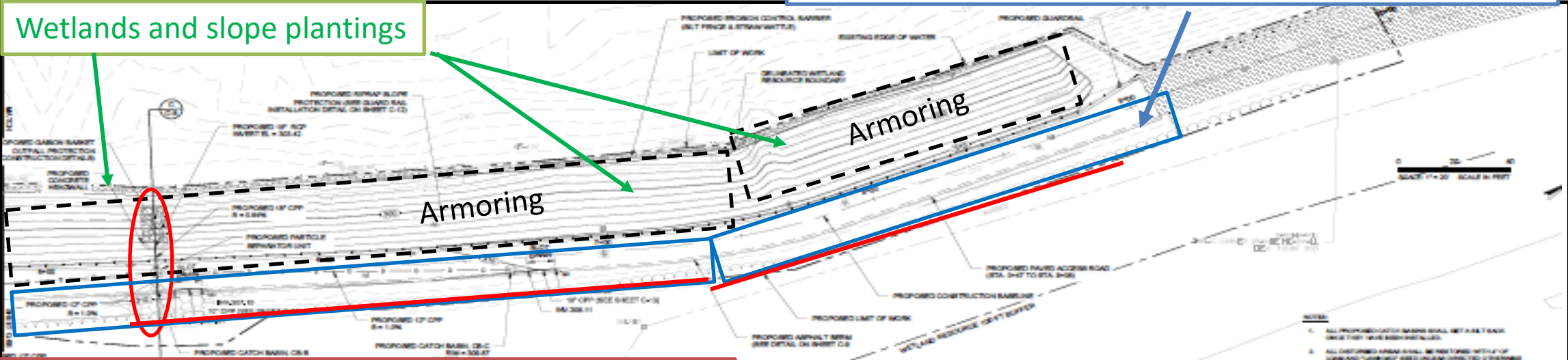


Wetlands and slope plantings

Armoring

Stormwater system South – slotted drain, detention basin

Remove contam. soils in road alignment, replace w/hi strength soils, asphalt surface, curbing, guard rail



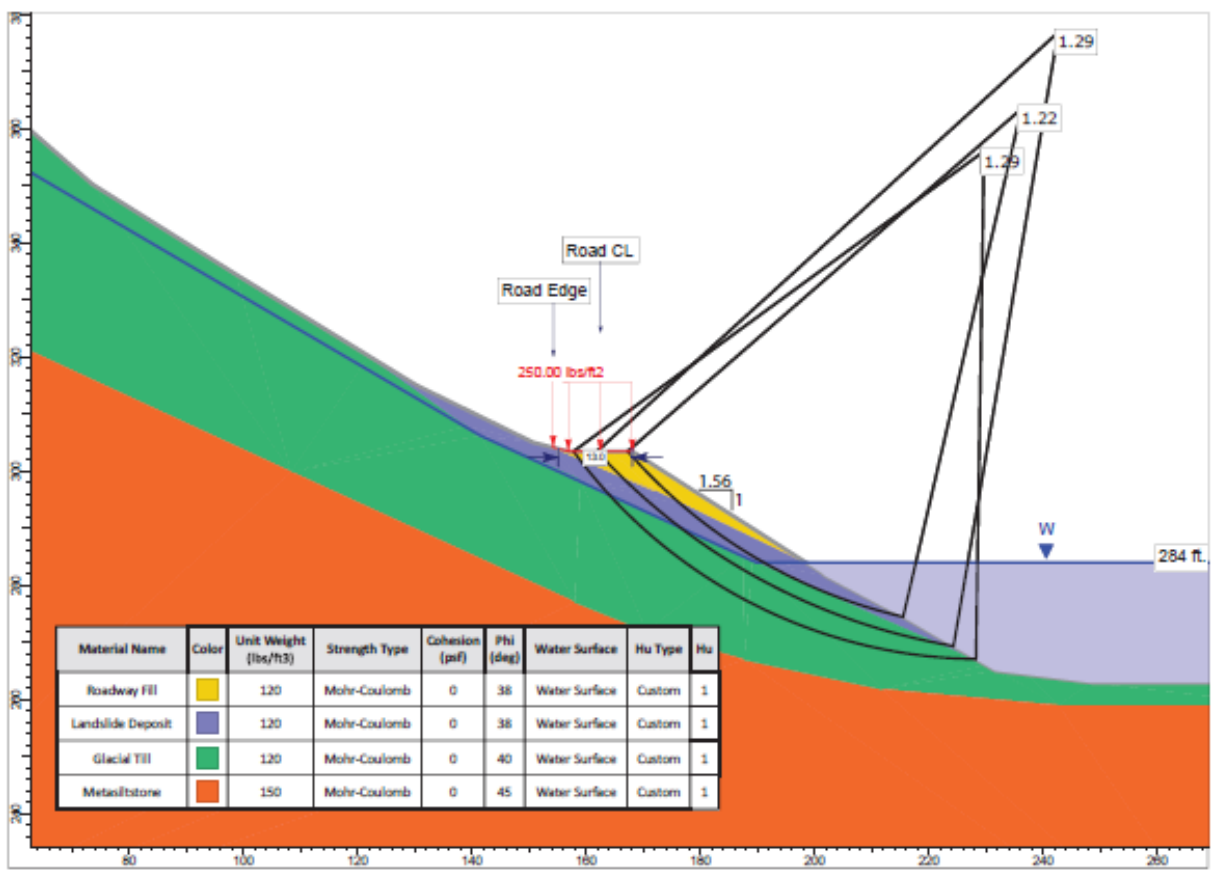
Wetlands and slope plantings

Armoring

Stormwater system North – piping (CPP), CBs, StormCeptor



Repair Alt. = flattened slope and reduced road width

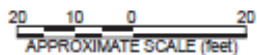


Meet FS of 1.25

Removal of 20 tons of contaminated soil (naphthalene, SVOCs, Ni) and replaced with higher strength material.

Armoring outboard slope to water line

13 ft. wide road w guard rail



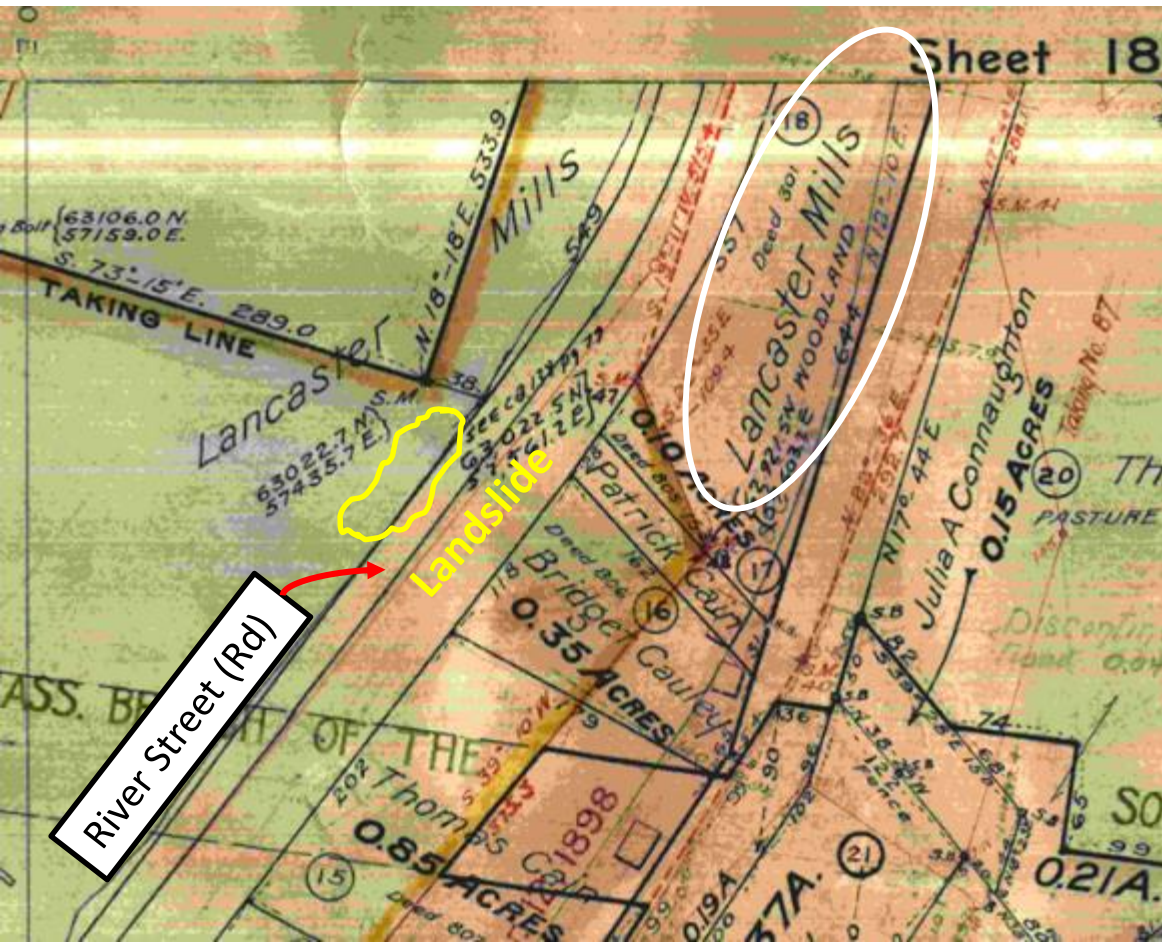
PROJECT NO.	20191018	13-FT WIDE ROAD WITH FLATTENED SLOPE:	FIGURE
DRAWN	JUN 2019	ELEVATED WATER LEVEL	E-6
DRAWN BY	MP	(CROSS SECTION A-A')	
CHECKED BY	DD	RIVER ROAD GEOLOGIC RECONNAISSANCE	
FILE NAME	13-FT wide road.ai	LANCASTER MILL POND / WACHUSETT DAM	
		CLINTON, MASSACHUSETTS	



River Road/"Street", Clinton historical uses and activities

Parcel 18 on Sheet 18 of the land taking plans is identified As "Lancaster Mills" and is within a few hundred feet of the landslide area where contaminated soils have been located. It is conceivable that Lancaster Mills might have used coal and coal oils for lighting and heating there prior to Wachusett Dam construction in 1897.

**Probably original 1890's
cart path surface**





River Road Rehab – Contract 7701

- Received 17 Bids
- Bid Range \$2,182,000 - \$4,063,050.
- Engineer's Estimate = \$3,150,670

Contractor	Bid	Terms
E.T. & L. Corp.	\$2, 182,000	270 calendar days

Staff recommend award of Contract 7710 to E.T. & L. Corp. for a term of 270 days.



Quinepoxet Dam Removal Project Update



Project Team





Goals of the project

Restoring natural fish passage, wildlife connectivity and recreational opportunities while protecting water quality within the Quinapoxet River has been a goal for MWRA, its partners and local organizations and stakeholders. MWRA has retained Milone & MacBroom, Inc. (MMI)/SLR, a leader in river restoration, to prepare design plans and prepare regulatory permits for the removal of the Quinapoxet Dam.



Quinapoxet Dam Removal Ecological Restoration Project West Boylston, Massachusetts

The Massachusetts Water Resources Authority (MWRA), in coordination with the Department of Conservation and Recreation (DCR), the Division of Ecological Restoration and the Division of Fisheries and Wildlife, is excited to announce a new ecological restoration project located along the regional important Quinapoxet River in West Boylston, Massachusetts. Restoring natural fish passage, wildlife connectivity and recreational opportunities while protecting water quality within the Quinapoxet River has been a goal for MWRA, its partners and local organizations and stakeholders. MWRA has retained Milone & MacBroom, Inc. (MMI)/SLR, a leader in river restoration, to prepare design plans and prepare regulatory permits for the removal of the Quinapoxet Dam.



Quinapoxet Dam

This dam was constructed in 1905 to support the Wachusett Reservoir construction project and has become obsolete with the various upgrades MWRA has made to its water transfer systems. It is a 230-foot-long and 18-foot-high earthen embankment and stone masonry structure. Centrally located on the structure is a 135-foot-long and 9-foot-high stone masonry and concrete arched spillway. Removal of this dam is expected to have minor short-term impacts to the surrounding area but significant long-term ecological benefits. The dam inhibits native species of fish from accessing miles of their natural habitat. The removal of the dam will restore passage to important fishery species such as the landlocked Atlantic salmon and native brook trout. In addition to the removal of the dam, several islands of sediment downstream of the dam will be relocated to create a new vegetated embankment that will help separate the natural river channel from the Quabbin Reservoir Shaft 1 power station release.

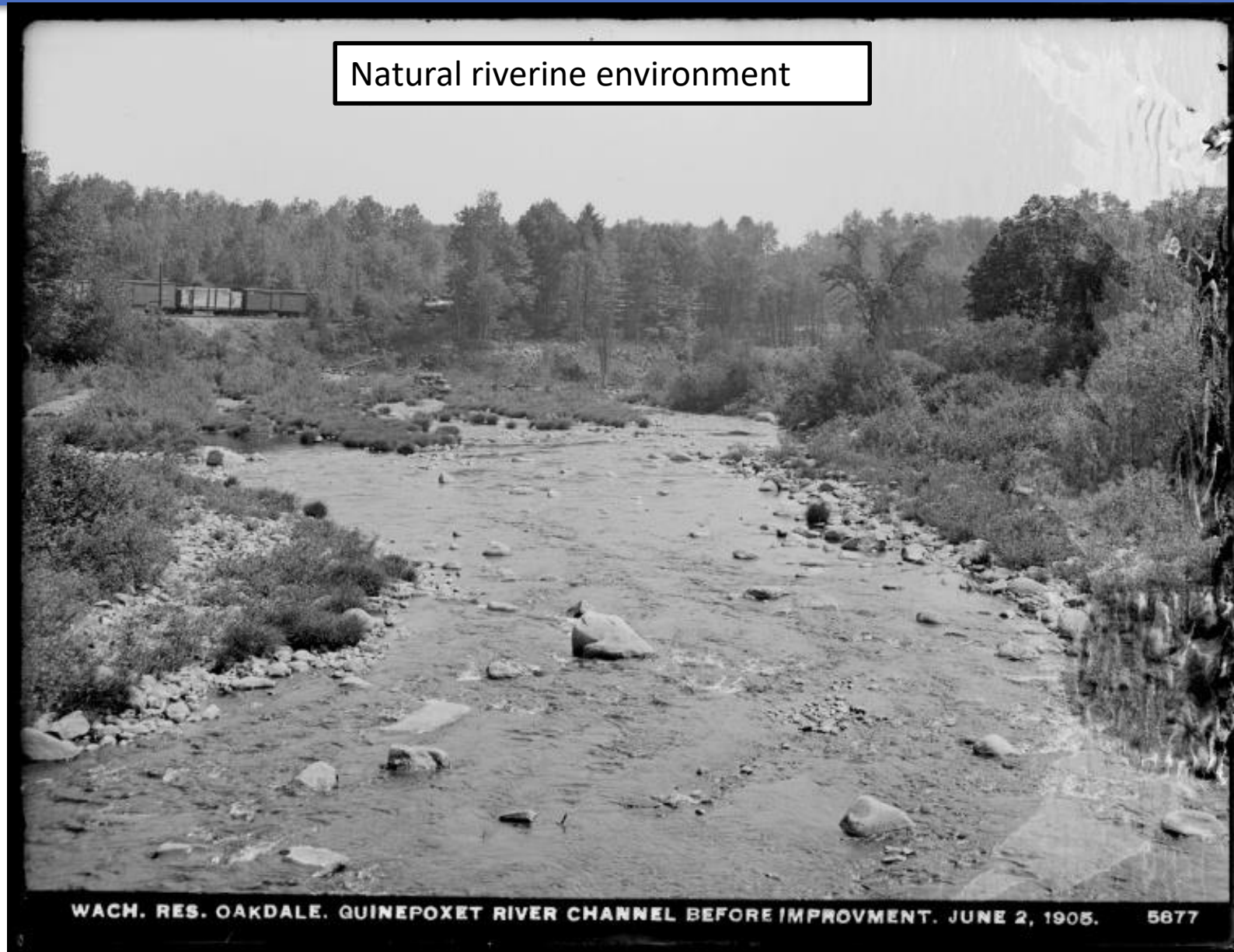
The project will require regulatory permitting through federal, state, and local regulatory agencies. The project team will be developing permit applications and supporting documents soon. The team looks forward to presenting this ecological restoration project to the community and receiving input during the permitting process. For more information regarding this project, please visit MWRA's website or email John Gregoire from MWRA at John.Gregoire@mwra.com or Kathryn Parent from DCR at Kathryn.Parent@mass.gov.

4673-03-03-n3003-rpt.docx



Quinni June 1902 – pre-dam

Natural riverine environment





“Improving Quinepoxet channel” 1905



WACH. RES. OAKDALE. IMPROVING QUINEPOXET RIVER CHANNEL. JUNE 2, 1905.

5879

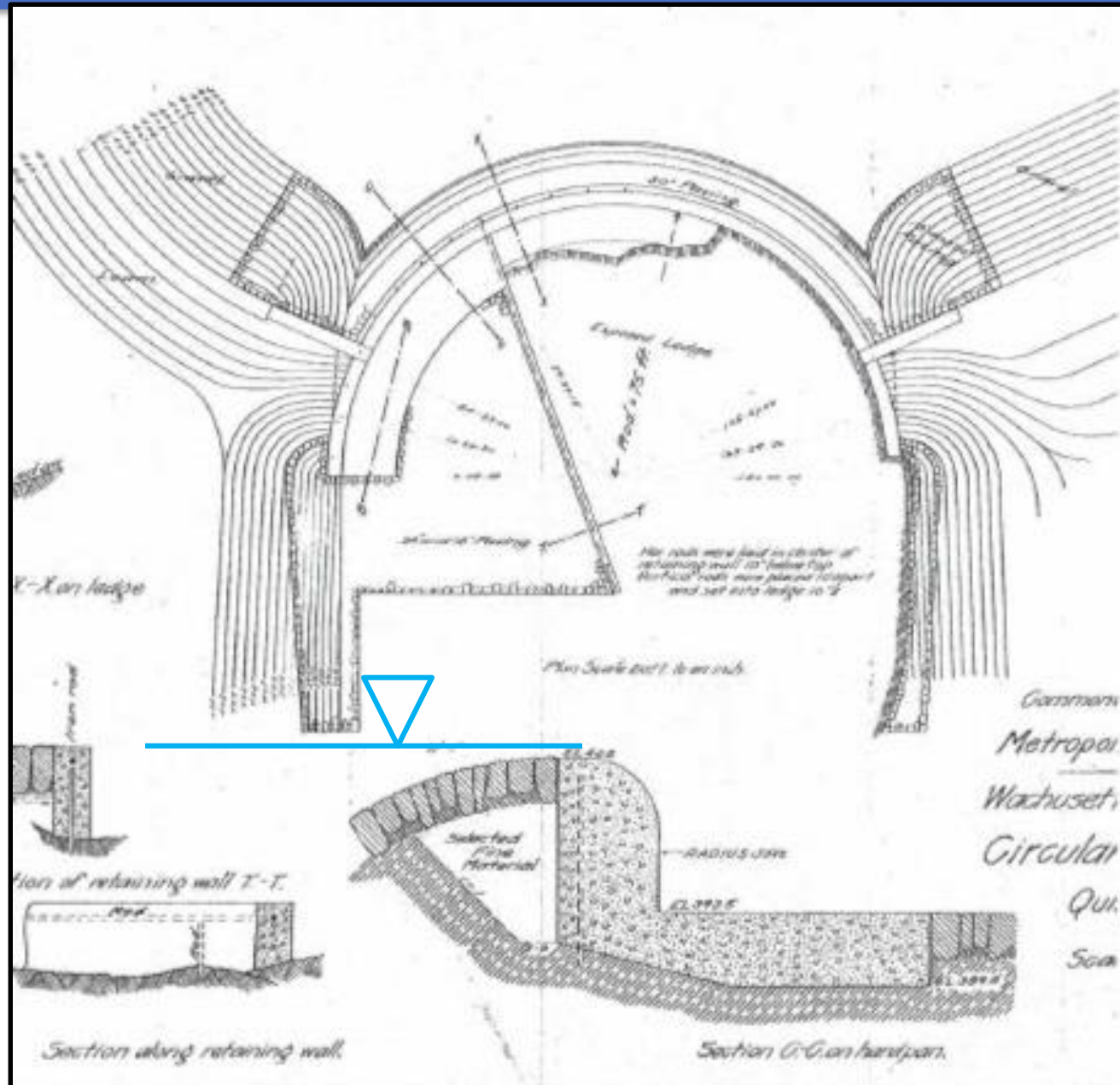


Dam Construction 1905





Quini Dam plan and profile





Re-engineered downstream channel 1905 and today





Project Location





Project Location

Downstream



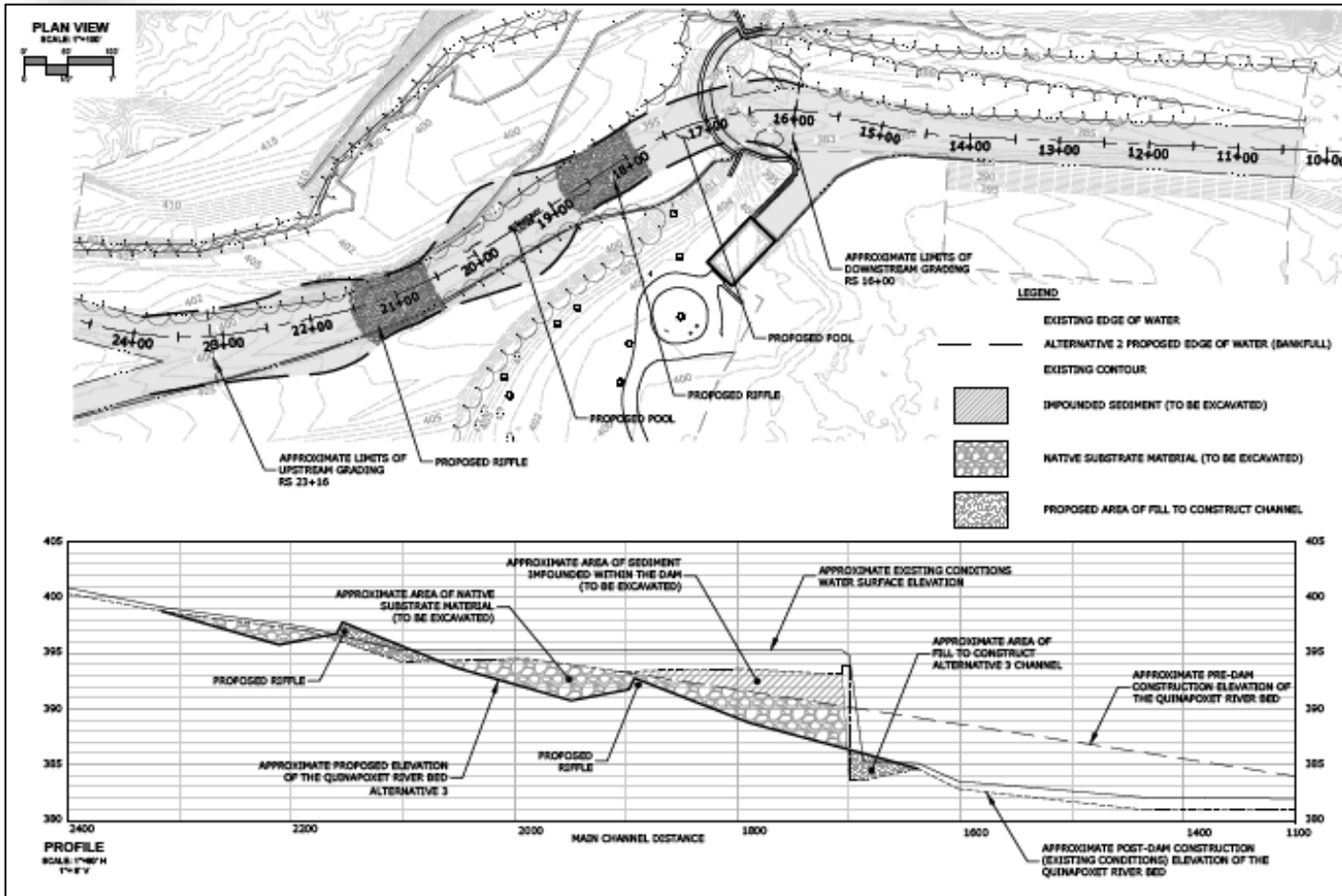
spillway



Upstream

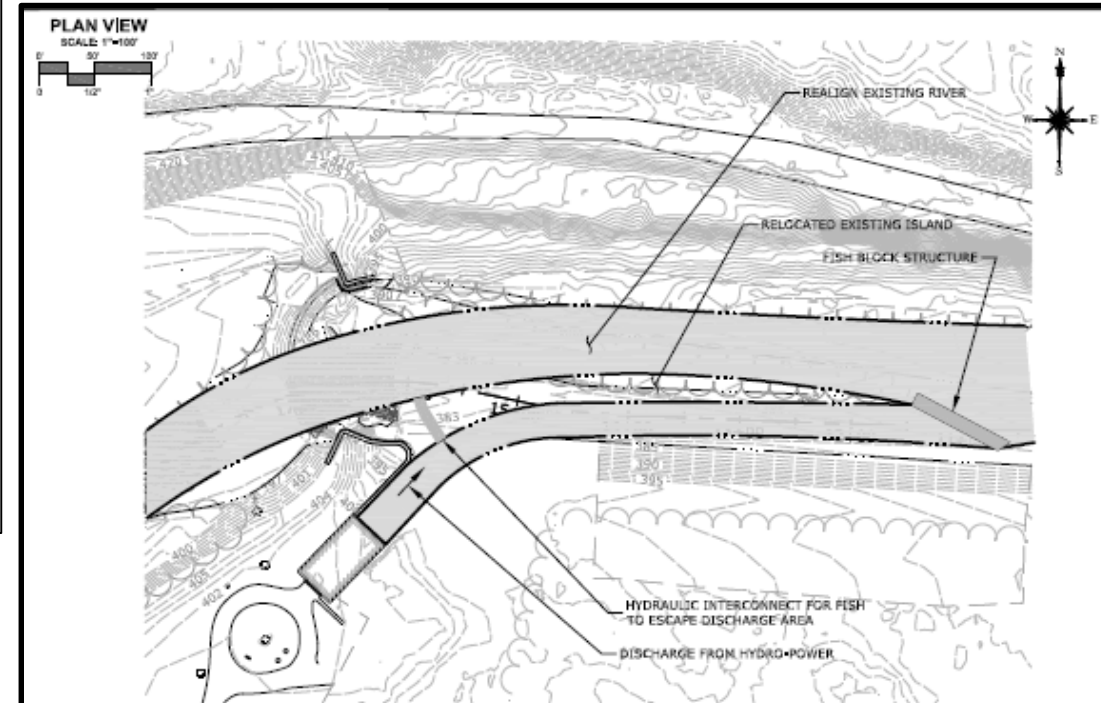


60% Design



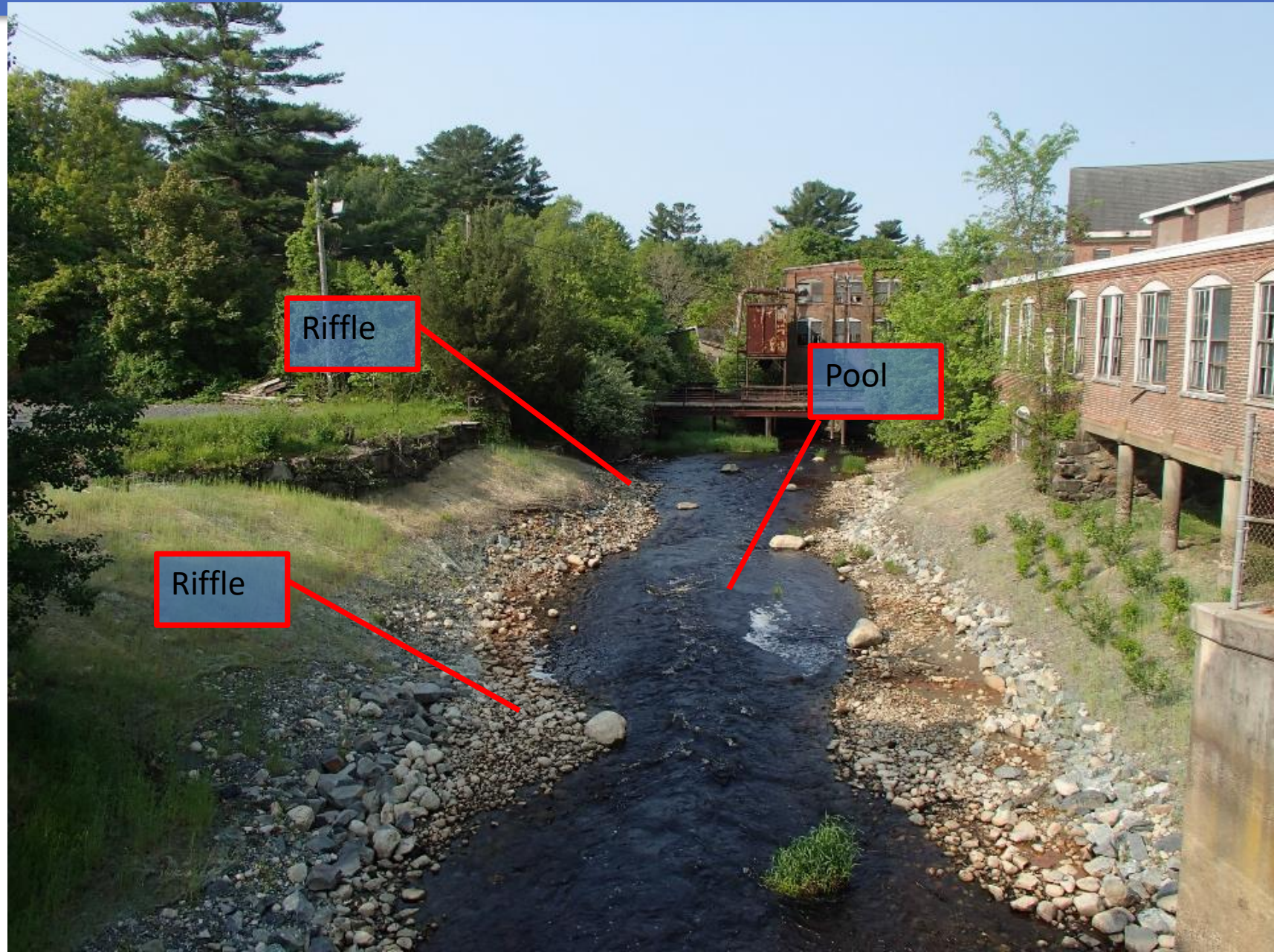
Riffle/pool system

Tailrace attraction flow reduction





Improved fish habitat for spawning





Protection of Oakdale Power Station and Wachusett Reservoir Paramount



- Structural analysis and protections for Shaft 1 during construction.
- Detailed water control plan and Sedimentation control plan for both during and post construction conditions.



2020 Season Aquatic Plants Survey and Invasive Control Efforts: **COMPLETED.** New Contracts under procurement for 2021

- Wachusett Stillwater Basin DASH
- Wachusett Lower Basins DASH (including full season phase @ Quinapoxet Basin VLM)
- Sudbury DASH (Fanwort)
- Sudbury/Foss Water Chestnut
- QA/QC Diver surveys of Wachusett and Sudbury DASH projects
- Reservoirs Aquatic Macrophyte Survey
- Ware River/Shaft 8 Intake Pool invasive plants control
- Weston Reservoir – pioneering EWM plants removed
- Chestnut Hill Mechanical Harvest