Columbia Mill Dam Removal
Draft Preliminary Design Scope of Work Outline

- Project management
    - Design team should hold a kickoff meeting and final meeting to present findings with project partners
- Existing data – gather and synthesize all existing data on the dam including, but not limited to:
    - historic maps
    - FEMA study
    - Dam design or construction plans
    - Bridge plans of Golden Hill Rd Bridge
    - Mill building plans if they exist
- Surveying – survey the following:
    - Dam and other potentially impacted structures surrounding the dam
    - Longitudinal profile including depth to refusal probes
        - Long profile should extend from Eagle Mill Dam remnants upstream through extent of impoundment, approximately just upstream of confluence with Washington Mountain Brook
        - Depth of refusal should probe to original streambed if possible, depending on sediment sizes in the impoundment. If sediment sizes are too large to probe, must estimate original streambed by matching slopes downstream of dam through upstream of impoudment
        - Longitudinal profile should plot:
            - Original streambed surface
            - Sediment surface
            - Water level at time of survey
    - Cross sections, including depth to refusal, sufficient to:
        - develop a hydraulic model
        - map sediment bathymetry and estimate sediment quantity
        - estimate potential infrastructure impacts
        - The river is fairly uniform and straight here, so I would estimate approximately 12 cross sections:
            - 1 at the downstream control point – Eagle Mill Dam remnant
            - 1 in the bend downstream of the dam
            - 3 around the dam
            - 3 between dam and bridge
            - 3 around Golden Hill Bridge
            - 1 upstream of the bridge
    - Regulatory resource areas
    - Utilities
- Mapping – develop a base map of:
    - existing conditions
    - property boundaries (from assessor's maps)
    - regulatory resource areas – change of wetland types
- Hydrology and Hydraulics
    - Develop hydrology and hydraulic model sufficient for informing:
        - Need for infrastructure protection (bridge, buildings, road, utilities, etc.)

        - Fish passage if required by funders (a full removal will pass all species that move in the river, but some funders require hydraulic proof)
- Sediment Management
    - Quantity assessment
        - Estimate total impounded sediment
        - Estimate portion of impounded sediment that will be mobile following dam removal
        - Assess distribution of sediment grain sizes throughout impoundment
    - Quality –
        - Complete basic due diligence assessment of potential upstream contaminant sources
        - test one sediment core for contaminants for every 1,000 cubic yards that will be mobile or exposed to human contact following dam removals, with the following stipulations:
            - If there is more than 10,000 cubic yards, fewer than one core per 1,000 CY may be acceptable with approval from DEP
            - If grain sizes are mostly cobble and gravel, fewer cores may be possible
            - Test for full suite of metals and organics specified in the 401 Water Quality Permit list plus any additional substances determined through due diligence
- Threatened and Endangered Species – check Natural Heritage maps for potentially impacted species of concern
- Infrastructure issues
    - Assess potential impacts to Columbia Mill buildings and other infrastructure
    - Assess potential impacts to Columbia Street
    - Assess potential impacts to Golden Hill Bridge
- Preliminary Permitting
    - Identify necessary permits
    - Quantify potential changes in resource areas including changes in wetland types
    - Work with any federal funders to complete preliminary phase of historic permitting or directly submit Project Notification Form to MassHistoric and identify local historic interests (town historic society, etc.)
- Develop alternatives for
    - Infrastructure protection if necessary – assess stability concerns of all surrounding infrastructure
    - Species protection or relocation if necessary from species of concern evaluation
    - Sediment management
    - Removal of dam
    - Channel and riparian habitat restoration (if active management is deemed necessary)
    - Preliminary plans for additional amenities such as walking paths or fishing access if desired
- Cost estimates – develop cost estimates for preferred alternatives, including costs of design, permitting, construction, and construction oversight

- Project partners should also consider timing of public meetings on the projects and possibly include in this scope.

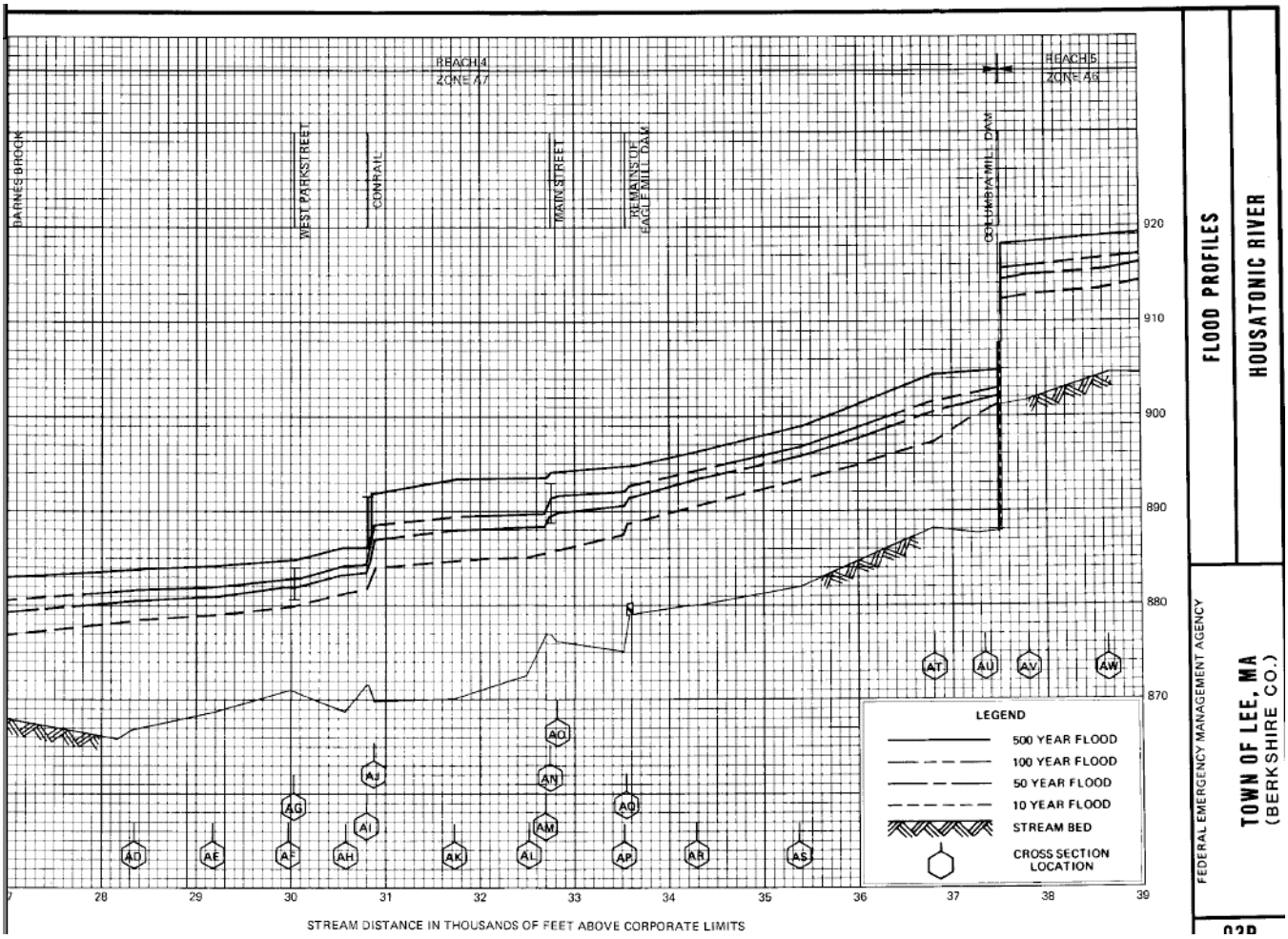
Brian Graber, American Rivers

Very Rough Cost Estimates for Preliminary Design:

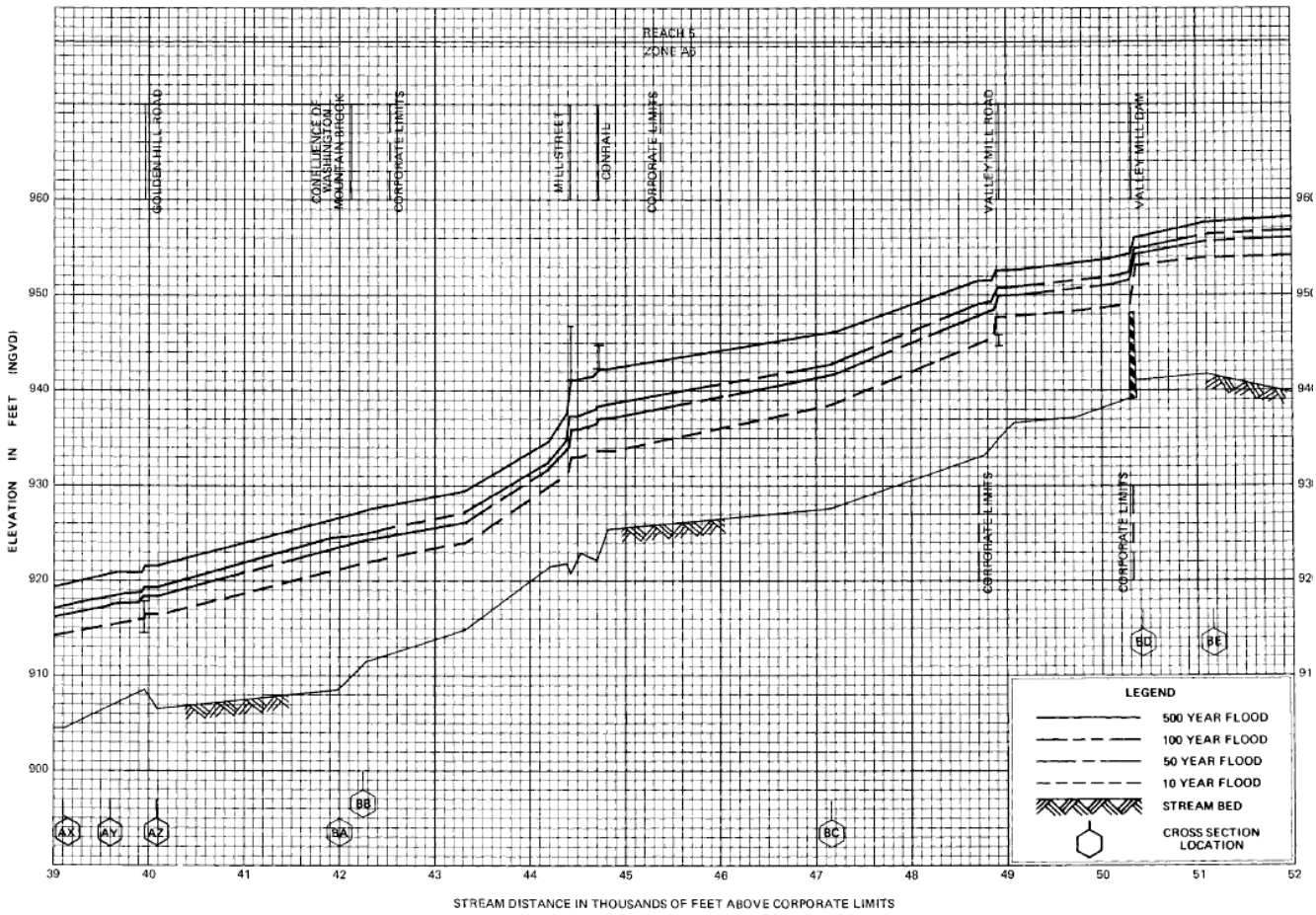
	Columbia Mill
Management and meetings	$ 4,500
Existing data	$ 2,500
Surveying and mapping	$ 12,000
Hydrology/hydraulics	$ 8,000
Sediment quantity	$ 5,000
Sediment quality	$ 10,000
infrastructure work: bridge and wall assessments	$ 8,000
Alternatives Report and Concept Drawings	$ 10,000
Prelim.permitting	$ 1,000
total	**$ 61,000**

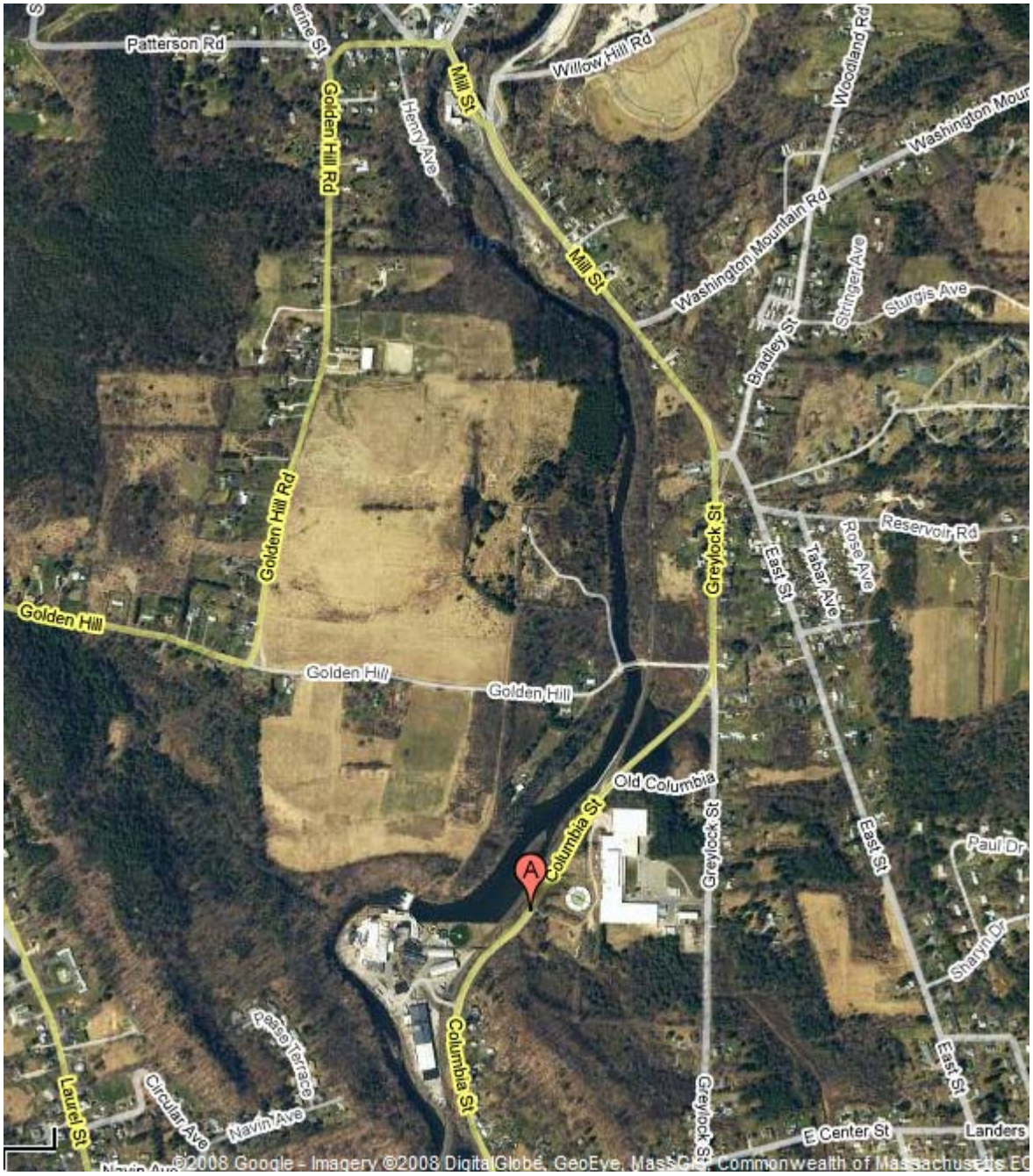
The final cost estimate will be determined by consultant bids and could vary significantly from this number – expect a range of $50,000 to $120,000.

Depending on the issues determined during preliminary design, expect engineering design costs to be $30,000 to $70,000 and construction to be $180,000 to $320,000.



Brian Graber, American Rivers


REACH 5
ZONE AO
GOLDEN HILL ROAD
CONFLUENCE OF MARTIN BROOK & MEADOW BROOK
CORPORATE LIMITS
MILL STREET
CONRAIL
CORPORATE LIMITS
VALLEY HILL ROAD
VALLEY MILL DAM
CORPORATE LIMITS
CORPORATE LIMITS
ELEVATION IN FEET (NGVD)
960
950
940
930
920
910
900
39
40
41
42
43
44
45
46
47
48
49
50
51
52
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CORPORATE LIMITS
AX
AY
AZ
BB
BA
BC
BD
BE
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION



Brian Graber, American Rivers

SCOPE OF SERVICES
(PHASES I and II: FEASIBILITY)

MASS ELECTRIC DAM REMOVAL, BLACKSTONE RIVER

I. PROJECT INFORMATION AND APPROACH

Statement of Qualifications

[the consultant] is a consulting civil and environmental engineering firm with national expertise and leadership in specialties such as stream channel assessment and restoration, fish passageway restoration, dam removal and watershed management. They work in close collaboration with many local, state and federal government agencies and other stakeholders on complex water resources projects. [the consultant]'s team includes a sub-consultant, [the sub-consultant] which provides geomorphologic and biologic assessment capabilities as well as bioengineering expertise to restore channels and habitat to natural conditions.

Project Background:

The objective of the Mass Electric Dam project is to improve natural stream conditions, facilitate movement of resident aquatic species, improve water quality, enhance navigation for paddlers (remove the necessity for portage) along this stretch of the Blackstone River and protect adjacent National Grid infrastructure. This project was recently awarded priority project status by Riverways. Lead project partners include the National Park Service (John H. Chafee Blackstone River Valley National Heritage Corridor Commission), National Grid, Blackstone Headwaters Coalition, Massachusetts Corporate Wetlands Restoration Partnership (CWRP) and Mass Audubon.

The current Mass Electric Dam (national ID: MA02828) was built in 1917 (earliest record) and is 8-10 feet high with 120-foot long crest length. The Mass Electric Dam is an abandoned "run-of–the-river" hydropower facility located 1,400 feet downstream of the Riverlin Street Bridge. The dam is partially breached and is constructed of cobble-boulders with a granite-slab sectional cap, a portion of which has broken loose. It is privately owned and the owner (National Grid) has indicated a willingness to remove the dam. The dam is in poor condition and is considered non-jurisdictional by the Office of Dam Safety. The dam is classified as low hazard based on the relatively low impact that unexpected failure could have on life and property downstream.

The United States Geological Survey, under a cooperative agreement with Riverways, recently performed sediment testing above the Mass Electric dam; data show elevated levels of copper, cadmium, lead and chromium.

The Mass. Division of Fisheries and Wildlife has conducted some fish community sampling in the Blackstone River in the vicinity of the project site. Species expected to be affected and benefited by the project include white sucker, common shiner, fallfish and tessellated darter.

The Blackstone watershed's prominent role in the American Industrial Revolution occurred largely due to, and at the expense of, the Blackstone River. The Blackstone River was once

dubbed "America's Hardest-Working River" due to the number of dams it supported (at one point there was an average of one dam per mile of the Blackstone's 46-mile length). While a handful of these dams are no longer in existence (many having been washed away in big floods in the 20th century), most remain, although many have fallen into dilapidated condition and no longer serve a useful purpose. The partial or complete removal of the Mass Electric Dam should serve as a valuable precedent for the removal of other obsolete dams in the Blackstone watershed.

II. SCOPE OF SERVICES

The main objective of this scope of services is to enable restoration implementation by producing: a preliminary feasibility study with detailed cost estimates for restoration and remediation, hydraulic data, a preliminary sediment management plan, and conceptual site restoration plans for the partial or complete removal of the Mass Electric Dam.

[the consultant] with the assistance from [the sub-consultant] will assess the various alternatives for removing the Mass Electric Dam and to restoring upstream reaches of the Blackstone River.

The Scope of Services to complete these objectives has been split into two Phases-both outlined within. **Phase I has been executed between Riverways Program and [the consultant]. Phase II is included within this contract between the Coastal America Foundation and [the consultant] with funding from the National Park Service**.

The following staff will be dedicated to this project:

[the consultant]

[redacted], P.E.	Officer (Project Director)
[redacted], P.E.	Project Manager (Engineering Analyses)
[redacted], P.E.	Senior Engineer (Water Quality/Stormwater Management)
[redacted], EIT	Engineer II (Water Quality)
[redacted], EIT	Engineer II (Flooding and Scour Analyses)
[redacted], CWP	Scientist III (Ecological Restoration)
[redacted], PhD	Associate (Contaminated Sediment Management)
[redacted], P.E., LSP	Senior Engineer II (Contaminated Sediment Management)

[the sub-consultant]

[redacted]	Project Manager (Channel Stabilization, Fish Passage)
[redacted]	Design Engineer (Channel Stabilization, Fish Passage)
[redacted]	Design Engineer (Channel Stabilization, Fish Passage)

Any modifications to the scope of work will require written approval by the Riverways Program.

SCOPE OF WORK

PHASE I

Task 1. Data Collection and Review

A. Kick-off Meeting:

[the consultant] will attend an initial kick-off meeting with Riverways staff and project partners prior to the initiation of any work in order to introduce the key team members, identify the communication protocol, the individuals who will be the main contacts for the various project entities, to establish an agreed-upon schedule and confirm the list of deliverables.

- [the consultant] will develop meeting minutes summarizing the items discussed and agreements reached for circulation to meeting participants for their review and concurrence.

B. Data Collection and Site Visit

[the consultant] will gather, review, and evaluate available data to understand the technical and engineering issues associated with the Mass Electric Dam. Data from a site visit will also be evaluated. Existing data to be evaluated includes:

- Sediment data available regarding the quality and physical characteristics of the sediment. If available, [the consultant] will look at the sample results that reportedly exist for a reach of the Blackstone within a mile or so downstream of the subject dam at the Singer Dam. (The sediments in the vicinity of this dam have been studied extensively over the years with results available from at least three separate sampling events by the Army Corps.) [the consultant] will also review the additional sampling undertaken by the Army Corps further downstream associated with a 206 River Restoration and Fish Passage study performed at the Fisherville Dam.
- [the consultant] will request and review available topographic, photogrammetric, utility, soils, surficial geology and property ownership mapping from the Town of Millbury and the National Grid.
- [the consultant] will review current and historical aerial photography available from [the consultant] sources. If aerial photography is not available from [the consultant] sources project partners will attempt to obtain this information.
- Existing plans and specifications will be reviewed and [the consultant] will perform a field visit in the company of [the sub-consultant] to acquaint themselves with the dam and other hydraulic structures and overall riverine and floodplain environment.

Task 1 Deliverables

- Attendance at kick-off meeting with project partners, meeting minutes summary
- Site field visit
- Compilation of data collected

Task 2. Hydraulics

A. [the consultant] will obtain FEMA information necessary to perform a hydraulics assessment for evaluation of hydraulic conditions and scour potential for existing and proposed restoration conditions.
- This evaluation will be based upon existing information, mapping, flood insurance study, flood insurance profile as well as a detailed field inspection of the river channel as it exists both upstream and downstream from the dam.
- The flood insurance study and original hydraulic model from FEMA will be utilized to assess potential impact on velocities and scour potential at the Riverlin Street bridge. Preliminary assessment implies that this bridge will not be substantially impacted by the removal of the dam.
- In addition, potential impact to National Grid structures or property located adjacent to the river and floodplain will be assessed to understand the potential for property damage.

B. Field measurements will be made to confirm section data obtained from the flood insurance study as well as to provide an updated estimate of sediment volume within the impoundment.
- Two cross sections will be surveyed and sediment depth measurements taken at 5 locations along each section.
- [the consultant] will measure depth to bottom and sediment depth with a mushroom anchor and steel probe rod.

C. The updated field measurements will be combined with the existing Flood Insurance Study Profile and existing topographic mapping to develop a HEC-RAS model.
- A HEC-RAS hydraulic model will be developed utilizing field measurements and observations including roughness coefficient, type of development in floodplain and constrictions.
- This model will analyze anticipated velocities and scour potential for a range of flows through the restored river reach and areas downstream and upstream.
- A longitudinal profile of channel bottom and sediment depth throughout the study reach will be developed.
- The results of this assessment will be the basis for the recommendation of conceptual improvement schemes to both reduce upstream flooding and to address scour potential at hydraulic structures and structures located within the river.

D. [the consultant] will survey additional river cross sections if the FEMA Study is not available, or not available in a timely fashion. The survey will include:
- One additional section within the impoundment area, and four additional sections for the two upstream bridge crossings.
- Roughness coefficients will be obtained based upon field observations of wet section and overbank areas. The overbank section grades would be obtained from the Sanborn topographic mapping.

E. [the consultant] will develop a HEC RAS hydraulic model. The newly surveyed wet sections will be compiled with the overbank grades from the Sanborn topographic mapping and input into the HEC RAS model. The HEC RAS model will be run and adjusted to come as close to the existing flood study elevations as possible. This will form the basis for evaluating dam removal and stream restoration options.

F. [the sub-consultant] will analyze available continuous gage data to determine the various operating baseflow conditions of the river including drought, normal, and high water conditions to ensure that options presented would allow for passage of target resident aquatic species. Likewise, considering most boating activities would occur during baseflow conditions, the information would be used to determine the passability of the options for the associated enhancing navigation by recreational boaters (canoe and kayak).

G. [the consultant] will prepare a hydraulic analysis report summarizing the approach to the investigation, the efforts undertaken during the investigation and the specific analyses performed. This report will be a component of the Final Report (Phase II Task 2) and developed with the input of [the sub-consultant] to include a discussion of conceptual ideas to correct or improve potential problems identified along the river.

Task 2 Deliverable

- Hydraulics report including data collected in above tasks A-H
- Site survey data in CAD format

Task 3. Sediment Analysis

[the consultant] will review information available regarding the quality and physical characteristics of the sediments to determine whether these sediments can move downstream, whether they need to be stabilized in place or whether they need to be removed.

A fair amount of data has been collected on sediment depth and physical characteristics as part of the Tufts study. [the consultant] will supplement this with information required to understand the potential impacts of dam removal on channel stability and sediment dynamics. The focus will be on whether channel bank stabilization is required to protect adjacent properties, and what the anticipated movement of accumulated sediments in the impoundment will be. Sediment movement will be critical both to assess potential hydraulic impact to downstream channel reaches and also in regard to movement of contaminated sediments.

A. Representative sediment samples will be taken and analyzed for physical characteristics.
   - Sieve analyses will be performed to determine the relative gradation of the sediment and its propensity to move with varying flow regimes.
   - Sediment depth will be measured by pushing the steel rod through loose sediments until firm substrate is encountered. This will be performed from a small boat and with waders in shallower water. This will be done coincident with survey of channel sections (see Task 2) to accurately locate sediment depth measurements.
   - Three discrete sediment cores will be taken and analyzed for gradation and vertical distribution of gradation. It may be feasible to leave some or all of the sediment in place if it can be shown that coarser materials overlie finer materials. The coarser materials may be of a size that would resist erosion and thereby protect the underlying sediments.

- The sediment analysis on cores taken by [the consultant] will be compared to the information collected previously as part of a study performed by students at Tufts University. This study indicates that the sediments are composed primarily of (65%) fine sands and larger size particles and to a lesser extent (35%) fines passing the number 200 sieve. This study also indicates that sediment depths range from zero at the upstream end near the Riverlin Street Bridge to several meters directly upstream from the dam. The study estimates a sediment volume of approximately 15,000 cubic meters. In general the study believes the sediment to be highly erodible. [the consultant] will confirm or refute these findings with some limited additional data gathering.

C. [the consultant]'s ecological risk assessor and Licensed Site Professional (LSP) will evaluate physical and chemical analyses of sediment samples previously collected from behind the Mass Electric Dam.
- Sediment samples will be evaluated relative to the 401 Water Quality Certification permitting requirements, the Massachusetts Contingency Plan (MCP), as well as relevant guidance for characterizing and handling contaminated sediments.

D. Sediment data collected to date will be evaluated in accordance with Environmental Risk Characterization guidance (BWSC/ORS-95-141) and various technical updates published by the MA DEP.
- To determine the potential risk associated with contaminated sediments, analytical data will be compared to available ecological screening values adopted by the MADEP. In the absence of MADEP-published screening values, equivalent published sediment screening values will be used.
- Sediment quality data from the Army Corps study performed downstream will be reviewed.

D. [the consultant] will advise as to what contaminants appear to be of critical concern and what additional sampling and/or analyses, if any, could further refine our assessment. Additional sampling may include background sampling of reaches of river both upstream and downstream from the Mass Electric Dam to determine if there is a preponderance of contaminated sediments within a large reach of the riverine system. Additional sampling may also be prudent to further explore options for cost-effective management of contaminated sediments in keeping with the 401 Water Quality Certification requirements.

E. Based on [the consultant]'s review of sediment data, [the consultant] and [the sub-consultant] will identify available options for the management of sediments located behind the Mass Electric Dam. These options may include slow release; removal and off-site disposal; beneficial off-site re-use; on-site vegetative stabilization; maintenance within the impoundment; and other appropriate options. [the sub-consultant] will provide assistance with this effort. [the consultant] will confer with the DEP Bureaus of Waste Site Cleanup, Resource Protection, and Waste Prevention to discuss options for sediment management.

Task 3 Deliverable
- Data collected and compilation of data reviewed from Task 3 (A-C)

PHASE II. Conceptual Restoration and Remediation Alternatives Analysis

TASK 1. Alternatives Analysis Assessment

[the consultant] with the assistance from [the sub-consultant] will assess the various alternatives for removing the Mass Electric Dam and to restoring upstream reaches of the Blackstone River. These alternatives could include a variety of approaches such as:

- Complete removal of the dam and stabilization and/or removal of accumulated sediments,
- Partial removal of the dam and provision for resident (weak swimming) fish passage at the remnant dam structure,
- Maintenance of the dam to retain contaminated sediments and construction of a protracted rock ramp for fish passage and possible boating passage.

There may be a number of sub-alternatives for resident fish passage which could involve a few different fish passage options. These options could include, for example, rock ramp or step-pool structures. Anadromous fish restoration is not a component of the project at this time. There may also be opportunities for enhancing the riparian areas with plantings as part of a bioengineering approach to bank stabilization if found to be justified by the hydraulics and channel stability analysis.

A. Conceptual Sketches/Plans

Conceptual sketches will be made of the various restoration and remediation alternatives. [the consultant] will utilize the best available mapping as a base for development of the conceptual plans.

- These design plans will be produced utilizing AutoCAD and will reflect the objectives as outlined in the Riverways RFP. An attempt will be made to geo-reference these drawings for GIS use by use of hand held GPS units in the field to locate the ends of the dam.
- A report will be developed which summarizes the analyses performed, assumptions made and conceptual plans developed regarding the restoration and remediation of the Blackstone River.

* Mapping Assumption: the Sanborn Mapping is available electronically.

B. Permits List

[the consultant] will develop a detailed list of specific permits required in order to undertake the river restoration improvements. This may involve contacting regulatory agencies in order to confirm the permits, the specific level of permitting, and specific information which must be provided as part of the permit applications. [the consultant], Inc. will query as to the willingness of the regulatory authorities to participate in a pre-application field meeting to view the project environs, current impaired resources, and to discuss the scope and details of the project. (This meeting would occur during the actual design phase of the project.)

- A recommended schedule which will identify the logical sequence of design and permit application activities will be provided.

C. Cost Estimates

[the consultant] will provide clear assumptions on the critical aspects of the project which could greatly affect the cost of construction. The management of contaminated sediment is a prime example. [the consultant] will develop a range of potential costs of sediment management based upon such factors as quantity, physical characteristics, chemical quality and location. From this, a range of potential costs will be developed which would represent a range from worst case to best case for various sediment management options such as stabilizing in place or removal, for example.

- [the consultant] will estimate the cost to restore the dam to a safe condition based upon the current standards of dam safety.
- [the consultant] will develop detailed cost estimates for the various river restoration alternatives (as developed in Phase II, Task 1). These costs will not only include capital improvement costs but also long-term operation and ongoing maintenance costs anticipated for the various alternatives. These cost estimates will be based upon [the consultant]'s experience and the experience of [the sub-consultant] with other similar projects and information available from the Riverways Program regarding the costs of dam removal and river restoration projects they have sponsored. [the consultant] will also request information from the State of Connecticut Department of Environmental Protection who has undertaken dam removal and river restoration projects as well. Current and regional cost information will be important to providing more accurate cost estimates.

D. Meeting with Project Partners

[the consultant]'s Project Director and project manager will attend a meeting in the Worcester area with the project partners to discuss and review conceptual restoration and remediation alternatives.

- A visit to the project site with interested project partners will be part of this meeting if partners choose.

Task 1 Deliverables

- Alternatives analysis assessment
- Conceptual Sketches in pdf and AutoCad format
- Permit list w/ permit schedule of design and permit application activities
- Cost estimate as per Phase II, Task 1C above
- Meeting with project partners

Task 2: Final Report

[the consultant] with the assistance of [the sub-consultant] will develop a sediment management and river restoration report which summarizes the efforts of the entire project to date and relates river restoration activities to the management of the contaminated sediment. The objective of this effort is to identify preferred cost effective methods of addressing the contaminated sediment while still meeting the original objectives of river restoration.

A. A final report will be written and provided to project partners for review and comments that includes:

- Discussion of data analysis and findings to date
- Hydraulics report
- Sediment Analysis
- Discussion of Alternatives Analysis and recommendation of a preferred approach

- Regulatory approach
- Cost analysis
- Discussion of additional data needs: Additional technical data and engineering analyses will be identified which must be gathered and performed in order to ultimately design improvements which could include the complete removal of the dam , removal and proper disposal of accumulated sediments, and restoration of the newly-exposed river channel.
- Outline of steps and deliverables needed to achieve final design

B. A draft final report will be provided to project partners
C. [the consultant] and [the sub-consultant] will participate in a conference call that will be convened to discuss partner comments on the draft final report
D. A final report will be written incorporating edits and comments from project partners.

Task 2 Deliverables

- Draft final report will be provided for review and comments by project partners and edits made accordingly.
- Participation in conference call discuss comments on the final report
- Final report - 10 copies of the report and 10 CDs for submittal to Riverways
- Design plans in AutoCad file format geo-referenced for GIS use

III. PROJECT SCHEDULE AND TIMELINE

Submission of invoices for work completed in the Scope of Services, as outlined above, should be submitted in accordance with timeline milestones and must be accompanied with appropriate documentation ie: bills for services and goods, applicable segments of completed work.

Phase I

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
1									
2									
3									

Phase II

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
1									
2									

Schedule of Fees

Fees will be consistent with fee schedule submitted as part of response to RFQ ID #RIV 2006-1.

IV. BUDGET

Phase I

All work in the above Scope of Services for Phase I must be entirely completed by June 30, 2006. Project costs are based on the scope of work presented herein and are given in the table below with a not-to-exceed total of $[redacted]. Costs for specific tasks and work items are also shown. Costs allocated for some of the tasks specified below may shift up to 5% between tasks as needed; budget modifications greater than 5% between tasks will not be permitted without prior written approval from Riverways.

Phase I Deliverables	Fee
1. Preliminary Feasibility Study/Implementation Efforts	$[redacted]
2. Conceptual Restoration and Remediation Plan	$[redacted]
3. Hydraulics Report**	$[redacted]
4. Sediment Management Plan	$[redacted]
** Additional Survey and Hydraulic Model (if FEMA Study Unavailable)	$[redacted]

Phase II

All work in the above Scope of Services for Phase II must be entirely completed by August 31, 2006. Project costs are based on the scope of work presented herein and are given in the table below with a not-to-exceed total of $[redacted] . Costs for specific tasks and work items are also shown. Costs allocated for some of the tasks specified below may shift up to 5% between tasks as needed; budget modifications greater than 5% between tasks will not be permitted without prior written approval from Riverways.

Phase II Deliverables	Fee
1. Preliminary Feasibility Study/Implementation Plan Report	$[redacted]
2. Sediment Management Plan Report	$[redacted]
3. Meeting	$[redacted]
4. Final Report	$[redacted]

VERMONT

Vermont Department of Environmental Conservation *Agency of Natural Resources*
Hydrology Program
103 South Main Street [phone] 802-241-3468
Waterbury, VT 05671-0511 [fax] 802-244-4516
http://www.anr.state.vt.us/dec/fed/dss.htm

REQUEST FOR PROPOSALS

DESIGN AND DECONSTRUCTION OF DUFRESNE POND DAM, MANCHESTER, VERMONT

OCTOBER 5, 2009

The Vermont Agency of Natural Resources, Department of Environmental Conservation (DEC) is requesting proposals from selected engineering consulting firms with experience in the removal of concrete and earth embankment dams. The chosen firm shall complete a design and provide construction oversight at the Dufresne Pond Dam as detailed in this request.

This request for proposals describes the existing dam, the scope of issues to be addressed, content of proposals, and the procedure and criteria for final selection of an engineering consulting firm.

Background

Dufresne Pond Dam is located on the Batten Kill in Manchester, Vermont. It was originally constructed by the Dufresne family in 1908 to power an adjacent sawmill and was subsequently used for other industrial purposes. In 1957, it was acquired by the State of Vermont and has been managed for recreation by the Department of Fish and Wildlife since that time. It is the only dam on the main stem of the Batten Kill in Vermont.

The dam is 11 feet high and about 270 feet long. It consists of a 40-foot long concrete spillway and a sluiceway consisting of two 5-foot long double stoplog sections. The spillway and sluiceway are flanked by concrete training walls and earth embankments. The left embankment extends from the spillway for approximately 200 feet. Its downstream face is paved with large marble blocks, while the upstream slope and crest are grass covered. The top width of this embankment is approximately 25 feet. The right embankment is grass covered and approximately 30 feet long.

Dufresne Pond is an approximately 11-acre body of water that extends upstream approximately 2,000 feet at normal water levels. The dam is capable of impounding approximately 78 acre-feet of water at the crest of the earth embankment. The watershed area at the dam is 18.4 square miles.

A railroad bridge on an active line leased by the Vermont Railway from the State of Vermont crosses the impoundment. A private bridge providing access to a home on the west side of the river is located approximately 200 feet downstream from the dam.

The dam has exhibited excessive uncontrolled seepage along the toe of the downstream slope. Further, it has inadequate spillway capacity, leading to frequent overtopping. In 2005, a remediation assessment report was completed for DEC and the U.S. Army Corps of Engineers. That report evaluated the dam

and quantified its condition and deficiencies and described remediation measures, including dam removal. Subsequent to the remediation assessment, DEC has tested impounded sediments for contamination and determined that contaminant concentrations do not preclude downstream release.

Based in part on the assessment report, the Department of Fish and Wildlife has decided to proceed with removal of the dam. DEC is acting as the project manager.

Project

The objective of the project is to develop a removal design and provide contractor oversight during the deconstruction process. The anticipated scope of this project may include the following items:

1. Develop 100 percent plans and specifications for removal of the dam, including sequential work activities and related erosion prevention and sediment control measures.
2. Develop a plan for management of impounded sediment.
3. Develop 100 percent plans and specifications for channel restoration and stabilization in the former impoundment. Bank stabilization measures should emphasize soft engineering.
4. Develop recommendations for fishery habitat improvements for the reach immediately downstream of the dam and in the former impoundment and develop 30 percent design plans and itemized cost estimates.
5. Provide hydraulic modeling of proposed conditions using public domain software accepted by FEMA and compare results to effective FEMA model.
6. Determine whether changes in flow vectors following removal of the dam may adversely affect the pier at the private bridge downstream of the dam.
7. Two residences in the vicinity of the project have shallow drinking water supplies (dug wells). Determine whether the elimination of the impoundment may reduce groundwater levels at these supplies and require development of alternate sources. If the source(s) may be imperiled, recommend appropriate measures.
8. Develop post-removal photo simulations of the dam and impoundment from vantage point(s) specified by DEC.
9. Participate in two public meetings to educate the public on details of the project.
10. Provide contractor oversight during the deconstruction process.
11. Provide certified record drawings following removal.

All plans and other documents shall be submitted in hard copy and digital (Adobe Acrobat) formats. All survey information shall be submitted in an AutoCAD compatible format.

Information from the 2005 assessment will be available to the chosen engineering firm, including a survey of the dam (in AutoCAD format) and a hydrology and hydraulic evaluation. In addition, the effective FEMA model for the area, results of sediment contaminant testing, a longitudinal stream profile and channel cross-sections (including sediment depths) will be made available.

Analysis of the structural integrity of the railroad bridge abutments will not be part of this engagement, but will be conducted by a firm under contract with the Vermont Agency of Transportation.