

## Article 11 - Town Dam Design

Spring Pond Dam	\$	70,000.00
Griswold Pond Dam	\$	40,000.00
Griswold Lower Pond Dam	\$	40,000.00
Total	\$	150,000.00

Article 11



5 Centennial Drive, Peabody, MA 01960 (HQ)  
Tel: 978.532.1900

Spring Pond Dam Rehabilitation  
Design, Permitting, Bidding, & Construction Services

October 24, 2017

Mr. Brendan O'Regan  
DPW Director  
Town of Saugus  
298 Central Street  
Saugus, Massachusetts 01906

Re: *Consulting Engineering Services Proposal  
Spring Pond Dam Rehabilitation Design, Permitting, Bidding, & Construction  
Saugus, Massachusetts*

Dear Mr. O'Regan:

Weston & Sampson Engineers, Inc. (Weston & Sampson) is pleased to provide you with this proposed scope of services and budget for engineering design, permitting, bid assistance, and construction services for the rehabilitation of Spring Pond Dam in Saugus, Massachusetts. These services are based on the data, analyses, and concepts provided in our October 2009 Phase II Investigation report for the dam.

#### PROJECT UNDERSTANDING

Spring Pond Dam is a SMALL size, SIGNIFICANT hazard earth embankment dam impounding Spring Pond in Saugus, Massachusetts. Spring Pond is a recreational pond surrounded by residential properties. The dam and pond are owned by the Town of Saugus (the Town).

The dam is approximately 110 ft. long and includes four 10-inch diameter pipes that discharge flow through the dam. The structural height of the dam is approximately 6 ft. Lake Dam Road, an asphalt paved roadway, constitutes the crest of the dam. Griswold Pond is located immediately downstream of the dam.

Spring Pond Dam was first rated in POOR condition during a 2007 dam safety inspection and the Department of Conservation and Recreation (DCR) issued a Certificate of Non-Compliance and Dam Safety Order in 2008. The Town retained Weston & Sampson to conduct a Phase II Inspection Report in 2009, which included an existing conditions survey, hydrologic and hydraulic assessment, geotechnical evaluations, as well as preliminary design recommendations for dam rehabilitation. The most recent Phase I inspection on May 11, 2015 identified the following major dam safety deficiencies:

- The dam cannot safely discharge the Spillway Design Flood (SDF) based on results of the Hydrologic and Hydraulic (H&H) Analysis. The H&H analysis updated in September 2017 estimates that the dam will likely overtop by 0.3 to 0.4 ft. during the SDF.
- Woody vegetation (trees and brush) is growing on the upstream and downstream slopes of the embankment.
- Embankment slopes are eroded near the normal water level.
- An eroded footpath was observed on the downstream slope at the left abutment.
- The concrete wall along the central portion of the downstream slope is in poor condition. The concrete is deteriorated, there are several cracks and the wall is tilted outward.
- The embankment fill behind the concrete wall is void of vegetation and eroded at both ends of the wall.
- The concrete splash pad below the downstream concrete wall is cracked and deteriorated.

The Phase II Report included recommendations for improvements to the dam and a conceptual design to bring the structure into compliance with current dam safety regulations. Based on that report and subsequent conversations with the Town, we expect that dam rehabilitation will include the following construction activities:

- Lower the elevation of the Spring Pond and Griswold Pond to El. 100 +/- for construction or implement water control measures and dewatering. Install erosion control measures along the limit of work.
- Clear and grub trees and brush from the embankment slopes and within 20 ft. of the dam abutments. Fill voids from root system removal with compacted structural fill.
- Remove organic and/or loose and soft soils from the embankment slopes and regrade upstream and downstream slopes to 2.5H:1V (Horizontal:Vertical) or flatter with compacted structural fill. The downstream concrete wall is expected to remain in place with fill placed over the splash pad and wall to form a consistent geometry for the downstream slope.
- Armor the upstream and downstream slopes to several feet beyond the abutments with riprap (12 in. to 24 in. diameter angular stone chinked with small stones) from the dam crest to several feet below the normal low water elevation in the ponds.
- Install pipe extensions through the upstream and downstream riprap slopes and measures to protect the existing pipes. Install trash racks or other means to prevent debris from entering the pipes.

The construction costs associated with the above scope of work are anticipated to be approximately \$125,000.

Additional field work and analyses are necessary to finalize elements of the design, which will include considerations such as construction site access and staging areas at the site. An evaluation of the condition of the existing outlet pipes is recommended. Permitting requirements will also be assessed and permit applications will be prepared and submitted on behalf of the Town as described in the following Scope of Services. Items we will need from the Town are noted in ***bold italics***, below.

## SCOPE OF SERVICES

### Phase I - Design Services

1. Conduct a Project Kickoff Meeting with the Town of Saugus to review the elements of the conceptual design, collect information that may impact proposed design and construction, and discuss site access and construction staging area requirements with the Town. A critical factor to consider is whether (and how far) the water level can be lowered during construction to El. 100 +/- in both Spring Pond and Griswold Pond. Repairs to the dam would be completed most economically if the water level can be lowered as much as possible during construction to reduce (or possibly eliminate) the need for cofferdams, dewatering, and management of flow.

***We will need the Town to provide property boundaries at and adjacent to the site to support the final design effort.***

2. We will conduct one site visit with representatives of the Town to observe the anticipated construction access, staging areas, and elements of the dam.
  - A. Our engineers will observe the condition of the outlet pipes and arrange for a subcontractor to conduct a television survey. Decisions to repair or replace the outlets will be based on the condition of the pipes and what is technically feasible and most cost effective for the Town. For budgeting purposes, our scope does not include replacement of the outlet pipes and headwalls. ***We will need the Town to clear the outlet pipes of pond debris prior to our site visit and television survey.***
  - B. We will flag the wetland resource boundaries at the site. The wetlands were last flagged in 2009 for the Phase II Investigation of the dam and are now out-of-date.
  - C. We will conduct supplementary surveying to include potential site access roads and construction staging areas. The new wetland resource boundaries will be included in the survey. Property line surveying is not included in this scope of services.



3. We will conduct engineering analyses and design computations to support preparation of design drawings for dam rehabilitation. Design analyses and computations will address:
  - A. Evaluations of dam embankment stability to assess the design geometry and physical requirements of the embankment cross section.
  - B. Hydraulic computations to evaluate dam overtopping with proposed embankment improvements. The model will consider various tail water elevations in Griswold Pond to evaluate any effects of tail water on Spring Pond Dam.
4. We will design embankment improvements including slope protection and grading, and other general civil design elements of the project as generally discussed in the 2009 Phase II Report.
5. We will prepare "Draft" design plans, technical specifications, and an updated opinion of probable construction costs for proposed improvements to the dam for review by the Town. It is anticipated that the drawings will include an existing conditions plan, a construction access and staging plan, proposed conditions plan, cross sections of the proposed embankment geometry, sections and details of proposed outlet pipe extensions, and two drawings showing erosion and sedimentation control measures and water control requirements during construction. We will prepare wetland replication plans if wetland replication is determined necessary by the Town of Saugus Conservation Commission. Specifications will include erosion and sedimentation control measures, clearing and grubbing, earthwork, and other technical specifications for completing the work.

Following receipt of comments from the Town, we will finalize the design plans and specifications for permit filing and bidding. It is assumed we will use the Weston & Sampson Division 0 and Division 1 specifications to complete the bid package.

6. Prepare an Operation and Maintenance (O&M) plan for future dam operation. The O&M plan will indicate routine maintenance items including measures to control vegetation on the dam, recommended observations for erosion and other indicators of stability problems with the embankment portions of the dam, and recommended instrumentation.

#### Phase 2 - Permitting Services

1. Prepare and submit the following permit applications as described below for the project on behalf of the Town of Saugus. Depending on the magnitude of resource areas impacted by the proposed construction, the level of required permitting could vary. The following permits will likely be required regardless of the resource area impacts.
  - **Massachusetts DCR, Chapter 253 Dam Safety Permit.** Prepare and submit a Chapter 253 Permit application for the project. The application will include the Phase II Report (updated with the results of engineering analyses completed for the current project) and construction documents.
  - **Notice of Intent (NOI).** Prepare and submit an NOI to the Town of Saugus Conservation Commission for the project. Attend one site visit with the Conservation Commission representatives to discuss the permit application. Additional meetings with the Conservation Commission may be required but are outside this scope of services.
  - **Section 404 Permit.** We will consult with the U.S. Army Corps of Engineers (COE) to evaluate whether a Category I, II, or III (Individual) permit will be required. We will attend one site visit with COE representatives to observe the site and discuss proposed construction. Preparing and submitting a Section 404 Permit Application is included in this scope of services. The need for an Environmental Impact Statement (EIS) associated with a Category III permit will be assessed, but preparation of an EIS is not included in this scope of services.
  - **Section 106 of the National Historic Preservation Act.** We will prepare a Project Notification Form and submit it to the Massachusetts Historical Commission in accordance with 950 CMR 71.00. Copies of

the COE Section 404 Permit Application will be submitted to the State Historic Preservation Officer. This scope only covers the notification to MHC; any additional field work required by MHC is considered to be outside of the scope of this project.

- **MEPA Environmental Notification Form (ENF).** We will consult with MEPA on the applicability of the MEPA regulations to the project. We will attend one site visit with the MEPA representatives to observe the site and discuss proposed construction. Preparing and submitting an ENF is included in the scope of services. Although unlikely, it is possible that an EIR may be required. This will be discussed with MEPA representatives during the initial consulting phase. An EIR is not included within this scope of services.
- **Massachusetts DEP, 401 Water Quality Certification.** We will consult with the DEP to identify whether the project falls under a Minor Project Certification (BRP WW 08) or a Major Project Certification (BRP WW 07). We will attend one site visit with the DEP representatives to observe the site and discuss proposed construction. The level of effort to prepare and submit a Minor Dredge Project Certification (BRP WW08) application is included in this scope of services. Preparing a Major Project Certification (BRP WW 07) application, for work greater than 5,000 cubic yards, is outside this scope of services.
- **Chapter 91 Waterways License (BRP WW 01).** We are assuming that a Chapter 91 Waterways License is not required for this project and will consult with DEP to confirm. Preparation of a Chapter 91 license application is not included in this scope of services.

#### Phase 3 - Bid Assistance Services

1. Prepare Bid Documents (Weston & Sampson's Division 0 and Division 1 specifications) to accompany the technical specifications for the project.
2. Prepare original stamped hard copies and electronic copies of the Bid Documents (contract specifications and drawings) for reproduction and distribution to prospective contractors. Construction documents will be made available to prospective bidders electronically using a document distribution service such as Accent Printing. Up to five (5) hard copy sets will be prepared and provided to the Town upon request.
3. Advertise the contract for public bidding in the Central Register. It is assumed that the Town will advertise the project in a local newspaper of general circulation, post the project advertisement in a conspicuous place within the municipal offices, and also place a notice on COMMBUYs as required by current state bidding laws.
4. Prepare one bid addendum to address bidder questions on the project.
5. Assist during the public bid opening to document submission compliance with the contract documents.
6. Review contractor bonding and insurance documentation, and technical references, and provide the Town with a formal recommendation to award the contract.
7. Prepare formal contract documents for execution by the Town and the successful bidder.

#### Phase 4 - Construction Services

1. Arrange and conduct one pre-construction conference with the Construction Contractor, representatives of the Town, and representatives from the Saugus Conservation Commission, Office of Dam Safety, and Saugus police department (if required).
2. Provide horizontal and vertical control data to enable the Construction Contractor to stake lines and grades for the work in the field.



3. Review shop drawings submitted by the Construction Contractor for general compliance with the contract documents.
4. Prepare and process up to two (2) change orders that may be required during the project.
5. Prepare up to two (2) supplementary drawings/sketches as required to clarify/resolve field construction problems that may occur.
6. Conduct up to five (5) site visits by the project manager or project engineer to observe construction progress and (1) to become generally familiar with and to keep the Town informed about general progress and quality of the portion of the Work observed, (2) to notify the Town regarding defects and deficiencies observed in the Work while we are on site, and (3) to assess, in general, if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. Note that these site visits shall not constitute exhaustive or continuous on-site visits to monitor the project or check the quality/quantity of the Work. Weston & Sampson shall neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Construction Contractor's rights and responsibilities under the Contract Documents and we are only performing periodic site visits and part-time monitoring.
7. Provide up to ten (10) site visits for part-time observation of construction activities by project engineering staff sufficient to assess (1) if the work is progressing in general conformance with the contract documents and (2) that completed work generally conforms to the contract documents. We anticipate up to approximately 40 man-hours for project engineering staff time over an approximately 12-week construction duration. We assume that each site visit will include up to 0.5 hours of travel time, up to 2 hours on-site, and up to 1.5 hours of office work. The type and level of monitoring may be adjusted based on construction activities and progress. Each site visit will be documented in a daily report prepared by the field staff, reviewed by the project manager, and provided to the Town. Since we are not onsite full-time, we will not be responsible for any discrepancies between the design and what is actually constructed while not on site.
8. Review construction contractor monthly applications for payment requests based on quantities and work completed. Prepare recommendations to the Town for payment to the construction contractor based on monthly payment request reviews.
9. Prepare Record Drawings of the completed project. Record Drawings will be based, in part, on information provided by others. Weston & Sampson is not responsible for errors or omissions in input provided by others.
10. Perform permit management tasks and prepare close-out documentation for the environmental and dam safety permits obtained for the project. Based on our experience we anticipate the following tasks will be required:

Saugus Conservation Commission Order of Conditions

- Reflag wetlands prior to construction.
- Provide Saugus Conservation Commission with stamped construction plans prior to the start of work.
- Submit Request for Certificate of Completion at conclusion of the project.

Chapter 253 Dam Safety Permit

- Submit Notice of Construction form prior to the start of work.
- Review Construction Contractor's flood warning/emergency response plan.
- Provide written documentation that submittals meet project criteria.

- At the conclusion of the project, prepare and submit a Certificate of Completion (COC) report to the Office of Dam Safety to close-out the permit. The COC requires a Phase I Dam Safety Inspection at the end of the work.

## PROJECT COST

The estimated fees to conduct Phase 1 through 4, above, are as follows:

Phase 1: Design	\$40,700
Phase 2: Permitting	\$27,900
Phase 3: Bid Assistance	\$7,600
<u>Phase 4: Construction</u>	<u>\$25,600</u>
Total Estimated Fee:	\$101,800

We propose to complete Phases 1 through 3 on a lump sum basis for the above amounts. As details developed during design, and permitting requirements can impact costs during construction, the above amount for Phase 4 is an estimate and not a not-to-exceed amount. We should be provided the opportunity to review and revise our Phase 4 estimate once project details are developed and permitting requirements are known. Construction during 2018 and 2019 is assumed.

## PROJECT SCHEDULE

We will begin the scope of services as soon as we have an executed contract. If the above scope of services, fee and schedule are satisfactory to you, we can prepare a contract for execution by the City and Weston & Sampson.

Thank you for inviting us to submit this proposal. We look forward to assisting you with this project. If you have any questions, please contact Julie Eaton at (978) 532-1900 (ext. 2223).

Very truly yours,

WESTON & SAMPSON ENGINEERS, INC.



Frank Ricciardi, P.E., LSP  
Vice President

## **GRISWOLD LOWER POND DAM SUMMARY**

The following are some of the recommendations included in the Weston and Sampson Inspection Report and which DPW requests be included in the FY19 budget:

- Perform a hydrologic and hydraulic (H&H) analysis of the watershed, impoundment, and dam to assess the ability of the structure to pass the SDF.
- Perform monitoring of Griswold Lower Pond Dam quarterly and after 25-year rainfall events (more than 5 inches of rain in a 24-hour period). Observe condition of the dam for changes from these identified in the report, including the condition of the downstream stone masonry wall and primary spillway for leakage and/or seepage.
- Prepare an Emergency Action Plan in accordance with 302 CMR 10.11.
- Prepare and implement an Operations and Maintenance Plan.

Estimated Project Cost: \$40,000.00



## **GRISWOLD POND DAM SUMMARY**

Below are some of the recommendations from the Weston & Sampson Inspection Report. The DPW recommends the following items be included in the FY19 budget:

- Perform a hydrologic and hydraulic analysis of the watershed, impoundment, and dam to assess the ability of the structure to pass the SDF with 1 ft. of freeboard.
- Perform engineering analysis of the embankment slopes and non-embankment structures to check conformance with 302 CMR 10.14.
- Prepare an Emergency Action Plan in accordance with 302 CMR 10.11.
- Prepare and implement an Operations and Maintenance Plan.

Estimated Project Cost: \$40,000.00