PROPOSAL FOR:

# PARKER MILL DAM CONSULTING SERVICES

Wareham, Massachusetts

August 19, 2021

***Submitted by:***

**Horsley Witten Group, Inc.**

***Submitted to:***

**Derek Sullivan, Wareham Town Administrator**

Town Hall

54 Marion Rd

Wareham, MA 02571

*www.horsleywitten.com*

Horsley Witten Group
*Sustainable Environmental Solutions*
90 Route 6A • Unit 1 • Sandwich, MA 02563
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August 19, 2021

Mr. Derek Sullivan
Town of Wareham Town Administrator
Town Hall
54 Marion Road
Wareham, MA 02571

Re: Proposal for Parker Mill Dam Alternatives Assessment Feasibility Study

Dear Mr. Sullivan:

The Horsley Witten Group, Inc. (HW) is pleased to provide this proposal to the Town of Wareham (the Town) in response to the Request for Qualifications (RFQ) regarding a feasibility study assessment of alternatives for the Parker Mill Dam in Wareham, Massachusetts. Please consider the following when evaluating our proposal:

- **Extensive experience with similar dam alternatives feasibility studies and all the related components of field work, hydrologic and hydraulic modeling, and design alternatives.**
- **Teaming with Weston & Sampson, Inc. to provide expert dam inspection and structural engineering support.**
- **Local, Cape Cod based small business.** HW's main offices are located in Sandwich, Massachusetts in close proximity to the project site.
- **Comprehensive range of environmental services and experience,** including land surveying, engineering design, ecological assessment, hydrologic assessment, environmental modeling, mapping, GIS analysis, remediation, landscaping, permitting, construction administration, statistics, and graphics to accommodate any foreseeable task to implement wetlands and riverine restoration projects.
- **Dedication to serving the public and non-profit sectors with cost-effective and significant deliverables.** We have made it a point to provide effective services to the public sector and non-profit organizations. Most of our senior staff have served in these sectors and understand the issues, processes, and constraints that may exist. We are motivated by doing the right thing for the environment.

Please find enclosed our proposed approach and scope of work, budget, qualifications, references, and attachments for resumes and select project descriptions. We have proposed a Project Approach and Scope of Work based on our related experiences and professional judgment that meets our understanding of the Town's goals for this initial project phase while staying below the RFQ-stated budget ceiling for the project. We are open to discussing with the Town modifications to the Scope of Work and resulting budget to best meet Town goals and available budget.

HW is committed to successfully implementing this project. Our proposal package has been assembled to respond fully to the requirements and selection criteria described in the RFQ. We agree to abide by all terms and contract stipulations of the RFP and documents referenced

therein. Please contact us if you have any questions or would like to discuss any aspect of our submittal. We look forward to hearing from you favorably.

Please note that Neal Price, acting as Project Manager will be assigned to be the main contact for all dealings with the Town. Neal can be reached at (508)833-6600 or nprice@horsleywitten.com. This proposal is valid for ninety days past the submission deadline.

Sincerely,

HORSLEY WITTEN GROUP, INC.

Richard A. Claytor, Jr. P.E.
President

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# I QUALIFICATIONS

## Statement of Qualifications

### Horsley Witten Group:

The Horsley Witten Group, Inc. (HW) is pleased to submit the following proposal to assist the Town of Wareham (the Town) with this study to evaluate the feasibility of different scenarios of dam removal, repair, or replacement for the Parker Mill Dam on the Wankinco River in Wareham, Massachusetts. We are pleased to include Weston & Sampson, Inc. (WSI) on our team to better serve the Town on this important project. WSI's role will primarily be structural engineering related to the dam's safety and rehabilitation feasibility options, but it will also provide support to HW on other project tasks. Together the HW and WSI Team provides the Town with a uniquely qualified Team with multiple layers of expertise for all project topics.

Our Team experience broadly covers the full range of services required for this project including, among others, restoration planning, feasibility analysis, structural engineering land surveying, hydrological and hydraulic analyses, resource area delineation, habitat assessment, technical studies, alternatives analysis, engineering design, and construction cost estimation.

HW is a forward-thinking engineering, planning, and environmental consulting firm providing sustainable design solutions for over 30 years. Our success can be attributed to a combination of innovation, responsiveness, and client satisfaction. Our dedicated staff of highly skilled professionals manages complex projects in New England and beyond. We excel as a liaison between decision makers and the public, translating technical subjects into understandable concepts. Our multidisciplinary-team approach integrates resilience, science, sustainable civil engineering, urban design, and landscape architecture.

Our projects address critical environmental challenges including climate change, coastal resiliency, watershed health, and open space and natural resource protection. Our services include site design, green infrastructure, water and natural resources study and restoration, smart growth planning and community design, zoning regulation review, and emergency preparedness. Our clients include the U.S. EPA, NOAA, and the U.S. Department of Justice as well as more than 100 New England municipalities (including Wareham on multiple occasions), several state agencies, tribal agencies, non-profit organizations, private organizations, and multiple universities and colleges. HW is a New England-based corporation headquartered in Sandwich, MA with regional offices in Boston, MA, Providence, RI, and Exeter, NH. For more information, visit us at horsleywitten.com or facebook.com/HorsleyWittenGroup.

### Weston & Sampson:

Since 1899, Weston & Sampson has been providing municipalities, public agencies, and private sector clients with cost-effective and innovative solutions to their infrastructure and environmental challenges. With nearly 700 professionals along the East Coast, employee-owned Weston & Sampson offers capabilities ranging from project development and planning through design, construction, and long-term operation and maintenance. Throughout its history, Weston & Sampson has been recognized for exceeding clients' expectations by providing attentive personal service, superior technical quality, and adherence to cost and schedule requirements. We pride ourselves on

the expertise that our staff provides on each assignment, including the dam safety, geotechnical, structural and water resources engineering services critical to this project.

## Key Personnel

Based upon staff experience, delineation of primary staff responsibilities for the work outlined herein is indicated below. Resumes for key staff have been provided as an attachment to this proposal.

**Horsley Witten Group:**

### Neal Price, Principal Scientist

Neal will serve as the **Project Manager**, bringing over 25 years of professional experience in the fields of hydrology and hydrogeology. Neal will be actively involved, managing all aspects of the project and will be the contact point for the client and stakeholders. The nature and extent of the work that he conducts at HW includes stream and wetlands restoration, groundwater and surface water modeling, watershed and drinking water protection studies, water supply investigations, sediment quality and dredging assessments, nutrient management, wastewater disposal feasibility studies, and estuarine hydrology studies, as well as development review and permitting. Neal has conducted and managed more than two dozen wetlands/stream restoration projects at HW and has led all of our dam removal/feasibility work, including the Ipswich Mills dam removal feasibility study highlighted in this proposal that is highly similar to the subject Parker Mill Dam study.

### Richard A. Claytor, Jr., P.E., Principal Engineer

Rich will serve as the **Principal in Charge**. Rich has more than 30 years of practical experience in civil and water resource management experience with specific expertise in stream restoration, stormwater management, hydrologic/hydraulic modeling, watershed protection and restoration implementation, and low impact development (LID) research and design. Rich has managed stream geomorphic assessment and design projects and authored a variety of publications on stream restoration design and implementation. Rich received the 2009 Clean Charles Award for his committed restoration work for the Charles River Watershed Association. He is also the proud recipient of the NEMO Lifetime Mensch Award, awarded to him in 2010 by the National Nonpoint Education for Municipal Officials (NEMO) Network for a lifetime of work contributing to the protection of our nation's water resources.

### Michelle West, P.E., Project Manager / Senior Water Resources Engineer

Michelle wills serve as the **Project Engineer**. She has more than 18 years of professional experience. With a background in both engineering and natural resources, she is passionate about using her skills to restore the natural world while improving the human experience. Her specific expertise is in stormwater management and policy; watershed planning; green infrastructure (GI) assessment, design, and implementation; stream, wetland, and other ecosystem restoration; and GIS mapping and modeling. Michelle was the Project Manager for our Fuller Brook and Ten Mile River restoration projects. She believes outreach and capacity building is vital to affecting change, and she has enjoyed working with state and local governments to update stormwater

management manuals and regulations and leading dozens of workshops on topics ranging from stormwater 101 to hands-on erosion control trainings for contractors and regulators. Michelle received her master's degree in Environmental and Water Resources Engineering from the University of Michigan.

### Brian Massa, LSP and Environmental Engineer

Brian will serve as HW's **Licensed Site Professional** assisting with sediment evaluation. Bryan is a Senior Scientist and Licensed Site Professional at HW with over 15 years of experience in the environmental field. He has a B.S. in Environmental Engineering from Wentworth Institute of Technology. His experience has included the completion of Phase I and Phase II Environmental Site Assessments for due diligence purposes, remediation design and oversight, risk assessments, landfill construction oversight and monitoring, soil gas and indoor air assessment, and environmental chemistry. Notably with regards to this project, Bryan has completed two in-river remediation projects that each removed tens of thousands of cubic yards of contaminated sediments from the river channels. Those projects both included components of dewatering, sediment control, bank stabilization and restoration that are common and standard for dam removals, culvert replacements, and other river restoration projects.

### Amy M. Ball, PWS, CWS, Senior Wetlands Scientist

Amy will serve as the **Wetlands Resources Specialist**, advising on permitting, wetlands, botanical, ecological, rare species, and wildlife habitat related components of the project. At HW, Amy manages projects requiring inland and coastal wetland resource area determinations, wildlife habitat assessments, impact mitigation, and regulatory compliance with more than 22 years of experience. Amy prepares permit applications and written narratives for projects requiring federal, state, and local permits pursuant to laws, regulations, and policies governing water resource protection. Amy frequently appears before local conservation commissions and state and federal regulatory authorities as a project representative or reviewing consultant. Amy also currently serves on the Board of Directors for the Massachusetts Association of Conservation Commissions (MACC), a non-profit organization whose mission is provide education and support for Conservation Commissions. She is also a Certified Wetland Scientist (CWS) in the State of New Hampshire and has significant project experience through New England.

### Dan MacKenzie, Professional Land Surveyor

Dan will serve as the **Professional Land Surveyor** for the project and has over 20 years of professional experience in land surveying, engineering and GIS. Dan's extensive knowledge of surveying and mapping allows him to compliment any type of project, whether it be planning, engineering design, permitting or construction. Having worked on dozens of wetlands restoration projects during his time at HW, Dan has a sound understanding of the importance of surveying to ultimate project goals. He has also worked in both the public and private sectors in the past and, has completed boundary surveys, subdivision plans, Land Court plans, ALTA title insurance and easement plans, plans for permitting, route surveying for utility installations, and topographic surveying for engineering design and plan review. Dan is also well versed with AutoCAD, ArcMap, GPS Pathfinder, and TDS Foresight surveying, mapping and GIS software packages.

**Weston & Sampson:**

**Thomas Strike, PE** will serve as the project **geotechnical and dam safety engineer**. He will be responsible for the day-to-day progress of your project. In this dual-role, Tom will monitor the performance of the project team, review budgets, ensure technical quality, monitor personnel assignments and allocations, and lead all design tasks. He is a Massachusetts Registered Professional Engineer with over 20 years of experience in geotechnical engineering design. Tom's specific areas of expertise include dam safety engineering, foundation design, retaining wall and slope stability analyses. Tom has managed numerous dam rehabilitation and modification projects, including those for Nabnassett Pond Dam in Westford; Babson Reservoir Dam in Gloucester; Middle Pond Dams #1 through #4, Big Bearhole Pond Dam, and Lake Rico Dam in Taunton; and Upper Reservoir Dam in Goffstown, NH.

**Nathan Seifert, PE** will serve as the project **structural engineer**. Nathan is a team leader in Weston & Sampson's structural engineering department with more than 25 years of experience, including design for dams and bridges. Nathan was the structural designer for the Hoppin Hill Dam Renovation project in Attleboro, which included rebuilding a concrete spillway and discharge channel. In addition, he assisted with the complete reconstruction and relocation of the 16-meter single-span Mountain Road Bridge over Mill Brook in Charlemont.

**Andrew (Andy) Walker, PH, CFM** will provide additional **hydrologic and hydraulic modeling** support to HW on this project. Andrew is a water resources engineer with over 10 years of experience working as a hydrologist on dam improvement projects. He has worked on numerous dam projects providing hydrologic and hydraulic studies, breach analyses and inundation mapping for inspections, EAPs, dam rehabilitations, and dam removals throughout New England. He specializes in watershed hydrology, as well as spillway and river channel hydraulic analysis and design, and is well-versed in computer-aided hydrologic and hydraulic analytical tools such as HydroCAD, HEC-HMS, and HEC-RAS. Andy has completed more than 30 dam breach analyses and prepared inundation maps for a variety of conditions including analysis of multiple reservoirs in series along river channels. Andy performed the hydrologic and hydraulic engineering support for dam rehabilitation projects in Attleboro, Cambridge, and Taunton, Massachusetts, and Bristol, Glastonbury and Stafford, Connecticut, among others.

## Prior Experience

Please consider the following overview of our Team's qualifications germane to this RFP. Project Descriptions for selected relevant projects are included with this proposal.

**Horsley Witten Group:**

HW's proposed Project Manager for this project, Neal Price, and the rest of our proposed staff conducted all of the following highlighted work:

- A recently completed dam removal feasibility study for the Ipswich Mills Dam in Ipswich, MA that was nearly identical in scope to the current Parker Mill Dam project. The Ipswich Mills project included field data collection, historic research, hydrologic and hydraulic modeling, and structural assessments to evaluate the potential positive and negative impacts from different dam removal scenarios on nearby structures, flooding, wetland resources, tidal dynamics, fish passage, ecology, recreation, historical resources, water quality, sediment management, and aesthetics. The project is currently in a phase of detailed evaluation of potential structural impacts to nearby mill buildings before it can proceed to more advanced design and permitting.

- A dam removal and upstream culvert replacement at Sucker Brook in Pepperell, MA that included many of the same assessment topics as listed above for Ipswich Mills, absent the potential structural impacts as the project is located along an undeveloped river reach. This project has progressed through permitting and final design and is planned for construction in the fall and winter of 2021.
- A restoration project for the Red Lily Pond/Lake Elizabeth system in Barnstable, MA. The system currently includes two large impounded ponds, a dam and fish ladder, a brackish coastal outlet stream, three culvert crossings, and a pedestrian bridge crossing. HW has completed a restoration feasibility study that included site survey, long term hydrologic monitoring, groundwater and surface water modeling, and conceptual design of culvert replacement and dam removal elements. Permit level designs have also been completed for a dam removal and replacement with a nature-like fishway. We are currently working on a grant proposal to fund final construction plans and construction for one new culvert and the new fishway.

- Over a dozen culvert replacement and salt marsh restoration projects on Cape Cod and in southeastern Massachusetts including projects at: Red River Beach in Harwich, Crosby Landing in Brewster, Labor in Vain Brook in Somerset, Scorton Creek in Sandwich, Bass Creek in Yarmouth, Conservation Pond and Bourne Fishway in Bourne, Medouie Creek and Consue Springs in Nantucket, Phinney's Bay in Barnstable, Barnstable Harbor Creeks in Barnstable and Yarmouth, Dyer Prince Road in Eastham, and Mattapoisett Neck in Mattapoisett. Each of these culvert replacement projects includes many of the same components of hydraulic modeling, tidal assessment, and impacts assessment as occur for dam removals. In fact, these undersized culverts typically act as small dams impounding water behind them. The goal of these culvert replacement projects is to remove the impounding

effect of the culvert to the maximum extent practical without causing undesired hydraulic or other impacts.

- A freshwater culvert replacement/ impoundment removal in Chilmark, Massachusetts that recently completed currently permitting and is now in the final design phase.
- Two significant stream and wetland restoration projects completed through construction in recent years: the Fuller Brook Park restoration in Wellesley, MA (construction currently in final stages) approximately 2 miles of river channel were restored and/or relocated and a wet meadow was created; and the Ten Mile River in Attleboro, MA, where HW has designed approximately 2,000 linear feet of river restoration and bank stabilization with invasive species management and storm water management.

*Fuller Brook before (left) and immediately after restoration (right)*

- A dredging and stream restoration feasibility study in a park environment in Winchester, MA, culminating in several conceptual restoration design options for an approximately half mile stretch of the Aberjona River. The river is impounded in the park and the project included testing and disposal feasibility analyses for contaminated sediments retained in the impoundment. The project has recently received funding to progress further into the design phase.
- We worked with the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Justice (DOJ) for over 15 years on a multi-phase project related to assessing and evaluating impacts to aquatic resources, and designing restoration remedies for a cranberry bog owner's violations of the Wetlands Protection Act (WPA). Our work has included field hydrology and wetlands monitoring and investigations; "forensic" groundwater modeling to estimate pre-cranberry bog hydrology and wetlands extent; expert witness testimony; research and analysis of nutrient attenuation capacity of cranberry bogs and wetlands to inform a "significant nexus" evaluation of significant site physical, chemical, and biological connection for the purpose of evaluating the jurisdictional applicability of the WPA to waters of the U.S.; and various stream and wetland restoration designs to support court-ordered remedial restoration of cranberry bogs.

**Weston & Sampson:**

- **Great Dam – Exeter, NH** – Weston & Sampson conducted a feasibility study for dam removal, partial dam breach, and dam modification alternatives for a historical head-of-tide dam in the Town's mill district. WSI developed a watershed model to evaluate design flows, including flood conditions, typical critical bioperiod flows, and summer flows. A hydraulic model of the dam, including more than two miles of upstream and downstream river floodplain, was developed to evaluate the hydraulic impacts of dam removal/modification on flooding, surface and groundwater drinking water supplies, and bank stability. A detailed sediment transport model was developed to evaluate the transport potential of accumulated sediments upstream of the dam. Great Dam was successfully removed in 2014. The site of the former dam retains several historic features and its value as an aesthetic, recreational, and cultural resource are popular with the residents of Exeter.

- **Mill Pond Dam – Durham, NH** – Weston & Sampson conducted a feasibility study for dam removal, partial dam breach, and dam modification alternatives for a head-of-tide dam in a federally recognized historic district. Developed a watershed model to evaluate design flows, including flood conditions, typical critical bioperiod flows, and summer flows. A hydraulic model of the dam, including more than two miles of upstream and downstream river floodplain, was developed to evaluate the hydraulic impacts of dam removal/modification on flooding, habitat availability, and recreational opportunities. A detailed sediment transport model was developed to evaluate the transport potential of accumulated sediments upstream of the dam into Great Bay, which is a critical and endangered estuary in coastal New Hampshire. The Town is actively studying the dam and evaluating options based on this study.


- **Massasoit State Park Dams – Department of Conservation & Recreation Office of Dam Safety – Taunton, MA** – Weston & Sampson conducted hydrologic and hydraulic, engineering and landscape design, and construction management services for five dams in Massasoit State Park. The dam crests and impoundments are used for recreational purposes. Each dam was in poor condition with deficiencies including uncontrolled seepage, marginally stable slopes, embankment erosion, and excessive woody growth on the embankment slopes. Completed stability, seepage, and hydrologic and hydraulic analyses to evaluate dam rehabilitation alternatives to bring the dams into compliance with dam safety requirements. Dam rehabilitation included tree removal, regrading and armoring the embankment slopes, installing mineral filters, raising and improving the crests, and outlet improvements and abandonment. Weston & Sampson worked closely with DCR staff to incorporate recreational park improvements into the project including ADA access, a timber pavilion structure, and beach improvements.

- **Lake Ripple Dam – Grafton, MA** – Weston & Sampson conducted a Phase II Investigation and engineering design, permitting, and construction management services for the 250 ft. long, 15 ft. tall dam that impounds Lake Ripple which is used for recreation. The dam had numerous deficiencies including uncontrolled seepage, thick overgrowth, inadequate slope protection, inability to safely pass the spillway design flood, and numerous structural defects. Completed stability, seepage, and hydrologic and hydraulic analyses to evaluate dam rehabilitation alternatives to bring the dam into compliance with dam safety requirements. Dam rehabilitation included constructing a new reinforced concrete auxiliary spillway and training walls, repairing deteriorated concrete, regrading the crest, and regrading and armoring the embankment slopes. Rehabilitation construction was completed in 2013.

- **Babson Reservoir Dam – Gloucester, MA** – Weston & Sampson conducted engineering design, permitting, and construction management services for rehabilitation of the 675-foot-long, 44-foot-tall dam that impounds one of the City's drinking water supply reservoirs. The dam had become heavily overgrown with trees and brush and the spillway capacity was considered inadequate. Detailed hydrologic and hydraulic analyses were performed to evaluate suitable combinations of changes to the spillway weir length, spillway location, and dam crest elevation to safely pass the spillway design flood. Based on these analyses, dam safety requirements, and City objectives, dam rehabilitation included construction of a baffled chute spillway and vertical extension of the dam core wall, removal of all vegetation and replacement with suitable turf, installation of a seepage collection system, and modifications to the water treatment works. Rehabilitation construction was completed in 2015.

- **Hoppin Hill Reservoir Dam – Attleboro, MA** – Weston & Sampson conducted engineering design, permitting, and construction management services for rehabilitation of the 1,000-foot-long, 23-foot-tall dam that impounds one of the City's drinking water supply reservoirs. The dam had significant structural, operational, and maintenance deficiencies. Applied for funding on behalf of the City through the Massachusetts Executive Office of Energy and Environmental Affairs and received $1,000,000 in a combined grant and low interest loans. Dam rehabilitation included installation of a mineral filter to control seepage, flattening of the embankment slopes to increase stability, demolition and replacement of the spillway and discharge channel structures, extension of the low-level outlet (LLO) pipe, and replacement of the LLO gate. Rehabilitation construction was completed in 2016.

- **Lexington Reservoir Dam – Lexington, MA** – Weston & Sampson conducted a Phase II Investigation and engineering design, permitting, and construction management services for the 600-foot-long, 10-foot-tall dam that impounds Old Reservoir, which is used for recreation. The dam had numerous deficiencies including significant tree growth, uncontrolled seepage, and an inoperable low-level outlet (LLO). Completed stability, seepage, and hydrologic and hydraulic analyses to evaluate dam rehabilitation alternatives to bring the dam into compliance with dam safety requirements. Dam rehabilitation included tree removal, regrading and armoring the embankment slopes, installing a mineral filter, raising the crest, and replacing the LLO pipe. Rehabilitation construction was complete in 2018.

## References

As requested by the RFP, four total references are provided below (two each for HW and WSI). Additional client contact information is provided on each of the attached Project Descriptions.

| Project | Contact | Phone | Email |
|---|---|---|---|
| Ipswich Mills Dam Removal (HW) | Kristopher Houle (MassDER) | 617-626-1543 | Kris.houle@state.ma.us |
| Sucker Brook Dam Removal (HW) | Joseph Gould (MassDER) | 617-626-1581 | Joseph.gould@state.ma.us |
| Lexington reservoir Dam (WSI) | John Livsey (Lexington Town Engineer) | 617-861-2757 | JLivsey@lexingtonma.gov |
| Massasoit State Park (WSI) | Daniel Mortell (DCR ODS) | 508-792-7716 X218 | dan.mortell@state.ma.us |

# II PROJECT PURPOSE AND APPROACH

## Background

Parker Mills Dam is a head of tide dam that impounds Parker Mills Pond, which previously provided hydro power to the Tremont Nail Company downstream and currently serves as a water supply for cranberry bogs upstream. The dam was originally constructed in the mid 1800's and there are no records of its construction. It is an Intermediate sized, high hazard potential structure that is rated in poor condition. The dam consists of a 415-foot-long earthen embankment structure with upstream and downstream dam retaining walls. The crest supports Elm Street and a concrete sidewalk. The upstream side of the earthen embankment dam slopes into the upstream pond with a stacked cut stone retaining wall near the crest supporting the roadway. The right side of the downstream side of the dam is supported by the foundation wall of the former Tremont Nail Company (mill) building. The left side of the downstream side of the dam includes the primary spillway with two stoplog control bays, an earthen slope, an auxiliary spillway with two stoplog bays, and a fish ladder. The fish ladder was reportedly constructed in 1952 and reconstructed in 1975.

Flow through the primary and auxiliary spillways pass through culverts below the roadway. There is an additional outlet from the pond through the former mill building consisting of two 30-inch-diameter

concrete pipes regulated by stoplogs; this outlet is currently inactive. An approximately 120-foot-long earthen dike extends from the left end of the dam to the left abutment at the Route 28 roadway embankment. The dike is about 5-feet-high with a granite block wall along the upstream side, a 12-foot-wide crest, and 3.25H:1V downstream slope.

Pare Corporation prepared a Phase II Inspection / Evaluation Report in August 2008 on behalf the Town. Their inspection services included an underwater inspection of the spillways and other areas of the dam, a geotechnical subsurface exploration program, survey of the dam and spillway, and wetland delineation. The hydrologic/hydraulic assessment determined that the outlet structures have the capacity to pass up to an approximately 100-year storm but cannot accommodate flows associated with the spillway design flood (1/2 PMF) without overtopping the dam. The static stability analysis determined that the upstream, downstream, and spillway channel walls are marginally stable and do not meet the required factors of safety.

The most recent Phase I Inspection/Evaluation Report was also completed by Pare Corporation on March 24, 2020. The report rated the dam in poor condition with numerous deficiencies including, unstable deteriorated structure walls, seepage and leakage, the presence of sinkholes, undesirable vegetation, and insufficient hydraulic capacity to safely pass the spillway design flood.

## Approach

Parker Mills Dam is a historic icon within the Town that is directly and symbolically connected to the Town's industrial and agricultural past, present, and future. Its location is popular for recreational, meeting, and commercial purposes. With its location at the head of tide, the dam also impacts important riverine and ecological factors such as tidal dynamics, fish passage, and habitat. With its dichotomy of uses, functions, benefits, impacts, and sense of place, Parker Mills Dam has much in common with many historic dams in New England constructed in a bygone time and whose future is under re-evaluation in the context of current conditions. Through this project the Town seeks to better understand the pros and cons of various options for the dam as they relate to a set of varying interests including safety, cost, habitat, flood control, recreation, agriculture, and Elm Street use. Broadly speaking, and as is typical for these types of projects, there are three general options available:

- Restore/Repair/ or Replace the dam in some form and size similar to its current condition;
- Restore/Repair/ or Replace the dam with a smaller hydraulic drop and/or different spatial footprint;
- Remove the dam entirely to restore naturalized tidal flow, riverine hydraulics, fish passage, and sediment transport.

Along with these three generalized dam options are additional options for restoring, modifying, or eliminating the Elm Street Bridge. Bridge options influence overall hydraulic characteristics of the selected dam option as well as use considerations for the site revolving around vehicular and pedestrian access.

As is also typical of these type of projects, the metrics or factors to be evaluated include, at least, fish passage, habitat, tidal and river flow dynamics, flood control, sediment management, climate change resiliency, safety, nearby properties, historical factors with the Tremont Nail Factory district, agriculture, recreation, public and private infrastructure, and aesthetics. Our services will evaluate

conceptual alternatives analyses related to these factors and to meet dam safety requirements including dam rehabilitation, a partial dam breach, or complete dam removal.

# III SCOPE OF WORK

The following Scope of Work is proposed to be responsive to the goals of the RFP. The RFP does not spell out a specific set of tasks. Therefore, based upon our review of the RFP and available background materials, and our experience with similar projects, we have proposed the following Scope of Work intended to answer the most important questions regarding dam removal/ repair options, and evaluate potential future evaluation needs, without overdoing the amount of field work or analysis at this initial stage. We have proposed a relatively minimalistic approach for this initial evaluation phase that can potentially be expanded upon in future project phase, once the desired overall approach has been selected by the Town. HW is open to modifications to our proposed scope in discussion with the Town in order to best meet the project goals within available budget constraints or to provide the Town with more comprehensive field or analysis efforts.

## Task 1. Project Management, Meetings, and Communication

The HW/WSI Team will work closely with the Town and other Project Partners to provide open and frequent communication on project status and receive input on key project decisions. We propose the following components for this task but are open to modification to suit Town needs.

- A kickoff conference call meeting, assumed to be in person at the site, but could be virtual;
- Up to two additional in-person meetings;
- Up to four virtual meetings or conference calls; and
- Ongoing email and phone calls as necessary.

## Task 2. Data Collection

The Team will collect necessary data to inform the H&H modeling, related analyses, and preliminary designs that are the ultimate deliverable for this project. This task will include both compilation and assessment of existing data as well as the collection and assessment of necessary new field data.

### *Task 2.A. Existing Information*

The Team has already obtained approximately two dozen documents from the Division of Conservation and Recreation (DCR) related to the dam. We will share that list with the Town to determine if there are other documents or information sources to also obtain and review. We will also compile, review, and assess other available existing data such as MassGIS data layers, LiDAR, FEMA, USGS, Town supplied data (GIS, assessor's maps, plans, utility information), and historical map data to prepare a preliminary base plan for the project work areas. We will use this base plan to coordinate field survey and provide the most effective use of field personal time.

### *Task 2.B. Site Inspection*

The Team will conduct a Site Inspection of the project work areas to assess overall site conditions, streamline field activities, and inform potential restoration options. This inspection will be led by the

HW Project Manager and will be coordinated to occur with the Task 1 kickoff meeting. The Team will install three water level data loggers (below the dam, between the dam and bridge, and above the bridge) to evaluate water level fluctuations for use in Task 3 H&H modeling and to assess the extent to which the dam and bridge impact water levels above and below them. We will also collect flow data in the field (if a suitable location is available) to compare to results from the various estimatin methods described in Task 4.

*Task 2.C. Wetlands Resources Delineation*

The boundaries of resource areas in the immediate vicinity of the dam and culvert work areas jurisdictional under the Massachusetts Wetlands Protection Act and the Wareham Wetlands Bylaw will be delineated at the site by HW wetland scientists. Field delineation will be limited to the areas within direct probable construction impact of any of the likely options, shortly upstream and shortly downstream of both the dam and bridge. Potential indirect resource area impacts (e.g. from changes in impoundment extent) will be estimated based on available MassGIS data.

Resource areas anticipated to be encountered include Bordering Vegetated Wetland (BVW), Inland Bank, Coastal Bank, Filled Tidelands, Bordering Land Subject to Flooding (BLSF), Land Under Waterbodies and Waterways, and Riverfront Area. HW wetlands scientists will delineate the boundary of BVW and the mean Annual High Water (MAHW) line (equivalent to Ordinary High Water (OHW)) from which Riverfront Area is established. In determining the boundary of BVW HW will follow the delineation methods as described in the Massachusetts DEP handbook, the regulations at 310 CMR 10.55(2), and local wetland regulations and policies. HW will follow the regulations at 310 CMR 10.58(2) to determine the extent of MAHW/OHW along the river. Wetlands flags will be located by field survey as part of Task 2.D.

*Task 2.C Deliverables:* ***To be included on Task 2.D. Existing Conditions Plans.***

*Task 2.D. Topographic Survey*

HW will collect topographic survey data necessary to complete an H&H model evaluation of the project area, inform sediment management evaluations, and inform preliminary restoration option evaluations. Planning-level topographical survey will be collected and generated in the vicinity of the dam and bridge that includes details of the dam and bridge, walls, visible utilities, resource area flagging, edge of tree line, hardscapes, and/or other relevant surface features. In addition, a longitudinal profile and 3 to 5 cross-sections will be surveyed for the immediate area below the dam. We will utilize a combination of high accuracy RTK GPS and traditional Total Station equipment to conduct the survey using the NAVD88 vertical datum and NAD83 horizontal datum. We have budgeted for two days of field survey as part of this task. Bathymetric data collection for the impounded area is described in Task 2.E.

Upon completion of the survey, HW will prepare a survey base map and existing conditions plan for the project area that includes the dam, bridge, edge of water, streambed longitudinal profile and cross sections, resource areas delineated in the vicinity of the dam and bridge, approximate property lines from MassGIS, and other major site features. Buffer zones to all resource areas will be included in the plans. HW will also utilize existing engineering drawings, GIS, LiDAR, and FEMA data to prepare the base map(s).

*Task 2.D Deliverables:* ***Draft and final existing conditions plans including a longitudinal profile and cross-sections. One round of comments per submission is assumed.***

Task 2.E. Bathymetric Survey:

To support the evaluation of sediment transport that may occur and the identification of potential mitigation or remediation activities that may be required during permitting of dam removal/ repair alternatives, WSI will conduct a survey of the impoundment's bathymetry and of the thickness of soft sediments that have accumulated there. We anticipate utilizing a boat equipped with an electric trolling motor and a sonar/GPS unit to conduct a bathymetric survey of Parker Mills Pond. Calibrated sediment sampling equipment will also be utilized to measure the thickness of accumulated soft sediments within the pond. The bathymetric survey and sediment thickness data will be used to produce a map depicting the existing bottom depth contours in Parker Mills Pond and a separate map depicting the sediment thickness within the pond.

*Task 2.E Deliverables:* ***Bathymetric survey maps to be included with Task 2.D. Existing Conditions Plans***

*Task 2.F. Geotechnical Borings:*

WSI will subcontract with a Massachusetts licensed driller to advance one boring from the dam crest to verify information collected by others, and better understand subsurface conditions. A series of probes and vacuum excavations will also be completed behind the upstream retaining wall, downstream foundation wall, primary spillway sidewall, and auxiliary spillway side wall. The purpose of the probes and vacuum excavations will be to attempt to evaluate wall configuration for use in our stability analyses.

The borings and probes will be advanced with a Geo-Probe rig outfitted with equipment to perform standard penetration testing (SPT). The boring will extend to about 25 feet below the roadway crest. The probes will be advanced to refusal which will be interpreted as the back of the wall. We assume the field explorations can be completed in two 8-hour workdays. The extent of the field exploration program may require modification in the field to limit the drilling to two days. Borings and probes will be backfilled with cement grout. The drilling subcontractor will contact Dig Safe to mark below-grade public utilities at the proposed boring locations prior to drilling. As this service is limited to public utilities in public easements, we assume that the Town will provide contacts with knowledge of municipal and private on-site utilities to approve proposed exploration locations. We understand that a gas main is located on the southern side of Elm Street adjacent to the former mill building; prior to drilling, we propose to use vacuum excavation techniques to locate the gas line to enable advancement of the probes near the building while protecting this utility.

WSI geotechnical engineering staff will observe the explorations in the field, classify the soils, prepare exploration logs, document estimated wall configuration observed in the explorations, and document any exploration location changes so that the as-drilled locations can be shown on the survey plan prepared by HW. We assume that special drilling methods, decontamination of drilling equipment, environmental contamination, permits, bonds, traffic details, and a Request for Determination of Applicability (RDA) or other permission from the Wareham Conservation Commission are not necessary (they are not included in the cost estimate for this task).

*Task 2.F Deliverables:* ***Geotechnical information will be incorporated in Task 5 structural assessment.***

## Task 3. Sediment Assessment

*Sediment sampling for Barnstable Municipal Airport, Hyannis, MA*

The quantity and quality of sediment impounded behind the dam is an important factor to consider during restoration planning. How sediment will be managed (e.g. passive downstream release versus physical dredging and removal) will be largely determined by the contaminant characteristics of those mobile sediments and the potential quantity and quality impacts to downstream resources from release of those sediments. Answering these questions will require permitting through the Massachusetts Department of Environmental Protection (MassDEP) and sediment testing in accordance with MassDEP's requirements.

MassDEP Water Quality Certification regulations at 314 CMR 9.07 are the primary regulations governing sediment sampling and assessment requirements for upland reuse of dredged material. The regulations define how sampling should be conducted for projects with 10,000 cubic yards of dredging or less (one sample per 1,000 cy, allowing up to three samples to be composited into one). Projects with greater than 10,000 cubic yards require that an individual sampling plan be submitted and approved by MassDEP prior to sampling. The number of samples required is dependent upon the volume of material to be dredged, and the parameters to be analyzed are dependent on suspected contaminants present and the potential disposal options to be used.

Since it is not yet known what volume of sediment might be mobilized, or need to be dredged, in order to implement the Town's selected dam repair or removal plan, the number of samples required for permitting cannot currently be accurately estimated. In addition, MassDEP only allows a three-year shelf life for sediment samples that it will consider during permit review. A project must, therefore, be sufficiently advanced that a permit application can be submitted within three years of the sampling date in order for sampling to be used for permitting. In recognition of the significant unknowns about even the type of dam repair or removal to be ultimately undertaken, our proposal and associated costs for this task are for a screening-level preliminary assessment of potential sediment quality issues, rather than attempting to undertake permit-specific sampling.

*Task 3.A. Due Diligence Review*

In order to evaluate potential historical threats to water and sediment quality on site and better inform the selection of sediment sampling parameters, HW will conduct a due diligence review of publicly available environmental release records. This review will include a review of spills and tier classified sites from MassDEP, and review of historical aerial photographs and Sanborn Fire Insurance Maps (if available). During the Task 2 Site Inspection, HW will also visually assess the presence, or likely presence of any hazardous substances or petroleum products under conditions that indicate an existing release, a past release, or a material threat of a release into structures or into the ground, groundwater, or surface water of the Subject Property.

*Task 3.B. Sediment Sampling*

Pursuant to the above-mentioned approach, the Team will submit Three composite samples for laboratory analysis as detailed below.

- Two composite samples created from 5-6 locations upstream of the dam.
- One composite sample collected from three locations downstream of the dam.

Our proposal cost is based on submitting two samples to a Massachusetts certified laboratory for analysis for the parameters shown in the table below (estimated to be the most generally appropriate for the site based on professional judgment). Depending upon the results of the Task 4.A due diligence review, and Town feedback, other analyses or sample locations may be added for additional fee. We are open to modifying these assumptions and associated costs in discussion with the Town.

*Laboratory Testing Parameters*

| Parameter | Reporting limit mg/kg (dry weight) – unless noted |
|---|---|
| Arsenic | 1.0 |
| Cadmium | 0.2 |
| Chromium | 0.4 |
| Copper | 1.0 |
| Lead | 2.0 |
| Mercury | 0.02 |
| Nickel | 1.0 |
| Zinc | 1.0 |
| Polycyclic Aromatic Hydrocarbons (PAHs) | 0.02 |
| Total Organic Carbon | 0.1% |
| Organochlorine Pesticides | 0.002 & 0.13 |
| Grain Size Distribution – wet sieve (ASTM D422) | Sieve Nos. 4, 10, 40, 60, 200 |

Upon receipt of the laboratory report, HW will review the data and prepare an analytical summary table for inclusion in the Task 7 summary report. Analytical data from the sediments will be compared to the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000) Sediment Benchmark Screening Levels and the Threshold Effects Concentrations (PECs). The summary report will consider alternatives (i.e. passive release versus mechanical removal).

*Task 3 Deliverables:* Summary presented in the Task 8 summary report.

## Task 4. Hydrologic and Hydraulic Analysis

Both HW and WSI will contribute the H&H analysis bringing our complementary skills and experience to support each other on this core project task. The Team will conduct hydrologic and hydraulic (H&H) modeling of the Wankinco River in the vicinity of the dam and bridge as detailed in the following subtasks. We propose to utilize the U.S. Army Corps of Engineer's HEC-RAS (Hydraulic Engineering Center- River Analysis System) modeling software here as the most appropriate tool to simulate spatially variable water level and velocity condition under various storm and flow scenarios. As such, it will be highly useful for evaluating dam alternatives, and potential impacts to flow, flood control, fish passage, sediment transport, recreation, and adjacent structures. For the purposes of this proposal budget we assume that the 2018 Pare HEC-RAS model prepared for its Elm Street Bridge evaluation will be made available to us. We propose to update and improve on that existing model by adding additional cross-sectional survey information and better discretizing the sub-catchments to calculate hydrologic inputs.

Hydrology in the 2018 Pare model was conducted using HydroCAD to develop rainfall-runoff relationships using NRCS methods. We propose to complement that methodology by also assessing the use of alternative precipitation data (e.g. Northeast Climate Center precipitation data for a range of flow conditions and storm return intervals) and alternative methods (e.g. correlation to other nearby USGS-gauged streams, USGS regression equations, and the USGS Streamstats program). In addition, the Team has available to it, and has used many times on nearby projects, the USGS MODFLOW groundwater model for the Plymouth-Carver Aquifer that can be useful for evaluating baseflow groundwater contributions to the river in a groundwater dominated system such as this one.

The project team will also evaluate the potential impact of climate change-driven sea level rise and precipitation on project alternatives. As the dam is a head-of-tide structure, significant changes to typical downstream tide levels can have a significant impact on structural stability of the dam, downstream retaining walls, and historical mill buildings; on the potential ecological benefit and new salt marsh habitat achieved through dam removal; on the outlet structures that would need to be incorporated into a rehabilitation design if the dam were to remain; and more. Increased precipitation will also drive more water through the system under all alternatives.

The Team will utilize the results of the various hydrologic methods to complete hydraulic analyses upstream and downstream from the existing dam and bridge.

The Team will utilize HEC-RAS to develop hydraulic profiles along the stream channel based on the hydrology inputs discussed above, under existing and potential alternative conditions. The HEC-RAS hydraulic model will allow us to investigate channel velocities, channel stability, water surface elevations, and sediment transport potential under various potential scenarios. We will use Task 2

field run cross-sectional data, and LIDAR derived cross-section for those areas beyond the field survey limits to complement the HEC-RAS model geometry depicted in the 2018 Pare model.

The existing conditions analysis will form the baseline for evaluating the effects of dam removal/ replacement alternatives on critical variables such as the 100-year floodplain, sediment transport, fish passage, and existing infrastructure. For the purposes of the costs included in this proposal, The Team will evaluate up to four alternatives of dam/bridge repair/replacement. In general, the following design/evaluation criteria will be assessed for each alternative:

- Evaluate how well the 100-year flood event can pass relative to existing conditions and what impacts to infrastructure may occur.
- Evaluate how close upstream water surface elevations are to downstream elevations during a range of storms to maintain a moderate hydraulic gradient for fish passage.
- Evaluate flow velocities through the affected reach (impoundment area and dam zone) relative to scour/erosion potential.
- Evaluate changes to downstream flood elevations relative to adjacent properties.
- To assess fish passage performance, the models will be run for typical fish passage flows (5% and 95% exceedance flows by month) to ensure that flow velocities are within acceptable guidelines. Fish passage assessments will specifically target species of choice (anticipated to be herring and alewife) to be decided with Project Partners.
- Overall, the model will be used to quantify the potential effects of dam alternatives on stream banks, sediment movement in the impoundment and existing channel, and fish passage.

Flow data will be processed to determine the 2-year, 10-year, 25-year, and 100-year recurrence interval flood events, in addition to seasonal low and high flow ranges (5% and 95% exceedance flows during months where upstream fish migration is likely) in order to identify critical fish passage criteria.

*Task 4 Deliverables: The results of the H&H modeling will be summarized in the Task 8 summary report containing data sources, model input variable, results files/model outputs, and supporting text and tables documenting the results of the analyses.*

## Task 5. Evaluate Dam Structural Conditions

In order to help inform Town decisions about dam repair, replacement, or removal, WSI will provide dam safety engineering services for the project which will include geotechnical, structural, and H & H assessments to evaluate the extent of deficiencies at the dam. Our evaluation will build upon the information provided in the Pare 2008 Phase II Evaluation but expand upon with new evaluations. In particular, Pare's 2008 evaluation of the upstream, downstream, and spillway channel walls were based upon assumed geometries. In Task 2.F WSI will undertake a subsurface exploration program to obtain more information on the wall geometries and revise the stability calculations accordingly.

### *Task 5.A. Structural Assessment*

Weston & Sampson structural engineers will visit the dam to conduct a visual assessment and non-destructive testing of the stone masonry and concrete components of the dam to evaluate repair

requirements. Visible exterior areas of the structures and the interior of the mill building foundation wall supporting the dam will be observed for signs of cracking, differential movement and deterioration. Measurements will be made to document the structure geometries. This information will be used to evaluate feasibility of repairs to the existing structure and any modifications that may be required to improve hydraulic capacity and operation and maintenance of the dam. We assume the Town will arrange for permission for us to access the interior of the mill building. The Elm Street Bridge will also be visited at this time to generally assess its stability as part of an overall evaluation of site alternatives.

*Task 5.B. Engineering Stability Analyses*

WSI structural engineers will evaluate field data and background information from Pare (and other sources) and conduct engineering analyses to assess the dam's existing embankment stability, structural stability of the walls, and seepage conditions to support conceptual design of rehabilitation alternatives. A similar, though less detailed, evaluation of the Elm Street Bridge will also be undertaken to generally assess how it may or may not best be included in potential site restoration alternative options.

*Task 5 Deliverables:* *Summary to be provided as part of Task 8 summary report.*

## Task 6. Historical Preservation

The historic value of the dam and adjacent mill buildings cannot be underestimated. Therefore, part of our charge in this dam repair/removal feasibility assessment is to create a plan that celebrates the history of place, highlights its many attributes, and records its current conditions. The Team's combined landscape architecture (LA) staff has considerable experience working on similar projects that require the careful balance between preserving the aesthetic and historical value of existing infrastructure with public health and safety, public use, resiliency, and cost considerations. As part of this scope of work, WSI LA staff will conduct a file review of publicly available documentation of the historic value of the project site and have a telephone call or virtual meeting with a Town representative or representatives knowledgeable about the site's historical story. WSI will then assess the relative historical impacts from the three main options of dam replacement, repair/modification, or removal. Those relative impacts will be summarized in the Task 8 summary report, and recommendations made for how best to preserve historic interests under each alternative.

When a Town-selected dam replacement/ modification/ removal moves forward beyond this initial feasibility study phase, more detailed archaeological and historical assessments are likely to be required to support project permitting and more fully document past history as part of the site's exciting future. The Team has relationships with archaeological and historical consulting firms who can be called upon at that time to conduct those more detailed studies for an additional fee.

*Task 6 Deliverables:* *Historical summary to be provided in Task 8 summary report.*

## Task 7. Alternatives Analysis, Cost Estimates, and Conceptual Design

Based on the results of Tasks 1 through 6, the Team will identify and evaluate up to three alternatives for dam repair, replacement, or removal with an evaluation of the pros and cons of each analysis as well as a planning level cost estimates. Two of the analyzed alternatives will be dam

removal or dam modification (partial breach) such that the dam no longer falls under the Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS) jurisdiction. The alternatives will be reviewed with the Town and a conceptual design prepared for the Town-selected alternative.

The alternatives analysis will be presented as a technical memorandum summarizing the impacts assessments for each alternative undertaken so that the Town can better understand the pros and cons for each alternative. The technical memorandum will later be incorporated in the Task 8 summary report. One of the Task 1 meetings is anticipated to be for the purpose of alternatives discussion with the Town and other Project Partners.

The conceptual design for the Town-selected alternative will include existing conditions, approximate resource area impacts, a representative cross section and longitudinal profile, sketches illustrating modifications to the embankment, spillway, and dike (if necessary), as well as identification of other repair requirements and permitting issues that may affect the cost of, and approach to design, permitting, and construction.

Our proposed cost for this task includes the preparation of one high quality, illustrative, graphic rendering in 3D view perspective of the Town-selected dam alternative. Additional views of the same alternative and/or renderings of other alternatives can be provided for additional fee upon Town request.

*Task 7 Deliverables: Draft and final technical memorandum summarizing alternatives analysis. Draft and final conceptual design plans, engineer's planning-level cost estimates, and one graphic rendering in pdf format. One round of comments per submission is assumed with one draft and one final provided. One conference call or virtual meeting with the Town to discuss alternatives analyses is included in Task 1 meetings.*

## Task 8. Feasibility Study Summary Report

The Team will document the methods and results of the field investigations, H&H modeling, sediment study, historical review, structural assessment, and alternatives analysis in an Alternatives Study Feasibility Report. The report will be submitted digitally in draft format and one round of edits is included to finalize the report. The report will:

- Package all of the above-mentioned task deliverables;
- Detail the alternative analyses and discuss relative positive and negative impacts to fish passage, habitat, tidal and river flow dynamics, flood control, sediment management, climate change resiliency, safety, nearby properties, historical factors, agriculture, recreation, public and private infrastructure, and aesthetics;
- Provide the rationale for the Town-selected alternative;
- Present and describe the conceptual design for the Town-selected alternative; and
- Lay out planning-level, next steps, anticipated schedule and costs for completing future project phases of design, permitting, and construction.

We are not aware of any potential concerns relative to impacts to private water wells or other permitted water withdrawals in the near vicinity to the dam site and, therefore, no costs are included in this proposal to assess such potential issues. We can provide this assessment for additional fee if desired by the Town.

*Task 8 Deliverables:* ***Draft and Final Feasibility Study reports delivered in digital (Word and/or pdf format). One paper copy of the Final Report will be provided upon request.***

## IV PROPOSED BUDGET

While the RFP did not request a Cost Proposal, it did provide an upper boundary cost limit as a guide for bidders to prepare a Scope of Work. The HW/ WSI Team has prepared the Scope of Work detailed above based upon our experience conducting similar projects and professional judgment, and with the goals of providing the Town with the best value possible. The Table below summarizes our proposed costs by associated Scope of Work tasks based on the assumptions detailed in the Scope of Work. Our proposed budget is well below the upper limit threshold specified in the RFP. We believe our proposed scope and budget are appropriate for this initial level of alternatives assessment presented herein. More detailed work can be conducted later as part of subsequent phases, as appropriate and informed by this initial project phase. We are also open to discussing with the Town additions, subtractions, or other modifications to the Scope of Work during this project phase to best meet Town project goals and available budget. A more detailed budget breakdown and staff labor rates can be provided upon request.

| Task | HW | WSI | Sub-Contractor | Total |
|---|---|---|---|---|
| **1. Meetings and Communication** | $5,500 | $2,500 | | $8,000 |
| **2A. Existing Information** | $3,900 | | | $3,900 |
| **2B. Site Inspection** | $1,100 | $1,500 | | $2,600 |
| **2C. Wetlands Resources** | $2,800 | | | $2,800 |
| **2D. Topo Survey** | $9,000 | | | $9,000 |
| **2E. Bathymetry** | $700 | $9,200 | | $9,900 |
| **2F. Geotechnical Borings** | $500 | $8,350 | $6,750 | $15,600 |
| **3A. Sediment Due Diligence** | $2,100 | | | $2,100 |
| **3B. Sediment Sampling** | $3,300 | | $2,400 (lab) | $5,700 |
| **4. H&H Modeling** | $9,000 | $3,600 | | $12,600 |
| **5A. Structural Assessment** | $500 | $5,750 | | $6,250 |
| **5B. Stability Analysis** | $400 | $5,750 | | $6,150 |
| **6. Historical** | $400 | $3,000 | | $3,400 |
| **7. Alternatives & Concept Design** | $14,500 | $11,900 | | $26,400 |
| **8. Summary Report** | $9,500 | $6,000 | | $15,500 |
| | | | | |
| **Total** | $63,200 | $57,550 | $9,150 | $129,900 |

## PROPOSAL ELEMENTS AND ASSUMPTIONS:

- Reimbursable expenses (copies, printing, travel mileage, survey staking materials, etc.) are included in our fee estimate as noted in the Scope of Services. Additional copies or other reimbursable expenses can be provided at our standard rates.
- Topographical survey and other field work will need to be coordinated with weather conditions (i.e. snow, rain).
- We have assumed our attendance at only the number of meetings listed under each task. Additional meetings, if necessary, will be provided at our hourly rate as requested and approved.
- Sediment sampling, field survey, and other tasks are budgeted as detailed in the Scope of Work. Additional field, analytical, design, or reporting services can be supplied for additional fee at client request.
- HW will not be responsible for the location of underground utilities not visible or identified in the field during the survey or within the as-builts provided by the Town. We will include appropriate caveats on the plans to require the contractor to verify subsurface conditions, prior to construction.
- We assume that the project site is not in the vicinity of a hazardous waste site. If any site assessment and remediation services are required, HW has fully qualified staff and would be pleased to offer any services necessary as a negotiated contract amendment to this scope of services.
- One set of revisions to the plans and/or specifications, as applicable, are assumed at each stage of the plan development process.

# ATTACHMENTS

# Resumes

# Neal M. Price

Senior Hydrogeologist –
Associate Principal
nprice@horsleywitten.com

**Areas of Expertise**

Hydrogeology/ Water Supply Development
Watershed Planning & Assessment
Integrated Water Management
Groundwater Quality
Wastewater Management
Stormwater Management
Wetlands Restoration
Dam Removal
Dredging
Coastal Resources
Environmental Permitting & Compliance

**Professional Registrations & Affiliations**

American Geophysical Union
National Groundwater Association
American Water Works Association
New England Water Works Association

**Academic Background**

Master of Science, Geology, University of Massachusetts, Amherst
Bachelor of Arts, Archeology, Oberlin College Archeological Field School, Sheffield University

**Professional Experience**

Horsley Witten Group, Inc., Senior Hydrogeologist/Senior Project Manager, 1997 to present
MetroWest Water Supply Tunnel Project, 1997
Water Resources Research Center, Univ. of Massachusetts, Research Scientist, 1995 to 1997
Fugro East Inc., Geologist, 1995
21E, Inc., Environmental Scientist, 1993

Horsley Witten Group
*Sustainable Environmental Solutions*

Neal Price has over 28 years of professional experience in the fields of hydrology and hydrogeology. Neal is a Senior Hydrogeologist/ Hydrologist and Associate Principal at HW and is responsible for developing client relations, supervising staff activities, and managing various projects within the firm. The nature and extent of the work he has conducted includes freshwater and saltwater wetlands restoration, groundwater and surface water modeling, watershed and drinking water protection studies, water supply investigations, wastewater disposal feasibility studies, dam removal, nutrient management, contaminant fate and transport studies, stormwater management, dredging assessment, expert witness testimony, as well as development review and permitting.

## KEY PROJECTS

***Sucker Brook Dam Removal and Culvert Replacement:*** Project Manager for a dam removal and culvert replacement project in Pepperell, MA that prioritized restoration of passage and habitat for brook trout. The project included field survey and hydrologic data collection; hydraulic modeling with HEC-RAS; design of dam removal, river restoration, and access road culvert replacement to Massachusetts Stream Crossings Standards; evaluation of potential complications from Beaver activity; and permitting. Construction pending funding availability.

***Quashnet Bogs Wetlands and Stream Restoration:*** Project Manager for a project that seeks to return approximately 70 acres of retired cranberry bogs in Mashpee, MA to a resilient riparian and wetlands ecosystem similar to what is thought to have existed prior to conversion to cranberry cultivation over a century ago. Restoration of brook trout and herring habitat and passage is the primary project goal. The project includes field survey and hydrologic data collection; hydraulic modeling with HEC-RAS; design of river and surrounding wetlands systems and design of multiple culvert replacements to Massachusetts Stream Crossings Standards. Project design must accommodate the presence of groundwater contamination from upgradient sources at the Massachusetts Military Reservation and the continued operations of onsite treatment systems. Innovative data gathering conducted to date includes the use of drones to efficiently gather visual imagery, thermal data to identify groundwater seeps, and LiDAR topography. Project currently active in the assessment and design phase.

***Ipswich Mills Dam Removal, Ipswich, MA:*** Managed dam removal feasibility assessment for this historic and highly visible dam in downtown Ipswich. The Project includes site survey, natural resources and habitat assessment, sediment quality/ dredging assessment, hydraulic evaluation, assessment of potential structural impacts to adjacent historic mill buildings supported by timber piles, conceptual dam removal and river restoration site designs, and public outreach.

***Taunton River Watershed Study, MA:*** Principal Investigator for the water budget components of this major basin-scale watershed study in Southeastern, MA. Compiled extensive databases of hydrology, climate, water/wastewater/stormwater infrastructure, geology, land use, and impervious surfaces in a GIS-based water budget model that estimated the water balance status of each of the 108 sub-watersheds within the basin.

***Water Supply Investigations, Plymouth, MA:*** Conducted groundwater modeling and field investigations to identify, develop, and permit new water supply wells for the Town of Plymouth, the Pinehills, and multiple golf courses.

**Neal M. Price**
Senior Hydrogeologist – Associate Principal
nprice@horsleywitten.com

Horsley Witten Group
*Sustainable Environmental Solutions*

***Groundwater Modeling Assessments of Water Management Alternatives, Southeastern Massachusetts:*** Served as Project Manager and Lead Modeler for two projects in the so-called Tri-Basin area of Southeastern Massachusetts evaluating water budget impacts from various water management strategies related to the City of Brockton's interbasin transfers of water between various surface water bodies. One project assessed water budget and water quality impacts to Stump Brook and Monponsett Pond; the other project assessed impacts to Silver Lake and the Jones River. Both projects involved the adaption of a USGS regional groundwater model to conduct the water quantity evaluations and then used that water budget information to inform water quality analytical evaluations of the water quality impacts from potential management strategies.

***Saltwater Wetland Restoration Feasibility and Implementation- Brewster, Sandwich, Falmouth, Barnstable, Yarmouth, Bourne, Eastham, Harwich, Nantucket, Manchester, and Mattapoisett, MA and Seabrook, NH:*** Managed approximately 20 projects to investigate the feasibility of restoring salt water flow to wetland areas and evaluate design options to provide enhanced flow (culverts, channels, bridges). Many of these projects were designed and permitted and several of them have progressed through construction.

***Freshwater Wetland Restoration Feasibility and Implementation- Whitman, Pepperell, Tisbury, Plymouth, Carver, Winchester, Walpole, Falmouth, Barnstable, and Harwich, MA:*** Managed approximately a dozen freshwater stream restoration projects involving dam removals, culvert replacements, dredging assessments, design, permitting, construction administration, and public outreach.

***Coastal Processes and Stormwater Impacts, Savin Hill Cove, Dorchester, MA:*** Managed this major, long-term project assessing potential impacts to coastal resource areas from stormwater improvements proposed as part of the continuing MWRA cleanup of Boston Harbor. The projects included modeling of stormwater quality and potential sediment erosion and transport characteristics; field monitoring of bathymetry, depositional characteristics, and long term, automated, stormwater water quality sampling of baseline, construction, and post-construction conditions.

***River Flow Studies Parker River, Ipswich River, Charles River, Vine Brook, Smelt Brook, Nemasket River, Canoe River, Santuit River, Quashnet River, Eel River, MA:*** Conducted and Managed over a dozen projects assessing river flow, flow impairment, regulatory status, mitigation strategies to address low flow and/or flooding conditions. Modeling including USGS MODFLOW, USGS StrmDeplete, USACE HEC-RAS, and analytical methods.

***Groundwater Modeling Cape Cod, Southeastern MA, San Fransisco, CA, Ontario, Canada:*** Conducted and managed dozens of groundwater modeling projects using the USGS MODFLOW groundwater modeling code to assess various considerations including water supply development, wastewater infiltration, remedial actions alternatives, river flows, and watershed delineations.

***Wastewater Discharge Feasibility Studies for Oak Bluffs, Plymouth, Holliston, Gloucester, Essex, Sandwich, Brewster, Bourne, Hale Reservation, and East Bridgewater, MA, and North Kingstown, RI:*** Conducted subsurface investigations, pumping tests, and loading tests to determine the suitability of sites to accept treated wastewater discharge. Conducted numerical modeling to determine hydrologic impacts in the vicinity of the discharge sites and nutrient loading analyses to determine water quality impacts to nearby surface waters. Prepared applications for and received Groundwater Discharge Permits from the MA Department of Environmental Protection (DEP).


# Richard Claytor, Jr.

President
rclaytor@horsleywitten.com


**Areas of Expertise**

Stormwater Management
Green Infrastructure
Wetland & Natural Resource Area Assessments
Environmental Permitting & Compliance
Watershed Planning & Assessment
Civil Engineering
Environmental Engineering
Surveying
Site Design
Training

**Professional Registrations & Affiliations**

Professional Engineer: MA & NH
LEED Accredited Professional
Town of Sandwich, Historical Commission
American Society of Civil Engineers

**Academic Background**

Bachelor of Science, Union College, Civil Engineering, Concentration in Hydrology, Hydraulics, Water Resources, and Geotechnical Engineering

**Professional Experience**

Horsley Witten Group, Inc., President, 2013- Present; Principal Engineer, 2001 to 2013
Center for Watershed Protection, Principal Engineer, 1994 to 2001
Loiederman Associates, Inc. (now Soltesz, Inc.), Vice President and General Manager, 1985 to 1994
Greenhorne and O'Mara, Inc.(Now Stantec, Inc.), Design Engineer, 1983 to 1985

Horsley Witten Group
*Sustainable Environmental Solutions*

Rich Claytor has more than 38 years of practical experience in civil and environmental engineering with specific expertise in water resources planning, design, implementation, research, education, and training. Rich has extensive experience and expertise in stormwater management design, implementation, program assessment, policy and stormwater control practice evaluation. Rich also is experienced in watershed planning, training and education; water resources assessment, research, and permitting; water supply and wastewater design; land use planning, site design and research; storm drainage, erosion/sediment control, and roadway design; and construction administration.

**KEY PROJECTS**

***Naragansett Bay Commission (NBC) Green Stormwater Infrastructure:*** Principal-in-Charge for this major multi-year initiative to reduce NBCs combined sewer overflows using Green Stormwater Infrastructure in the City of Central Falls Rhode Island, including design and permitting of over 50 sites since 2018.

***EPA, Region 1:*** Clean Water Act and Safe Drinking Water Act Basic Purchasing Agreement (2018-2023) Program Manager for HW and Principal-in-Charge for specific work assignments, including Palmer River Watershed Plan, Long Island Sound Study GAO Response, Connecticut Statewide Lake Nutrient TMDL and Lake Winnisquam, NH Watershed Based Plan development.

***Integrated Water Quality Plan, Burlington, VT:*** Principal-in-Charge for HW's role in Burlington's integrated water quality plan. Specifically, HW is assisting in the development of stormwater runoff opportunities to identify projects that reduce phosphorus loading to Lake Champlain and meet multiple permit requirements.

***Green Stormwater Infrastructure Solutions for Boston Public Schools and the Boston Water and Sewer Commission (BWSC), Boston, MA:*** Principal-in Charge for the implementation of green infrastructure (GSI) solutions to manage stormwater runoff and engage students at five Boston Public Schools.

***Fuller Brook Restoration, Wellesley, MA:*** Principal-in-Charge for the stream restoration of a 2.2-mile reach of a suburban impaired stream/wetland system using natural channel-based geomorphologic principles.

***Massachusetts Department of Ecological Restoration:*** Principal-in-Charge for master services contracts for the assessment, design, and implementation of ecological restoration for more than two dozen projects in the Commonwealth of Massachusetts, beginning in 2005.

***Willard Street, Cambridge MA Sewer Separation:*** Principal-in Charge for the assessment and design of GSI measures to manage stormwater runoff prior and reduce phosphorus loading for a new discharge pipe to the Charles River in compliance with the Lower Charles TMDL.

***Assessment of Climate Change Impacts on Stormwater BMPs in Coastal Massachusetts:*** Principal-in-charge for this assessment of likely impacts to stormwater management practice performance as a consequence of climate change and resulting sea level rise and changes in precipitation characteristics with funding from the Massachusetts Office of Coastal Zone Management.

**Richard Claytor, Jr.**
President
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***Engineering Design and Assessment of Stormwater Management for MassDOT's Impaired Waters Program:*** Principal-in-charge for several project assignments to evaluate existing drainage/stormwater characteristics and design stormwater retrofit improvements to address runoff from MassDOT rights-of-way that drain impaired waters.

***Maine Mall Retrofit Design and Construction, South Portland, ME:*** Principal-in-Charge for the identification, design, permitting, and construction administration for the "Greening of the Maine Mall," a key component of the Long Creek Watershed Management District's charge to restore Long Creek to meet water quality standards.

***Roger Williams Park Water Quality Improvement Plan and Implementation, Providence, RI:*** Principal Engineer for planning and design of implementation projects to improve the water quality and biodiversity conditions of the Park's urban ponds.

***Comprehensive Evaluation of Alternative Strategies for Combined Sewer Overflow Reduction, New York City:*** Principal Engineer and part of a team under contract with the New York City Department of Environmental Protection to evaluate and implement a series of pilot green infrastructure stormwater retrofits projects to reduce the contribution of stormwater to combined sewer systems.

***Barnstable Municipal Airport Terminal Improvement Project, Hyannis, MA:*** Principal Engineer for the permitting and design of civil site improvements for a $20 million passenger terminal construction.

***2010 Rhode Island Stormwater Design and Installations Manual Update:*** Principal-in-Charge and co-author for the update to the statewide Rhode Island Stormwater manual to incorporate low impact development practices for all new and redevelopment projects.

***Oak Bluffs Streetscape Improvements:*** Principal-in-Charge for the Oak Bluffs Downtown Streetscape Master Plan to provide a framework for future planning, development, and design of the commercial district of Oak Bluffs on Martha's Vineyard, Massachusetts.

***Centennial Brook Flow Restoration Plan, Burlington, VT:*** Principal-in-Charge for a watershed assessment and plan to develop a flow restoration approach to meet the flow based TMDL for the 1.4 square mile Centennial Brook watershed.

***Salmon River Watershed Evaluation of Municipal Policies and Regulations, Eastern Connecticut:*** Principal-in-Charge of a two-phase project for the Salmon River watershed to evaluate municipal codes and management practices contributing to water resource impacts. Completed technical training, and support for policy revisions to Conservation Subdivision Design, parking regulations, roadway standards, and LID design standards for two Connecticut municipalities.

***Upper Charles River Sustainable Stormwater Funding Assessment, Bellingham, Franklin, & Milford, MA:*** Project Director for the assessment and dissemination of a technical report documenting the feasibility of widespread implementation of stormwater control measures to meet TMDL requirements and the requirements for a sustainable funding source through a Stormwater Utility structure.

***Phase II Stormwater Permit and LID Training Clinics for Municipal Officials in New England, EPA Region I:*** Conducted a series of training clinics and hands-on assistance to New England municipal staff on the requirements of the new Phase II permits, as well as helping municipal officials and decision-makers encourage the use of low impact development/green infrastructure practices.

***Massachusetts Statewide Stormwater Training Seminars, Various Locations in Eastern Massachusetts:*** Prepared technical presentations for more than a dozen one-hour stormwater design, policy, implementation and maintenance topics for a range of stormwater management strategies and presented at more than ten one full-day training sessions.

# Michelle L. West, P.E.

Senior Project Manager
Water Resources Engineer
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**Areas of Expertise**

Watershed Planning & Assessment
Ecological Restoration
Geographic Information Systems
Civil Engineering
Environmental Engineering
Stormwater Management
Low Impact Design/Green Infrastructure Training

**Professional Registrations & Affiliations**

Professional Engineer, HI, MI, USVI

Member, Conservation Commission, Town of Falmouth, 2007-2013

**Academic Background**

Master of Science in Engineering, Environmental Engineering, University of Michigan

Bachelor of Science in Engineering, Civil and Environmental Engineering, University of Michigan

Bachelor of Science, Natural Resources and Environment, University of Michigan

**Professional Experience**

Horsley Witten Group, Inc., Project Manager, 2005-Present

Ayres, Lewis, Norris, & May, Inc., Senior Engineer, 2002-2005

Horsley Witten Group
*Sustainable Environmental Solutions*

Michelle West has 19 years of professional experience in civil and environmental engineering. Her specific expertise is in stormwater management, watershed planning, hydraulic/hydrologic modeling, and green infrastructure (GI) planning, assessment, design, and implementation. She has presented at several technical training workshops on stormwater issues, GI, and erosion and sediment control (ESC). She also has experience with public education and outreach, as well as with geographic information system (GIS) mapping, analysis, and modeling.

## KEY PROJECTS

***Assessment, Prioritization, Design, and Installation of Stormwater Retrofits in Three Bays Watershed, APCC, Barnstable, MA (current):*** Project manager for this multi-year project prioritizing and implementing green stormwater infrastructure retrofits to reduce nitrogen and bacteria loading into the Three Bays. Six GSI sites have been constructed, with more on the way. Public education and outreach, including a hands-on rain garden workshop and DPW maintenance trainings, are important components of this project.

***Beaver River Watershed Assessment, Richmond, RI (current):*** Analyzing existing GIS data to evaluate current and future impacts to the river and associated habitat. Working together with an advisory committee, HW has prioritized restoration and land management actions to preserve and improve conditions in this important cold-water watershed.

***MS4 Stormwater Program Support, City of Attleboro, MA (current):*** Project manager for this on-going support to the City to help them meet their MS4 requirements. Tasks include assistance developing their NOI, SWMP, IDDE Plan, and annual reports; conducting outfall screening; stormwater system mapping; operation and maintenance procedures; SWPPPs; and revisions to their relevant stormwater management ordinances and regulations. Michelle has also performed numerous stormwater peer reviews and has provided training on GI for City staff and board members.

***Fuller Brook Restoration, Wellesley, MA:*** Project Manager for the restoration of a 2.2-mile reach of a suburban impaired stream/wetland system within Fuller Brook Park, a major recreation and transportation corridor for the town. Design components included bioretention facilities to treat existing road runoff, stream relocation for sewer main protection, hard and soft stream bank stabilization measures, log and rock vane flow diversion structures, and wetland/floodplain restoration.

***Orr's Pond Drinking Water Protection Plan and Stormwater Retrofits, Attleboro, MA:*** Conducted watershed field assessments to identify stormwater retrofits and pollution prevention opportunities within the City's drinking water protection district to Orr's Pond. Nine of the retrofit concepts to reduce phosphorus and bacteria loading have been designed and permitted, with construction complete Fall 2018.

***Second Beach "Surfer's End" Parking Lot Retrofit, Middletown, RI:*** Project Manager for the innovative retrofit design of linear, beach grass sand filters to treat parking lot runoff before it reaches Sachuest Bay to improve water quality and coastal resiliency.

***Ten Mile River Riverwalk Connector Project, Attleboro, MA:*** Project Manager for the design of a riverwalk connection between two parks in downtown Attleboro, including a porous asphalt path with boardwalk sections, and two pedestrian bridges. Incorporated restoration components including green infrastructure, bank stabilization, invasive species removal, and buffer restoration.

**Michelle L. West, P.E.**
Sr. Project Manager - Water Resources Engineer
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Horsley Witten Group
*Sustainable Environmental Solutions*

***Morses Pond Erosion Study and Restoration Plan, Wellesley, MA:*** Project Manager for this study of shoreline erosion at Morses Pond. A field team assessed the 3.5-mile shoreline from canoe using tablet technology. Over 20 erosion sites were identified for restoration, including eroding trails and water/boat access points. Michelle created restoration concepts for each site and developed a prioritization method to help the Town focus limited funding on the top priority locations. Sites on Town-owned property have been designed and permitted, with construction anticipated in Summer 2019.

***2010 Rhode Island Stormwater Design and Installations Manual Update and LID Site Planning and Design Guidance for Communities:*** Updated the statewide Rhode Island Stormwater manual to incorporate LID practices for all new and redevelopment projects. Michelle developed and presented training workshops for agency staff, as well as for engineers and developers, on the new manual, and prepared a companion guide on LID for Rhode Island municipalities.

***Guam/CNMI Stormwater Management Design Manual:*** Prepared the first stormwater manual for this area, incorporating island-specific sizing criteria, design guidance, and case studies of local projects to illustrate calculations and techniques. Michelle conducted several training workshops for local regulators, engineers, and developers, including a certification exam.

***MassDOT Impaired Waters Program - Route 28 Stormwater Improvements, Brockton, MA:*** Assessed existing conditions within the right-of-way and prepared design plans for a stormwater retrofit along Route 28 to improve water quality discharging to the impaired Salisbury Plain River.

***Roger Williams Park, Providence, RI:*** Developed a water quality management plan to improve the water quality and biodiversity conditions of the Park's urban ponds. Performed a watershed assessment including pollutant-loading analyses, the establishment of long- and short-term water quality goals, identification of feasible stormwater retrofits, assessment of in-pond treatment options, and design, permitting, and construction oversight of the six highest priority stormwater retrofit BMPs.

W***alton's Cove Stormwater Mitigation Project in Hingham, MA:*** Project manager for this watershed assessment and stormwater retrofit design project that identified, evaluated, and prioritized both structural and non-structural practices. Green infrastructure practices such as bioretention facilities, porous pavement, and green street designs were sized to be resilient for larger storm events and expected sea level rise. Michelle also conducted a rain garden training workshop in the watershed.

***Stormwater Assessment for Bare Hill Pond, Harvard, MA:*** Performed a watershed assessment and designed stormwater retrofits to help reduce phosphorus and bacteria inputs to the impaired pond. Six retrofits were constructed in 2010, with two more completed in Spring 2013.

***Chepachet Village Integrated Water Management Planning and Design, Glocester, RI:*** Developed conceptual designs of stormwater retrofits for village roadways, incorporating grass swales, bioretention systems, infiltration basins, and wet vegetated treatment systems (WVTS) into the existing stormwater management system. In 2012, the WVTS concept was fully designed and constructed, integrating stormwater management with surrounding parkland, historical sites, and wetland areas.

***Watershed Assessment and Planning for the East End of St. Croix, USVI:*** Developed a watershed management plan for six watersheds on the East End of St. Croix. The plan identified and prioritized restoration opportunities to reduce loading of pollutants of concern, as well as recommended programmatic and technical standards related to stormwater, wetlands/gut management, and wastewater management.

***Pacific Islands Watershed Institute, Kaneohe, HI:*** Faculty for the first Pacific Islands Watershed Institute, sponsored by NOAA and including representatives from the Hawaiian Islands, Guam, CNMI, Palau, American Samoa, and the Federated States of Micronesia. The "Institute" consisted of four days of intensive training for attendees in a range of watershed management and protection strategies and techniques to reduce the impacts of land based sources of pollution on nearby coral reef ecosystems.


# Bryan Massa, LSP

Senior Scientist
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**Areas of Expertise**

Environmental Due Diligence
Environmental Site Assessment
Remediation
Environmental Chemistry
Manufactured Gas Plant Assessment and Remediation
Environmental Risk Characterization
Soil Vapor and Indoor Air Assessment and Mitigation

**Professional Registrations & Affiliations**

Massachusetts Licensed Site Professional
40-Hour OSHA
Massachusetts Third Party Inspector (Landfills and White Goods)

**Academic Background**

Bachelors of Science, Environmental Engineering, Wentworth Institute of Technology

**Professional Experience**

Horsley Witten Group, Inc., Senior Scientist and LSP, August 2018 to Present

Lightship Engineering, Senior Project Manager, July 2013 to August 2018

META Environmental, Project Manager January 2009 to June 2013

Vertex Engineering, Project Manager, June 2005 to December 2008

Battelle, Environmental Laboratory Technician and Hazardous Waste Coordinator, June 2000 to June 2005

Horsley Witten Group
*Sustainable Environmental Solutions*

Bryan Massa is a Senior Scientist and Licensed Site Professional with over 20 years of experience in the environmental field. He has worked on a variety of environmental projects throughout the United States and Mexico. His experience has included the completion of Phase I and Phase II Environmental Site Assessments for due diligence purposes, remediation design and oversight, risk assessments, landfill construction oversight and monitoring, emergency response to releases, soil gas and indoor air assessment, LSP services and environmental chemistry.

## KEY PROJECTS

***Assessment and Remediation of Perflourinated Alkyl Substances (PFAS) in Soil and Groundwater, Barnstable Municipal Airport, Hyannis, MA:*** Mr. Massa is the Licensed Site Professional (LSP) of record for a release of PFAS to soil and groundwater relating to the historic usage of aqueous fire-fighting foams (AFFF) at the Airport. Tasks have included the delineation of soil and groundwater impacts, forensic evaluation of source materials and the development of a remediation plan to cap PFAS impacted soils to reduce groundwater impacts.

***Assessment of PFAS in Soil and Groundwater, Commercial Property, Carver, MA:*** Mr. Massa is managing the investigation of soil and groundwater relating to a release of PFAS from wastewater biosolids and other potential sources. Tasks have included the delineation of soil and groundwater impacts, groundwater elevation survey, data review and project management.

***Emergency Response to a Petroleum Release at the Fuel Farm, Barnstable Municipal Airport, Hyannis, MA:*** Mr. Massa provided LSP services for a release of approximately 50 gallons of petroleum at the Airport's fuel farm. The services included MassDEP regulatory reporting, release assessment and remediation oversight.

***Former Mill Building, Gardner, MA:*** Mr. Massa conducted an ASTM Phase I Environmental Site Assessment on a former mill building that had been used for the manufacturing of furniture. The former mill building had been abandoned since the mid 1980's and a private developer was interested in converting the former mill building into residential apartments. Mr. Massa identified several recognized environmental conditions ("RECs") at the site. A subsequent Phase II Subsurface Investigation identified a release of petroleum related compounds ("PRCs") from an upgradient source had impacted the site as well as chlorinated solvents relating to the historic use as a furniture manufacturer. Soil, groundwater and soil gas was impacted by the release. A sub-slab depressurization system was subsequently designed and installed at the Site during construction. A Method 3 Risk Assessment determined that a level of No Significant Risk exists at the site.

***Former Mill Building, Haverhill, Massachusetts:*** Mr. Massa conducted an ASTM Phase I Environmental Site Assessment of a former mill building that had been used for the manufacturing of circuit boards. The former mill building had been abandoned since the mid 1990's and a private developer was interested in converting the former mill building into residential apartments. Mr. Massa identified several RECs at the site. A subsequent Phase II Subsurface Investigation identified a release of petroleum related compounds, an abandoned in place petroleum underground storage tank, and soil gas impacted with chlorinated solvents.

**Bryan Massa, LSP**
Senior Scientist
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***Former Commercial Vehicle Painter, Braintree, Massachusetts:*** Mr. Massa conducted an ASTM Phase I Environmental Site Assessment on a commercial vehicle painter that had been in operation since the 1970's. Mr. Massa identified several RECs at the Site. A subsequent Phase II Subsurface Investigation identified a release of select metals and PAHs in soil relating to the historic use of the site. A Method 3 Risk Assessment determined that a level of No Significant Risk exists at the site.

***Former Manufactured Gas Plant, Greenfield, MA:*** Mr. Massa conducted a comprehensive subsurface investigation of river sediment within the Green River as part of response actions at an adjacent former Manufactured Gas Plant. Mr. Massa advanced over 100 sediment borings within the river from a barge to delineate the extent of coal tar that had migrated into the river. The data collected by Mr. Massa was utilized to develop a comprehensive remedial action that included the excavation of thousands of tons of sediment, the re-stabilization of the adjacent river banks, the installation of a barrier wall to prevent the migration of coal tar into the river, and the installation of a passive groundwater management system to reduce groundwater mounding at the site. Mr. Massa participated in the remedial design and data review and oversaw the remediation on a daily basis over a period of approximately nine months.

***Former Manufactured Gas Plant, Canandaigua, NY:*** Mr. Massa conducted a comprehensive subsurface investigation of river sediment and soil within and adjacent to Sucker Brook as part of response actions at an adjacent former Manufactured Gas Plant. Mr. Massa advanced over 50 borings at the site to delineate the extent of coal tar that had migrated into the river and the extent of land side contamination. The data collected by Mr. Massa was utilized to develop a comprehensive remedial action that included the diversion of the river, excavation of thousands of tons of sediment and land side soil, and the re-stabilization of the adjacent river banks. Mr. Massa participated with the remedial design and data review and oversaw the remediation on a daily basis over a period of approximately 12 months.

# Amy Ball, PWS, CWS

Project Manager/Senior Ecologist
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**Areas of Expertise**

Wetland & Natural Resource Area Assessments
Environmental Permitting & Compliance
Rare Species
Coastal Resources
Training
Meeting Facilitation

**Professional Registrations & Affiliations**

Professional Wetland Scientist, 2542
Certified Wetland Scientist, 230
Certified Invasive Species Manager
V.P. for Education, Board of Directors, MACC
Member, AMWS, SWS

**Academic Background**

Master of Science, Plant Biology, University of MA
Bachelor of Science, Biology, Muhlenberg College
Wetlands Wildlife of Southeastern MA Field Course, University of MA Cooperative Extension
Marine Phycology Summer Field Course, University of Washington
Barrier Island Ecology Summer Field Course, Duke University

**Professional Experience**

Horsley Witten Group, Inc., Project Manager/Senior Ecologist and Wetland Scientist, 2001 - Present
LEC Environmental Consultants, Inc., Project Manager, Ecologist, 1995-2001
Harvard Forest, Petersham, MA, Research Assistant, Summer 1994
UMASS, Amherst, Research Assistant, Spring/Summer 1993, Teaching Assistant, 1991-1994
SMC Environmental Services Group, Inc., Intern/Assistant, Summers 1989-1991

Horsley Witten Group
*Sustainable Environmental Solutions*

Amy Ball has more than 26 years of professional experience as a wetland scientist and ecologist. Her specific expertise is in wetland botany and ecology, wetland restoration and mitigation, rare species and wildlife habitat assessments, wetland assessment and monitoring, invasive species management, environmental policy evaluation, and environmental permitting. Ms. Ball frequently appears before local conservation commissions and state and federal regulatory authorities as project representative or as a peer review consultant and has provided expert testimony before the Massachusetts Division of Administrative Law Appeals and in Massachusetts Land Court.

## KEY PROJECTS

***Provincetown Municipal Airport, Capital Improvement Program, Provincetown, MA (current):*** Managed project for wetlands and wildlife-related studies and project permitting. Project included freshwater and coastal resource area delineation, wildlife habitat assessments, and rare species habitat surveys, preparation of various reports and public presentations. Coordinated permitting with Federal, State, regional, and local regulatory agencies. Provided environmental oversight during construction.

***Integrated Solid Waste Management Facility, Bourne, MA (current):*** Project manager responsible for providing natural resources assessments and coordination and permitting under the Massachusetts Endangered Species Act to mitigate project-related impacts to rare species habitat associated with a master-planned expansion of the Bourne Landfill. The project will ultimately result in expanded solid waste handling facilities and office space, as well as the permanent protection of rare species habitat.

***Coastal Bank Restoration and Resiliency Project, Ipswich, MA (current):*** Permitting manager for restoration project involving a green infrastructure shoreline stabilization design along the Ipswich River to improve coastal resilience an protect critical infrastructure. The project, still underway, will result in the construction of living shorelines as well as upgradient stormwater improvements to two existing outfalls.

***Province Lands Road and Province Lands Bicycle Trail Bridge Improvements, Provincetown, MA:*** Managed project and led field investigations for wetland delineations, vegetation community assessments, hydrogeomorphic assessments, and wetland functions and values with a 2.39-mile roadway corridor in the Cape Cod National Seashore on behalf of the National Park Service and the Federal Highway Administration.

***MassDOT Stormwater Improvements along Interstate 95, Attleboro, MA:*** Permitting manager for implementation of stormwater BMPs along a 4-mile stretch of interstate highway in support of MassDOT's Impaired Waters Program addressing water quality within the watersheds of Ten Mile River and Fourmile Brook. Performed resource area delineations, prepared permit applications and invasive species management plans, and served as project representative before the local Conservation Commission.

***Sunset Lake and Lakeside Park, Oak Bluffs, MA (current):*** Led efforts for proposed park improvements involving stormwater retrofit and habitat restoration around a gateway public park in downtown Oak Bluffs. Project was initiated by a local grassroots non-profit group, Friends and Neighbors of Sunset Lake (FANS), and funded through grants from the Community Preservation Committee. Construction slated for spring 2021.

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Project Manager/Senior Ecologist
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***Fuller Brook Park Preservation Project, Wellesley, MA:*** Permitting manager for the restoration of a 2.2-mile reach of a suburban impaired stream and wetland system within a major recreation and transportation corridor for the community. Project designed to restore habitat and hydrologic function to the riparian system including stream bank restoration, improved wetland connectivity, invasive species management, and construction of bioretention facilities to manage stormwater runoff.

***Conservation Commission Peer Review Services (on-going):*** Performed third-party independent project reviews for projects involving wetlands and wildlife habitat impacts, including for the municipalities of Attleboro, Bedford, Duxbury, Newburyport, North Attleborough, Oak Bluffs, Provincetown, Scituate, and Taunton, MA. Responsibilities vary by project, and include review of resource area boundaries, wildlife habitat assessments, wetland mitigation, and compliance with state and local regulations.

***Norman Bird Sanctuary, Middletown, RI:*** Performed field identification of plant communities and invasive species to support the development of a Facilities Master Plan for a private wildlife sanctuary. Master Plan includes an invasive species management plan, identification of site amenities, and recommended improvements to shape future investments and management opportunities for the property's campus facilities, trail network, grounds, and environmental resources.

***Rhode Island Airport Commission, T.F. Green Airport Airspace Obstruction Removal Project, Warwick, RI:*** Managed permitting of the removal, topping, and/or lighting of identified on- and off-airport obstructions surrounding the four runway ends through the Rhode Island Department of Environmental Management. Project is part of the larger Airspace Obstruction Removal Project associated with the runway extension at the Airport.

Coastal Restoration Projects, Cape Cod and Nantucket, MA: Managed permitting for restoration of salt marsh hydrology and ecology for several coastal restoration projects in southeastern Massachusetts. Varied responsibilities included resource area delineation, survey oversight, and project coordination with federal, state, regional, and local permitting agencies.

***Sachem's Path Affordable Housing Development, Nantucket, MA:*** Conducted rare plant surveys and vegetation community assessments and managed permitting for a housing development on a site mapped for rare species habitat. Massachusetts Endangered Species Act permitting included mitigation design and preparation of land management plans for on-site and off-site habitat preservation and Conservation Restrictions. Oversaw propagation and transplantation of state-listed plant species and long-term monitoring required by the Conservation and Management Permit.

***Rare Plant Survey, Cochecho Waterfront Development Project, Dover, NH:*** Performed a rare plant survey for state-listed threatened and endangered plant species and habitats as part of the permitting support for a City-sponsored waterfront park and development that includes site remediation, living shoreline restoration, and bank stabilization in downtown Dover.

***Goose Point Lane, Mashpee, MA:*** Served as wetlands expert on behalf of the Mashpee Wampanoag Tribe opposing a project with potential adverse impacts to the Tribe's long-standing shellfish grant. Provided expert at a Division of Administrative Law Appeals (DALA) hearing. Decision was rendered in favor of the Town of Mashpee and the Tribe.

***Expert Witness, Marshfield, MA:*** Provided vegetation and community-based botanical evaluations in support the Town and the Commonwealth of Massachusetts in a coastline change and beach access case. Served as expert witness in Land Court in Boston, MA. Decision was rendered in favor of the State.

***Summary and Analysis of Public Comments Relating to the Federal Clean Water Act, EPA Office of Wetlands, Oceans and Watersheds:*** Assisted the U.S. Environmental Protection Agency on several projects relating to the definition of "waters of the United States," including proposed rule-making and draft guidance documents, and implementation of wetland mitigation regulations. Efforts included compiling, categorizing, and summarizing public comment letters, and preparing topic compendiums.

# Dan MacKenzie, PLS

Professional Land Surveyor
dmack@horsleywitten.com

**Areas of Expertise**
Surveying
Geographic Information Systems
Civil Engineering
Site Design

**Professional Registrations & Affiliations**
Registered Professional Land Surveyor Massachusetts (# 47187)

Rhode Island (#2512)

Member of Massachusetts Association of Land Surveyors and Civil Engineers (MALSCE)

**Academic Background**
Bachelor of Arts, Stonehill College

*Land Survey Classes:*

Mathematics & Computations including Route Surveying and Advanced Surveying, University of Wyoming

Legal Aspects of Land Surveying, Wentworth Institute of Technology

**Professional Experience**
Horsley Witten Group, Inc., September 2004 to Present

Town of Stoughton Engineering Department, October 2001 to September 2004

GAF Engineering Inc., August 2000 to October 2001

Alpha Land Surveying & Engineering Associates, August 1994 to August 2000

Horsley Witten Group
*Sustainable Environmental Solutions*

Dan MacKenzie has 27 years of professional experience in land surveying, engineering and GIS. Dan's extensive knowledge of surveying and mapping allow him to compliment any type of project whether it planning, engineering design, permitting or construction. Having worked in both the public and private sectors, Dan has directed the completion of boundary surveys, subdivisions, Land Court, ALTA title insurance and easement plans, plans for permitting, topographic surveying for engineering design and plan review. Dan is also well versed with AutoCAD, ArcMap, GPS Pathfinder, TDS Foresight to name a few surveying, mapping and GIS software packages.

**KEY PROJECTS**

***University of Rhode Island, Kingston, RI - Green Hall and Tau Epsilon Phi (TEP) Parking Lot Design:*** Lead surveyor for the topographic and property line survey for Green Hall and the TEP lots on the URI campus. Fieldwork, utility mapping, property line research and utility research was collected and compiled onto the existing conditions plan. The survey is based on the Rhode Island State Plane Coordinate System NAD 83 and the vertical datum NAVD 88,

***University of Rhode Island, Kingston, RI - Tucker Parking Lot:*** Lead surveyor for a property line survey of the Tucker parking lot improvement project. The survey adhered to the Procedural and Technical Standards for the Practice of Land Surveying in the State of Rhode Island and Providence Plantations.

***Multi-Modal Bicycle Path, Burrilville, RI:*** Lead surveyor for the topographic and property line survey for a former railroad Right-of-Way. Fieldwork, utility mapping, property line research and utility research was collected and compiled onto the existing conditions plan. The survey is based on the Rhode Island State Plane Coordinate System NAD 83 and the vertical datum NAVD 88,

***Low Impact Design Stormwater Retrofit for Perkins Street, Peabody, MA:*** HW designed a Stormwater Retrofit Conceptual Master Plan for Perkins Street in order to help alleviate a localized flooding problem and improve safety conditions at the intersection of Perkins Street and Allens Lane. The Plan includes a variety of innovative, feasible and cost-effective stormwater Best Management Practices (BMPs) that could be installed on publically-owned park land and rights-of-way along Perkins Street to better manage the stormwater and alleviate the flood occurrences. Dan conducted a site survey of Perkins Street and potential locations where BMP projects can be implemented along this street.

***The Driftway Bicycle and Pedestrian Trail, Scituate, MA:*** Dan performed an extensive topographic and property line survey to produce an existing conditions plan for the placement and design of an 8-foot wide bicycle and pedestrian trail in Scituate. The trail is located along a high traffic roadway within the center of the Town. The path is approximately one-mile long and included various utility relocations and resource area protection measures

**Dan MacKenzie, PLS**
Professional Land Surveyor
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***Phinney's Lane, Barnstable, MA:*** Dan led a topographic and property line survey encompassing approximately 3,100 feet of this historic road in Centerville, MA. The field survey was based on Massachusetts State Plane Coordinate System was performed in full compliance with the Mass Highway Survey manual. An extensive survey of the underground utilities was also undertaken compiling field locations, subsurface observations and utility locations maps provided by the authorized utility. The final existing conditions plans were used to design roadway and drainage improvements and were to be used as preliminary takings plans if design warranted.

***Gannett Road Bike Path, Scituate, MA:*** In an effort to produce an existing conditions plan for the placement and design of a bike path, Dan performed an extensive topographic and property line survey. Gannett Road is a high traffic, densely populated neighborhood that was in need of pedestrian access to the center of town, which was had been recently revitalized by a commuter rail station. It was important to map all constraints along the over 2-mile route. The finished plan allowed engineers to identify these constraints and choose the best location.

***Centennial Park Detention Basin Retrofit and Wetland Restoration, Peabody, MA:*** Dan produced an existing conditions plan for this project to improve the wetland function and provide even more stormwater detention for the Centennial Park Detention Basin. The purpose of the Project is to improve flood storage capacity in locations upgradient of Downtown Peabody, an area that experiences severe flooding at an unsustainable frequency. HW is also providing design plans, and assisting with the construction bid package, project management, and construction oversight.

***Stoughton Center Traffic Improvement, MA:*** Produced an existing conditions plan for heavily congested downtown area. Plan area covered the convergence of all 11 roadways into the center of Stoughton. To accurately depict buildings, roadways, sidewalks, 1 foot contours and utilities, Dan directed GPS control survey, conducted field survey, coordinated with all public utility companies and the public works department and drafted plan into format for design engineer.

***Existing Conditions Survey, Sudbury, MA:*** Produced an existing conditions plan for Concord/Old Sudbury/ Hudson Road Intersection. To accurately depict buildings, roadways, sidewalks, 1 foot contours and utilities, Dan directed GPS control survey, conducted field survey, coordinated with all public utility companies and the public works department and drafted plan into format for the client.

# TULIN FUSELIER, PE

## BACKGROUND

2020-Present
Associate
Weston & Sampson

2017-2020
Geotechnical Practice Leader
Weston & Sampson

2011-2017
Northeast Region Geotechnical
Practice Leader
Kleinfelder Corp.

2009-2011
Geotechnical Engineer
Bioengineering Group

2005-2009
Staff Engineer
Haley & Aldrich, Inc.

2001-2004
Project Engineer
Parsons Corp.

## EDUCATION

2006
Master of Science
Geotechnical Engineering
Tufts University

1999
Bachelor of Science
Environmental Engineering
Louisiana State University

## PROFESSIONAL REGISTRATION

Professional Engineer:
Massachusetts No. 47146
Maine No. 13327

OSHA 40-hour Hazwoper

## PROFESSIONAL AFFILIATIONS

Urban Land Institute, Sustainability
Committee Founder and Chair
(2009, 2010)

Boston Society of Civil Engineers

Tulin leads Weston & Sampson's geotechnical engineering practice. She has over 20 years of diverse experience, having provided geotechnical engineering design and construction services for projects ranging from high-rises with up to four levels of below-grade parking to small buildings, various sized bridges, water/wastewater pipelines in urban and suburban areas, levee design following Hurricane Katrina effects, dam rehabilitation, climate resilient design, a pedestrian tunnel in urban setting, and railway extension through metro-Boston (Green Line Extension).

## SPECIFIC PROJECT EXPERIENCE

North Reservoir Dam Rehabilitation, Winchester, Massachusetts. Engineer of Record for Phase II dam investigations and rehabilitation of the 780-foot long, 25-foot tall poor conditioned, HIGH hazard potential earth embankment dam in Winchester Phase II investigations included topographic and bathymetric survey; subsurface investigations; hydrologic and hydraulic analyses; geotechnical analyses including seepage, slope stability and liquefaction; alternative analyses; and development of conceptual repairs and associated cost estimates. Leading a multi-disciplinary team of engineers, scientists, and surveyors in design and permitting services to bring North Reservoir Dam into compliance with current dam safety regulations. The design includes broadening the embankment crest, flattening, buttressing against liquefaction, armoring the slopes, constructing a two-stage graded seepage filter and embankment toe drain, replacing the gatehouse bridge, wetland replication, repurposing the existing water supply pipe as a low-level outlet, pipe improvements including spray applied epoxy lining, new ductile iron pipe, a new stilling basin and downstream channel improvements, and new gate valves in the gatehouse.

Old Reservoir Dam Rehabilitation, Lexington, Massachusetts. Engineer of Record for design, permitting, bidding, and construction services for the rehabilitation of SIGNIFICANT hazard Old Reservoir Dam in Lexington. Work included embankment improvements including raising the crest based on H&H analyses results, slope armoring, mineral filter construction, outlet structure and low-level outlet rehabilitation, environmental permitting, wetland replication, and engagement in public process. Coordinated and performed engineering analyses, coordinated environmental permit preparation and presentations, and prepared drawings and specifications.

Industries Drive Dam Repair, Norfolk, Massachusetts. Led the emergency repair of Industries Drive Dam outlet failure. Industries Drive Dam is a significant hazard potential, poor conditioned, earthen embankment dam about 1000-feet-long and 15-feet-tall. On Christmas Day, a sinkhole that had recently developed on the dam crest along the outlet structure turned into an active downstream slope failure. Weston & Sampson was called for emergency response to the dam failure. The emergency response included installation of a temporary cofferdam to close the reservoir outlet, installation of de-watering pumps to act as temporary outlets, and emergency replacement of the outlet pipe with a box culvert.

**Phase I Dam Inspections, Various Towns in Massachusetts.** Engineer of Record for several Phase I dam inspections. Inspections were conducted in accordance with Department of Conservation and Recreation Office of Dam Safety guidelines and included reviews of existing information, visual observations, qualitative hydrologic, hydraulic, and geotechnical analyses, identification of dam safety deficiencies, and recommendations for repair and associated estimated costs.

**Moakley Park Resiliency Improvements, Boston, Massachusetts.** Leading the geotechnical design of Moakley Park's climate resilience and flooding improvements. Moakley Park, a 60-acre waterfront park in South Boston, is prone to flooding with subsurface conditions consisting of very soft clays to 200 feet deep. Design includes up to 20-foot-high berms along the waterfront to function as levees, which will cross over existing, large-diameter, brick stormwater utilities. Currently working on optimal placement and preliminary design of the new levee system. Final design is expected in 2021.

**Langone Park and Puopolo Playground Resiliency Improvements, Boston, Massachusetts.** Led the geotechnical design of the approximately 4.6-acre waterfront park in Boston's North End neighborhood. The design included raising site grades by up to 6.5 feet while managing settlement in existing adjacent structures, including the 15-foot high seawall and buildings.

**Mill Brook Corridor and Wellington Park, Arlington, Massachusetts.** Provided geotechnical engineering support for this flood conditions improvement project. Evaluated/studied the conditions of the park soils and Mill Brook's banks. Following a team approach on alternatives analyses, led the geotechnical portion of the project solution.

**North River Canal, Riverwalk, and Park, Peabody, Massachusetts.** Geotechnical lead for the rehabilitation of the approximately 1,600-foot-long wall along the southern bank of the North River Canal in the urban industrial section of downtown Peabody. During the first phase of the project conducted a wall repair alternatives analysis to evaluate options to replace the failing canal wall, portions of which are crumbling into the river. The wall condition varied over its length, ranging from "good," which needs minor or no repairs, to "poor," requiring full or partial reconstruction. During the second phase, advanced the design of the preferred wall alternative and Riverwalk.

**City of Boston Public Works Department Climate Resilient Design Standards and Guidelines.** Prepared geotechnical resiliency guidelines as part of the Climate Ready Boston initiative to prepare for 40 inches of sea level rise by 2070. Provided geotechnical considerations for design of vegetative berms, raised harbor walks, and raised roadway flood barriers, including considerations for incremental future sea level rise.

**Metro Wastewater Treatment Plant Flood Protection Study, Columbia, South Carolina.** Under a Hazardous Mitigation Grant Program (FEMA), studying alternative methods to protect the Metro WWTP and its supply route from future flood conditions. The WWTP's surroundings were flooded following a levee breach during a 2015 storm. The study includes inspecting existing conditions of a 2.5-mile levee section, evaluating the stability of a 1-mile existing levee section under flood conditions, and optimal placement and preliminary design of new levee sections for future resiliency of the WWTP.

# THOMAS STRIKE, PE

## BACKGROUND

2018-Present
Senior Project Manager
Weston & Sampson

2015-2018
Project Manager
Weston & Sampson

2013-2015
Project Engineer
Weston & Sampson

2005-2013
& 1999-2004
Staff Engineer
Miller Engineering & Testing, Inc.

2004-2005
Geotechnical Engineer
PSI, Inc.

1998-1999
Field Engineer
SMW Seiko, Inc.

## EDUCATION

2005
Master of Science
Geotechnical Engineering
University of Massachusetts, Lowell

1998
Bachelor of Science
Civil & Environmental Engineering
University of Massachusetts, Amherst

## PROFESSIONAL REGISTRATION

Professional Engineer:
Massachusetts No. 50328
New Hampshire No. 13858

Tom is a senior project manager in the firm's environmental and geotechnical program. He has over 20 years of experience with geotechnical engineering design and has been responsible for managing multiple ongoing construction projects. His specific areas of expertise include foundation design, retaining wall and slope stability analyses, and dam safety engineering.

## SPECIFIC PROJECT EXPERIENCE

**Babson Reservoir Dam Rehabilitation, Gloucester, Massachusetts.** Project manager and engineer for the rehabilitation of Babson Reservoir Dam, which involved modifications to the 630-foot-long earthen embankment including vegetation removal and flattening of the downstream slope to 2H:1V; concrete repair of the core wall, discharge channel walls, and gatehouse walls; construction of vertical and horizontal extensions to the concrete core wall and spillway walls; repair and modification to the spillway slab; construction of new stilling basin walls and foundations, and of a new discharge channel pipe and headwalls; and installation of downstream mineral filters. Prepared drawings for construction and managed office and field activities during construction, including review of pay requisitions and contractor submittals.

**Massasoit State Park Dam Rehabilitations, Taunton, Massachusetts.** Project manager and dam safety engineer for rehabilitation of five earthen embankment dams in Massasoit State Park (Intermediate Size, High Hazard Structures ranging from 180 to 365 feet long and 10.5 to 18.5 feet tall). Work includes coordination with Massachusetts DCR Office of Dam Safety, environmental permitting, repair of concrete outlet structures, raising the crest of one of the dams, and embankment improvements (including slope armoring), and mineral filter construction. Coordinated and completed engineering analyses; prepared drawings and specifications; coordinated environmental permit preparation and presentations; and provided bidding assistance.

**Phase II Dam Investigations, Westford, Massachusetts.** Project manager for Phase II investigations for two significant hazard dams, including wetland delineation, surveying, geotechnical explorations, hydrologic and hydraulic evaluations, structural analyses, and development of conceptual repairs and associated cost estimates.

**Nabnassett Pond Dam Phase II Investigations, Westford, Massachusetts.** Project manager and dam safety engineer for Phase II investigation of Nabnessett Pond Dam (Large Size, Significant Hazard), a 200-foot-long, 14-foot high earthen embankment with a concrete inlet box primary spillway and a 24-inch ductile iron low level outlet located in the impoundment. Work included topographic and bathymetric surveys, subsurface investigations, hydrologic and hydraulic analyses, geotechnical analyses including seepage and slope stability, alternative analyses, and development of conceptual level repairs and associated costs estimates.

**Stony Brook Dam Phase II Investigations, Westford, Massachusetts.** Project manager and dam safety engineer for Phase II investigations of Stony Brook Dam (Intermediate Size, Significant Hazard), a 350-foot-long, 25-foot-high earthen and stone masonry structure with a stepped stone masonry primary spillway and a low-level outlet consisting of two 36-inch by 40-inch openings controlled by slide gates. Work included topographic and bathymetric surveys, subsurface investigations, hydrologic and hydraulic analyses, geotechnical analyses including seepage and wall and slope stability, alternative analyses, and development of conceptual level repairs and associated costs estimates. Identified deficiencies that included an over-steepened upstream slope with areas of erosion, movement/bulging of upstream and downstream walls, and the inability to safely pass the spillway design flood (SDF) without overtopping. Recommended alternatives (e.g., repairing or reconstructing the upstream and downstream walls and regrading and armoring the upstream slope) to allow the dam to safely pass the SDF.

**Phase I Dam Inspections, Various Locations, Massachusetts.** Project manager and dam safety engineer for more than 15 Phase I dam inspections for communities throughout Massachusetts. Conducted inspections in accordance with Department of Conservation and Recreation Office of Dam Safety guidelines, and included reviews of existing information, visual observations, qualitative hydrologic, hydraulic, and geotechnical analyses; identification of dam safety deficiencies; and recommendations for repair and associated estimated costs.

**Upper Reservoir Dam, Goffstown, New Hampshire.** Project manager and dam safety engineer responsible for evaluating the 345-foot-long High Hazard earth embankment dam with a concrete core wall constructed circa 1930. Repairs were required to manage a washout/sinkhole in the downstream slope abutment contact and an accumulation of eroded sand at the toe of the downstream slope. Conducted exploratory work with the use of an excavator and test pits to evaluate subsurface conditions, concrete core wall, and the evidence of seepage. Designed recommendations to repair the downstream slope, install a mineral filter, and provide means for upper stormwater diversion. Also prepared a reservoir refilling monitoring plan.

**Hood Pond Dam, Derry, New Hampshire.** Project manager and dam safety engineer for rehabilitation of Hood Pond Dam, a 560-foot-long, 31-foot-tall High Hazard earthen embankment dam. Work included wetland delineation, topographic survey, subsurface investigations, visual assessment of dam conditions, hydrologic and hydrology analyses, alternative repairs analysis, and development of design plans and specifications.

**Gillett Pond Dam, Richmond, Vermont.** Project manager and dam safety engineer for rehabilitation of an approximately 160-foot-long, 8-foot-tall Low Hazard stone masonry dam. Work included replacement of the dam with a new 240-foot-long, 12-foot-tall reinforced concrete dam on native soils and bedrock. Construction of the dam involved installing a cofferdam in Gillett Pond (so that work can be completed in-the-dry) and preparation of soil and bedrock subgrades.

# NATHAN SEIFERT, PE, LEED®AP

## BACKGROUND

2018-Present
Team Leader
Weston & Sampson

2014-2018
Project Manager
Weston & Sampson

2008-2014
Structural Engineer
Hart Design Group, LLC

2007-2008
Project Manager
The Torrey Company

2005-2007
Project Manager
Churchill & Banks, LLC

1999-2005
Structural Engineer
Lin Associates, Inc.

1994-1999
Field Engineer
Bechtel Corporation

## EDUCATION

1994
Bachelor of Science
Civil Engineering
Worcester Polytechnic Institute

## PROFESSIONAL REGISTRATION

Massachusetts (No. 41693)
Rhode Island (No. 7663)
Connecticut (No. 29660)
Kentucky (No. 29965)
Florida (No. 79595)
South Carolina (No. 35047)
Vermont (No. 018.0134531)
North Carolina (No. 048585)

LEED® Accredited Professional

## PROFESSIONAL SOCIETIES

American Society of Civil Engineers

Nathan, a team leader in Weston & Sampson's structural engineering department, has more than 25 years of engineering and construction experience. His areas of expertise include reinforced concrete, masonry, structural steel, and timber design, and he is well versed in the International Building Code. His project experience includes design for new construction and renovation of commercial, multi-unit residential institutional and pharmaceutical/industrial buildings; water/wastewater treatment facilities; and bridges. Nathan also has construction management experience and is a LEED® Accredited Professional.

## SPECIFIC PROJECT EXPERIENCE

**Hoppin Hill Dam Renovation, Attleboro, Massachusetts.** Responsible for structural design for the project which consisted of the renovation of an existing dam. Structural work included rebuilding a concrete spillway and discharge channel.

**Quincy Point Pump Station, Quincy, Massachusetts.** Responsible for structural design for the project which consisted of the renovation of an existing wastewater pump station, including rebuilding the concrete influent channel, and other concrete repairs.

**Bridge Reconstruction Services for the Mountain Road over Mill Brook C-05-06 Bridge, MassDOT, Charlemont, Massachusetts.** Engineer responsible for providing services as part of the complete reconstruction and relocation of the roadway and the Mountain Road Bridge over Mill Brook. The 16-meter single-span bridge included pre-stressed, pre-cast concrete butted box beams and integral abutments. In accordance with MassDOT requirements, work included survey, final roadway design, design of sidewalks to ADA standards, utility/drainage improvements, geotechnical engineering, detour route selection, and contract documents preparation.

**Mill Brook Corridor and Wellington Park, Arlington, Massachusetts.** Responsible for structural support of the revitalization of the linear corridor along Mill Brook and Wellington Park. Project work includes site improvements, vegetation management planning, and bank restoration.

**Ireland Street over West Branch Bronson Brook, MassDOT, Chesterfield, Massachusetts.** Provided structural engineering services for the replacement of an existing 56-foot single span, steel thru-girder bridge. Responsibilities included performing a bridge type study; developing conceptual bridge plans, evaluating bridge superstructure replacement options of prestressed concrete NEXT beams, steel girders with precast concrete deck panels, and steel girders with shop fabricated concrete decks; and analyzing existing abutments.

**Water Street over Blackstone River Bridge, Millbury, Massachusetts.** Responsible for structural design and construction administration for the bridge substructure and superstructure design for Mass Highway Department. The superstructure was constructed with prestressed concrete box beams.

**Central Artery/Tunnel Project, Boston, Massachusetts.** Worked on project to depress a major artery through the city and adding a third harbor tunnel. Responsible for field construction inspection and other construction management duties on portions of the project.

**Copeland Building, Mass Maritime Academy, Buzzard's Bay, Massachusetts.** Responsible for analyzing the existing structure, developing structural details, and construction administration for the structural renovation of a historic building that included jacking and underpinning the foundation, and seismic and wind bracing.

**Municipal Services Facility, Andover, Massachusetts.** Responsible for structural design and construction administration for a new 60,000-square-foot public works facility with vehicle storage, vehicle maintenance, and administration areas. Structure was a one- and two-story pre-engineered metal building.

**Department of Public Works and Natural Resources Facility, Orleans, Massachusetts.** Responsible for structural design and construction administration for a new 42,000-square-foot public works facility with vehicle storage, vehicle maintenance, and administration areas. Structure was a one-story pre-engineered metal building.

**Vehicle Maintenance Addition and Renovation, Chelmsford, Massachusetts.** Responsible for structural design and construction administration for a new 6,000-square-foot vehicle maintenance addition. Structure was a one-story pre-engineered metal building.

**Highway Department Repair and Partial Replacement, Colrain, Massachusetts.** Responsible for structural design and construction administration for the renovation of an existing 4,500-square-foot highway department facility with vehicle storage, vehicle maintenance, and administration areas. Renovation included a 2,000-square-foot addition. Structure was a combination of conventional steel, concrete masonry, and wood framing.

**Arlington Reservoir Master Plan, Arlington, Massachusetts.** Structural engineer for the development of a master plan for the Arlington Reservoir property.

**Department of Public Works Renovation & Addition, Arlington, Massachusetts.** Responsible for structural design for the renovation of the historic public works facility and design of a new addition. The project involves historic designation, historic contamination on site, multiple end users, utility easements through the site, a brook running through the center of the site, and budgetary limitations.

**Fort Myers Country Club Bridge Inspection, Fort Myers, Florida.** Responsible for drafting the report and providing a technical review for the inspection of nine pedestrian/golf cart bridges at the country club.

**Light Pole Inspections, Fort Myers, Florida.** Responsible for technical review of a report for the inspection of city street lighting.

# ANDREW WALKER, PH, CFM

## BACKGROUND

2020-Present
Technical Specialist
Weston & Sampson

2009-2020
Hydrologist
Weston & Sampson

2006-2007
Water Engineer
Fay, Spofford & Thorndike

## EDUCATION

2014
Master of Science
Hydrology
University of New Hampshire

2006
Bachelor of Science
Civil Engineering
Tufts University

## PROFESSIONAL CERTIFICATIONS

Professional Hydrologist

Certified Floodplain Manager

Engineer-in-Training (EIT):
New Hampshire

## PRESENTATIONS

October 2014
"Town-wide Stormwater Best Management Practice Screening"
NEWWA Water Resources & Sustainability Symposium

April 2014
"Surface Water Controls or Enhanced Aquifer Recharge, the Big River Story"
NEWWA Spring Joint Regional Conference

April 2013
"A Tale of Two Ponds: Developing Model to Improve Reservoir Management"
NEWWA Spring Joint Regional Conference

September 2011
"A Balancing Act: Optimizing

Andrew is a hydrologist with more than 10 years of experience specializing in engineering and water resources. He has conducted hydrologic and hydraulic modeling on more than 40 dam projects that included aspects such as hydraulic assessment of existing conditions, conceptual alternative analyses, and rehabilitation design. Andrew has developed dozens of HEC-RAS hydraulic models, including breach models in support of emergency action plans for more than 25 dams with all manner of flood zones ranging from rural rivers valleys to dense urban floodways with no defined channel. In developing hydraulic models and EAPs, he has worked with regulators from every New England state as well as with FERC, FEMA, and the NRCS. He is also familiar with the latest GIS datasets and ArcGIS-based tools for evaluating hydrologic and hydraulic problems.

## SPECIFIC PROJECT EXPERIENCE

**Dam Rehabilitation Design, Lexington, Massachusetts.** Conducted hydrologic and hydraulic analyses in support of rehabilitation projects for two dams in Lexington. Developed rainfall-runoff models of the upstream watershed to determine the spillway design floods. Developed multiple hydraulic models of the dams and their impoundments to determine the adequacy of the dams and their outlet structures during the design flood events for existing and alternative conditions.

**Butterfield Pond Dam, Lexington, Massachusetts.** Engineer for the Phase II rehabilitation of the Butterfield Pond Dam, which included monitoring erosion control measures for conservation committee, documenting construction activities, reviewing submittals, and performing a Phase I inspection and evaluation report and Permit 253 close-out for the dam post-rehabilitation.

**Emergency Action Plan for Hoppin Hill Dam, Attleboro, Massachusetts.** Conducted dam breach analyses and prepared inundation maps in support of the development of an Emergency Action Plan for Hoppin Hill Dam. Developed a hydraulic model that incorporated a total of over 7 river miles, 3 dams, 14 bridges, and several significant tributaries. Conducted dam breach simulations under both sunny day and stormy day conditions for both dams. Evaluated the potential impact of cascading dam failures.

**Rehabilitation Design and Emergency Action Plan for Significant Hazard Dam, Gloucester, Massachusetts.** Conducted dam breach analyses and prepared inundation maps in support of the development of an emergency action plan for a significant hazard dam in Gloucester. Developed a hydrologic model of the reservoir's watershed to develop appropriate stormy day inflow conditions. Used the model to evaluate rehabilitation design alternatives to improve capacity of the dam's outlet structures and to evaluate the potential impacts of energy dissipation structures in the dam's primary spillway. Developed a hydraulic model that incorporated a total of 3+ river miles and 7 bridges. Conducted dam breach simulations under both sunny day and stormy day conditions for both dams.

Water Supply Availability through Integrated Management" New England Water Works Association

## PRESENTATIONS (CONT.)

January 2011
"A Balancing Act: Optimizing Water Supply Availability through Integrated Management" New England Water Works Association

**Dam Rehabilitation Design, Weston, Massachusetts.** Conducted hydrologic and hydraulic analyses in support of a rehabilitation project on a failed dam in Weston. Applied streamflow statistics to USGS streamflow data and developed a rainfall-runoff model of the immediate drainage basin to determine the spillway design flood. Developed multiple hydraulic models of the dam and its impoundment to determine the adequacy of the dam and its outlet structures during the design flood event for existing and alternative conditions.

**Hydrologic and Hydraulic Analyses of Four Dams, Attleboro, Massachusetts.** Conducted hydrologic and hydraulic analyses to determine the adequacy of four dams as part of routine dam safety inspections. Developed rainfall-runoff model of the upstream watersheds to determine the spillway design flood. Developed multiple hydraulic models of the dams and their impoundments to determine the adequacy of the dams and their outlet structures during the design flood events for existing and alternative conditions. Addressed challenges posed by two of the dams that involved 10+ square mile watersheds with a wide variety of land uses and soil types, multiple impoundments and other areas of instream flood storage, and a significant network of tributaries.

**Hazard Classification Analyses for Two Dams, Mashpee, Massachusetts.** Conducted dam breach analyses and developed flood inundation maps to evaluate the potential impact of the hypothetical failures of two unclassified dams in Mashpee. Developed a HEC-RAS model for each dam and downstream floodway, including a total of 9 river miles, 1 downstream dam, and 18 bridges. Conducted dam breach simulations under a variety of antecedent conditions. Submitted a letter report to the NRCS summarizing the results of the modeling effort and recommending a NRCS Hazard Classification; the NRCS concurred with and approved the recommended Hazard Classification.

**Mill Pond Dam Study, Durham, New Hampshire.** Developed a hydrologic and hydraulic model of the Mill Pond watershed to develop inflow hydrographs to the pond and evaluate the hydraulic capacity of the dam in its existing condition as well as several conceptual-level alternative designs. Evaluated impacts of lateral inflows due to roadway overtopping from the adjacent Lamprey River watershed on the dam's hydraulic adequacy. Developed a hydraulic model of 1.8 miles of the Oyster River based on sediment sampling, bathymetric survey, and LiDAR elevation data to evaluate areas of sediment accumulation and degradation and to identify potential changes in sediment transport in the long-term as a result of dam modifications.

**Hood Pond Dam Rehabilitation and EAP Update, Derry, New Hampshire.** Developed a hydrologic and hydraulic model of the Hood Pond watershed to develop inflow hydrographs to the pond and evaluate the hydraulic capacity of the dam in its existing condition as well as several conceptual-level alternative designs. Developed a hydraulic model of the dam, its impoundment, and the downstream floodway in order to develop inundation maps to be included in an updated Emergency Action Plan.

# Project Descriptions

Project Profile
Ipswich, MA

Client Contact:
Beth Lambert
Division of
Ecological Restoration
617-626-1526

HW Contact:
Neal Price

16041

# Ipswich Mills Dam Removal Feasibility Study

In the heart of downtown Ipswich, a dam has reportedly existed at the "head-of-the tide" Ipswich Mills site since the mid seventeenth century. The current dam powered mills and manufacturing facilities from the late nineteenth century through the mid twentieth century. The dam still holds an aesthetic and emotional appeal for many residents. It also, however, represents a maintenance burden and legal liability to the Town, exacerbates flooding concerns for the downtown area, represents a significant fish passage obstruction, and degrades water quality and ecological conditions for its upgradient-impounded area. HW, working with a structural subcontractor, is assisting the Town, MA DER, and the local watershed association with a feasibility study to evaluate how the community might be affected by the dam's removal; structurally, environmentally, historically, and economically. The project includes baseline topographic and bathymetric mapping to inform hydraulic modeling of potential changes to river stage and flow; analysis of the potential impacts of dam removal on fish passage, habitat function, and recreation; historical research and impact assessment; and evaluation of potential structural impacts to adjacent mill buildings.

Horsley Witten Group

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Project Profile
MassDER Pepperell, MA

Client Contact
Nick Wildman
Mass DER
617-626-1527

HW Contact
Neal Price, Associate Principal,
Sr. Hydrogeologist
19055

Horsley Witten Group

# Sucker Brook Dam Removal and Culvert Replacement

Sucker Brook is a tributary of the Nissitisset River that flows into the Keyes-Parker Conservation Area located in Pepperell, MA. Within the conservation area, the river is impounded by a stone dam built in the early twentieth century that no longer serves any practical function. It also unfortunately represents a significant barrier for the passage of brook trout and other fish, negatively impacts water quality and habitat, and interferes with natural sediment movement. Upstream of the dam, the access road to the conservation area crosses and negatively affects fish passage, water quality, and habitat due to its undersized culvert.

HW is assisting the Town, MassDER and Trout Unlimited in solving these problems by evaluating and designing dam removal, stream restoration, and a culvert replacement that meets Massachusetts Stream Crossing Standards to optimize fish and wildlife passage. Our staff conducted field wetlands resource delineation, hydraulic assessments, cost/benefit analyses of options, and a design of the selected culvert replacement and dam removal. Currently, the project is in the permitting phase.

Project Profile
Barnstable, MA

Client Contact
Dick Delaney
Red Lily Pond Association
312-933-8600

HW Contact
Neal Price

15156

Horsley Witten Group

# Red Lily Pond Restoration

Red Lily Pond is a picturesque coastal pond and stream system that grades from freshwater to saltwater before discharging to the Osterville River in the Craigville Beach area of Barnstable. Over time the Red Lily Pond system has suffered hydraulic and water quality impacts due in - part to the construction of undersized road crossings at several locations. HW has conducted survey, geomorphic stream assessment, and modeling activities to identify optimal stream crossing replacement structures at three locations to restore a more naturalized hydraulic regime and improve fish passage for anadromous fish. We are currently working on the design of a fish passage structure for the Red Lily Pond outlet to replace the existing dam and poorly-performing fish ladder. This includes the assessment of different alternatives of manufactured fish ladders and naturalized bypass channels using riffle-run and step-pool segments. Design work includes stream bank stabilization, flood plain reconnection, and native plantings to improve riparian habitat. We are assisting a structural engineer with the designs for a new culvert for a downstream road crossing and a new bridge road crossing to enhance the hydraulic connection between the pond's two basins. Our work on these road crossings focuses on stream restoration, meeting the Massachusetts stream crossing standards and permitting.

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Project Profile
Harwich, MA

Client Contact:
Jeremy Bell
Aquatic Habitat Restoration Manager
The Nature Conservancy
207-373-5073

HW Contact:
Neal Price

10051

Horsley Witten Group

# Red River Beach Salt Marsh Restoration

HW collaborated with the Town of Harwich and the Division of Ecological Restoration to restore a degraded salt marsh at Red River Beach. The project area consists of two distinct marshes, each approximately 4 acres in area, that experienced restricted tidal flow through undersized 2-foot diameter road culverts.

HW designed and permitted two replacement culverts to improve the salt marsh hydraulics, water quality, and habitat conditions. During the design process, HW evaluated potential flooding impacts to nearby properties resulting from increased tidal flow and evaluated alternatives to minimize these impacts. The final design included an adjustable tide gate to protect low-lying property from storm damage.

Lastly, HW managed construction of the two culvert replacements and related road and drainage work. Both replacement concrete box culverts, one a 4-foot by 8-foot and the other a 3-foot by 4-foot, were successfully constructed in 2012 along with an adjustable tide gate on the upstream culvert to protect upstream properties.

Project Profile
MA Coastal Zone Management
Wetlands Restoration Program

Client Contact
Tim Smith
Restoration Ecologist
Cape Cod National Seashore
508-487-3262 x 107

HW Contact
Neal Price
Sr. Hydrologist

2182

Horsley Witten Group

# Salt Marsh Restoration at Scorton Creek

Years ago, game farm management in East Sandwich created a tidal restriction with construction of a dam, a road, and a tide gate that blocked tidal flushing to the headwaters of Scorton Creek. The purpose of the dam was to eliminate the salt marsh and to create a freshwater pond for raising trout. Years later, the MA Office of Coastal Zone Management Wetlands Restoration Program, and the MA Corporate Wetlands Restoration Program teamed up with other agencies and Ducks Unlimited to remove the dam and increase tidal flushing to the upstream salt marsh, while hoping to enhance diadromous fish migration. As a Corporate Wetlands Restoration Partner, HW assessed alternative options for opening the tidal restriction and designed, permitted and managed construction of a pedestrian bridge over the creek. The goal was to restore tidal flow to an approximately 8-acre potential marsh area upstream of the existing impoundment. We evaluated hydrologic conditions and modeled alternative openings, including culverts and a single span bridge. HW designed and permitted the replacement bridge, evaluated the potential increase in tidal flushing, and specified wetland planting for disturbed areas. The bridge was constructed in 2007 and since then tidal flushing has increased markedly upstream of the bridge. Fish species diversity has also increased and Phragmites abundance has shown decline.

Project Profile
Town of Brewster, MA

Client Contact
Chris Miller
Natural Resources Director
Town of Brewster
508-896-4546

HW Contact
Neal Price, Senior Scientist

16078

Horsley Witten Group

# Crosby Landing Culvert Replacement and Stormwater Improvements

Crosby Landing is a popular Town-owned beach in Brewster, Massachusetts. The access road to the beach crosses a sensitive salt marsh habitat dividing it into two sections. Prior to completing this project, the access road contributed to significant salt marsh degradation by allowing only limited saltwater exchange to the isolated western section of salt marsh through a small, 18-inch culvert. Two other problems were the unmanaged stormwater runoff from the road and parking area and the propensity for the low-lying access road to flood during storms. HW helped the Town solve these problems by evaluating and designing a climate change-resilient road raising, green stormwater Infrastructure (GSI) best practices to capture and treat stormwater runoff, and a replacement culvert that optimizes tidal flushing and fish and wildlife passage. HW conducted field wetlands resource delineation, hydraulic assessments to size the appropriate culvert replacement, cost/benefit analyses of options, design of the selected culvert replacement and stormwater management options, environmental permitting, and construction administration. In the spring of 2021, the project was completed with improved tidal flow and water quality already evident.


Project Profile

Fuller Brook Park, Wellesley, MA

Client Contact
David Hickey
Town Engineer
781-235-7600

HW Contact
Michelle West, P.E.

Date completed: July 2017

12003-2

Horsley Witten Group

# Stormwater Management and Stream Restoration

Fuller Brook Park is a historic, heavily used greenbelt in the Town of Wellesley. The path that runs through the 2-mile long park connects residents to Fuller Brook and its tributaries and provides recreational opportunities in a natural setting. Increased development in the surrounding watershed over many decades has impacted the streams. Water quality and area of wildlife habitat have declined, and bank erosion threatens the adjacent path and infrastructure. Working with the Town, HW set goals for this park preservation and stream restoration project. Our team designed restoration features, including bioengineered bank stabilization, a restored wet meadow with a boardwalk crossing, and in-stream habitat structures, rain garden practices for stormwater management, native riparian plantings, and invasive species management. We designed interpretive signage featuring the stormwater management and stream relocation projects in the park and helped the Town obtain all necessary permits, grant funding for a portion of the project, We also oversaw construction and restoration activities.


Project Profile
City of Attleboro, MA

Client Contact:
Gary G. Ayrassian
Director of Planning and Development
City of Attleboro
508-223-2222

HW Contact:
Michelle West, P.E.

10041

Total HW Design Fee = $139,875
Connector Fee = $186,990

Horsley Witten Group

# Riverfront Park, Riverwalk Connector, and River Restoration Project

HW worked with the Attleboro Redevelopment Authority and the Attleboro Planning and Development Department to re-envision a formerly industrial stretch of the Ten Mile River. HW designed Riverfront Park, a passive recreational area with a multi-use path, canoe access, native landscaping, and park amenities such as benches and picnic tables. Our design also incorporated riverbank and buffer restoration components, and invasive species management. HW took this project from concept stage through design, permitting, and construction, with completion in summer 2017. More recently, we also designed a Riverwalk Connector that provides a vital linkage between Riverfront Park and a park further upstream. The Connector project combined two pedestrian bridges, porous asphalt pathway, and boardwalk, with green infrastructure and buffer restoration. Project construction is complete. These projects are important elements of the City's downtown urban renewal plan and greenbelt vision.

*HW focuses on providing sustainable environmental solutions. Learn more at horsleywitten.com*

Project Profile
Yarmouth, MA – CZM
Wetlands Restoration Program

Client Contact:
Jeremy Bell
Aquatic Habitat
Restoration Manager
The Nature Conservancy
207-373-5073

HW Contact:
Neal Price

5025

Horsley Witten Group

# Bass Creek Salt Marsh Restoration Project

A salt marsh at the upgradient end of Bass Creek in the Town of Yarmouth, MA had a restricted connection to Cape Cod Bay due to an undersized tidal culvert. The culvert contributed to impaired water quality with Phragmites dominance on the upgradient (restricted) side of the culvert. HW completed salt marsh restoration work at Bass Creek for the Massachusetts Coastal Zone Management Wetlands Restoration Program.

HW first evaluated the tidal restriction and recommended solutions for increasing tidal flow to the salt marsh. HW deployed water level recorders to measure the headwater/tailwater hydrodynamics near the culvert; delineated wetlands; and surveyed topographic and low-lying property surveys. The data supported hydrodynamic modeling to evaluate a series of alternative replacement culvert sizes, and helped the team arrive at the most effective solution. The chosen solution was a cost effective, aesthetically pleasing open span, timber framed bridge over an enlarged channel opening that improved tidal-flushing. HW designed the new channel opening and bridge; handled environmental; permitting; and provided construction oversight. Construction was completed in the spring of 2008. The new pedestrian footbridge provides the primary access point to a popular conservation area.

Project Profile
Town of Winchester, MA

Client Contact:
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Town Engineer
781- 721-7120
brudolph@winchester.us

HW Contact:
Neal Price

13052

# Aberjona River & Davidson Park Restoration Project

The Aberjona River is the largest tributary to the Mystic River, which empties into Boston Harbor. The river runs through downtown Winchester, as well as many areas of parkland and open space. In the 1930's following the "Olmsted style" of landscape architecture, the Town created the Davidson Park. The river was impounded to create a large, landscaped pond. As the pond was not dredged regularly, and over time sediment clogged the pond. Additionally, riverbank erosion has compromised a section of the park's bike path, and invasive species have become problematic. HW worked with the Town to complete a park feasibility study and produce conceptual restoration designs. HW's scope of work included an existing conditions survey; wetlands habitat mapping and evaluation; sediment depth and quality assessment; dredging feasibility assessment; hydraulic modeling; and public outreach. The goal of the project was to create an optimal balance between sustainable hydraulic river design (minimize sedimentation and erosion), habitat enhancement, and the passive recreational use intended in the original park design. Three different conceptual designs were prepared for public review. All river restoration and park design improvements complement the historic nature of the park.

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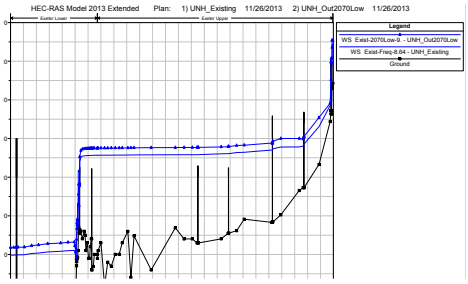
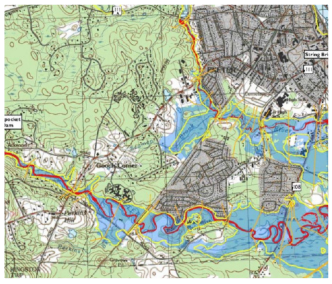
# GREAT DAM ALTERNATIVES ANALYSIS

town of exeter, new hampshire

The Town of Exeter retained Weston & Sampson as part of a team to conduct hydrologic and hydraulic analyses for a dam removal feasibility and alternatives analysis of Great Dam. Our analyses formed the basis for evaluating the impacts of a dam removal or modification, including those associated with flooding, fish passage, water quality, bridge and foundation scour, and recreational opportunities. The analyses were conducted by developing a rainfall-runoff model of the upgradient watershed, and a river and floodplain model of the Exeter and Little Rivers. Both models were developed in compliance with the NH Code of Administrative Rules Chapters Env-Wr 400 and 500, and were reviewed and approved by NH DES Dam Bureau staff.

Hydrologic analyses of Great Dam's 107.5-square-mile drainage basin were conducted to determine its runoff characteristics during several design rainfall events, ranging from the 2-year bankfull event to the 100-year flood. The analyses incorporated the hydrologic characteristics of the watershed's 53 sub-basins, including drainage area, slope, soil type, and the length of the longest flow path. Rainfall data used for the model were derived from the most recent regional sources.

Hydraulic analyses were then conducted to evaluate the response of the Great Dam impoundment to the simulated inflow hydrographs produced by the rainfall-runoff model. A HEC-RAS model of the Exeter and Little Rivers' channels and floodplains was developed. The model consisted of more than 13 miles of channel and floodplain defined by 100+ cross-sections, 5 dams, and 12 bridges.

Weston & Sampson used the hydraulic model to evaluate the quantity and rate of sediment transport during various flow conditions, combining the model results with a fluvial geomorphological survey of the river system to identify likely changes in the Exeter River channel and floodplain due to dam removal. The hydrologic model and hydraulic models enabled Weston & Sampson and the project team to evaluate possible impacts of the removal or modification of Great Dam.

- dam removal/ modification feasibility
- hydrologic and hydraulic analyses
- HEC-HMS
- HEC-RAS
- consultation with NH Dam Bureau

## client contact

Paul Vlasich, PE
Town Engineer
Department of Public Works
13 Newfields Road
Exeter, NH 03833
603-773-6157

# MASSASOIT STATE PARK DAMS

massachusetts department of conservation and recreation | city of taunton, massachusetts

Weston & Sampson provided design, permitting, bidding, and construction services for the rehabilitation of four significant hazard embankment dams and one high hazard embankment dam within Massasoit State Park in Taunton. A densely forested conservation area, the park is home to six lakes and ponds and over 120 campground sites.

The dams impounding Middle Pond and Big Bearhole Pond had fallen into disrepair and were no longer in compliance with the current jurisdictional dam safety regulations. The dams were in “poor” overall condition, meaning that significant structural, operational, and maintenance deficiencies were clearly recognized under normal sunny-day conditions. Such deficiencies included uncontrolled embankment seepage, marginally stable slopes, excessive embankment erosion, and deteriorating outlet structures. The embankments themselves were largely obscured by excessive woody vegetation growing on and around the earthen structures, making required inspections more challenging and less effective.

The Massachusetts Department of Conservation and Recreation (DCR) sought to improve the condition of these important earthen structures and selected Weston & Sampson to design the necessary repairs and rehabilitations in compliance with current state dam safety regulations. Given the nature and location of the dams, Weston & Sampson worked closely with DCR and Massasoit State Park officials to incorporate recreational park improvements into the project. Dam safety improvements included removal of undesirable vegetation from the embankments, restoration of concrete outlet structures, installation of new outlet control devices, decommissioning of secondary (non-used) outlets, installation of seepage control filters with perforated collection pipes, slope armoring, and general restoration of the embankments including slope regrading to improve stability and facilitate mowing. Park and landscape improvements included resurfacing of walking paths, construction of a timber pavilion structure, roadway (crest) improvements, beach restoration, ADA-compliant pedestrian access to specific areas, and several other requests made by park officials during the design process. Weston & Sampson considered strict deadlines associated with camping season, pond level management, and special requirements associated with unavoidable impacts to environmentally sensitive areas.

- massachusetts department of conservation and recreation
- significant and high hazard dam rehabilitation
- recreational park improvements
- hydraulic and hydrologic analyses
- in-house, multi-disciplinary approach
- permitting
- bidding
- construction administration

## client contact

Daniel Mortell
Program Manager, Dam Maintenance
Massachusetts Department of Conservation and Recreation
West Boylston, MA 01583
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dan.mortell@state.ma.us

# REMEDIATION & REDEVELOPMENT OF WEIR RIVERFRONT PARK

city of taunton, massachusetts



The former FB Rogers Silver Company operated a silver plating and manufacturing facility at the 2.3 acre site along the Taunton River for more than 40 years. The mill complex was recently demolished; however, contaminated soil and groundwater remains at the site, including petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), metals, cyanide, and volatile organic compounds (VOCs) in soil and elevated VOCs in groundwater above applicable Massachusetts Department of Environmental Protection (MassDEP) reportable concentrations. Phase 1 of the project included the remediation of the site and preparation of the site for Phase 2, which included design and construction of the new Weir Riverfront Park.

As part of Phase 1, Weston & Sampson performed a subsurface site investigation, designed the remediation of the site, prepared plans and specifications for public bidding, and performed construction administration and resident representative services during the remediation activities. The remediation project included the removal of concrete slabs, excavation of "hot spot" areas of contaminated soil, support of the sea wall during excavation activities, and the reuse of contaminated soils beneath a soil and asphalt cover system for the park.

Our in-house environmental professionals (LSPs), landscape architects, engineers, and permitting specialists worked together to fully integrate the design of Weir Riverfront Park with the site cleanup strategy. Park features include a boat launch ramp and floating dock and a small parking lot to accommodate trailers, as well as standard and accessible parking stalls. Additional new features within the park overlook the plaza at the river's edge and include a riverwalk, a park entrance plaza, and a sitting area. The park features LID stormwater design practices in the form of rain gardens, maximized lawn spaces, and minimized impervious paving throughout. Landscape plantings and large shade trees frame this passive park oasis set within its larger surrounding industrial neighborhood.

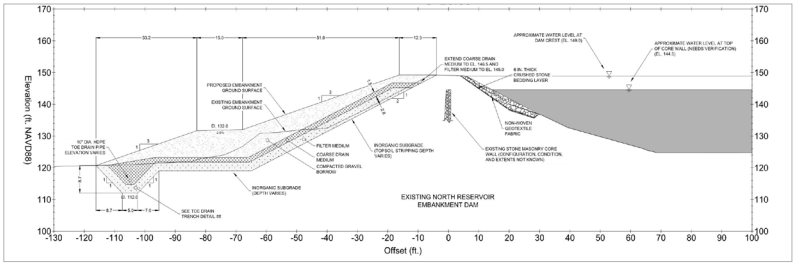
- site-wide assessment with redevelopment considerations
- remedial plan development
- plans/specifications & engineers cost estimate
- environmental oversight
- additional regulatory reporting to close the site under the MCP
- accessible park design & construction oversight

### client contact

Kevin Shea
Former Executive Director, Taunton Office of Economic and Community Development (currently with the City of Framingham)
508-532-5455
kshea@framinghamma.gov

# NORTH RESERVOIR DAM

## town of winchester, massachusetts




North Reservoir Dam is a 780 foot long, 25 foot tall HIGH hazard potential earth embankment dam that is owned and operated by the Town of Winchester. The dam was constructed circa 1875 for public water supply purposes; North Reservoir still serves as the town's water supply today.

For nearly a decade, the town has engaged Weston & Sampson to conduct the safety inspections and rehabilitations of its dams and dikes, as necessary. The town most recently engaged Weston & Sampson to conduct a preliminary study and engineering evaluation of North Reservoir Dam. This effort included hydraulic and hydrologic analyses, subsurface explorations consisting of soil borings, installation of monitoring wells, excavation of test pits to locate a potential low-level outlet alignment, dive inspections to evaluate submerged features of the gatehouse containing the outlet headworks, structural assessment of the gatehouse and bridge, and geotechnical analyses and assessment of embankment stability. The study showed that the embankment had inadequate factors of safety against slope and seepage instability and consisted of loose sands susceptible to liquefaction and lateral spreading, presenting a significant safety risk in the event of an earthquake. The study also indicated the potential presence of hazardous materials at the dam. A Weston & Sampson Licensed Site Professional (LSP) subsequently conducted a site visit with the town and developed an approach to better quantify the materials. We completed test pitting activities and estimated the volume of debris that will require disposal. In addition, Weston & Sampson evaluated soil re-use/disposal options and developed a cost-effective soil approach.

Weston & Sampson, using its in-house multi-disciplinary engineers, scientists, and surveyors, is currently providing rehabilitation design and permitting services to bring North Reservoir Dam into compliance with current dam safety regulations and preserve this critical piece of the town's drinking water supply infrastructure. The design includes broadening the embankment crest, flattening, buttressing, and armoring the slopes with considerations for liquefaction, constructing a two-stage graded seepage filter and embankment toe drain, replacing the bridge to the gatehouse, wetland replication, repurposing the existing water supply pipe as a low level outlet, pipe improvements including spray applied epoxy lining, new ductile iron pipe, a new stilling basin and downstream channel improvements, and new gate valves in the gatehouse.

Design of the North Reservoir Dam rehabilitation project is currently being permitted and construction is expected to begin in 2021. In the interim, Weston & Sampson continues to perform mandated follow-up inspections to document possible worsening conditions and new deficiencies at the dam.

- water supply reservoir
- high hazard dam rehabilitation
- hydraulic and hydrologic analyses
- in-house, multi-disciplinary approach
- liquefaction mitigation
- low level outlet improvements
- wetlands replication
- permitting
- LSP services

### client contact

James Gibbons
Water & Sewer Operations Manager
Town of Winchester
781-721-7100
jgibbons@winchester.us

# HOPPIN HILL RESERVOIR DAM

city of attleboro, massachusetts





Weston & Sampson provided engineering analysis, design, permitting, bidding, and construction management services associated with the rehabilitation of Hoppin Hill Reservoir Dam located in Attleboro, Massachusetts. Hoppin Hill Reservoir Dam is a 1,000 foot long, 27-foot tall HIGH hazard potential embankment dam owned and operated by the City of Attleboro Water Department. The dam and impounded reservoir are important components of the City of Attleboro's water supply infrastructure. Weston & Sampson also prepared an Emergency Action for the dam based on information provided by the city and the results of an in-house hydrologic and hydraulic study.

Prior to rehabilitation, Hoppin Hill Reservoir Dam was in poor overall condition, meaning that significant structural, operational, and maintenance deficiencies were clearly recognized under normal sunny-day conditions. The downstream embankment slope was overly steep, eroded in several areas, and had inadequate factors of safety against slope and seepage instability. The concrete spillway structure and chute channel had fallen into disrepair and a circular concrete aeration basin and outfall channel associated with the low-level outlet were structurally deficient.

Rehabilitation construction began in October 2015 and included installation of a two-stage inclined chimney filter and drain in combination with downstream slope flattening to control seepage and increase overall embankment stability. Improvements were also made to the dam's appurtenances, including replacement of the concrete spillway structure and meandering chute channel, demolition and removal of the low-level outlet aeration basin and outfall channel, extension of the low-level outlet conduit in coordination with embankment filling, and replacement of the low-level outlet control gate. Weston & Sampson also applied for funding for the project on behalf of the city through the Massachusetts Executive Office of Energy and Environmental Affairs. As a result, the city received $1,000,000 in combined grant and low interest loan to be applied to the cost of design and construction of the repairs.

The rehabilitation was implemented in September 2016 for a total construction cost of approximately $1,000,000. Weston & Sampson continues to perform mandated dam safety inspections for Hoppin Hill Reservoir Dam, as well as several other dams and hydraulic structures owned and operated by the City of Attleboro.

- high hazard dam rehabilitation
- water supply reservoir
- hydraulic and hydrologic analyses
- structural rehabilitation
- construction grant application
- in-house, multi-disciplinary approach
- permitting
- bidding
- construction administration

## client contact

Kourtney Wunschel
Assistant Watershed Superintendent
1296 West Street
Attleboro, MA 02703
508-203-1853
water1@cityofattleboro.us

# Forms

## DESCRIPTION OF APPLICANT BUSINESS/ORGANIZATION

Check appropriate box(es):

The named organizational entity submitting this proposal is:

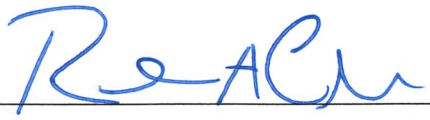
[X] Corporation [ ] Partnership [ ] Proprietorship

[ ] Minority Owned [ ] Woman Owned

SIGNATURES:

This page must be signed by a(n) individual(s) with authority to commit the proposing entity to a binding agreement. Corporations must attach required certification:

COMPANY NAME: Horsley Witten Group, Inc.

AUTHORIZED SIGNATURE: 

PRINT NAME OF AUTHORIZED OFFICIAL: Richard A. Claytor, Jr.

ADDRESS: 90 Route 6A, Unit 1, Sandwich, MA 02563

TELEPHONE #: 508-833-6600 FAX NUMBER: 508-833-3150 EMAIL: hwinfo@horsleywitten.com

DATE: August 17, 2021

FEDERAL TAX ID #: 04-2959513

DUNS #: _____

*If a corporation, a notarized attestation of the signature(s) is required, or in the case of corporate seal affixed, that the signature is the signature of an officer authorized to bind the corporation to a contractual agreement.*

## STATE TAXES CERTIFICATION CLAUSE

I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes under law.

By: Richard A. Claytor, Jr.

* Signature of individual or Corporate Name (Mandatory)

Corporate Officer (Mandatory, if applicable)

04-2959513

Federal Identification Tax ID

* Approval of a contract or other agreement will not be granted unless the applicant signs this certification clause.

** This request is made under the authority of Mass. G.L. 62C s. 49.A.

## HOLD HARMLESS AND INDEMNITY CLAUSE

Horsley Witten Group, Inc. , its officers and members all,
Legal Name of Proposer's Business Entity

through the signing of this document by an authorized party or agent, indemnify, hold harmless and defend the Town of Wareham and its agents and employees from all suits and actions, including attorneys' fees and all costs of litigations and judgment of every name and description brought against the Town as a result of loss, damage or injury to person or property by reason of any act by Horsley Witten Group, Inc. , its agents, servants or employees.

Legal Name of Proposer's Business Entity

_____ Authorized Signature

Richard A. Claytor, Jr., President Name and Title (Print or Type)

August 17, 2021 Date

HORSLEY WITTEN GROUP, INC. CORPORATE SEAL MASSACHUSETTS 1987

Corporate Seal

## CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

FIRM Horsley Witten Group, Inc.

SIGNATURE

ADDRESS 90 Route 6A, Unit 1

NAME (print) Richard A. Claytor, Jr.

Sandwich, MA 02563

TITLE President

TELEPHONE 508-833-6600

DATE August 17, 2021

Corporate Seal

CERTIFICATE OF AUTHORITY

At a duly called meeting of the Board of Directors of Horsley Witten Group, Inc. held at Sandwich, Massachusetts on May 12, 2021, at which a quorum was present and acting, it was voted that Richard A. Claytor Jr., the President of this corporation, is authorized to enter into any and all proposals, contracts and other binding matters on behalf of the corporation.

I hereby certify that the above is a true and correct copy of the record and the vote has not been amended or appealed and is in full force and effect as of this date,

Jane E. Estey
Clerk of the Corporation
August 18, 2021

Corporate Seal: