

TALBOT MILLS DAM REMOVAL / CONCORD RIVER ECOLOGICAL RESTORATION PROJECT

HISTORIC DISTRICTS COMMISSION CERTIFICATE APPLICATION

Town of Billerica, Middlesex County, MA



DECEMBER 2024

Project Proponent:

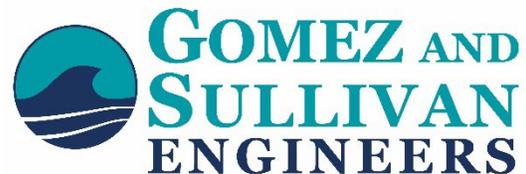
CRT DEVELOPMENT REALTY, LLC

Prepared for:

TOWN OF BILLERICA
HISTORIC DISTRICTS
COMMISSION

365 Boston Road, Room 105, Billerica, MA 01821

Prepared by:



PO Box 2179, Henniker, NH 03242

December 11, 2024

David Gagliardi, Chair
Historic Districts Commission
365 Boston Road, Room 105
Billerica, MA 01821
planning@town.billerica.ma.us

Re: Talbot Mills Dam Removal / Concord River Restoration Project
Application for Historic Districts Commission Review/Certificate

Dear Mr. Gagliardi:

Gomez and Sullivan Engineers, DPC hereby submits the enclosed Application for Historic Districts Commission Review/Certificate for the Talbot Mills Dam Removal / Concord River Restoration Project in Billerica, Massachusetts on behalf of the dam owner, CRT Development Realty, LLC. The National Oceanic and Atmospheric Administration Restoration Center (NOAA) is serving as the Lead Federal Agency (LFA) for National Historic Preservation Act (NHPA) Section 106 review.

The Talbot Mills Dam is a former mill dam located on the Concord River just upstream of the Faulkner Street bridge. The dam no longer serves its design purpose and creates a barrier in the river, which blocks anadromous (migratory) fish from accessing important spawning habitat, and has resulted in other environmental and public safety impacts. In partnership with multiple state and federal agencies and local watershed organizations, the owner of the dam is seeking removal as the best alternative to restore anadromous fish passage and connectivity for resident aquatic species; decommission aging infrastructure; reduce flood hazards and increase climate resilience; and improve water quality, habitat, and natural river functions. The Talbot Mills Dam is one of seven dams identified as a priority for fish passage in the 2021 Merrimack River Comprehensive Plan, and the proposed dam removal project has been designated as a Priority Project by the Massachusetts Division of Ecological Restoration.

Major elements of the proposed project include: 1) removal of the approximately 127-foot-long, 10-foot-high existing masonry spillway and concrete abutment, 2) archaeological recordation and removal of a former timber/rock fill dam thought to be submerged just upstream (if found), 3) grading of sediment immediately upstream of the dam, and 4) passive instream management of potentially mobile sediment within the dam impoundment. The granite masonry abutment at the southwest end of the spillway will be retained to honor the history of the site and protect the Faulkner Street bridge. An approximately 20-foot-wide stepped section of the spillway adjacent to the masonry abutment will be retained to support this structure.

The Talbot Mills Dam removal project requires review under Section 106 of the National Historic Preservation Act. The Public Archaeology Laboratory (PAL) completed a historic and archaeological reconnaissance survey for the project in 2016 and a Cultural Resources Assessment Update in 2023. The National Oceanic and Atmospheric Administration Restoration Center (NOAA), serving as Lead Federal Agency, has determined that the project will result in adverse effects to the Middlesex Canal Historic and Archaeological District and the Billerica Mills Historic District, which are listed in the National Register of Historic Places. NOAA is conducting ongoing consultation with the parties that have been invited to

participate in the Section 106 process. The goal of the consultation is to seek ways to avoid, minimize, and/or mitigate adverse effects from the project to historic properties, including archaeologically sensitive areas, in accordance with Section 106 of the NHPA and Massachusetts General Law (MGL) Chapter 9, Sections 26-27C (950 CMR 70-71). The next Section 106 consultation meeting is scheduled for January 29, 2025.

Alternatives to restore diadromous fish passage at Talbot Mills Dam were evaluated in the 2016 *Concord River Diadromous Fish Restoration Feasibility Study* and summarized in Section 2.1 of the Single Environmental Impact Report filed for the Massachusetts Environmental Policy Act review in February 2024. Installation of a fish ladder at the dam could provide passage for some of the target species under ideal flow conditions and with proper (intensive daily) operation and maintenance. However, passage efficiency of target species would be low, and passage of other aquatic species and overall connectivity of the river would be limited. Other ecological restoration goals and public safety benefits associated with dam removal would not be realized with this alternative. The obligation to bring the dam into compliance with dam safety regulations as well as the continued responsibility for ongoing operation, maintenance, and liability associated with the dam and fishway would make this alternative prohibitively expensive and not feasible for the dam owner to undertake. Therefore, dam removal was selected as the only feasible alternative that meets project goals.

Electronic copies of this and other permit application materials for the proposed project as well as the project feasibility study and design documents can be downloaded from the following publicly accessible file transfer site: <https://tinyurl.com/TalbotDamRemovalPublic>. Additional resources can be found on the project websites (<https://merrimack.org/talbotmills> and <https://oars3rivers.org/talbot-mills-dam-removal>), including links to previous documents, answers to frequently asked questions, a StoryMap, recordings and/or slides from previous public meetings, and press coverage.

We look forward to your review of this project. We respectfully request to present the project at the January 8, 2025 meeting of the Historic Districts Commission. Please do not hesitate to contact me directly with any questions or comments at jgriffiths@gomezandsullivan.com or (716) 402-6777.

Sincerely,



Jill Griffiths, PE
Water Resources Engineer

Encl.

TABLE OF CONTENTS

1. **Historic Districts Commission Review Application Form**
2. **Project Narrative**
3. **Photographs**
4. **Figures**
5. **Design Plans**
6. **Response to BHDC Comments on MEPA EENF**

1. Historic Districts Commission Review Application Form

Application Number _____

Date of Hearing: _____

Major or Minor: _____

Town of Billerica Billerica Historic Districts Commission

365 Boston Road, Room 105

Billerica, MA 01821

978-671-0962

Application for Historic Districts Commission Review

Under the Town of Billerica General By-laws, Article VII, Section 5, for properties in a local historic district, a certificate from the Historic District Commission is required before obtaining any building permit or before proceeding with construction projects affecting the exterior of the property. Submission of this application will begin the process of review for a Certificate of Appropriateness, Non-Applicability, or Hardship, which will be issued by the Historic District Commission as applicable.

Submit the application to: planning@town.billerica.ma.us

Application fee: Check payable to the Town of Billerica required with application.
\$25.00 for a minor-\$50.00 for a major

I. **Property Address** Faulkner Street (adjacent to 2 Old Elm Street)

Property Owner Name Robert Martin, CRT Development Realty, LLC

Phone (978) 314-8080 **Email** martinr181@gmail.com

Name of Contractor Jill Griffiths, Gomez and Sullivan Engineers, DPC (engineering consultant;
contractor TBD)

Phone (716) 402-6777 **Email** jgriffiths@gomezandsullivan.com

Est. Start Date July 1, 2025 **Est. Completion Date:** December 31, 2025

II. **Type of Structure:**

House Shed Fence Non-Residential

Garage Wall Sign Other

Proposed Work:

Addition New Construction Replacement Roofing

Demolition Repair Alteration Other

III. **Description of Work**

On a separate page, please provide a detailed statement of the work to be completed, including information on materials, style of work, etc., referencing plans and photographs if appropriate. Please note if approval is needed or has been received from any other boards or departments (Planning, Zoning Board of Appeals)

Application Number _____

Date of Hearing: _____

Major or Minor: _____

IV. Supporting Documentation

- Please provide any appropriate documentation for the project, including:
- ✓ - Photographs (clear, in color, and current) [See Attachment 3](#)
 - ✓ - Site Plan [See Attachment 4](#)
 - Building plans or elevations (no larger than 11 x 17) [See Attachment 5](#)
 - Product/material information (spec sheets from the manufacturer, photographs of installed examples)

We encourage applicants to consult with staff in order to determine what additional documentation should be provided.

[See Attachment 2 \(Project Narrative\)](#) and [Attachment 6 \(Response to BHDC MEPA Comments\)](#)

Dimensions and materials should be clearly labeled on all plans.

For window replacement, please provide a photograph showing the full side of the building, and cross off the windows that are to be replaced.

For signs, please provide a rendering showing accurate dimensions and graphics, how it will be erected in its proposed location, along with current photographs of the proposed location.

V. Notice to Applicants

-The Commission generally hears applications for certificates on the first Wednesday of every month (subject to change). Applications should be submitted at least three weeks in advance for review and to satisfy public hearing notice requirements.

-An approved certificate shall expire six months from the time of issuance unless otherwise extended by the Commission.

-Certificates are specific to the project and owner cited on the application.

-Please notify the Commission in writing (email is acceptable) upon completion of the changes included in this certificate

Date of Hearing:	
Date of Decision:	
Signed By:	
Conditions:	

2. Project Narrative

TABLE OF CONTENTS

2.1 Project Background	2
2.2 Existing Conditions	3
2.3 Proposed Design	7
2.4 Potential Resource Impacts & Benefits.....	8
2.5 Alternatives Analysis	9

2.1 Project Background

CRT Development Realty, LLC (CRT) plans to remove the Talbot Mills Dam located on the Concord River in Billerica, Middlesex County, Massachusetts. The project is proposed as an Ecological Restoration Project in accordance with 310 CMR 10.13(1). The Talbot Mills Dam is an approximately 127-foot-long, 10-foot-high, granite masonry former mill dam built in 1828. The project site is located in the Sudbury, Assabet and Concord (SuAsCo) watershed on the Concord River approximately 4.76 miles upstream of its confluence with the Merrimack River in Lowell. The area of significant changes in water level anticipated to result from the proposed project extends from the dam to the Pollard Street bridge about 0.6 miles upstream (where there is a significant hydraulic control known as the Fordway Bar).

A location map is provided in **Figure 1** in **Attachment 4** of this permit application package. An aerial image of the project site is provided in **Figure 2** in **Attachment 4**.

Project Goals & Anticipated Benefits

The primary goal of the proposed project is to restore passage for diadromous (migratory) fish species, including both species of river herring (alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*)), American eel (*Anguilla rostrata*), and sea lamprey (*Petromyzon marinus*). Other anticipated benefits of the proposed dam removal and river restoration project include the following:

- Decommissioning of aging and unsafe infrastructure
- Elimination of ongoing maintenance and repair obligations
- Reduction of upstream flood hazards and increased climate resiliency
- Elimination of the potential for unexpected dam failure resulting in downstream property damage
- Restoration of natural riverine processes and ecological functions (e.g., sediment movement)
- Improvement of water quality (increased flow velocity and dissolved oxygen, reduced water temperature and stagnation)
- Restoration of passage and connectivity for diadromous fish and resident aquatic species
- Enhancement of aquatic habitat
- Significant reduction of invasive water chestnut infestation in impoundment and associated ongoing monitoring and treatment costs
- Improved public access to the river and new recreational activities (e.g., through-paddling, whitewater boating, fishing in fast-moving flow conditions, viewing of natural falls)
- Support of commercial and sport fisheries (e.g., striped bass, trout, cod, bluefish, tuna, etc.) and other species that forage upon diadromous fish throughout the Gulf of Maine

Removal of the Talbot Mills Dam will result in one of the largest diadromous fish habitat restoration efforts in Massachusetts, opening access to over 35 miles of mainstem river habitat, plus more than 100 miles of tributary habitat and at least 260 acres of spawning and rearing habitat in lakes and ponds.

Project Partners

Project partners include the dam owner, the Massachusetts Department of Fish and Game (DFG) Division of Marine Fisheries (DMF) and Division of Ecological Restoration (DER), the National Oceanic and Atmospheric Administration (NOAA) Restoration Center, the US Fish and Wildlife Service (USFWS), the National Park Service (NPS), OARS For the Sudbury, Assabet & Concord Rivers (OARS), the Merrimack River Watershed Council (MRWC), the Lowell Parks and Conservation Trust (LPCT), and others.

Regulatory Reviews

The following permits and regulatory reviews are anticipated to be required or potentially required for this project:

- US Army Corps of Engineers (USACE) Preconstruction Notice (PCN) **(filed)**
- MA Historical Commission (MHC) Project Notification Form (PNF) **(complete)** and Section 106 Consultation **(in progress)**
- MA Environmental Policy Act (MEPA) Expanded Environmental Notification Form (EENF) and Single Environmental Impact Report (SEIR) **(complete)**
- MA Dept. of Environmental Protection (DEP) Joint Application for 401 Water Quality Certification (WQC) and Chapter 91 Waterways Dredge Permit **(filed)**
- MA Dept. of Conservation and Recreation (DCR) Office of Dam Safety (ODS) Chapter 253 Dam Safety Permit **(pending)**
- MA. Dept. of Marine Fisheries (DMF) – Fishway Construction Permit **(pending)**
- Town of Billerica – Wetlands Protection Act (WPA) and Billerica Wetlands Protection Bylaw Notice of Intent (NOI) for an Ecological Restoration Project **(filed)**
- Town of Billerica – Historic Districts Commission Review/Certificate **(this application)**

Project Funding

The project has received funding from the Nyanza Chemical Waste Dump Superfund Site Natural Resource Damages (NRD) settlement for feasibility studies; from DER for conceptual design; from the American Rescue Plan Act (ARPA) through DER for design, permitting, and construction phase services; and from the Bipartisan Infrastructure Law (BIL) through USFWS for construction. The funding sources currently allocated for engineering and construction have been approved only for dam removal, and would not be available for a fish ladder or other alternative that does not meet the project’s ecological restoration goals.

Project Documents

Electronic copies of project documents can be downloaded from the following publicly accessible file transfer site: <https://tinyurl.com/TalbotDamRemovalPublic>. Additional resources can be found on the project website (<https://merrimack.org/talbotmills>). The following previous studies and design phases have been completed to date:

- Concord River Diadromous Fish Restoration Feasibility Study (Gomez and Sullivan Engineers, DPC (GSE), 2016)
- Talbot Mills Dam Historic & Archeological Report (The Public Archaeology Laboratory, Inc. (PAL), 2016)
- Talbot Mills Dam Removal Targeted Impact Analysis (GSE, 2021)
- Conceptual Design Plans & Analyses (GSE, 2022)
- Preliminary (60%) Design & MEPA Expanded Environmental Notification Form (GSE, 2023)
- Talbot Mills Dam Cultural Resources Assessment Update (PAL, 2023)
- Preliminary (75%) Design & MEPA Single Environmental Impact Report (GSE, 2024)
- Various permit applications (2023 to present)

2.2 Existing Conditions

Photographs of Talbot Mills Dam are shown in **Attachment 3**. Figures are shown in **Attachment 4**. Design plans are provided in **Attachment 5**.

Watershed

The Concord River is part of the Merrimack River watershed. It joins the Merrimack River downstream of the Pawtucket Dam in Lowell, Massachusetts, making it an ideal candidate for fish passage restoration. Fish migrating upstream from the ocean must only navigate the fish passage facilities at the Essex Dam in Lawrence before reaching the Concord River. The Concord River originates at the confluence of the Assabet and Sudbury Rivers near historic Egg Rock in the town of Concord, Massachusetts. The three rivers collectively drain an approximately 400-square-mile area known as the SuAsCo watershed.

Dam

A detailed description of the dam, its history, and the various surrounding infrastructure is provided in the 2016 Feasibility Study Report and the SEIR. A summary is provided below.

The Talbot Mills Dam (NID ID MA00774) is an approximately 127-foot-long, 10-foot-high, granite masonry former mill dam built in 1828. The spillway has a crest elevation of approximately 108.2 feet North American Vertical Datum of 1988 (NAVD88)¹. The dam was previously used for industrial waterpower, but no longer serves a useful purpose. The current dam was built just downstream of a previous dam at the site, built in 1798. The 1798 dam was approximately 150 feet long and 8 feet high and is believed to be submerged in the impoundment approximately 8 to 12 feet upstream of the current dam, with rock/gravel fill between the two dams.

Figure 2 in Attachment 4 shows an aerial image of the site with key features labeled. Existing plans, sections, and elevations of the dam are provided in the Design Plans in **Attachment 5**.

The spillway is flanked by small granite block masonry abutments that tie into retaining/training walls for the river and impoundment. The left and right abutments have lengths of approximately 17 and 20 feet and average crest elevations of 110.5 and 110.8 feet, respectively. The left abutment contains two small former low-level outlets with downstream inverts at approximately 99.8 feet. The outlets are partially blocked, although there is significant leakage through them. There is no operational low-level outlet for the dam. A section of the right abutment is constructed of cast-in-place concrete, which is reportedly the location of a former fishway that was filled with concrete sometime after the 1960s.

An approximately 12-foot-wide, mortared stone masonry and concrete sluiceway just east of the right spillway abutment, historically known as the Faulkner Canal, diverts water to the Faulkner Mill complex located on the right bank of the river just downstream from the dam. The sluiceway contains a concrete weir with a movable sluice gate. The gate is in poor condition and leaks through large gaps in the wood. Water in the sluiceway passes under a small bridge supporting Faulkner Street and into a stilling basin located between the road and the Faulkner Mill complex. From the stilling basin, water flows through an outlet gate locked in the open position to a former turbine under the mill, which reportedly has not been in service since 1972. Water from the sluiceway is discharged back to the river approximately 150 feet downstream of the Faulkner Street bridge.

A small park is located adjacent to the right abutment of the spillway. The park contains a gazebo, benches, and a historic marker dedicated to the employees of the Faulkner Mills. Access to the park is

¹ All elevations in feet NAVD88 unless otherwise specified. To convert from the National Geodetic Vertical Datum of 1929 (NGVD29), subtract 0.827 feet.

available from a paved parking lot just east of the river and south of Faulkner Street by crossing a pedestrian bridge over the sluiceway.

The Talbot Mills Dam is classified as an Intermediate sized, Significant (Class II) Hazard potential structure by the ODS. The most recent Phase I dam safety inspection was conducted on April 30, 2021, by Geotechnical Consultants, Inc. (GCI). According to the 2021 inspection, the Talbot Mills Dam was found to be in “fair” condition. The following deficiencies were noted:

- Lack of an operation and maintenance plan
- Lack of routine oversight of the dam, particularly during storm events
- Lack of working controls
- Lack of a functional low-level outlet
- Leaks and inability to control water at sluiceway gate and weir
- Trees located just downstream of the primary spillway and on the upstream face of the left embankment near the former intake gates to the Talbot Mills complex

The following remedial measures were recommended in the inspection report:

- Prepare an Emergency Action Plan (EAP).
- Prepare and implement a comprehensive maintenance and routine inspection plan.
- Remove trees on the upstream face of the roadway embankment near the non-functional intake gates to the Talbot Mills Complex.
- Remove tree trunks and branches just upstream of the primary spillway.
- Repair/replace the sluiceway and stilling basin gates so that the gates are operational and can provide emergency bypass control.
- Inspect the interior of the Talbot Mills complex, particularly the downstream end of the former intake structures. The infilling of the intake tunnels on the left side of the dam rendered these intakes inoperable. Given the configuration of the dam, proximity of the mill complexes, and changing ownership of the downstream properties, the reconstruction of a low-level outlet in this area is impractical.
- Repair/replace the left spillway abutment to provide an operational low-level outlet and emergency bypass control.

Additionally, detailed hydraulic analyses conducted for this project found that the dam does not meet the dam safety requirement of being able to pass the spillway design flood—in this case, the 100-year flood—without overtopping². If the dam were to remain in place, an engineering assessment would need to be conducted to confirm this finding and investigate options to increase spillway capacity. The amount of water that can pass over a spillway is a product of length of the spillway, the depth of water atop the spillway (head), and a weir coefficient (which is related to the spillway shape and head). The capacity of an existing spillway can be increased by lengthening the spillway crest and/or increasing the operating head or weir coefficient. Some increase in the weir coefficient may be possible by improving the spillway crest shape (e.g., from broad-crested to an ogee crest), but this approach is generally costly for the limited results attained. To increase head, the spillway crest elevation would need to be lowered. Due to the physical constraints at the site (i.e., the road, parking lot, and bridge bounding the current spillway), increasing spillway length is not feasible without replacing the spillway with an alternate design such as a

² This finding contradicts that in the most recent dam safety inspection report (GCI, 2021) but is based on an updated analysis and more detailed hydraulic modeling.

labyrinth weir, which uses a zig-zag layout to fit more spillway length within a given overall structure width. Any of these potential spillway retrofit/replacement projects would involve destruction or significant modification of the historic structure and many of the associated impacts of dam removal with none of the ecological or other benefits, likely at a substantially higher cost.

Impoundment

Because the upper Concord and lower Assabet and Sudbury Rivers are relatively flat in gradient, the Talbot Mills Dam has some effect on upstream water levels for 11.6 miles on the Concord River, 17 miles on the Sudbury River (up to the Saxonville Dam in Framingham), and 6.4 miles on the Assabet River (up to the High Street Dam in Acton). However, the area of significant hydraulic influence is limited to the area between the dam and the Pollard Street bridge (about 0.6 miles upstream of the dam), which is referred to in this document as the lower impoundment. A natural high point in the riverbed known as the Fordway Bar, comprised primarily of cobbles, boulders, bedrock, and other hard substrate, spans the river in the vicinity of the Pollard Street bridge and reduces the hydraulic influence of the dam upstream of that point. The lowermost section of the impoundment, which is significantly wider than the riverine sections upstream, is referred to as the Mill Pond and is approximately 9 acres in surface area.

Cultural Resources

The Talbot Mills Dam is a historic property listed in the National Register of Historic Places as a contributing resource to both the Middlesex Canal Historic and Archaeological District and the Billerica Mills Historic District. The dam is also within the North Billerica Mills Local Historic District.

The project Area of Potential Effects (APE), shown in **Figure 3** in **Attachment 4**, contains two National Register-listed historic districts and one local historic district that overlap and extend outside of the project APE:

- Middlesex Canal Historic and Archaeological District/Middlesex Canal Historic District (MHC Nos. BIL.T, BIL.K, BIL.P)
- Billerica Mills National Register Historic District (MHC No. BIL.O)
- Billerica Mills Local Historic District (MHC No. BIL.E)

Properties that contribute to one or more of these historic districts in the project APE consist of:

- Middlesex Canal Dam and Locks (aka Talbot Mills Dam) (MHC Nos. BIL.900/BIL-HA-09)
- Middlesex Canal Segment 24 (MHC Nos. BIL.P, BIL.T, BIL.929/BIL-HA-08)
- Middlesex Canal Floating Towpath Peninsula (MHC No. BIL.953/BIL-HA-39)
- Middlesex Canal Floating Towpath Anchor Stone (MHC No. BIL-HA-40)
- J.R. Faulkner Mills (MHC No. BIL.77)
- Faulkner Kindergarten (MHC No. BIL.78)
- Talbot Mills (MHC No. BIL.80)
- William Rogers House/Toothaker Tavern (MHC No. BIL.273)
- Talbot Woolen Mills Worker Housing (MHC No. BIL.274)
- Warehouse (MHC No. BIL.317)
- Faulkner Street Bridge over Concord River (MHC No. BIL.935)

The site of the current Talbot Mills Dam has a long and controversial past, with several exhaustive studies of the river system and upstream impacts associated with the “Flowage Controversy” of 1858-1862.

Multiple dams have been constructed, removed, and rebuilt throughout the years. Prior to the damming of the river at this location, the area was used by generations of Native Americans as an encampment and fishing grounds. A map of Billerica circa 1700 documents the existence of a series of falls in the Concord River between the present-day Pollard Street and Faulkner Street bridges. A large Native American village is reported to have been located along the Concord River in proximity to the Talbot Mills Dam. The Native American occupation in the area of the dam was focused on a natural falls, which would have afforded an abundance of diadromous fish resources and wildlife. The first dam was erected at the location of the current Talbot Mills Dam in 1710-11.

2.3 Proposed Design

Proposed design plans are provided in the Design Plans in **Attachment 5**. Major elements of the proposed project include: 1) removal of the approximately 127-foot-long, 10-foot-high existing granite masonry spillway and concrete right abutment, 2) documentation and removal of a former 1798 timber/rock fill dam assumed to be submerged just upstream (if found), and 3) grading of sediment immediately upstream of the dam. Sediment within the dam impoundment is proposed to be allowed to move downstream naturally over time and restore sediment-deprived areas. The river left³ (southwest) granite masonry abutment will be retained. An approximately 20-foot-wide stepped section of the spillway adjacent to the left abutment will be retained to support the abutment (conceptually approximated by the red line in the photograph below).



Sketch approximating the section of the spillway to remain adjacent to the left abutment, which will also remain.

All construction activities will be undertaken in compliance with the conditions of all state and local permits. The proposed project is scheduled for construction in the summer/fall of 2025 and is anticipated to take approximately three to four months to complete. Proposed temporary construction access and staging areas for the project are shown in **Drawings 5 & 6** of the design plans in **Attachment 5**. Two potential access options are further detailed on **Drawing 7A** (Alternative 1) and **Drawing 7B** (Alternative

³ For the purposes of this document, “river left” and “river right” refer to the direction when facing downstream.

2). The area of direct disturbance due to temporary access/staging activities will be restored to former conditions following construction.

2.4 Potential Resource Impacts & Benefits

Historic & Archaeological Resources

The Talbot Mills Dam removal project requires review under Section 106 of the NHPA. In 2014, on behalf of the project proponent, PAL submitted a PNF and permit application to the MHC to conduct a historic and archaeological reconnaissance survey for the modification or removal of the Talbot Mill Dam. The PNF identified that the project involved participation by federal agencies, including NOAA, the USFWS, and possibly the USACE. In a comment letter dated November 18, 2014, in response to the PNF, the MHC recommended that NOAA (as the lead federal agency for complying with Section 106 of the NHPA) contact potential consulting parties, including the Billerica Historical Commission (BHC), Billerica Historic Districts Commission (BHDC), Middlesex Canal Association (MCA), and Middlesex Canal Commission (MCC), to ascertain their interest in reviewing and commenting on the project. The MHC requested copies of any written comments received from these bodies.

Surveys & Consultation

In 2014–2016, PAL completed the reconnaissance survey for the project under a State Archaeologist's Permit issued by the MHC. The reconnaissance survey identified previously recorded historic properties, archaeological sites, and archaeologically sensitive areas within a study area that was developed based on concept plans for the proposed project alternatives. The 2016 survey identified 14 previously recorded historic and archaeological resources within the recommended APE for the Project alternatives. A link to a redacted version of the 2016 reconnaissance survey report is provided in **Section 2.1** above.

In a letter dated February 16, 2016, the MHC provided comments to NOAA on PAL's reconnaissance survey report. The MHC requested to review additional information as project planning proceeds, including scaled proposed conditions project plans and NOAA's determinations and findings for the preferred project alternative, including determinations of the project's APE and potential effects to significant historic and archaeological resources.

In June 2022, NOAA distributed a letter to potential consulting parties, including the Town of Billerica, MCC, MCA, BHC, BHDC, Wampanoag Tribe of Gay Head (Aquinnah), Mashpee Wampanoag Tribe, Narragansett Indian Tribe, Massachusetts Commission on Indian Affairs, and MA BUAR. The letter invited parties to attend a public meeting that was held on June 29, 2022, and to formally participate in the Section 106 consultation process as the project progresses. A response was requested by July 29, 2022; responses were received from the BHC and the MCC.

PAL completed a Cultural Resources Assessment Update dated December 12, 2023, for the preferred alternative based on the 75% design plans (link to a redacted version of the report provided in **Section 2.1** above). NOAA submitted the Cultural Resources Assessment Update to MHC via a letter dated December 18, 2023, requesting concurrence with its determination of the APE, identification of historic properties, and finding that the project will have an adverse effect on historic properties. MHC concurred with NOAA's finding in a letter dated January 8, 2024. On January 31, 2024, NOAA filed an Electronic Section 106 (e106) form with the Advisory Council on Historic Preservation (ACHP) to notify the ACHP of its findings and invite the ACHP to participate in the consultation. Outreach meetings have been held with interested and consulting parties to discuss mitigation alternatives on March 19, 2024 and May 22, 2024 to date. The next Section 106 consultation meeting is scheduled for January 29, 2025.

Copies of Section 106 correspondence are provided in Attachment 5 of the MEPA EENF (2014 through 2022) and Appendix D of the MEPA SEIR (2023 through February 2024).

Findings

NOAA has determined that the project will result in adverse effects to the Middlesex Canal Historic and Archaeological District and the Billerica Mills Historic District, which are listed in the National Register. The project will affect four historic/archaeological resources that contribute to both districts. The preferred alternative includes the demolition of the granite masonry spillway and concrete right abutment of the Talbot Mills Dam (MHC No. BIL-HA-09). The proposed permanent drawdown of the impoundment (Mill Pond) will expose the Middlesex Canal Prism, Middlesex Canal Floating Towpath Peninsula, and the Middlesex Canal Floating Towpath Stone Anchor, all of which are inventoried archaeological resources (MHC Nos. BIL-HA-08, BIL-HA-39, and BIL-HA-40, respectively). Furthermore, the permanent drawdown of the dam impoundment will expose and potentially impact archaeologically sensitive upland shoreline and underwater ground surfaces. These sensitive shoreline and underwater areas could contain potentially significant pre-contact Native American archaeological resources and structural remains of other documented resources associated with the Middlesex Canal, including a 1798 dam.

NOAA is conducting ongoing consultation with the parties that have been invited to participate in the Section 106 process. The goal of the consultation is to seek ways to avoid, minimize, and/or mitigate adverse effects from the project to historic properties, including archaeologically sensitive areas, in accordance with Section 106 of the NHPA and Massachusetts General Law (MGL) Chapter 9, Sections 26-27C (950 CMR 70-71).

Measures to minimize impacts to the Talbot Mills Dam that have already been incorporated into the project design include retaining the river-left (southwest) granite masonry abutment (which contains the waste gate openings), as well as an adjacent section of the granite masonry spillway to support the remaining abutment. Potential mitigative measures could include the preparation of written and photographic documentation to form a permanent archival record of the affected properties and installation of interpretive signage, and archaeological monitoring and recordation during construction. Other appropriate measures to resolve project effects may be developed during discussions among the Section 106 consulting parties.

2.5 Alternatives Analysis

Alternatives to restore diadromous fish passage in the Concord River were developed for the Talbot Mills Dam for the 2016 Feasibility Study. Possible scenarios were identified in part through review of planning documents such as the Nyanza Restoration Plan, discussed with project partners, presented to the public at an informational session, and narrowed to those with the greatest potential to be ecologically effective and feasible to implement. These alternatives are briefly excerpted below and are summarized in more detail in Section 2.1 of the Single Environmental Impact Report filed with MEPA in February 2024 (available from <https://tinyurl.com/TalbotDamRemovalPublic> or provided upon request).

No Action / Dam Repair

The “no action” alternative assumes that none of the proposed or other fish passage restoration alternatives would be implemented at the Talbot Mills Dam, and the dam would remain in place. Because the dam has documented deficiencies that are required to be addressed per dam safety regulations, this alternative would also include necessary dam repairs (discussed in **Section 2.2**).

The “no action / dam repair” alternative would continue to negatively impact fisheries, water quality and aquatic habitat, wetlands and riparian habitat, upstream flooding, and, for some people, recreation and aesthetics. An aging structure that does not have a formal maintenance plan and does not meet dam safety criteria (unless costly repairs are implemented) would remain in place and able to potentially fail unexpectedly, causing substantial impacts to these and other resources. The dam owner would still be responsible for ongoing maintenance, inspection, and repair costs. Project goals would not be met with no action at Talbot Mills Dam.

Fishway

Due to its relative effectiveness at passing target species including American shad, a Denil fishway was selected for the concept design alternative at the Talbot Mills Dam. A simple eel ramp was proposed to accommodate upstream migrating elvers. Since experience has shown that sea lamprey can effectively utilize a Denil ladder, a separate lamprey-specific structure was not included in the concept design. A downstream passage notch in the spillway was also proposed.

Installation of a technical fishway—including a Denil ladder, eel ramp, and downstream bypass notch—at the Talbot Mills Dam could provide passage for some of the target species under ideal flow conditions and with proper (intensive daily) operation and maintenance. However, passage efficiency of target species would be low, and passage of other aquatic species and overall connectivity of the river would be limited. With the exception of cultural resources and aesthetics, little to no impacts or benefits to other resources would be anticipated. The obligation to bring the dam into compliance with dam safety regulations as well as the continued responsibility for ongoing operation, maintenance, and liability associated with the dam and fishway would make this alternative prohibitively expensive and not feasible for the dam owner to undertake.

Dam Removal

Complete or partial removal of dams has been shown to be a simple, highly effective option for fish passage at dam barriers. Dam removal has the advantage of restoring connectivity of rivers in both upstream and downstream directions for a wide variety of fish and other aquatic species. Additionally, removing the dam eliminates the need for ongoing maintenance and inspections of the dam, and the risk for dam failure and consequential flooding.

Full removal of the entire Talbot Mills Dam and all appurtenances (including the former intake gates to the Faulkner Mills complex, the sluiceway channel, and any embankment sections that may or may not have been constructed as part of the original dam) is not feasible due to the integral nature of some structures with Faulkner Street and other adjacent structures. Therefore, the dam removal alternative considered for this study is a partial dam removal that would consist of removing the entire primary spillway structure down to bedrock at a minimum as well as the 1798 dam structure that is reportedly buried upstream, if found. The alternatives analysis considered maintaining one or both spillway abutments in an effort to honor the historic significance of the site. For the proposed design, the left stone abutment will be retained, and the right concrete abutment will be removed.

In summary, the proposed removal of the Talbot Mills Dam would meet project goals by providing effective passage for target fish species as well as significant benefits for other resources. Water quality, aquatic habitat connectivity, and natural riverine sediment regime would be restored. Increased upstream flooding resulting from the dam would be reduced. Aging infrastructure would be decommissioned, eliminating ongoing operation, maintenance, and liability costs and concerns. Recreation and aesthetic resources may improve as well, although these benefits are subject to individual preferences of the

members of the public using the site. With the exception of cultural resources, few significant impacts to other resources are anticipated. As such, partial removal of the Talbot Mills Dam is the selected alternative to achieve all of the project goals, and therefore has been advanced to the permitting stage.

Summary

Below is a summary of the alternatives discussed above:

- **No Action/Dam Repair** – does not meet project goals; no ecological or public safety benefits; would require costly repairs to bring the dam into compliance with dam safety regulations
- **Technical Fishway** – would provide some level of passage for specific target fish species, but would not meet project ecological restoration goals, and would be cost prohibitive to address dam safety requirements and build, maintain, and operate the fishway
- **Dam Removal** – meets project goals and provides greater ecological restoration and public safety benefits; would bring the dam into compliance with dam safety regulations

3. Photographs



Aerial View



Spillway from Downstream Channel



Spillway from Right Abutment



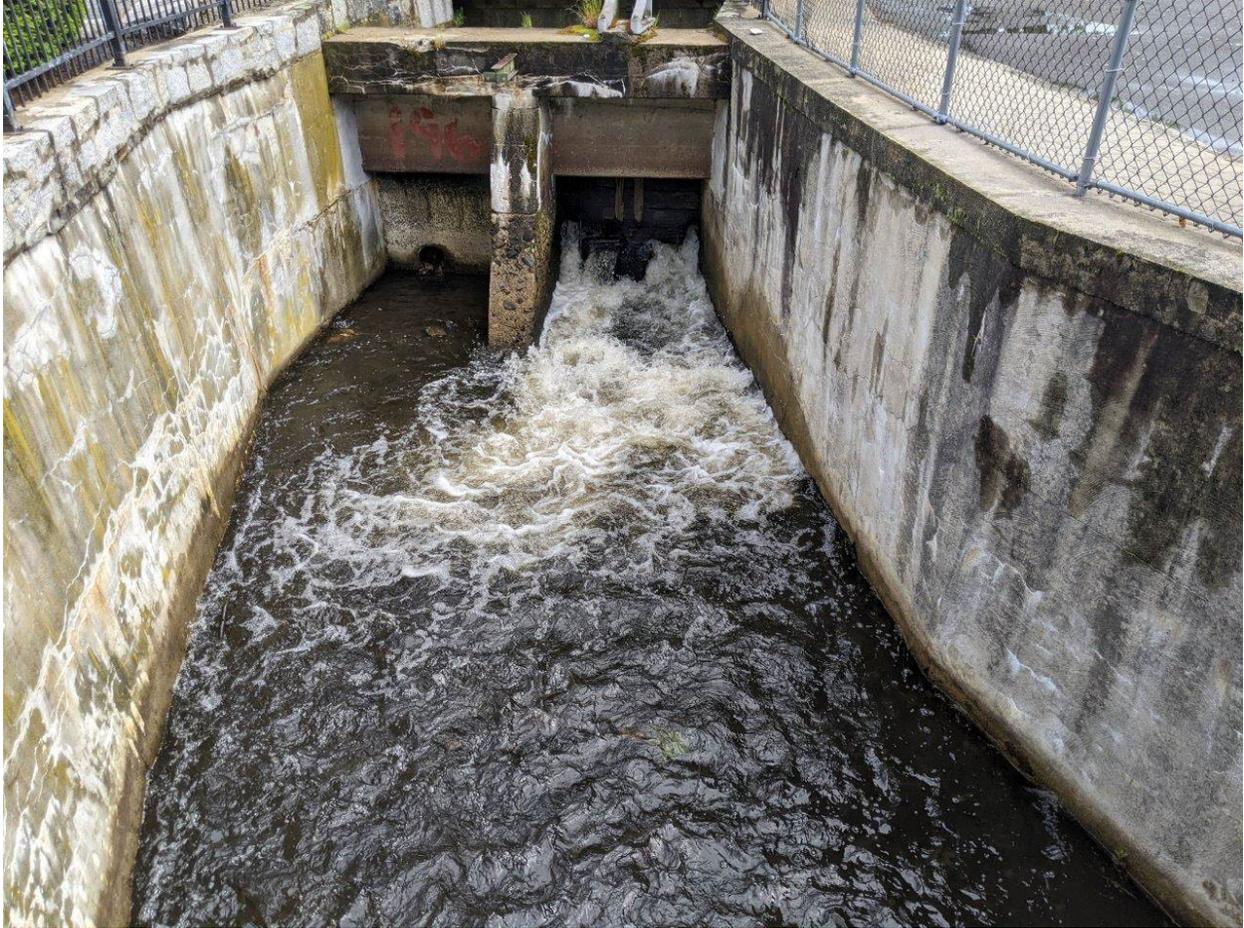
Spillway from Left Abutment



Right Abutment (to be removed)



Left Abutment (to remain)



Sluiceway and Stoplog Gate Structure, Looking Upstream (to remain)

4. Figures

This section contains the following figures:

Figure 1: Location Map.....	2
Figure 2: Aerial View of Talbot Mills Dam	3
Figure 3: Area of Potential Effects Map	4

Figure 1: Location Map

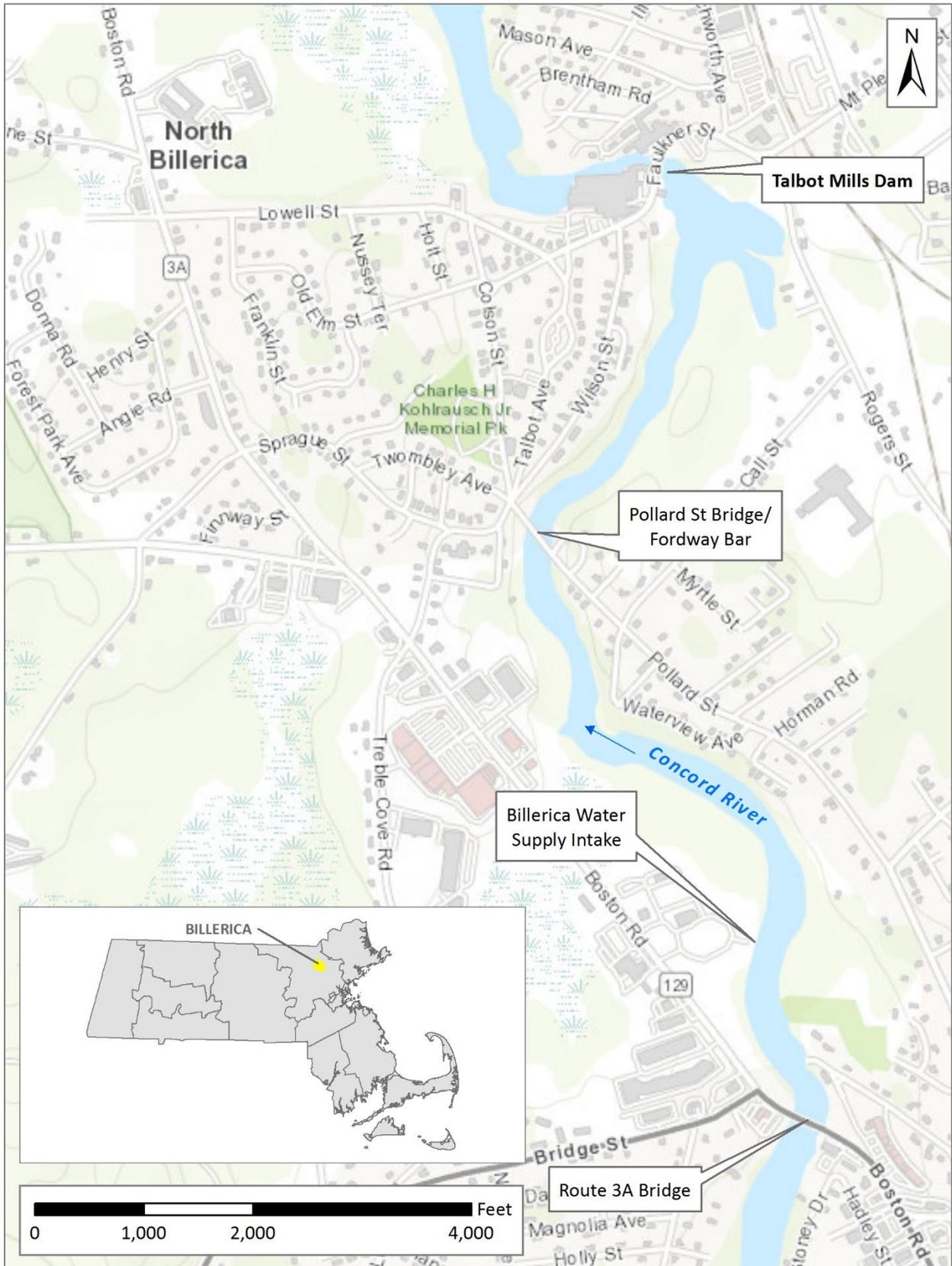


Figure 2: Aerial View of Talbot Mills Dam



Figure 3: Area of Potential Effects Map



5. Design Plans

TALBOT MILLS DAM REMOVAL/ CONCORD RIVER RESTORATION PROJECT

BILLERICA, MA

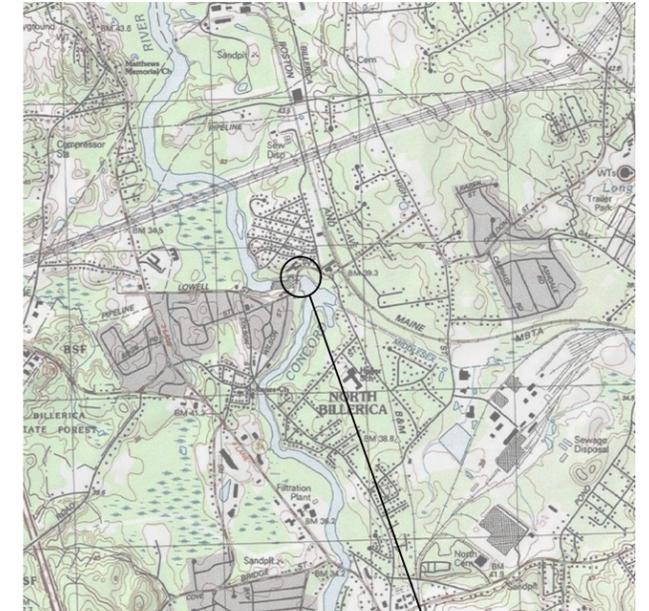
CRT DEVELOPMENT REALTY, LLC (DAM OWNER)

PRELIMINARY (75%) DESIGN PLANS

DRAWING NO.	TITLE
1	COVER SHEET
2	GENERAL NOTES
3	EXISTING SITE PLAN
4	EXISTING DAM SECTION AND ELEVATION
5	PROPOSED STAGING AND INVASIVE SPECIES CONTROL PLAN
6	PROPOSED STAGING AND ACCESS PLAN (ALTERNATIVE 1)
7A	PROPOSED ACCESS, STAGING, WATER CONTROLS, & REMOVALS PLAN (ALTERNATIVE 1)
7B	PROPOSED ACCESS, STAGING, WATER CONTROLS, & REMOVALS PLAN (ALTERNATIVE 2)
8	PROPOSED ACCESS & WATER CONTROL DETAILS (ALTERNATIVE 2)
9	PROPOSED DAM BREACH SECTION AND ELEVATION
10	PROPOSED SITE PLAN
11	EROSION AND SEDIMENT CONTROL DETAILS

FUNDING PARTNERS:

- MA DEPT. OF FISH & GAME, DIV. OF ECOLOGICAL RESTORATION
- MA DEPT. OF FISH & GAME, DIV. OF MARINE FISHERIES
- MA DEPT. OF ENVIRONMENTAL PROTECTION
- NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION RESTORATION CENTER
- US FISH AND WILDLIFE SERVICE



SOURCE: GOOGLE

SCALE: 1" = 2000'

PROJECT SITE



SOURCE: GOOGLE

SCALE: 1" = 1000'

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ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO THE ENGINEER WITHOUT DELAY. ALL DESIGNS AND DRAWINGS ARE INSTRUMENTS OF SERVICE OF GOMEZ AND SULLIVAN ENGINEERS, D.P.C. REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY GOMEZ AND SULLIVAN, D.P.C. IS DONE AT THE LIABILITY OF THOSE RESPONSIBLE FOR SUCH REPRODUCTION OF USE.

<p>PRELIMINARY NOT FOR CONSTRUCTION</p>						<p>TALBOT MILLS DAM REMOVAL / CONCORD RIVER RESTORATION</p>		
						<p>COVER SHEET</p>		
		DATE	#	DESCRIPTIONS	BY	APP	<p>OARS, INC. 23 Bradford Street Concord, MA 01742</p>	<p>Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henriker, NH 03242</p>
		DRAWN BY: MAO						
		CHECKED BY: JWG						
		APPROVED BY: JWG						
		PROJECT NO.	02450	DATE:	10/11/2024	SCALE: AS NOTED	DRAWING: 1	

DATA SOURCES

- HORIZONTAL DATUM IS NORTH AMERICAN DATUM (NAD) 1983, MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, MAINLAND ZONE. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM (NAVD) 1988 FEET.
- CONTOUR INTERVAL SHOWN ON PLANS IS 1 FOOT.
- TOPOGRAPHIC SURVEYS OF THE DAM AND DOWNSTREAM CHANNEL WERE CONDUCTED BY GOMEZ AND SULLIVAN ENGINEERS, DPC ON OCTOBER 6, 2014 AND AUGUST 9, 2022. PLANS WERE SUPPLEMENTED BY SURVEY DATA COLLECTED BY EAGLEBROOK ENGINEERING & SURVEY, LLC ON APRIL 14, 2009.
- ALL OTHER TOPOGRAPHY OUTSIDE SURVEY AREAS DERIVED FROM LIDAR DATA WITH A VERTICAL ACCURACY OF 0.56 FEET COLLECTED IN WINTER/SPRING 2011 AND OBTAINED FROM MASSGIS.
- BATHYMETRIC DATA WITHIN THE IMPOUNDMENT WAS COLLECTED BY GOMEZ AND SULLIVAN ENGINEERS, DPC ON JULY 28, 2021.
- WETLAND BOUNDARIES IN THE VICINITY OF THE DAM AND MILL POND WERE DELINEATED BY LEC ENVIRONMENTAL CONSULTANTS, INC ON JUNE 29, 2022. WETLAND BOUNDARIES UPSTREAM OF THE MILL POND AND DOWNSTREAM OF FAULKNER STREET WERE DERIVED FROM 2005 MASSACHUSETTS DEPT. OF ENVIRONMENTAL PROTECTION (MASSDEP) WETLANDS DATA AND/OR AERIAL IMAGERY.
- PROPERTY BOUNDARIES WERE OBTAINED FROM MASSGIS.
- BORDERING LAND SUBJECT TO FLOODING (BLSF) DEPICTED ON THE PLANS IS BASED ON THE 100-YEAR FLOOD INUNDATION MAPPING DEVELOPED BY GOMEZ AND SULLIVAN ENGINEERS, DPC FOR EXISTING AND PROPOSED CONDITIONS. THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) 100-YEAR REGULATORY FLOODPLAIN (ZONE AE) IS ALSO SHOWN FOR REFERENCE BUT IS ASSUMED TO BE LESS ACCURATE THAN THE MODELED BLSF.

GENERAL NOTES

- CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF EXCAVATION. CONTRACTOR SHALL NOTIFY DIG SAFE MASSACHUSETTS AT 811 OR 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION. SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS ARE NOT TO BE INCLUDED IN THE REQUIRED 72 HOUR NOTICE.
- CONTRACTOR SHALL MAINTAIN CONTROL POINTS DURING CONSTRUCTION, INCLUDING BENCHMARKS AND ELEVATIONS AT CRITICAL AREAS. SITE LAYOUT SURVEY REQUIRED FOR CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR AND PERFORMED BY A MASSACHUSETTS REGISTERED PROFESSIONAL LAND SURVEYOR. ALL GRADE STAKES SET BY SURVEYOR SHALL BE MAINTAINED BY CONTRACTOR UNTIL FINAL INSPECTION OF THE ITEM HAS BEEN COMPLETED BY ENGINEER.
- EXCESSIVE IDLING DURING THE CONSTRUCTION PERIOD IS PROHIBITED. SIGNS SHALL BE POSTED AT THE SITE LIMITING IDLING TO 5 MINUTES OR LESS. PERIODIC INSPECTIONS SHALL BE CONDUCTED BY SITE SUPERVISORS TO ENSURE COMPLIANCE. STAGING AREAS SHALL BE LOCATED TO MINIMIZE EMISSION IMPACTS TO ADJUTING PROPERTIES.
- ANY WOOD OR OTHER DEBRIS CAUGHT ON THE DAM OR IN THE SLUICeway SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR PRIOR TO CONSTRUCTION.
- ALL OPTIONAL TASKS ARE TO BE COMPLETED AT THE CONTRACTOR'S DISCRETION AND SHALL BE ADDRESSED IN THE CONTRACTOR'S SUBMITTALS.
- SUGGESTED DETAILS HAVE BEEN PROVIDED IN THE DRAWINGS FOR A TEMPORARY ACCESS BRIDGE TO BE USED BY THE CONTRACTOR. ALL COMPONENTS OF THE PROPOSED TEMPORARY BRIDGE SHALL BE DESIGNED AND DETAILED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE COMMONWEALTH OF MASSACHUSETTS.
- SUPPORTING SURFACE/CRANE FOUNDATION REQUIREMENTS:
 - AN ENGINEERED CRITICAL LIFT PLAN SHALL BE DEVELOPED BY A QUALIFIED PROFESSIONAL ENGINEER TO DETAIL SUPPORTING SURFACE/CRANE FOUNDATION REQUIREMENTS FOR ANY PROPOSED CRANE USE.
 - THE CRITICAL LIFT PLAN SHALL BE DEVELOPED IN ACCORDANCE WITH OSHA, THE COMMONWEALTH OF MASSACHUSETTS REQUIREMENTS, AND THE U.S. ARMY CORPS OF ENGINEERS EM 385-1-1, SECTION 16, LOAD HANDLING EQUIPMENT (LHE).
 - THE CONTRACTOR SHALL SUBMIT A CRITICAL LIFT PLAN, INCLUDING ALL CALCULATIONS, STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF MASSACHUSETTS.

CONSTRUCTION WASTE MANAGEMENT

- SITE SHALL BE KEPT WELL ORGANIZED, SIGNED, AND FREE OF WASTE MATERIALS, DEBRIS, AND RUBBISH AT ALL TIMES. GOOD HOUSEKEEPING PRACTICES SHALL BE MAINTAINED ON A CONTINUOUS BASIS FROM WORK SITE TO WORK SITE. DISPOSAL OF ANY WASTE MATERIALS ON THE CONSTRUCTION SITE IS PROHIBITED.
- SANITARY, WASTE DISPOSAL, AND EMPLOYEE FACILITIES SHALL BE PROVIDED BY CONTRACTOR.
- ALL WATER RESOURCES (E.G., GROUND AND SURFACE WATERS), INCLUDING ALL DRAINS AND CATCH BASINS, SHALL BE PROTECTED FROM LEACHING AND/OR RUN-OFF OF CHEMICAL POLLUTANTS, SOLID WASTES, AND CONSTRUCTION SITE DEBRIS. ALL CATCH BASINS SHALL BE MAINTAINED FREE FLOWING.
- ALL COMBUSTIBLE WASTE MATERIALS SHALL BE PLACED IN COVERED METAL CONTAINERS AND PROMPTLY DISPOSED OF IN AN APPROVED MANNER AT AN APPROVED WASTE DISPOSAL FACILITY.
- STORAGE AND/OR USE OF CHEMICALS, FUELS, OILS, GREASES, BITUMINOUS MATERIALS, SOLIDS, WASTE WASHINGS, AND CEMENT SHALL BE HANDLED APPROPRIATELY AS TO PREVENT LEACHING OR SURFACE RUNOFF INTO PUBLIC WATERS OR DRAINS. ALL APPROVED STORAGE AREAS FOR THESE MATERIALS MUST BE DIKED.
- ALL ROADWAYS SHALL BE MAINTAINED FREE OF DEBRIS. STABILIZED CONSTRUCTION ENTRANCES SHALL BE CONSTRUCTED TO CAPTURE DEBRIS FROM WHEELS OF CONSTRUCTION VEHICLES. VEHICLES SHALL BE INSPECTED AT ENTRANCES BEFORE TURNING ONTO THE ROADWAY AND EXCESS DEBRIS SHALL BE REMOVED.

- ALL EXCESS DREDGED MATERIALS SHALL BE REMOVED FROM THE SITE AS SOON AS POSSIBLE AND IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS FOR REUSE AND DISPOSAL.

CARE AND DIVERSION OF WATER

- CONTRACTOR SHALL PREPARE A WATER CONTROL PLAN STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN MASSACHUSETTS TO BE APPROVED BY ENGINEER INCLUDING 1) PROPOSED COFFERDAM/TEMPORARY BYPASS PLAN, DETAILS, AND CALCULATIONS 2) WATER CONTROL CONTINGENCY PLAN, AND 3) DEWATERING/SEDIMENT CONTROL METHODS. WATER CONTROL PLAN SHALL CONFORM TO ALL APPLICABLE ENVIRONMENTAL PERMIT REQUIREMENTS AND CONDITIONS.
- CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO WORK OR EQUIPMENT BY HIGH WATER OR STORMS.
- ANY WATER PUMPED FROM THE EXCAVATION MUST FLOW THROUGH A SEDIMENT FILTER BAG (OR APPROVED EQUAL) PRIOR TO RELEASE INTO ANY WATER BODY.

TEMPORARY ACCESS ROUTE STABILIZATION

- DEFINITION: THE STABILIZATION OF TEMPORARY CONSTRUCTION ACCESS ROUTES, ON-SITE VEHICLE TRANSPORTATION ROUTES, AND CONSTRUCTION PARKING AREAS.
- PURPOSE: TO CONTROL EROSION ON TEMPORARY CONSTRUCTION ROUTES AND PARKING AREAS.
- CONDITION WHERE PRACTICE APPLIES: ALL TRAFFIC ROUTES AND PARKING AREAS FOR TEMPORARY USE BY CONSTRUCTION TRAFFIC.
- DESIGN CRITERIA: CONSTRUCTION ROADS SHOULD BE LOCATED TO REDUCE EROSION POTENTIAL, MINIMIZE IMPACT ON EXISTING SITE RESOURCES, AND MAINTAIN OPERATIONS IN A SAFE MANNER. HIGHLY ERODIBLE SOILS, WET OR ROCKY AREAS, AND STEEP SLOPES SHOULD BE AVOIDED. ROADS SHOULD BE ROUTED WHERE SEASONAL WATER TABLES ARE DEEPER THAN 18 INCHES. SURFACE RUNOFF AND CONTROL SHOULD BE IN ACCORDANCE WITH OTHER STANDARDS.
- ROAD GRADE: A MAXIMUM GRADE OF 12% IS RECOMMENDED, ALTHOUGH GRADES UP TO 20% ARE ACCEPTABLE FOR SHORT DISTANCES.
- ROAD WIDTH: 14 FT (9 FT MINIMUM) FOR ONE-WAY TRAFFIC, OR 24 FT MINIMUM FOR TWO-WAY TRAFFIC.
- SIDE SLOPE OF ROAD EMBANKMENT: 2:1 OR FLATTER.
- COMPOSITION: USE AN 8-INCH LAYER OF STATE DOT APPROVED GRAVEL SUB-BASE OR EQUIVALENT, PLACED ON A GEOTEXTILE FABRIC.
- MAINTENANCE: ACCESS ROUTES AND PARKING AREAS SHALL BE INSPECTED PERIODICALLY FOR CONDITION OF SURFACE AND TOPDRESSED WITH NEW GRAVEL AS NEEDED.
- RESTORATION: UPON COMPLETION OF THE WORK, ALL TEMPORARY MATERIALS SHALL BE REMOVED AND THE SITE SHALL BE RESTORED TO PRE-PROJECT CONDITIONS.

CONSTRUCTION SEQUENCE

- CONTRACTOR SHALL PREPARE A CONSTRUCTION SEQUENCE PLAN TO BE APPROVED BY OWNER AND ENGINEER. THE FOLLOWING GENERAL SEQUENCE SHALL BE ADAPTED FOR THE SITE-SPECIFIC REQUIREMENTS.
- INSTALL TURBIDITY CURTAINS TO CONTAIN WATER CHESTNUT IN IMPOUNDMENT PRIOR TO DEWATERING.
- REMOVE STLOPLOGS FROM SLUICE GATE TO LOWER IMPOUNDMENT.
- INSTALL EROSION AND SEDIMENTATION CONTROLS.
- INSTALL OIL BOOM ACROSS CHANNEL DOWNSTREAM OF DAM.
- REMOVE EXISTING FENCE SECTIONS AS NEEDED TO FACILITATE ACCESS. REPLACE IN KIND FOLLOWING CONSTRUCTION.
- INSTALL TEMPORARY FENCING AND SWING GATES AT ENTRANCE(S) TO STAGING AREA(S).
- OPTIONAL - INSTALL TEMPORARY ACCESS ROAD FROM STAGING AREA AT 6 OLD ELM STREET TO LEFT DAM ABUTMENT.
- OPTIONAL - INSTALL TEMPORARY COFFERDAM AT UPSTREAM END OF SLUICeway TO FACILITATE CONSTRUCTION OF TEMPORARY SLUICeway CROSSING AT CONTRACTOR'S DISCRETION.
- OPTIONAL - REMOVE WOODEN PEDESTRIAN BRIDGE FROM SLUICeway, RETAINING STEEL BEAM SPANNING THE SLUICeway BELOW. REINSTALL OR REPLACE IN KIND FOLLOWING CONSTRUCTION.
- OPTIONAL - INSTALL TEMPORARY STONE FILL CROSSING IN SLUICeway WITH 4' DIA. BYPASS PIPE EXTENDING THROUGH SLUICE GATE OPENING. REMOVE TEMPORARY COFFERDAM AT UPSTREAM END OF SLUICeway.
- ANCHOR 1/2" STEEL PLATE TO INFRASTRUCTURE ADJACENT TO LEFT AND/OR RIGHT DAM ABUTMENTS TO PROTECT FROM FLOW AS REQUIRED BY WATER CONTROL PLAN.
- REMOVE CONCRETE RIGHT ABUTMENT.
- OPTIONAL - INSTALL TEMPORARY COFFERDAM UPSTREAM OF RIGHT ABUTMENT TO FACILITATE INSTALLATION OF TEMPORARY BRIDGE AT CONTRACTOR'S DISCRETION.
- OPTIONAL - INSTALL TEMPORARY BRIDGE CROSSING AT RIGHT ABUTMENT.
- OPTIONAL - INSTALL TEMPORARY STONE ACCESS ROAD ALONG SPILLWAY AT CONTRACTOR'S DISCRETION.
- OPTIONAL - DREDGE SEDIMENT AND REMOVE ANY BLOCKAGES FOUND UPSTREAM OF LEFT ABUTMENT TO ALLOW FLOW THROUGH TWO EXISTING APPROX. 4' H X 3' W LOW-LEVEL OUTLETS.

- BREACH 30-FOOT-WIDE SECTION OF GRANITE SPILLWAY AND FORMER TIMBER/ROCK DAM (IF FOUND) TO FACILITATE FLOW.
- OPTIONAL - INSTALL COFFERDAM UPSTREAM OF SPILLWAY AT CONTRACTOR'S DISCRETION.
- OPTIONAL - INSTALL TEMPORARY STONE RAMP FOR DOWNSTREAM ACCESS AT CONTRACTOR'S DISCRETION.
- COMMENCE ARCHAEOLOGICAL RECORDATION (IF PRACTICABLE) AND REMOVAL OF FORMER DAM REMAINS (IF FOUND) FOLLOWED BY EXISTING GRANITE SPILLWAY. RETAIN STEPPED GRANITE BLOCKS ADJACENT TO LEFT ABUTMENT TO SUPPORT ABUTMENT (SEE ELEVATION SHEET B). SALVAGE GRANITE BLOCKS AS REASONABLY PRACTICABLE FOR STOCKPILING AS DIRECTED BY OWNER. GRADE ANY SEDIMENT UPSTREAM OF DAM AT 3:1 SLOPE OR FLATTER.
- REMOVE ANY TEMPORARY ACCESS RAMPS, ROADS, AND/OR COFFERDAMS WITHIN THE CHANNEL.
- REMOVE TEMPORARY BRIDGE AND/OR SLUICeway CROSSING (IF UTILIZED).
- REMOVE TEMPORARY FENCING AND SWING GATES.
- REINSTALL OR REPLACE FENCE SECTIONS AND PEDESTRIAN BRIDGE IN KIND AS NEEDED.
- RESTORE ACCESS AND STAGING AREAS TO FORMER CONDITIONS.
- REMOVE EROSION AND POLLUTION CONTROL MEASURES ONLY AFTER ALL AREAS ARE STABILIZED TO THE SATISFACTION OF ENGINEER.

SOIL EROSION AND SEDIMENTATION CONTROL

- ALL WORK SHALL BE CONDUCTED IN ACCORDANCE WITH MASSDEP EROSION AND SEDIMENTATION CONTROL GUIDELINES AND APPLICABLE NPDES STANDARDS.
- ALL APPLICABLE SOIL EROSION AND SEDIMENT CONTROL PRACTICES ARE TO BE INSTALLED PRIOR TO ANY SOIL OR STREAM DISTURBANCE, OR IN THEIR PROPER SEQUENCE, AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
- ALL DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN FOURTEEN (14) DAYS, AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, SHALL IMMEDIATELY RECEIVE A TEMPORARY SEEDING WITH A NATIVE SEED MIXTURE. MULCH, WATER AND ANCHOR AS NECESSARY TO ESTABLISH GRASS AND PREVENT LOSS TO WIND OR EROSION. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS SHALL BE MULCHED WITH SMALL GRAIN STRAW AT A RATE OF TWO (2) TONS PER ACRE IN ACCORDANCE WITH STATE STANDARDS.
- PERMANENT VEGETATION SHALL BE SEEDING WITH A NATIVE SEED MIXTURE ON ALL EXPOSED AREAS IMMEDIATELY AFTER FINAL GRADING. MULCH SHALL BE USED AS NECESSARY FOR PROTECTION UNTIL SEEDING IS ESTABLISHED.
- ALL CRITICAL AREAS SUBJECT TO EROSION SHALL RECEIVE A TEMPORARY SEEDING WITH AN APPROVED NATIVE SEED MIXTURE IN COMBINATION WITH STRAW MULCH, AT A RATE OF TWO (2) TONS PER ACRE IN ACCORDANCE WITH STATE STANDARDS.
- SHOULD THE CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE SHALL BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET. TEMPORARY VEGETATIVE COVER SHALL BE ESTABLISHED, OR MULCH SHALL BE APPLIED IN ACCORDANCE WITH STATE STANDARDS FOR EROSION CONTROL.
- ALL SOIL WASHED, DROPPED, SPILLED, OR TRACKED OUTSIDE THE LIMIT OF DISTURBANCE OR ONTO PUBLIC RIGHTS-OF-WAY SHALL BE REMOVED IMMEDIATELY.
- STOCKPILE AND STAGING LOCATIONS DETERMINED IN THE FIELD SHALL BE PLACED WITHIN THE LIMIT OF DISTURBANCE. ALL SOIL STOCKPILES SHALL BE TEMPORARILY STABILIZED IN ACCORDANCE WITH NOTE #3 AND PROTECTED BY COMPOST FILTER SOCKS ON DOWNHILL SIDES.
- THE CONTRACTOR SHALL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE, AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION AND THAT HAVE NOT BEEN FINALLY STABILIZED, STABILIZATION PRACTICES, STRUCTURAL PRACTICES, AND OTHER CONTROLS AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS AFTER THE END OF ANY STORM THAT PRODUCES AT LEAST 0.5 INCHES OF RAINFALL AT THE SITE. WHERE SITES HAVE BEEN FINALLY STABILIZED, SUCH INSPECTION SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH UNTIL FINAL COMPLETION. CRITICAL AREAS AND AREAS WHERE VEHICLES EXIT THE SITE SHALL BE INSPECTED DAILY.

PROPOSED DREDGE/FILL VOLUMES

TYPE	VOLUME (CY)	DESCRIPTION
DREDGE	440	GRANITE MASONRY SPILLWAY + ABUTMENT
	30	CONCRETE ABUTMENT
	350	WOOD/ROCK FILL FORMER DAM
	600	ROCK FILL BETWEEN DAMS
	220	ACTIVE SEDIMENT GRADING UPSTREAM OF DAMS
	1,640	TOTAL DREDGE
FILL	0	TOTAL FILL

PROPOSED DREDGING DIMENSIONS

LENGTH (FT)	150	SPILLWAY + ABUTMENT
WIDTH (FT)	30	BOTH DAMS + ACTIVE SEDIMENT GRADING
DEPTH (FT)	< 13	MAX HEIGHT OF SPILLWAY
AREA (SF)*	10,000	

*NOTE THAT THE VOLUME CALCULATED BY THESE DIMENSIONS IS LARGER THAN THE PROPOSED DREDGING VOLUME IN THE TABLE ABOVE BECAUSE IT IS CONSERVATIVE IN ALL DIMENSIONS.

WETLAND RESOURCE AREA IMPACTS

WETLAND RESOURCE	AREA (SF)	
	TEMP. DISTURBANCE	PERMANENT CHANGE
BANK (LINEAR FEET)	1,200	-2,800
LAND UNDER WATER (LUW)	46,000	-436,000
BORDERING VEGETATED WETLANDS (BVW)	0	435,000
BORDERING LAND SUBJECT TO FLOODING (BLSF)	900	-441,000
BVW BUFFER ZONE	51,000	0
RIVERFRONT AREA (RFA)	61,000	-314,000

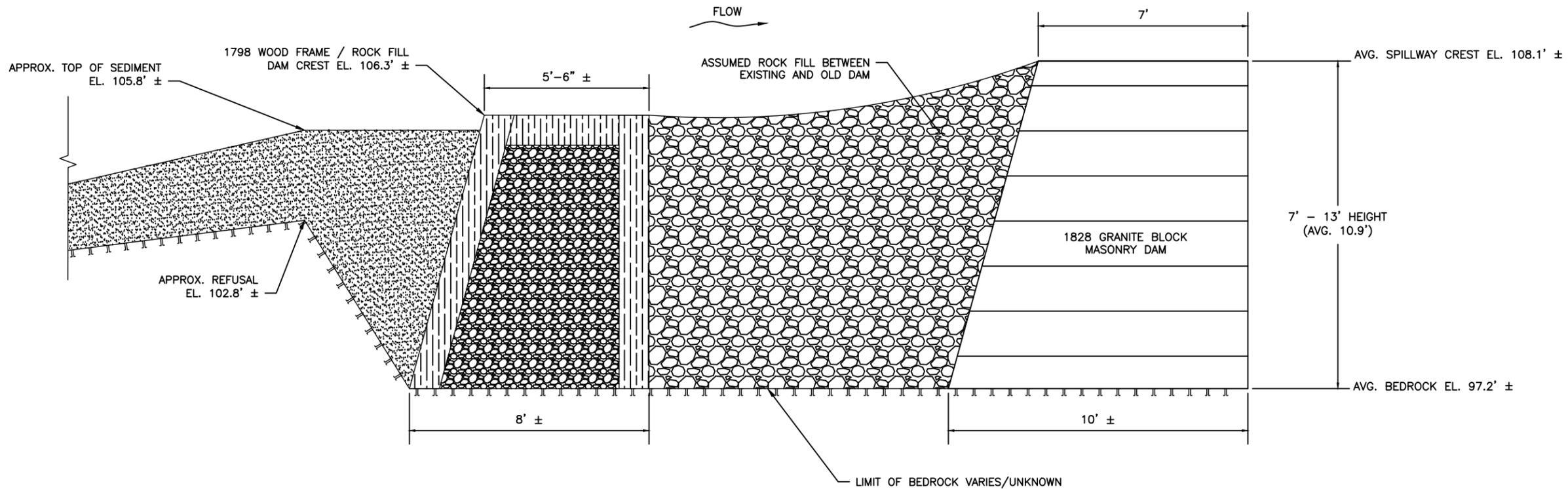
TALBOT MILLS DAM REMOVAL / CONCORD RIVER RESTORATION

GENERAL NOTES

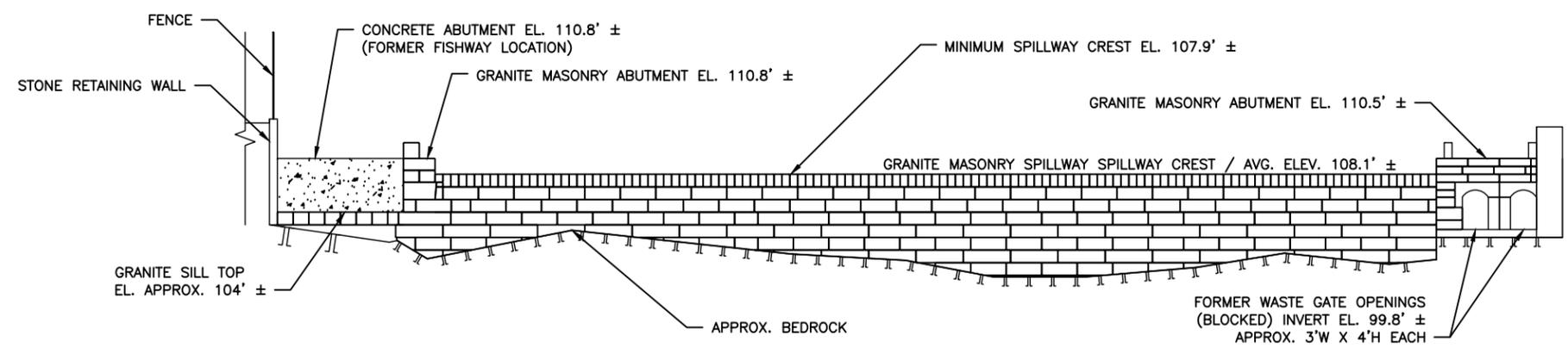
PRELIMINARY NOT FOR CONSTRUCTION	DATE	#	DESCRIPTIONS	BY	APP
	DRAWN BY: MAO				
	CHECKED BY: JWG				
	APPROVED BY: JWG				
	PROJECT NO. 02450 DATE: 10/11/2024				
	SCALE: NONE				
OARS, INC. 23 Bradford Street Concord, MA 01742			Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henriker, NH 03242		
				DRAWING: 2	

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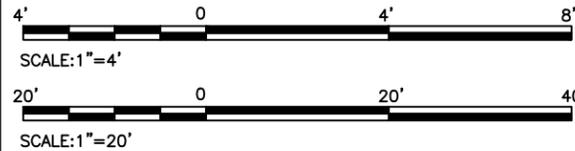
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1 EXISTING AND 1798 DAM SECTION
4 SCALE: 1"=4'



2 EXISTING DAM ELEVATION (LOOKING UPSTREAM)
4 SCALE: 1" = 20'

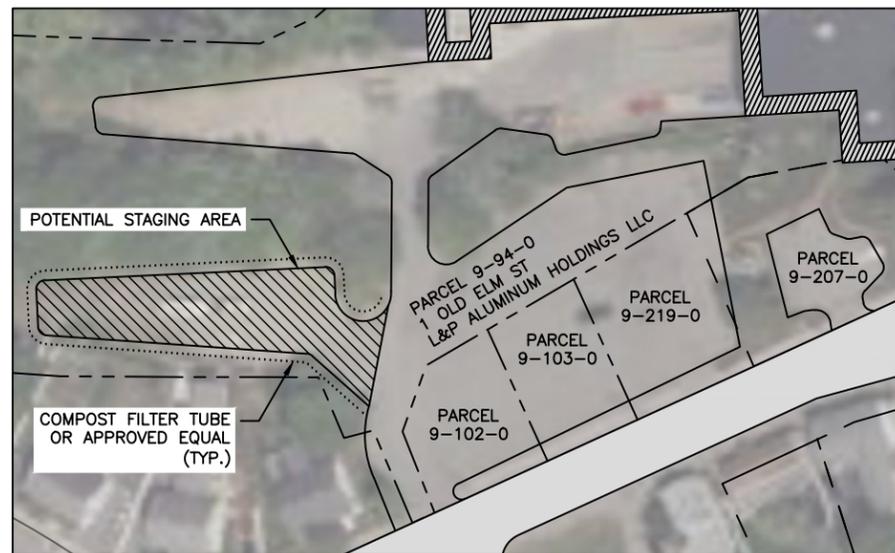


PRELIMINARY NOT FOR CONSTRUCTION	DATE	#	DESCRIPTIONS	BY	APP	TALBOT MILLS DAM REMOVAL / CONCORD RIVER RESTORATION	EXISTING DAM SECTION AND ELEVATION	
	DRAWN BY: MAO							
	CHECKED BY: JWG							
	APPROVED BY: JWG							
	PROJECT NO. 02450 DATE: 10/11/2024							
OARS, INC. 23 Bradford Street Concord, MA 01742						Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henriker, NH 03242		
SCALE: AS NOTED						DRAWING: 4		

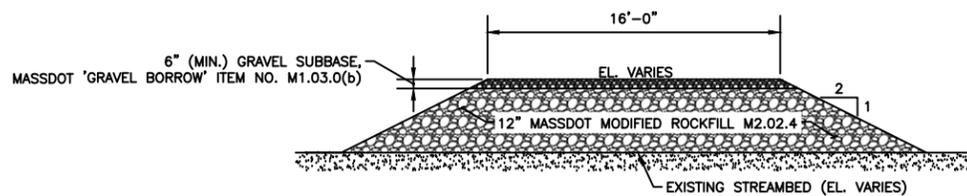
IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANYWAY UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. ALTERATIONS MUST HAVE THE ENGINEER'S SEAL AFFIXED ALONG WITH A DESCRIPTION OF THE ALTERATION, THE SIGNATURE AND DATE.



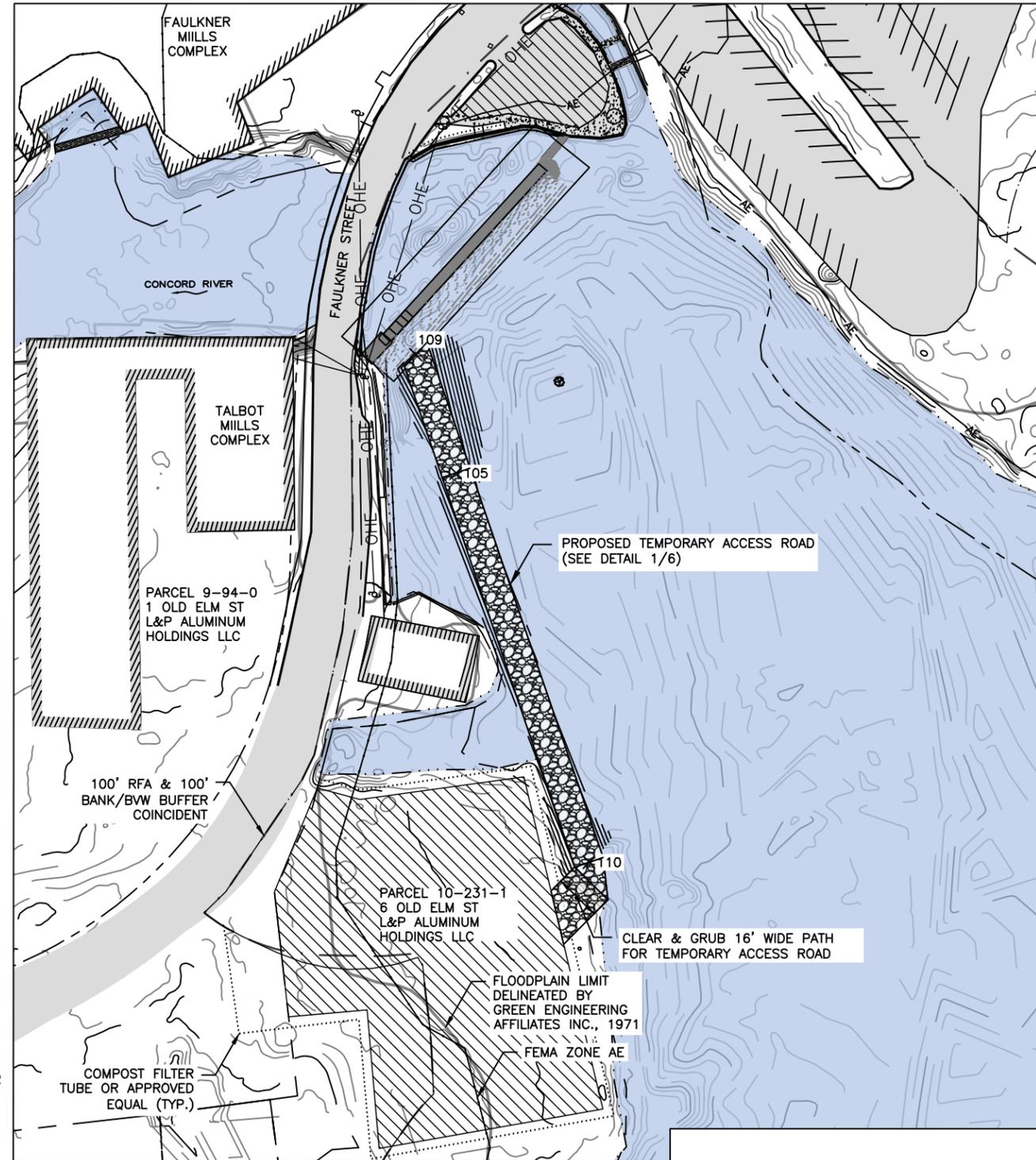
SITE PLAN
SCALE: 1" = 200'



STAGING PLAN
SCALE: 1" = 100'



1 TEMPORARY ACCESS ROAD DETAIL
6 SCALE: 1" = 10'



ACCESS PLAN
SCALE: 1" = 80'

NOTES:

1. PARCELS 9-102-0, 9-103-0, 9-219-0, AND 9-207-0 ARE ADDRESS 0 OLD ELM STREET AND ARE OWNED BY L&P ALUMINUM HOLDINGS LLC.
2. PERMISSION TO USE POTENTIAL STAGING/LOADING AREAS TO BE CONFIRMED WITH LANDOWNER(S) AND TEMPORARY ACCESS EASEMENTS TO BE ESTABLISHED AS NEEDED.
3. TRAFFIC CONTROL PLAN, INCLUDING TEMPORARY FENCE AND GATE LOCATIONS SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER AND OWNER.



SCALE: 1" = 200'



SCALE: 1" = 100'



SCALE: 1" = 80'



SCALE: 1" = 10'

**PRELIMINARY
NOT FOR
CONSTRUCTION**

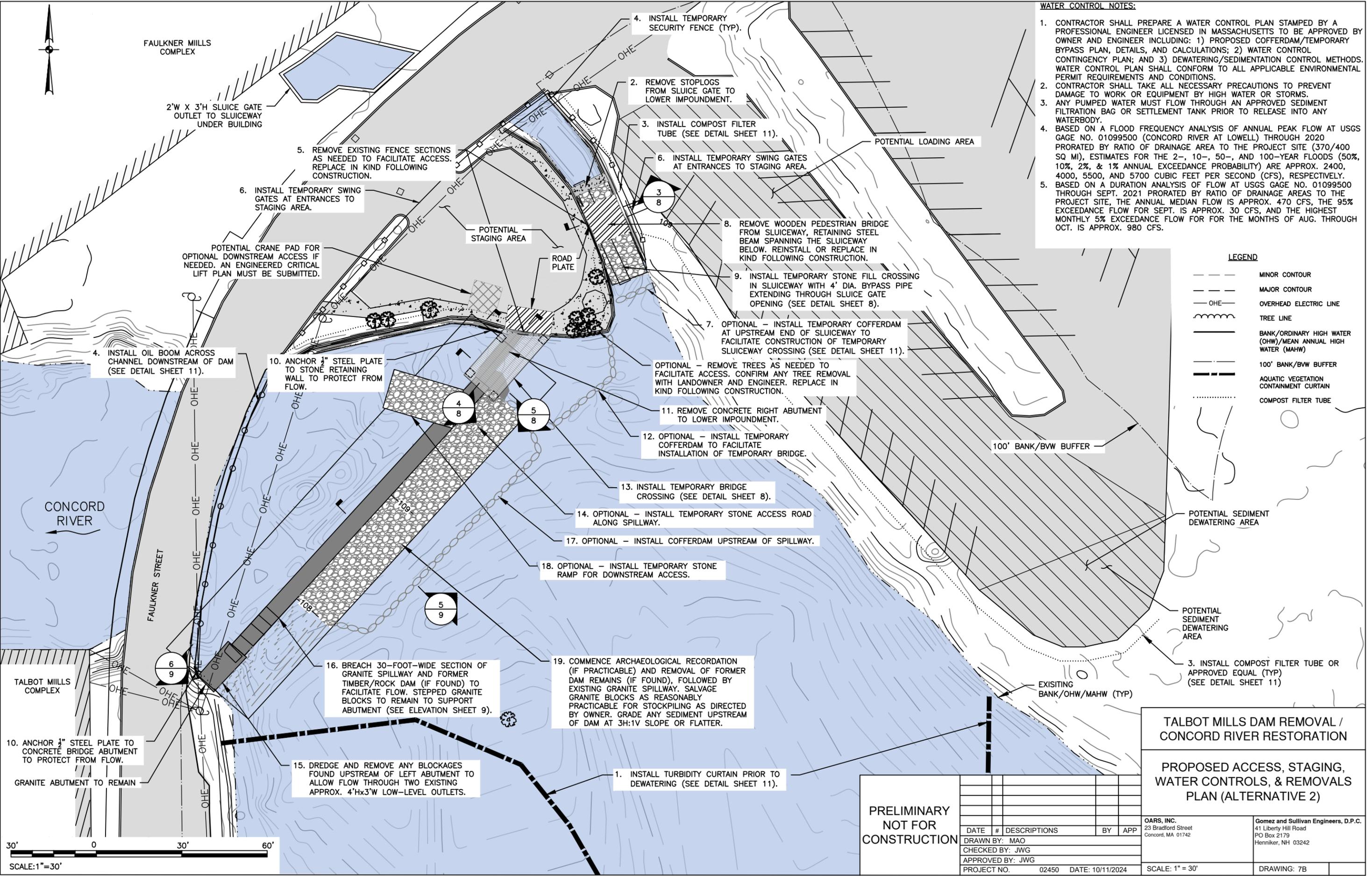
DATE	#	DESCRIPTIONS	BY	APP

**TALBOT MILLS DAM REMOVAL /
CONCORD RIVER RESTORATION**

**PROPOSED STAGING AND ACCESS
PLAN (ALTERNATIVE 1)**

OARS, INC. 23 Bradford Street Concord, MA 01742	Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henriker, NH 03242
SCALE: AS NOTED	DRAWING: 6

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- WATER CONTROL NOTES:**
1. CONTRACTOR SHALL PREPARE A WATER CONTROL PLAN STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN MASSACHUSETTS TO BE APPROVED BY OWNER AND ENGINEER INCLUDING: 1) PROPOSED COFFERDAM/TEMPORARY BYPASS PLAN, DETAILS, AND CALCULATIONS; 2) WATER CONTROL CONTINGENCY PLAN; AND 3) DEWATERING/SEDIMENTATION CONTROL METHODS. WATER CONTROL PLAN SHALL CONFORM TO ALL APPLICABLE ENVIRONMENTAL PERMIT REQUIREMENTS AND CONDITIONS.
 2. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO WORK OR EQUIPMENT BY HIGH WATER OR STORMS.
 3. ANY PUMPED WATER MUST FLOW THROUGH AN APPROVED SEDIMENT FILTRATION BAG OR SETTLEMENT TANK PRIOR TO RELEASE INTO ANY WATERBODY.
 4. BASED ON A FLOOD FREQUENCY ANALYSIS OF ANNUAL PEAK FLOW AT USGS GAGE NO. 01099500 (CONCORD RIVER AT LOWELL) THROUGH 2020 PRORATED BY RATIO OF DRAINAGE AREA TO THE PROJECT SITE (370/400 SQ MI), ESTIMATES FOR THE 2-, 10-, 50-, AND 100-YEAR FLOODS (50%, 10%, 2%, & 1% ANNUAL EXCEEDANCE PROBABILITY) ARE APPROX. 2400, 4000, 5500, AND 5700 CUBIC FEET PER SECOND (CFS), RESPECTIVELY.
 5. BASED ON A DURATION ANALYSIS OF FLOW AT USGS GAGE NO. 01099500 THROUGH SEPT. 2021 PRORATED BY RATIO OF DRAINAGE AREAS TO THE PROJECT SITE, THE ANNUAL MEDIAN FLOW IS APPROX. 470 CFS, THE 95% EXCEEDANCE FLOW FOR SEPT. IS APPROX. 30 CFS, AND THE HIGHEST MONTHLY 5% EXCEEDANCE FLOW FOR FOR THE MONTHS OF AUG. THROUGH OCT. IS APPROX. 980 CFS.

- LEGEND**
- MINOR CONTOUR
 - MAJOR CONTOUR
 - OHE — OVERHEAD ELECTRIC LINE
 - ~ TREE LINE
 - BANK/ORDINARY HIGH WATER (OHW)/MEAN ANNUAL HIGH WATER (MAHW)
 - 100' BANK/BVW BUFFER
 - AQUATIC VEGETATION CONTAINMENT CURTAIN
 - COMPOST FILTER TUBE

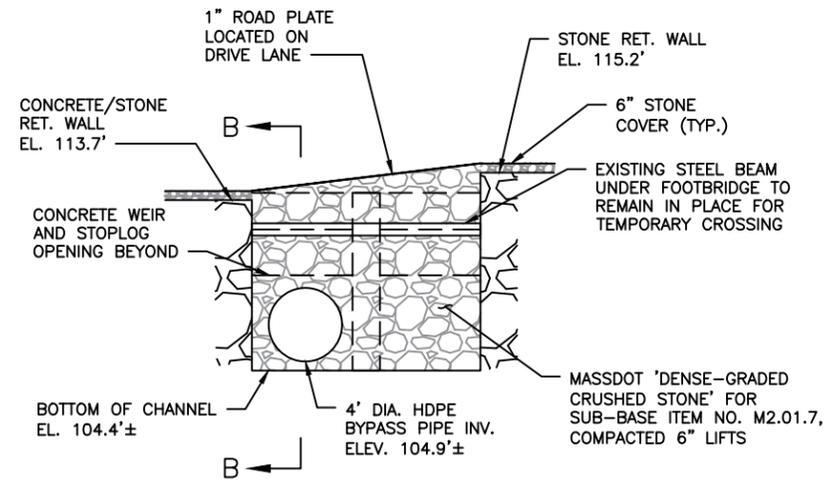
TALBOT MILLS DAM REMOVAL / CONCORD RIVER RESTORATION

PROPOSED ACCESS, STAGING, WATER CONTROLS, & REMOVALS PLAN (ALTERNATIVE 2)

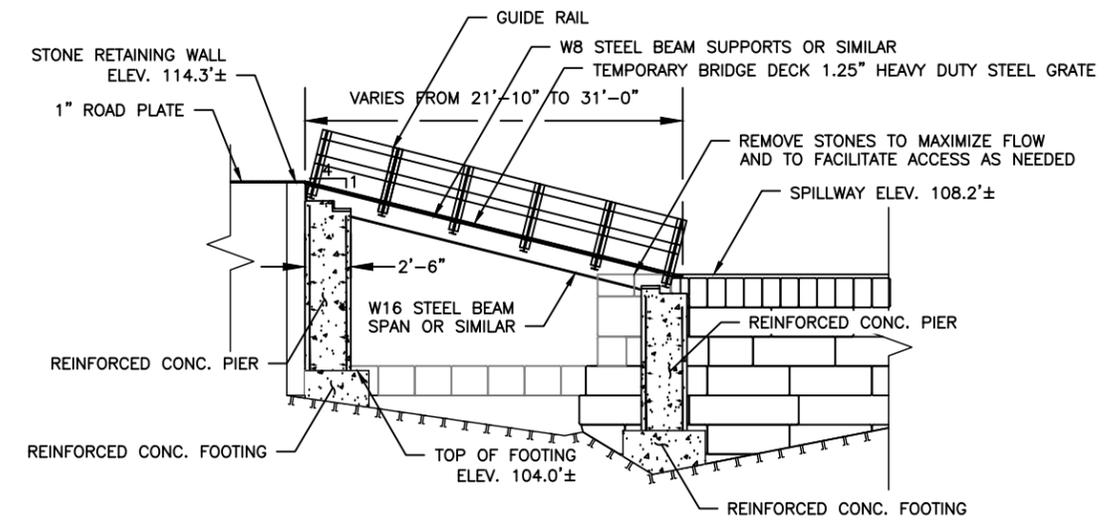
OARS, INC. 23 Bradford Street Concord, MA 01742		Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henriker, NH 03242		
DATE	#	DESCRIPTIONS	BY	APP
DRAWN BY: MAO				
CHECKED BY: JWG				
APPROVED BY: JWG				
PROJECT NO.	02450	DATE:	10/11/2024	SCALE: 1" = 30'
DRAWING: 7B				

**PRELIMINARY
NOT FOR
CONSTRUCTION**

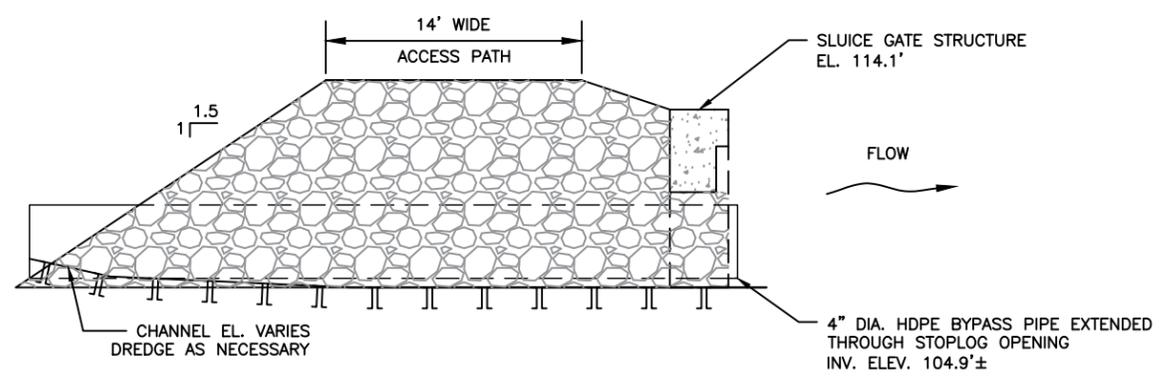




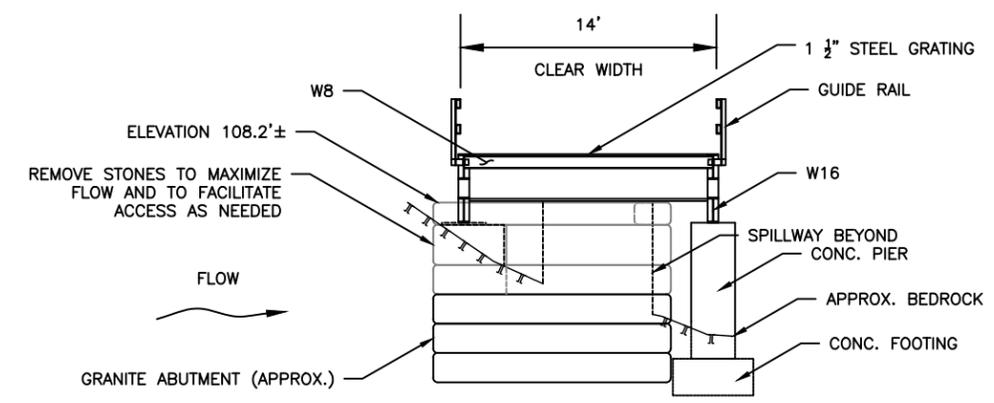
3
8 TEMPORARY CROSSING & BYPASS PIPE IN SLUICWAY
(LOOKING DOWNSTREAM) SCALE: 1" = 10'



4
8 TEMPORARY ACCESS BRIDGE AT RIGHT ABUTMENT
(LOOKING UPSTREAM) SCALE: 1" = 10'

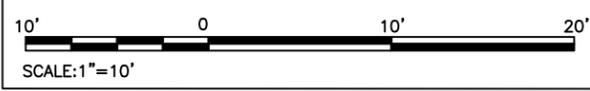


SECTION B-B
SCALE: 1" = 10'



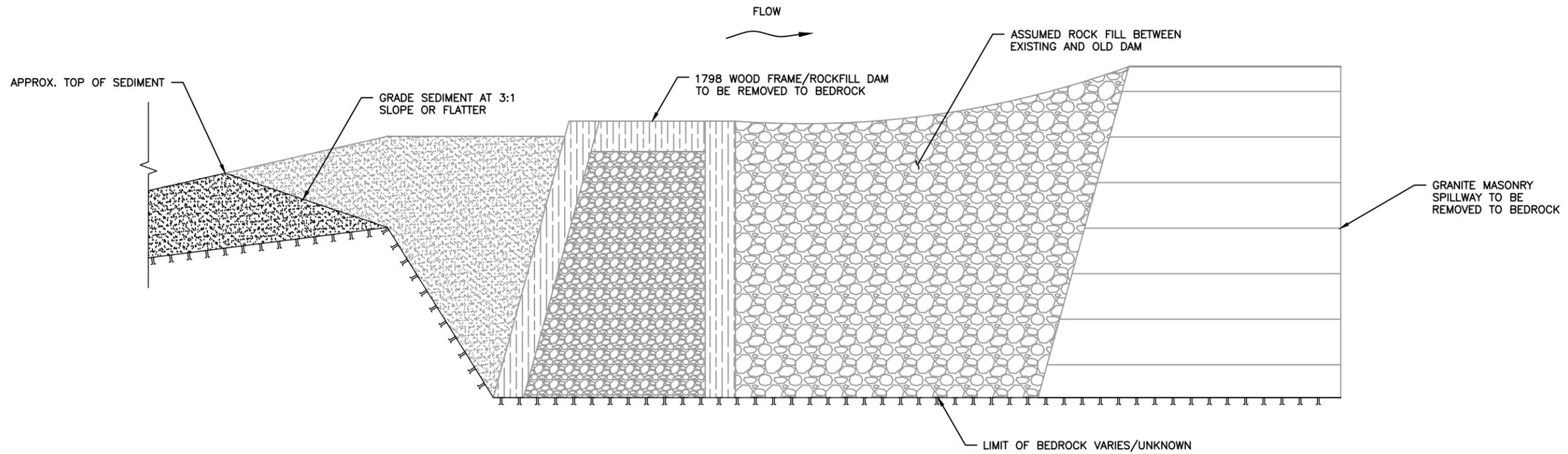
5
8 TEMPORARY BRIDGE SECTION
SCALE: 1" = 10'

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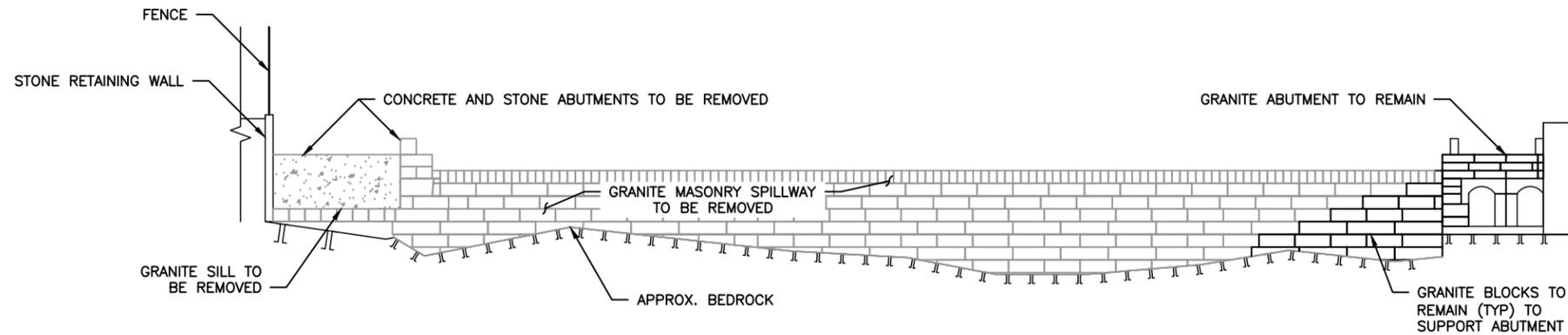


PRELIMINARY NOT FOR CONSTRUCTION						TALBOT MILLS DAM REMOVAL / CONCORD RIVER RESTORATION		
						PROPOSED ACCESS & WATER CONTROL DETAILS (ALTERNATIVE 2)		
		DATE	#	DESCRIPTIONS	BY	APP	OARS, INC. 23 Bradford Street Concord, MA 01742	
		DRAWN BY: MAO						Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henniker, NH 03242
		CHECKED BY: JWG						
		APPROVED BY: JWG						
		PROJECT NO. 02450		DATE: 10/11/2024		SCALE: AS NOTED	DRAWING: 8	

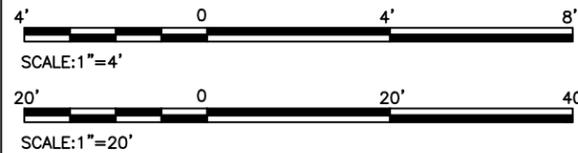
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5 PROPOSED DAM REMOVAL SECTION
SCALE: 1"=4'



6 PROPOSED DAM REMOVAL ELEVATION (LOOKING UPSTREAM)
SCALE: 1" = 20'



PRELIMINARY NOT FOR CONSTRUCTION					
	DATE	#	DESCRIPTIONS	BY	APP
	DRAWN BY: MAO				
	CHECKED BY: JWG				
	APPROVED BY: JWG				
	PROJECT NO.	02450	DATE:	10/11/2024	

TALBOT MILLS DAM REMOVAL / CONCORD RIVER RESTORATION	
PROPOSED DAM BREACH SECTION AND ELEVATION	
OARS, INC. 23 Bradford Street Concord, MA 01742	Gomez and Sullivan Engineers, D.P.C. 41 Liberty Hill Road PO Box 2179 Henriker, NH 03242
SCALE: AS NOTED	DRAWING: 9

6. Response to BHDC Comments on MEPA EENF

This section provides excerpts from the BHDC’s August 25, 2023 letter and report submitted during the MEPA EENF public comment period, along with responses from the project team. These responses were initially published in Section 8.5 of the SEIR (starting on page 120 of the SEIR), but have been updated to replace references to other SEIR comment responses with the direct responses themselves.

The Talbot Mills Dam, which has been in place for nearly two centuries, is uniquely historic and should not be demolished. It not only served the Talbot Mills complex with power, but it also provided the water that made the Middlesex Canal possible, which, in turn, “revolutionized engineering in the U.S., leading to the development of hydraulic cement and serving as the inspiration for the Erie Canal.” As such, it is unique among historic structures. The National Park Service (NPS) has recognized its significance by including it on the National Register of Historic Places (NRHP). . . .

- 1. Response: The project team is committed to working with consulting parties to address the effects of the project on historic properties. Outreach to potential consulting parties has been initiated, and continued discussions will be held to determine ways to avoid, minimize, and/or mitigate adverse effects from the project to historic properties, including archaeologically sensitive areas, in accordance with Section 106 of the NHPA and MGL Chapter 9, Sections 26-27C (950 CMR 70-71). A consultation meeting is scheduled for March 19, 2024, with invited interested and consulting parties. The Section 106 consultation process is anticipated to result in an MOA that will specify measures to avoid, minimize, and/or mitigate the adverse effects.**

Although various rationales have been given for removing the dam and have been accompanied by statements suggesting that removal does not present risks, it is the opinion of the Commission that the underlying motivation for the dam’s removal appears to be purely financial on the part of its owner. This is evidenced by the owner appearing at the recent 7/27/2023 site visit and telling those in attendance that he doesn’t want to pass the responsibility of owning the dam on to his grandchildren, which appears to be consistent with the observations of the Middlesex Canal Commission at its 6/22/2022 meeting, where the meeting minutes state that the owner “said he wants the dam removed as removal ends [his company’s] burdensome responsibility for it.”

Fish Passage

In the various supporting documents offered by the MRWC, the efficacy of a fishway (or fish ladder) seems to have been summarily cast aside in favor of removing the dam. To start, the MRWC Webpage states that removing the dam “would reconnect [upstream] rivers with the ocean.” Yet while characterizing the removal of this dam as a means to reconnect rivers to the ocean, they ignore the fact that there are two additional dams downstream of Talbot Mills. How is it that one dam (Talbot Mills) is a disconnect while the other two dams downstream of it are not? If it’s because those dams have fishways, then isn’t that a tacit acknowledgment that a fishway at Talbot Mills is also a viable option for restoring fish passage?

- 2. Response: The dams downstream of Talbot Mills are active hydropower dams with owners who wish to keep their dams, and consequently are required to provide effective fish passage and continually work with fisheries agencies to monitor fish passage, maintain their fishways, and implement improvements as needed, at the cost of millions of dollars. Fish passage improvements are planned for both the Essex Dam in Lawrence and the Centennial Island Dam in Lowell downstream of Talbot Mills Dam. At Centennial Falls, engineering design for a new nature-like**

fishway is currently underway to improve fish passage efficiency at that site. The Essex Dam is an important part of strategies to restore diadromous fish to the Concord. Fish passage at the dam is provided through a mechanical fish lift rather than a fish ladder. This allows restoration biologists to capture spawning condition herring and shad and transport them to the Concord, effectively restarting the populations once the Talbot Mills Dam is removed.

The MRWC Webpage provides a link titled “Read All Studies” in support of their position. The Commission’s review of those reports showed the following regarding fish passage:

- *2016 Concord River Diadromous Fish Restoration Feasibility Study (2016 Fish Study). It states that three alternatives “were determined to be most feasible” for the Talbot Mills Dam: take no action, construct a fishway, and remove the dam. With regard to building a fishway, the study states that a fishway “would provide effective passage for target species,” and concludes that “a fishway at Talbot Mills Dam is a viable alternative for restoring diadromous fish in the Concord River.” However, whether fish can actually make it to Talbot Mills is another story. The study discusses the remnants of the Middlesex Dam and states that “the natural bedrock ledge of the falls creates turbulence, making it hard for fish to pass upstream. Previous studies have suggested that during low flow conditions in spring, fish passage could be impeded, particularly for river herring and American shad.” And upstream of that, the study notes that the Centennial Dam fishway “has a history of deficiencies and passage efficiency is unknown.”*

3. **Response: Installation of a technical fishway at the Talbot Mills Dam could provide passage for some of the target species under ideal flow conditions and with proper (intensive daily) operation and maintenance. However, passage efficiency of target species would be low, and passage of other aquatic species and overall connectivity of the river would be limited. The obligation to bring the dam into compliance with dam safety regulations as well as the continued responsibility for ongoing operation, maintenance, and liability associated with the dam and fishway would make this alternative prohibitively expensive and not feasible for the dam owner to undertake.**

The 2016 Feasibility Study determined that neither the breached Middlesex Falls Dam nor the Centennial Falls Dam are significant barriers to fish passage. An adaptive management strategy is recommended for the former Middlesex Falls Dam location to evaluate whether future improvements would be recommended to enhance fish passage at that site. At Centennial Falls Dam, engineering design for a new nature-like fishway is currently underway to improve fish passage efficiency at that site.

- *2021 Talbot Mills Dam Removal Targeted Impact Analysis (2021 Impact Analysis). Despite the belief that dam removal would restore fish passage, this report notes that Streamworks [PLLC], a consultant hired by the Town of Billerica, raised doubts about whether dam removal would actually restore fish passage. Specifically, it points to Streamworks’ recommendation that further study was required “to verify that fish would be able to navigate through the site after the dam is removed and provide a contingency for fish passage ... in case remnant falls are not adequately passable for target species.” So not only is it uncertain that dam removal will provide fish passage, but the level of uncertainty is high enough that this consultant recommended a contingency plan be developed to fulfill what appears to be the project’s main purpose.*

4. **Response: Updated hydraulic modeling developed in response to the peer reviewer’s (Streamworks’) comments, as well as additional data collection and analyses, indicates that average**

channel velocities between the dam and the Fordway Bar will not exceed 4 ft/s, which is below the maximum acceptable velocity for passage of target fish species (6 ft/s), as presented in Section 3.5 of the SEIR. Project permits and specifications will include an option for adaptive management during or following construction to modify channel bed elevations within acceptable ranges to achieve project goals. This may include removal of major impediments to fish passage and/or threats to safe recreational navigation within the reach between the dam and the Pollard Street bridge.

- *2021 Merrimack River Watershed Comprehensive Plan for Diadromous Fishes (2021 Fish Plan). The plan states that “NOAA Fisheries Restoration Center and MADMF are working closely with the Talbot Dam owner to improve fish passage at the site with dam removal the preferred alternative.” Note that removal is one alternative, it’s not the only option. The plan later calls into question whether fish are even reaching Talbot Mills, stating that “fish passage effectiveness at the [Centennial Dam downstream of Talbot Mills] has not been evaluated, despite [the dam’s] importance as the first barrier in the system,” and observes that multiple options exist “to provide fish passage, ranging from installing a fish ladder to complete removal of the dam.”*

5. Response: See Response 2 above regarding planned improvements at Centennial Island Dam and Response 3 regarding the evaluation and dismissal of the fish ladder alternative at Talbot Mills Dam.

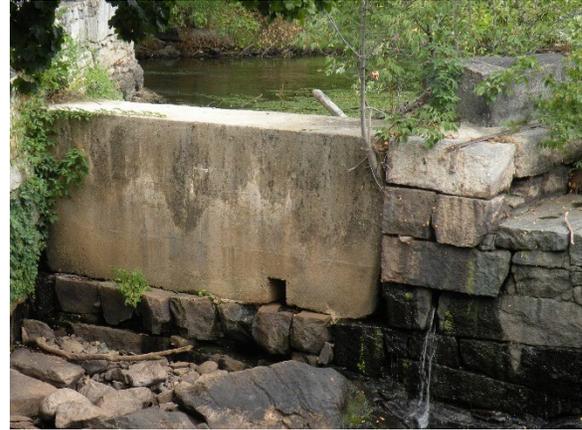
Interestingly, the story map portion of the MRWC Website includes several figures illustrating the extent of the Merrimack River watershed. In those figures . . . the MRWC describes the green portions of the rivers as “habitat available to migratory fish today.” Note that the vast majority of this apparently available habitat is, in fact, upstream of the Essex Dam fishway in Lawrence. So, in the MRWC’s own estimation, fishways increase available habitat above an otherwise impassible barrier like the Talbot Mills Dam.

6. See Response 3 above regarding the effectiveness of fishways in general and specific to Talbot Mills Dam. Again, Essex Dam is an active hydropower dam whose owner is required to provide effective fish passage and continually work with fisheries agencies to monitor fish passage, maintain their fishways, and implement improvements as needed, at the cost of millions of dollars, which is not feasible or appropriate for the Talbot Mills Dam as it is not a hydropower dam.

In addition to the good/passable fishways at the two downstream dams, the installation of a fishway at Talbot Mills would, in fact, be historically accurate, since it apparently had one, though this fact is conspicuously absent from the fish passage section of the MRWC Webpage.

7. There is a long history of fish passage being provided and repealed/removed at the Talbot Mills Dam. Both the 1798 and 1828 dam structures reportedly included a fishway at the northeast (river right) end of the spillway. Maintaining a fishway at the dam was required by an act of the Legislature as early as 1820, which ordered that the fishway be open from April 1 through May 20 and measure at least 15 feet wide (or 6 feet during low flow periods) and 30 inches high (MA Senate and House of Representatives, 1820).

The fishway was reportedly filled with concrete sometime after the 1960s (Ingraham, 1995). However, based on historic plans and reports, it is likely that the former fishway was simply an opening in the dam through which fish could swim under suitable flow conditions. It was assumed to be located in the portion of the right spillway abutment currently comprised of concrete (pictured at right). The granite capstones under the concrete likely formed the sill over which fish were intended to swim. The concrete abutment (and the assumed former fishway opening) is about 16 feet wide by 6.5 feet high with a bottom elevation (top of the granite sill under the concrete) of approximately 104.3 feet NAVD 88. The opening was likely fitted with wooden stoplogs or a gate structure so that it could be closed at times of the year outside of the mandated fish migration period.



It is unknown how effective the former fishway would have been at providing for upstream fish passage under the range of flows experienced during the migration period. It appears to have been essentially a gate opening in the dam abutment that could be opened to allow flow through it during the upstream fish passage period. Water velocities through an opening of this size would range from approximately 4 to 13 feet per second (ft/s) during the upstream fish passage period target design flow range. The upper half of this range exceeds the burst swimming speeds of target fish species (approximately 6 ft/s for river herring or 8.25 ft/s for American shad), and the fishway opening would be fully submerged (pressurized) on the upstream side, making it even less likely that fish would be able to enter it. Additionally, the drop from what is assumed to be the sill of the former fishway (the existing granite sill seen below the concrete abutment, with an elevation of 104.3 feet NAVD88) to the bedrock channel below ranges from 2 to 4 feet (plus the added depth of any water flowing through the fishway would make the drop even greater). The fish species targeted for restoration at this site do not have the ability to “jump” over falls like Atlantic salmon do. The maximum hydraulic drop that American shad and river herring can ascend is approximately 6 to 12 inches. Due to the above findings, it is unlikely that the former fishway effectively passed many fish. A fishway of this design would not be approved by modern regulatory standards.

Water Quality

The MWRC Webpage states that “thousands of people currently get their drinking water from the Concord River and improved water quality will benefit them as well.” Two of the studies available through the “Read All Studies” link at the webpage are illuminating:

2022 Review of 2021 Impact Analysis (Review of 2021 Impact Analysis). This review, also performed for the Town of Billerica by Streamworks, was centered on potential contamination of the Concord River (and, consequently, Billerica’s water supply) due to changes in ground water flow triggered by the removal of the dam. The contaminants at issue would be coming from the Iron Horse Park superfund site, which is located east and slightly north of the Talbot Mills. Streamworks makes numerous concerning observations and statements that cast doubt on the safety, from a water quality perspective, of dam removal. . . .

2022 Talbot Mills Dam Removal Targeted Impact Analysis (2022 Impact Analysis). This report, prepared by Gomez and Sullivan Engineers for the Division of Marine Fisheries, also addressed contamination

concerns and states that “the [superfund] site appears to be hydrologically connected to the dam’s impoundment by a wetted section ... of the old Middlesex Canal.”

8. **Response:** An updated assessment of the Iron Horse Park Superfund site was provided in the EENF and reviewed by Streamworks in their July 14, 2023, review of the EENF that was attached to the Town of Billerica’s EENF comment letter. A field survey conducted in April 2023 confirmed that 1) the canal is completely blocked at the railroad with fill material (no culvert present), 2) water flows east from the railroad toward the Superfund Site, 3) the culvert nearest to the impoundment (Rogers Street) has an invert elevation approximately 2.5 feet above the Talbot Mills Dam, which would be significantly perched above the river post-dam removal. Based on these findings, it was determined that the proposed dam removal project will not result in the migration of contaminants away from the Iron Horse Park Superfund Site.

Streamworks reviewed these findings and recommended no further action on their comments from Gomez and Sullivan (Streamworks’ full response can be found on pages 133-134 of the SEIR). The EPA has also been consulted about the project, and has not identified any concerns or additional data needs.

2022 Intake Pump Performance Analysis (Intake Pump Analysis). Although this analysis was limited to pump performance questions stemming from the lowering of the Concord River’s water surface due to dam removal, the authors apparently felt it necessary to make observations about water quality. While they state that they don’t anticipate hydraulic issues to arise, they immediately (in the same sentence) note that “changes in water quality at the intake are difficult to predict.” They then go on to recommend that Billerica construct “a second water supply intake and pump station at an alternative location on the Concord River” or get “an alternative water supply source for the Town.” And why did they recommend this? Because the town has “only one water supply source and a single intake at their existing intake pump station” and because of “the unpredictable adverse effects to the Concord River from contamination.”

9. **Response:** Extensive studies have been conducted to assess potential impacts to the Town of Billerica’s water supply intake. These studies were scoped in collaboration with the Town DPW and peer reviewed by their consultants, Woodard & Curran and Streamworks, as well as by DEP. Woodard & Curran noted that changes in water quality at the intake are difficult to predict. However, if anything, dam removal may improve water quality by increasing flow velocity and reducing water temperature, which can lead to less stagnation, sedimentation, and other issues that could affect water treatment costs. In an EENF comment letter dated August 25, 2023, DEP Northeast Regional Office (NERO) concurred that “Based on the studies conducted, it does not appear that removal of the Talbot Mills Dam will have a significant impact on Billerica’s intake pump.”

Upstream and Downstream Flood Hazards

The MWRC Webpage states that removing the dam would “remove the risk of a catastrophic failure of the dam, which would release a significant amount of water at once, potentially flooding downstream properties.” Yet this risk is never quantified. A proper risk analysis requires two assessments – 1) the likelihood of the event occurring and 2) the consequences of the event if it occurs. We have yet to see any quantitative study assessing the potential for the dam to fail; in fact, we note that its condition, as discussed below in the Aging Infrastructure section, is quite good. With regard to the potential consequences, the wording by MRCA says “potentially flooding” without quantifying this potential. Importantly, the nature of the speculated flooding (e.g., its extent and severity) is not presented to the

reader. Studies assessing, in part, potential flooding have been performed. . . . [Refer to original comment letter in Appendix H for additional context from previous studies.]

10. Response: A dambreak analysis was conducted by Geotechnical Consultants, Inc. and summarized in a letter to the DCR Office of Dam Safety dated June 2, 2009. A flow of 6,000 cfs was modeled, which is comparable to the 100-year (1% AEP) flood (5,675 cfs per the current Flood Insurance Study). A breach width of approximately 25 feet was assumed for the 127-foot-long spillway. The results indicated that the incremental rise in downstream flood elevations due to the dam breach (above existing flood elevations) would be approximately 0.2 feet. A greater potential risk, and the reason that the dam is classified as Significant Hazard Potential, is the risk of damage or possible loss of life associated with the downstream Faulkner Street Bridge and mill buildings.

Decommissioning Aging Infrastructure

We find it interesting that MRWC uses the term “decommissioning,” since that implies taking the dam out of service. Yet what’s being proposed is not decommissioning it; it’s destroying it. But aside from nuances of word choice, the structure of the dam is actually in good condition. . . . In spite of [dam safety inspection] documents characterizing the dam as being in fair condition, and in spite of this characterization being based upon poor maintenance and operation of the dam rather than the condition of the dam itself, the MRWC Website’s story map appears to intentionally mislead the reader by stating that “Talbot Mills Dam is aging and in poor condition.”

11. According to the most recent (2021) dam safety inspection, the Talbot Mills Dam was found to be in “fair” condition. The following deficiencies were noted:

- **Lack of an operation and maintenance plan**
- **Lack of routine oversight of the dam, particularly during storm events**
- **Lack of working controls**
- **Lack of a functional low-level outlet**
- **Leaks and inability to control water at sluiceway gate and weir**
- **Trees located just downstream of the primary spillway and on the upstream face of the left embankment near the former intake gates to the Talbot Mills complex**

The following remedial measures were recommended in the inspection report:

- **Prepare an Emergency Action Plan (EAP).**
- **Prepare and implement a comprehensive maintenance and routine inspection plan.**
- **Remove trees on the upstream face of the roadway embankment near the non-functional intake gates to the Talbot Mills Complex.**
- **Remove tree trunks and branches just upstream of the primary spillway.**
- **Repair/replace the sluiceway and stilling basin gates so that the gates are operational and can provide emergency bypass control.**
- **Inspect the interior of the Talbot Mills complex, particularly the downstream end of the former intake structures. The infilling of the intake tunnels on the left side of the dam rendered these intakes inoperable. Given the configuration of the dam, proximity of the mill complexes, and changing ownership of the downstream properties, the reconstruction of a low-level outlet in this area is impractical.**
- **Repair/replace the left spillway abutment to provide an operational low-level outlet and emergency bypass control.**

Additionally, detailed hydraulic analyses conducted for this project found that the dam does not meet the dam safety requirement of being able to pass the spillway design flood—in this case the 100-year flood—without overtopping³. If the dam were to remain in place, an engineering assessment would need to be conducted to confirm this finding and investigate options to increase spillway capacity. The amount of water that can pass over a spillway is a product of length of the spillway, the depth of water atop the spillway (head), and a weir coefficient (which is related to the spillway shape and head). The capacity of an existing spillway can be increased by lengthening the spillway crest and/or increasing the operating head or weir coefficient. Some increase in the weir coefficient may be possible by improving the spillway crest shape (e.g., from broad-crested to an ogee crest), but this approach is generally costly for the limited results attained. To increase head, the spillway crest elevation would need to be lowered. Due to the physical constraints at the site (i.e., the road, parking lot, and bridge bounding the current spillway), increasing spillway length is not feasible without replacing the spillway with an alternate design such as a labyrinth weir, which uses a zig-zag layout to fit more spillway length within a given overall structure width. Any of these potential spillway retrofit/replacement projects would involve destruction or significant modification of the historic structure and many of the associated impacts of dam removal with none of the ecological or other benefits, likely at a substantially higher cost.

³ This finding contradicts that in the most recent dam safety inspection report (GCI, 2021) but is based on an updated analysis and more detailed hydraulic modeling.