CITY OF NEWBURYPORT
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Jim McCauley, Community Services Chair
City of Newburyport
60 Pleasant St.
Newburyport, MA 01950

August 9, 2023

Dear Councillor McCauley,

I'd like to take this opportunity to provide a high-level synopsis of the design changes that have been made to the Bartlet Mall Frog Pond Restoration Project in anticipation of the August 15th Community Services Meeting. This meeting is being held to satisfy the bond order condition to present the Council with the final design for the Bartlet Mall Frog Pond Restoration project, in anticipation of an August 28th Council vote to release the CPA bond. Our consultant team looks forward to presenting our final design to the Council and the public, and to answer any questions to alleviate any concerns about the project.

Since the bond was approved back in September, 2022, the design has remained substantially the same while the details have been refined. We've sought approvals from 9 different Federal, State and local agencies, each of whom have looked at this project through a different lens and have offered their contributions. Our design team consists of geotechnical, environmental, water resource, and civil engineers, landscape architects, and architects. We have sifted through historical data and collaborated with peer reviewers, board and commission members, local residents, and Federal and State agencies to come up with the best solution to this 200-year-old problem. We have studied the pond's bathymetry (topography underwater), taken sediment cores to test its structural stability, permeability, and contaminant distribution, drilled borings and installed monitoring wells to evaluate its hydrology, flow of water underground and location of any potential stream, and taken surface water quality samples. The high-level results of all this testing are as follows:

- Groundwater is 30' below the bottom of the pond.
- The water is contained by low-permeability sediment consisting of peat and silty sand lenses (it's a giant bowl).
- There are no hydrologic connections to the pond; it is not spring fed and has no apparent groundwater connection.
- There are phosphorous and other contaminants present in all sediments to 12' depth. This renders the sediment not suitable for disposal in any MA landfills.

Based on all the above-mentioned studies and testing, the plan for the Pond, at its highest level, is as follows:

- Dewater the pond.
- Line the pond with an HDPE/LDPE liner to prevent phosphorus from mixing with the water to prevent harmful algal blooms (HABs) and human/animal contact with urban contaminants.

- Protect the liner with 3" armor stone and 3" of benthic sediment to support wildlife and aquatic plant life.
- Install a bedrock well to refill the Pond and top off the water level during dry spells and keep the water at a consistent level.
- Install a subsurface recirculation and aeration system to maintain the water quality long-term
- House the equipment in a small pump house near the northwest corner of the park, tucked away as much as possible and designed to complement the Superior Courthouse.
- Provide an outflow to sustain the pond elevation during high water levels such as snow melt and heavy rainfall events.
- Install a granite seat-height edge and removable dock to protect the wetland resource, deter waterfowl, and provide boating access for the public that will generate revenue to pay for utility and maintenance costs long-term.
- Restore the fountain, including upgrading the pumps to promote water circulation, which are not currently operational.

The changes to the overall design are modest and have been made either to satisfy a regulatory agency, to reduce costs and/or long-term maintenance, or to take advantage of the latest available technology. At a high level, the design changes are as follows:

- Instead of removing the top layer of contaminated sediment for removal off-site, we are capping the sediment in place and elevating the surrounding walkway by an average of 6" to maintain the minimum required pond depth needed for long-term water quality. This decision was made in order to reduce the high cost of off-site, out-of-state disposal. This was discussed as a potential option during CPA and City Council deliberations in 2022.
- Instead of burying the utility shed that houses the pump, circulation, and aeration equipment within the northwest corner hillside beneath the playground, we are proposing it as a free-standing pump house. This decision was made for several reasons:
    - to reduce the visible prominence of the vault at the nose of the northwest slope;
    - to avoid construction sequencing issues with the installation of the new universally-accessible playground;
    - to improve climate control and avoid a moisture-rich environment that would corrode the equipment;
    - to reduce the structural design, support of excavation, material disposal, grading, and retaining wall costs of constructing such a building, and
    - to avoid the need for licenses to operate in enclosed spaces with engulfment risk.

  A fully underground vault was considered, but deemed too costly and too dangerous from a permit-required confined space requirement. The pump house was originally intended to be a modest building constructed of wood and/or brick veneer with a standing-seam roof, but the Historical Commission and Planning Board requested greater detailing including brick, slate roof, dentil moulding, and potential pilasters to increase its visual compatibility with the Superior Courthouse.
- We added in hibernacula within the pond and a ring of low-growing aquatic plants (instead of constructed floating wetlands originally proposed) along the bank to support wildlife at the request of the Conservation Commission. The hibernacula, or deeper pockets of benthic sand above the liner of the pond, will allow turtles to burrow during the winter and the native aquatic plantings will provide habitat for amphibians.

With regard to the maintenance of the Frog Pond once construction is completed, the Contractor will own the first year of maintenance, replacement parts, and labor, and will train City staff (DPS Parks Division) and the Owner's Representative on how to operate the system. The system will be fully automated with submersible pumps drawing in water from the wet well intake inside the pump house (completely hidden from view) and discharge through automatically backflushing filters prior

to re-entering the pond at the pond bottom through a return pipe system just above the liner and ballasted down by stone.

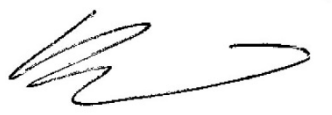
We anticipate 150-man hours per year, including spring startup, winterization, and weekly checks, which is fewer man hours than Inn Street (460 hrs.) and Atkinson Lily Pond (245 hrs.). Additionally, we anticipate roughly $10-15K in utility costs annually. The intent is that the boating program planned to be implemented at the park will pay for these modest maintenance costs.

We do not expect leaves or debris to build up against the screen of the intake pipe given its location tucked away into a niche beneath the dock. The dock and intake pipe were carefully designed so as to not come in contact with people, wildlife, and each other. Moreover, the intake pipe feeds the wet well via gravity as opposed to suction, which would normally draw in debris across the screen. To combat the rare possibility of the screen becoming clogged, we have added a return pipe from the recirculation system into the niche to push water across the intake screen and back into the pond to clear any floating debris from under the dock and keep the intake pipe clear. Future leaves in the pond will also not be an issue. In fact, leaves will become integrated with the benthic environment we are trying to resuscitate, becoming food and habitat for wildlife in the pond. The current situation stems from centuries of peat and decades of rainwater runoff from the street and surrounding park lawn which has caused the Total Phosphorous to become excessive. We will be diverting street runoff via curbing to existing catch basins and roof runoff via roof drains into dry well. Additionally, the City no longer uses any of the toxic chemical fertilizers and weed control chemicals of the past within the Mall, thus reducing the potential addition of phosphorus nutrient.

Since September 2022, as the design has come more into focus, we have made the system simpler and less complicated to operate. The engineering team met with the Parks Division staff to discuss future Frog Pond operations, as well as assess the Atkinson Lily Pond and Inn Street Water Feature operations. The City's Park Division is well-versed and experienced in the current water features under their purview, and they feel confident they can take on the proposed Frog Pond pump system; which in the opinion of the design team is less complicated than those at Atkinson Lily Pond and Inn Street.

We look forward to continuing this conversation with the public during a presentation to the Community Services Committee on August 18th, when our entire consultant team will be available to answer questions and present our final design in anticipation of the final Council vote on August 28th. In the meantime, please do not hesitate to contact me with any additional questions or concerns.

Sincerely,



Kim Turner, Manager of Special Projects