



STOW

MASSACHUSETTS

Incorporated 1683



Weston & SampsonSM

transform your environment

Lake Boon Dam Rehabilitation Project

Special Select Board Meeting
January 31, 2023

- **Participants**
 - Town of Stow
 - Town of Stow Select Board & Town Administrator
 - Department of Public Works
 - Police & Fire Departments
 - Weston & Sampson
- **Meeting Topics**
 - Brief dam background and history
 - Current project status
 - Planned design components
 - Responses to questions

- Constructed in 1870's
- Size Classification: Large
- Hazard Classification: Significant
- Height: 12 feet
- Length: 540 feet
- Design Flood: 500-year

302 CMR Section 10.06. Significant hazard potential dams are "Dams located where failure may cause loss of life and damage to home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities."



April 18, 2017
 Certified Mail No. 7013 1090 0000 4863 5724
 Return Receipt Requested

Town of Stow
 c/o Michael Clayton, Superintendent
 88 South Acton Rd
 Stow, MA 01775

Subject: CERTIFICATE OF NON-COMPLIANCE and DAM SAFETY ORDER

Dam Name:	Lake Boon Dam
Location:	Stow
National ID No:	MA00137
Known Condition:	Poor
Hazard Potential:	Significant
Middlesex Registry of Deeds:	Book 10194, Page 35

Dear Mr. Clayton:

In accordance with 302 CMR 10.08, the Department of Conservation and Recreation (DCR), Office of Dam Safety (ODS) has determined that Lake Boon Dam does not meet accepted dam safety standards and is a potential threat to public safety. Therefore, DCR hereby issues a **CERTIFICATE OF NON-COMPLIANCE and DAM SAFETY ORDER**.

ODS records indicate that the Town of Stow is the Owner of the Lake Boon Dam, National Inventory of Dams No. MA00137. ODS classifies the dam as a **Large Size, Significant Hazard Potential Structure**. Significant Hazard Potential Dams are dams that may cause the loss of life and property damage in the event of dam failure.

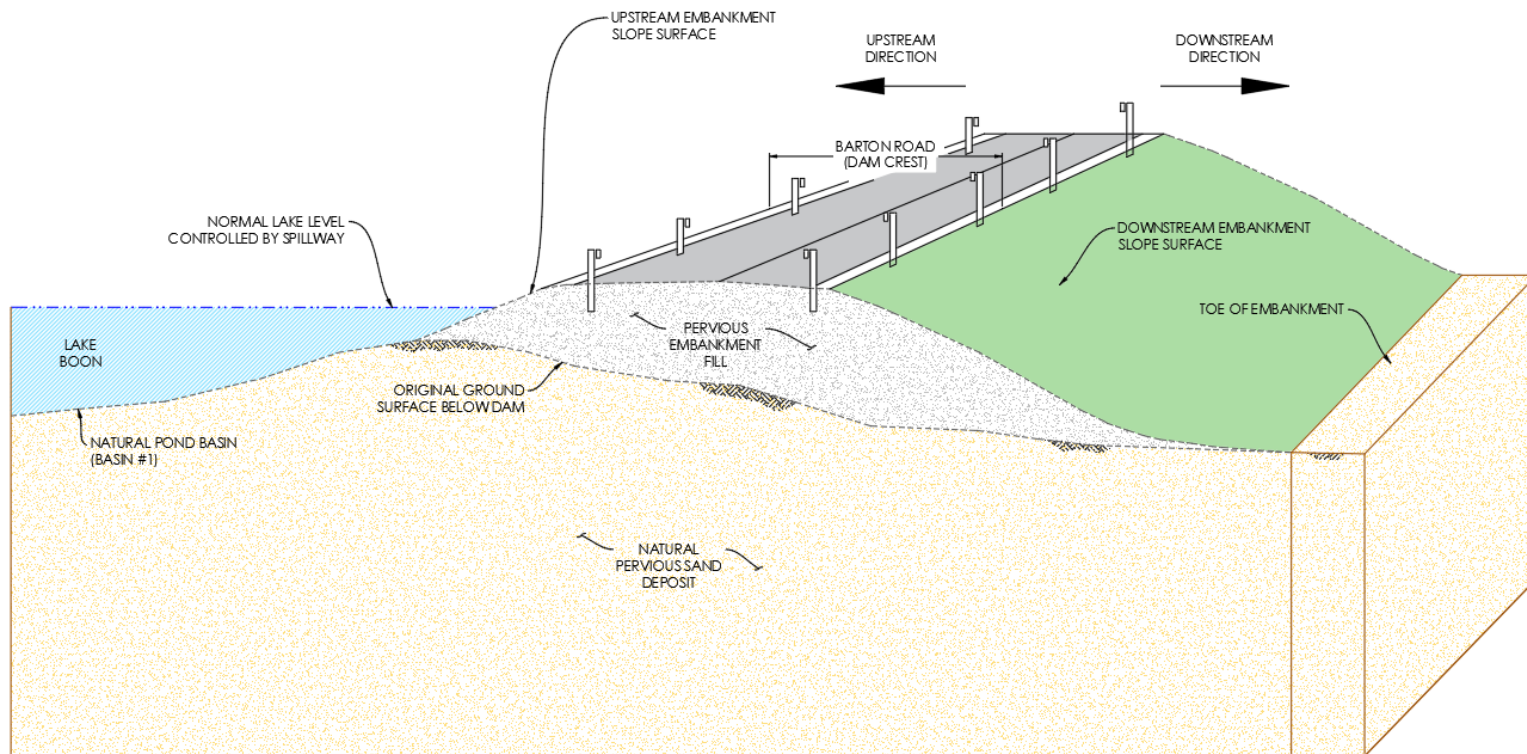
COMMONWEALTH OF MASSACHUSETTS · EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

Department of Conservation and Recreation
 251 Causeway Street, Suite 600
 Boston MA 02114-2119
 617-626-1250 617-626-1351 Fax
www.mass.gov/dcr



Charles D. Baker
 Governor
 Karyn Polito
 Lt. Governor

Matthew A. Boston, Secretary
 Executive Office of Energy & Environmental Affairs
 Leo Roy, Commissioner
 Department of Conservation & Recreation



**LAKE BOON DAM
ILLUSTRATIVE BLOCK DIAGRAM**

*Spillway
not shown*

- Deficiencies Include:

- Overly steep slopes
- Seepage through embankment
- Spillway in disrepair
- Embankment instability
- Tree growth along toe of dam
- Inadequate spillway capacity based on the design flood event

- In 1999: Limited repairs to the dam were completed, but they did not include structural or hydrologic upgrades





Fragmented and structurally compromised spillway, which is also undersized

A void in the bottom of spillway culvert caused the 2021 sinkhole incident

- Design Components:
 - Phase I & Follow-up inspections (2017 through 2022)
 - Visual inspections of the dam's exterior condition
 - Phase II inspection (2018)
 - Subsurface borings, slope stability analyses, conceptual design concepts, etc.
 - Emergency Action Plan (2019)
 - Evaluates impact to downstream communities
 - Preparation of Preliminary Design Plans (2021 – Current)
 - Preliminary Meetings with Conservation Commission (2021, 2022)
 - Informational Meetings with the Public (2022 – Current)

Project Review

Current Status, Planned Construction Components

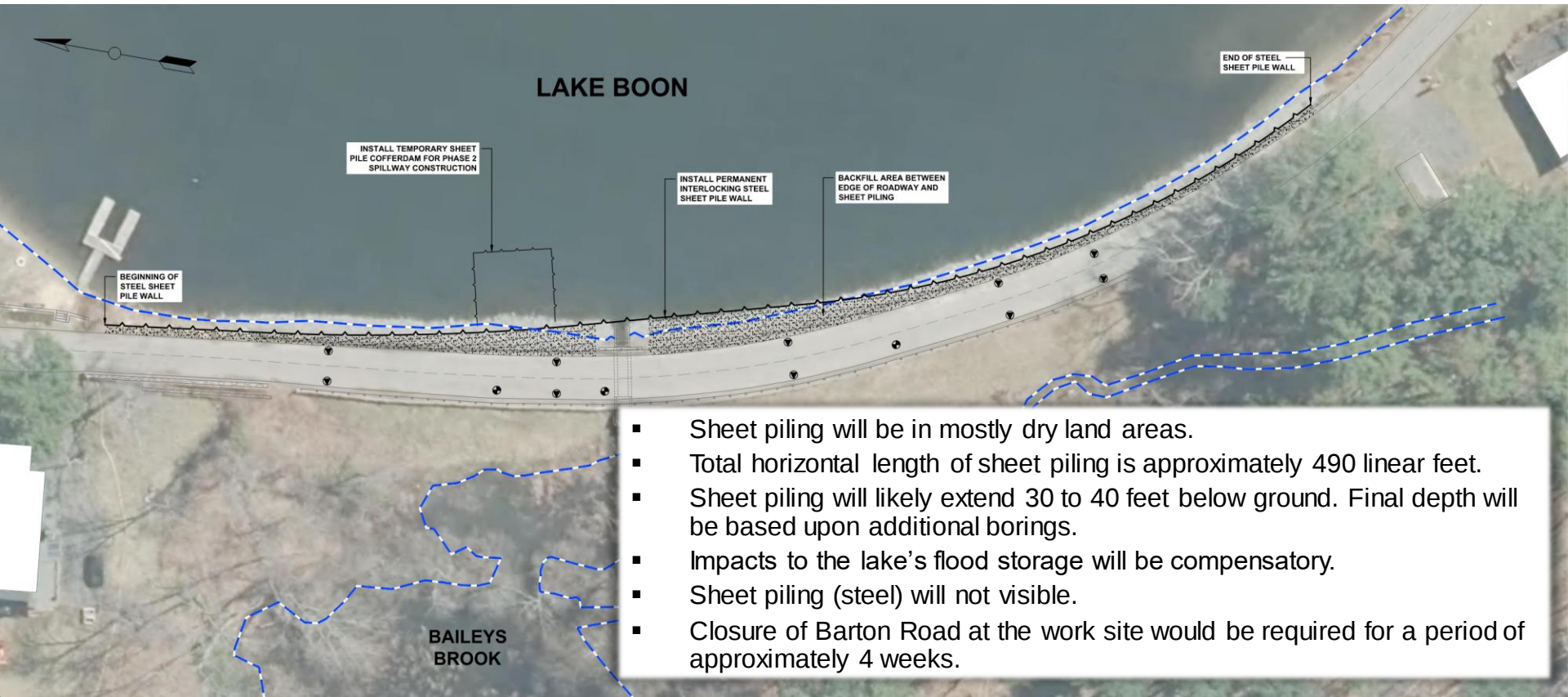
Design Process

- Preliminary site investigations and analyses
- Grant applications
- Consideration of design alternatives
- Preliminary design of dam safety improvements
- Environmental Permitting
- Final design
- Construction contract and bidding assistance



We are here

Project Plan – Phase 1



Why Sheet Piles?

- Provides temporary earth support and water control
 - Integrates the use of required sheeting in permanent design
- Provides a seepage cutoff
 - Improves stability and reduces seepage through embankment
- Speed of installation
 - Relatively quick installation reduces construction duration
- Allows realignment of Barton Road & it maintains existing downstream limits of the dam

Sheet Piling Considerations

- Vibrations

- Pre-construction surveys of nearby residences
- Seismographs will monitor vibrations

- Noise

- Options for reduced noise during installation
 - Variable Speed Vibratory Hammer
 - Hydraulic Press-in Rig

- Potential Obstructions

- Based on the 13 borings completed to date, sheet pile installation is feasible
- Additional borings will be completed to supplement the design
- Probe borings along the alignment will be completed by the Contractor before the start of construction
- If obstructions are encountered, depending on their depth, the obstructions will either be left in-place or the sheet pile alignment may be modified on a case-by-case basis



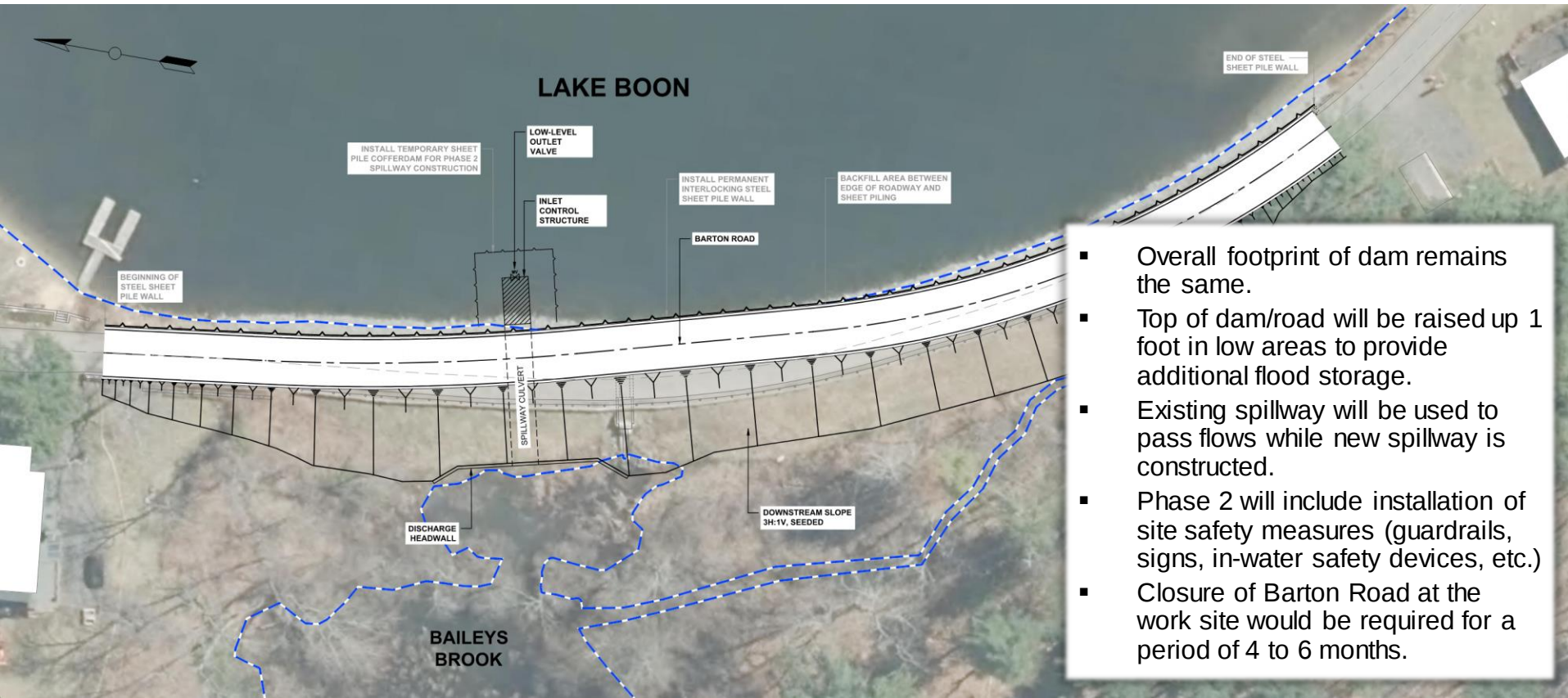
Boxford, MA



Arlington, MA

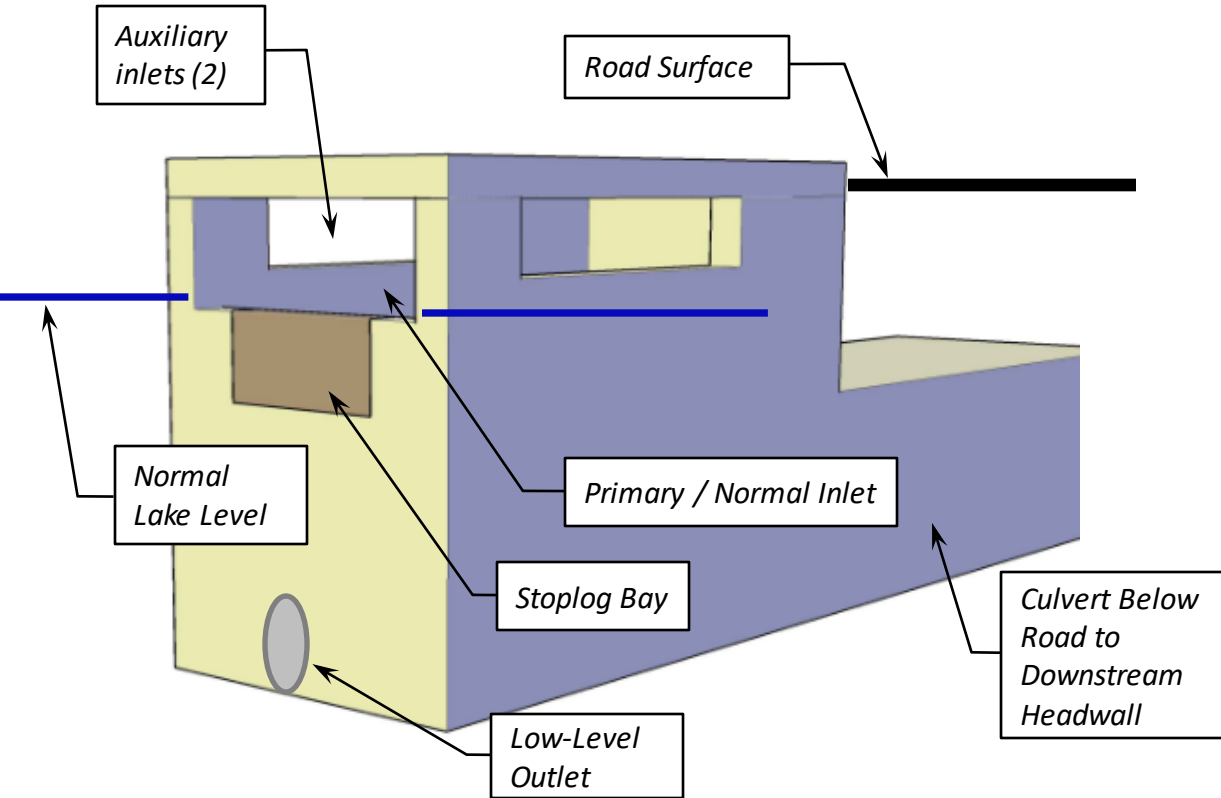


Project Plan – Phase 2



- Overall footprint of dam remains the same.
- Top of dam/road will be raised up 1 foot in low areas to provide additional flood storage.
- Existing spillway will be used to pass flows while new spillway is constructed.
- Phase 2 will include installation of site safety measures (guardrails, signs, in-water safety devices, etc.)
- Closure of Barton Road at the work site would be required for a period of 4 to 6 months.

Spillway Design



- Increased outflow capacity.
- Greater flexibility for lake level control
- Maintains current lake operating procedures (summer, winter)
- Incorporates a bottom valve for low-level outlet control
- Major structural improvement
- Energy Dissipation at Outlet (baffles, riprap)

Attleboro, MA



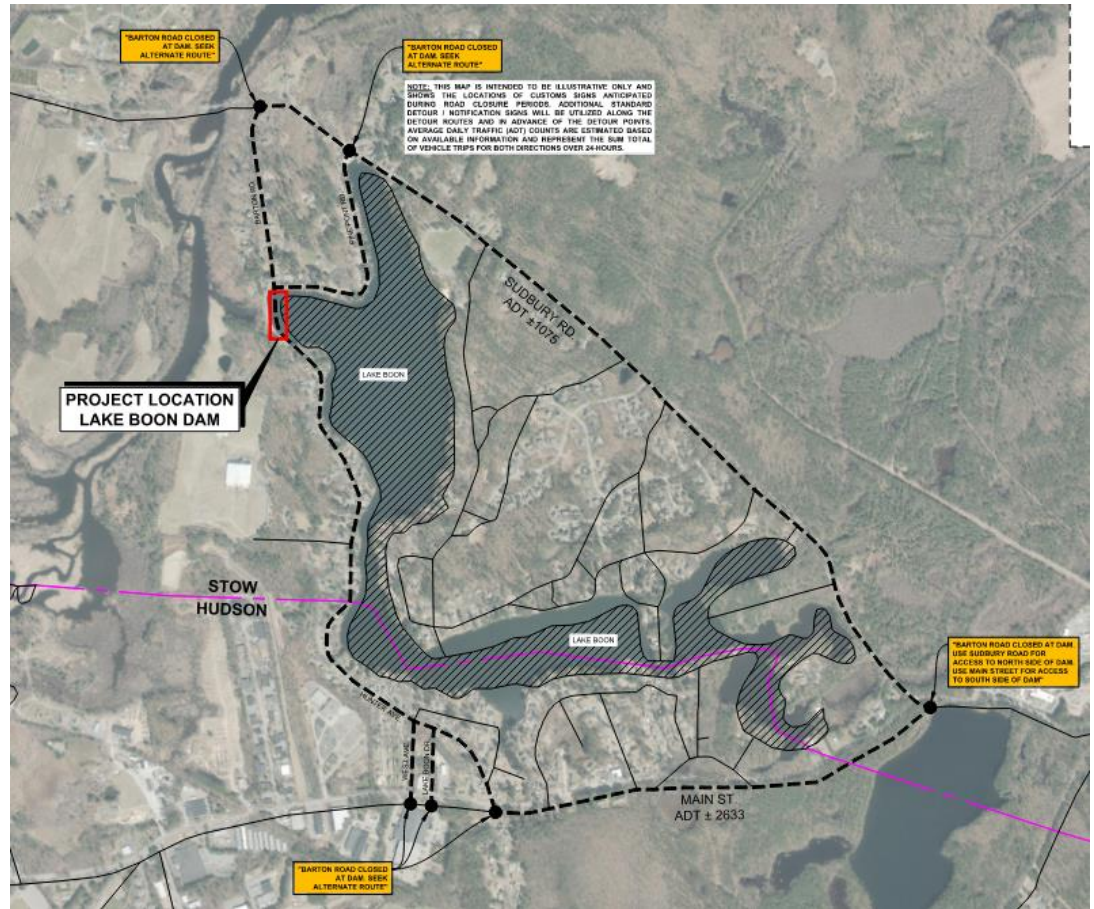
Guardrails

- Timber guardrails do not meet current safety standards
- Options include:
 - Painted guardrail (see example)
 - Weathering Steel



Traffic Routing

- Public Notifications in advance
- Phase 1:
 - North access only (not via Pine Point Road)
- Phase 2:
 - Contractor will be responsible to establish a staging area



Traffic Routing

- Phase I
 - Limited material and equipment deliveries
- Phase 2
 - Estimated 200 to 300 material import and export truck trips
- Emergency (Fire/Ambulance/Police) Services during construction
 - Town Fire and Police services will be maintained during construction
 - Coordination will occur with the neighboring communities

Project Path

PHASE	TASK	DURATION
Preliminary Design	Attend Public Informational Meeting	1 Month
	Finalize 60% Design Plans	
Environmental Permitting	Prepare and Submit Environmental Permit Applications	9 Months
	Regulatory Review Period for Environmental Permits (9 months)	
Final Design	Progress to 100% Design Plans	2 Months
	Prepare Construction Specifications	
Dam Safety Permitting	Prepare and Submit Dam Repair Permit Application	6 Months
	Regulatory Review Period for Dam Repair Permit (6 months)	
Construction	Prepare Contract Document Package	4 Weeks
	Phase 1 Contract Bidding Period	
	Phase 1 Construction	6 Months
	Apply for Additional Grant Funding	
	Phase 2 Contract Bidding Period	
	Phase 2 Constuction	

thank you

westonandsampson.com