



54 Fairview Ave.
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Feasibility Study Proposal / Scope of Work

April 4, 2016

Gentlemen of the Baddacook Pond Committee:

Please find below the Feasibility Study Proposal details, as you requested. Aquatic Vision LLC proposes a start date of July 11. There will be some observation visits by Ted Fiust and others before the start date, in order to establish parameters for the full-on two week test period. Water temperatures in local ponds have reached 60 degrees Fahrenheit already, which means plant growth will accelerate. Initial observations both above and below the surface of Baddacook Pond will commence as soon as possible after the signature of the acceptance of this proposal by appropriate representatives of Groton, Massachusetts.

Aquatic Vision proposes to utilize three basic harvesting methods, with variations, to determine rates of removal. For depths less than 5 feet, a harvester will be utilized. For depths to the extent of the weed infestation, a combination of DASH and SASH will be used. DASH stands for Diver Assisted Suction Harvesting, while SASH stands for Surface Assisted Suction Harvesting. The only difference is that in SASH a diver may not necessarily be present at the end of the suction hose.

Diver handpulling will be utilized as necessary for the cleanup of the two operations mentioned above. Using a harvester and DASH/SASH technologies sometimes results in missed plants here and there, much as if a garden were to be weeded with machinery, but then a human returned to look over the area just weeded and that human pulled out the few stragglers that escaped the machinery.

Disposal on shore will end Aquatic Vision responsibility for the bio-material. The Town of Groton then takes responsibility for removing the material from the site of offloading or deigns to leave the material and compost-in-place.

Aquatic Vision will at a minimum provide a pre-work assessment of the invasives in Baddacook Pond. An investigation of the pond bottom will include species density and percent of water column assessments in order to determine biomass volume to be removed. Aquatic Vision estimates that at full production, approximately one acre per day will be remediated with the combined technologies listed above.

Other parameters such as dissolved oxygen, pH, phosphorous, etc., will be obtained via instrumentation and/or chemical tests. Sediment depth data was determined by Aquatic Control Technology in the past.



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Unless specified by the Town of Groton, Aquatic Vision will assume the depths have not increased significantly enough to alter plant growth parameters for the purposes of this study.

Diver and surface assessments will be undertaken on various dates leading up to the start date. This will involve qualitative as well as quantitative assessments for the purpose of determining the rate at which invasive biomaterial can be removed. The goal is to remove as much material as possible in as short a time as possible. Under the National Heritage Protection Act, Aquatic Vision will attempt to minimize negative impact to such species of special concern as the Blanding Turtle. As such, a goal of the diving survey is to determine to the extent visual inspection might provide, an assessment of suitable habitat. Further, the final goal is to gain control of the growth of invasives such that minimum maintenance may be required in future years.

A diving and surface survey will, at the least, be accomplished within 7 days prior to the start date of the full-on two week test. This helps assure that pre-work parameters are accurate. Once the two week test is complete, another diving survey will occur in order to assess efficacy of the methods employed. Again, an investigation of the pond bottom will include species density and percent of water column assessments in order to determine biomass area and volume that was removed.

Based on operational characteristics observed during the actual work performed in the Feasibility Study, other parameters such as dissolved oxygen, pH, phosphorous, etc., may be obtained via instrumentation and/or chemical tests.

A comprehensive written Post Survey Report will be given to the Town of Groton within one month of the completion of the two week period. The report will include details of the Pre-work survey, the methods employed and results of the two week trial period, and recommendations and cost estimates for the 2017 proposed removal and remediation of aquatic invasives from the whole of Baddacook Pond.

An appropriate Notice of Intent needs to be in place before the July 11 start of work. Aquatic Vision will comply with the Order of Conditions. Within 5 working days of receipt of the NOI/Order of Conditions, Aquatic Vision will indicate whether there is some condition it is incapable of meeting. If that is the case, Aquatic Vision agrees to refund the deposit money, less \$2500.00. This will cover Aquatic Vision's Pre-work Survey and initiation of equipment reservation expenses.



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As the process continues toward narrowing the focus to an actual start date for the 2016 Feasibility Study for remediation of invasives in Baddacook Pond by Aquatic Vision LLC, the following Scope of Work Proposal addresses in further detail the points of common understanding of both parties involved.

SCOPE OF WORK

Proposal Submitted to:

Town of Groton, Massachusetts

Description: Harvesting and Diver handpulling of invasive aquatic weeds at Baddacook Pond. Start date on or about JULY 11, 2016.

Payments to be made as follows:

A deposit of \$6500.00 to be received by Aquatic Vision within 30 days of signing of this Proposal/Contract, or no later than June 15. Remainder of total Feasibility Study fees to be received within 30 days of completion of the two week test period, less 10% holdback for completion of Post Survey Report. Upon submittal of the Post Survey Report, the 10% holdback fee is due within the 30 days following. Daily operating costs include the following:

-Site humans. At least three persons on site at all times.

-Transportation. Workers travel expenses going to site and coming from site

-Equipment transportation. Harvester and DASH/SASH equipment, one or two pontoon boats serving as DASH/SASH/Dewatering platforms and transport barges, one to three smaller boats, and floating dock elements need be transported to and from the site. Onsite storage and docking/mooring areas for said equipment need be designated by Town of Groton.

-Fuel and Power. AVLLC will provide all necessary diesel and gasoline fuels for the harvesters, conveyors, DASH pumps, outboards, and air supply ("third lung") systems. In addition, batteries need be charged either on site or at night off site. Availability of an outdoor grounded outlet to recharge deep cycle gel batteries is necessary within a mile of the boat ramp. Hours of operation may also require lights for night work. If so, AVLLC will supply the lights and power for those lights. Some solar charging equipment may also be employed.



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-SCUBA tank refills. Depending on the situation, tanks may be used instead of the third lungs. Tanks need to be refilled each night. Aquatic Vision is responsible for filling the tanks.

-Equipment maintenance. In addition to routine maintenance, inevitably items will break and need fixing. Except for any use of the Town of Groton's Aquarius harvester, the maintenance of other AVLLC equipment is included.

EXCLUSIONS FROM THE DAILY RATE QUOTED ABOVE:

-Liability insurance and workers compensation. Aquatic Vision carries a \$1,000,000 liability insurance policy, as well as workers compensation. Given the size of the harvesting equipment, the possible constrained space in which to operate for the sake of the test, and the fact that divers may be in the water in proximity to such equipment, Aquatic Vision has initiated discussions with its insurance agent. At the time of this writing, estimates vary, but additional insurance for these constraints appears to be less than \$2,000.00. It is possible that additional insurance will be much less than this, in which case adjustments to the Total Feasibility Study will be made.

-Transportation of major equipment. The harvester is currently located in Weedsport, NY. It will cost approximately \$1,000 to transport it to the worksite and deploy it. Given the short time-frame of two weeks for the test, Aquatic Vision will forgo its normal deployment fees, but transportation from Weedsport needs to be included. DASH/SASH, pontoon and other boats will be brought on site as needed. These equipment act as survey, personnel transport, and weed transport vessels. No transportation fees will be incurred for these boats.

CUSTOMER RESPONSIBILITIES:

Customer is responsible for disposal of weeds and any permits required to perform the work proposed in this Feasibility Study.

Customer has represented to Aquatic Vision LLC that approximately 35 acres of fanwort /eurasian watermilfoil plus floating islands of lilies need be removed from the 75 acre Baddacook Pond. Since the timing of biomaterial removal and disposal is critical to operational success, the Town of Groton assumes responsibility for the material deposited as soon as it reaches the shore. It is anticipated that at optimal conditions, approximately 100 cubic feet will be offloaded every fifteen minutes, or approximately 15 yards per hour. Given the experimental nature of the



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Feasibility Study, this figure is likely to vary widely depending on the equipment and personnel used at any time or day. However, 15 yards per hour is likely the maximum offloading rate. If the shore conveyor is backed up because Town of Groton biomaterial handlers cannot keep up with the loads, alternate potential offloading sites need be designated ahead of time. At later times convenient to the Groton biomaterial handlers, those alternate sites can be dealt with by Town of Groton.

Customer agrees to flexible hours of operation. At least three persons and associated equipment will be operating at least 8 hours per day of the 10 day trial period. Should Aquatic Vision determine, for whatever reason (e.g. weather, equipment availability/downtime, etc.) that to fulfill the 8 hours per day for ten working days portion of this contract, it needs to be present and perform at other than 8 a.m. to 4 p.m., Aquatic Vision will be allowed to do so. If this is the case and if sufficient biomaterial handling areas on the shore are not available, after meeting with the town appointed Representative, Aquatic Vision may elect to extend the time of the Feasibility Study period in order to fulfill the full 80 hour time trial.

With the goal of assessing production rates, records of production hours, production rates, acreage cleared, and rates of biomaterial removal will be kept, and included in the final report to the Town of Groton. In the final report, there will also be a summary of effectiveness, including a discussion of the processes' scalability to a full Baddacook Pond solution. The final report will contain a "Lessons Learned" section to describe what worked well and what did not work well.

ADDITIONAL CONSIDERATIONS NOT ELSEWHERE CLASSIFIED:

- If Town of Groton equipment is in need of repair, Town of Groton is responsible for fixing it in a timely manner.
- Aquatic Vision recommends leaving the biomaterial from the shore conveyor or any biomaterial offloaded, in place as long as possible. A skid-steer (a.k.a. Bobcat) can be used to manage the piles to compost most quickly. Aquatic Vision suggests accelerant beneficial bacteria be added so that the actual material Groton need haul away is minimized.
- Time is of the essence. Growth rate will be maximal at the time of the proposed start of the Feasibility Study, therefore consecutive days of harvesting are crucial for accurate predictions of a whole pond remediation effort.
- Town of Groton is responsible for regulating boating activity on the pond, since most boating takes place in the summer months. Town of Groton is responsible for limiting access to the boat ramp, as this is the proposed offloading site of biomaterial for the Feasibility Study, as well as the launch site for Aquatic Vision equipment.



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-Town of Groton shall designate an appropriate single point of contact Representative who can be contacted 7 a.m. to 7 p.m. for feasibility/go-ahead decisions. Aquatic Vision understands the intent of this Feasibility Study to be a test case. The goal is to determine the best combination of non-herbicide methods to remove nuisance vegetation from Baddacook Pond. As such, some as-yet experimental methods may prove more effective than others. With this in mind, Aquatic Vision as a fast-responder company, crucially needs access to appropriate decision-making capable individuals.

-Downtime due to circumstances beyond the control of the Town of Groton or Aquatic Vision, will be minimized. Aquatic Vision will make every effort to include appropriate descriptions of the equipment and proposed methods in the NOI of the ConCom. Equipment may include, but not be limited to automated ROV scouting and locating devices, DASH/SASH pumps, and dewatering devices.

-If the people and their respective equipment lined up to take away the weeds do not show up before Aquatic Vision runs out of room, Aquatic Vision proposes to put the biomaterial directly on the shore, and let Town of Groton deal with it later. As previously stated, maximum productivity under ideal conditions and presence of working equipment might be approximately 100 cubic feet every fifteen minutes, though likely less on a daily basis due to factors such as equipment actual run time, transport time from site of harvesting to deposit sites on shore, weather issues such as thunderstorms forcing a shutdown of operations, which takes approximately an hour, and re-start of operations, which also takes about an hour, and possibly other unforeseen factors.

COST STRUCTURE:

10 working days at \$1500 per day	\$15,000
Pre-Project and Post-Project Survey and Reports	2,000
Transport of harvester to Baddacook Boat Ramp	1,000
Potential insurance for additional liability (estimated not to exceed)	<u>2,000</u>
Total Feasibility Study	\$20,000



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References:

Dudley Pond: Michael Lowery, Surface Water Quality Committee. 508-397-8828

Aquatic Vision and Ted Fiust became involved in hand-pulling and DASH operations on Dudley Pond in 1995. Ted Fiust has been involved in Dudley Pond weed control operations continuously from 1995 to the present.

Lake Cochituate: Carol Berkowitz, Lake Cochituate Watershed Council. 508-653-8228

Aquatic Vision and Ted Fiust became involved in the 1990's when vertical barriers were first installed at the roadway overpasses. Ted Fiust cleaned the vertical barriers. Also in the 90's, Ted Fiust was a subcontractor to Aquatic Control Technology when the first benthic mats were installed just outside the swim ropes at the State Park Beach, the busiest inland beach in Massachusetts. Aquatic Vision, in 2011, installed 50 benthic mats (12' by 50' each) on the peninsula just south of the State Park. In subsequent years, Aquatic Vision installed benthic mats at the swim areas and docks of individual homeowners, as permitted by the Conservation Commissions of Wayland, Natick, and Framingham. Aquatic Vision did many surveys of aquatic weeds over the years. Ted Fiust handpulled the Wayland Town Beach area continuously from circa 2003 to 2010, before herbicide was first used in Lake Cochituate. Last year, Aquatic Vision was contracted to DASH leaves from the swim area when winter and spring winds piled up excessive amounts. Also last year, Aquatic Control Technology sub-contracted Aquatic Vision to do 21 days of handpulling of sparse invasive vegetation among the three sub-basins of Lake Cochituate, before Aquatic Control Technology was to spot treat with herbicide in the more dense areas.

Wachusett Reservoir: Aquatic Control Technology – Marc Bellaud, President. 508-865-1000

Continuously from 2001 to 2010, Ted Fiust was subcontracted by Aquatic Control Technology to handpull and vacuum the benthic matting at Wachusett Reservoir. The handpulling was done over two inlet basins of this Boston drinking water supply reservoir, covering approximately 130 acres. Milfoil and Fanwort were the target invasive species.



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ACCEPTED BY:

Printed Name and Title

Signature

Date