



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

August 31, 2023

Dear Councilor McCauley,

I am in receipt of your questions from August 20, 2023. Thank you for providing them. Our team has attempted to keep the responses succinct and refer to the City website and/or previous meeting recordings where additional detail, if desired, can be found.

Technical

1. Please provide 3-5 references on projects where a similar engineering solution has been deployed. Please provide an overview (+/- 100 words) of the solution, how long the solution has been in existence, known changes (upscope/downscope) from the original plan, and ongoing maintenance approach (DIY or contracted). Has the referenced solution had component updates or replacements since the original rollout?

The methods recommended for the Frog Pond were selected based on the June 2021 Preliminary Alternatives Analysis and the March 2022 Investigation Summary, Detailed Alternatives Evaluation & Recommendations. Like all projects, the Frog Pond presents its own unique challenges; however, the methods for lining the pond are common practice for everything from storm water retention through basic landfill design. This information has been previously submitted and discussed with the CPC, City Council, and Newburyport Conservation Commission and all were in approval of proceeding with this method. This information is available on the City website, under the Parks Commission page, under a tab labelled 'Bartlet Mall Restoration Project'

2. What were the conditions for the decision to not remove the toxic-layer of soils? While we've settled on plan for containment of this material, what known challenges may the city face 10-20-30-40 years from now? Is our mutual goal "clean" (non-potable, non-toxic) water quality of the pond?

The decision to encapsulate vs dredge the sediment of the pond was made based on a detailed evaluation of alternatives. As discussed in the alternatives evaluation and presented to the CPC, MassDEP, Newburyport Conservation Commission, the Newburyport City Council, the shallow sediments contain levels of various urban contaminants as well as high nutrient loads which are resulting in the eutrophic to hypereutrophic conditions in the pond. Dredging and removal were dismissed as alternatives because removal of shallow sediments still results in the need to

encapsulate the existing sediment and the additional costs to dredge, dewater, amend, transport and dispose of the sediment brought no additional benefit to the City.

3. Is the geotextile portion (pond liner) of the solution nonporous? The geogrid and stones would be on top of this liner? The result of this is a “solid” containment plan, what contingencies should the city consider to prolong quality of these materials?

*As discussed in the alternatives evaluation and presented to the CPC, MassDEP, Newburyport Conservation Commission, the Newburyport City Council, the liner system placed in the following order on top of the existing sediment: methane removal system, geogrid, High Density Polyethylene (HDPE) HDPE/ Low Density Polyethylene (LDPE) liner, armor stone and benthic sand. While robust, the liner system is not “solid” since it is made up of flexible materials, stone and sand. The system has been designed in accordance with accepted engineering practices and is expected to perform in accordance with manufacturer specifications. To that point, the armor stone acts as a shield to prevent any inadvertent penetrations into the **non-permeable** liner, and the benthic sediment supports habitat for flora and fauna. The six-inches of armor stone and benthic sand cover will also protect the liner materials from UV rays, thereby likely increasing its useful life*

4. It was stated the life expectancy of the geotextile liner has a life expectancy of 20 years. Then in discussion it was amended to 40-80 years. How long will the manufacturer offer a guarantee of the material used in the solution. What would be the projected impact to the whole solution if (or when) this liner needs to be replaced? Would there be an option to purchase extended material warranty?

To correct this statement, the mention of 20-year life expectancy was in respect to some of the parts for the water treatment system. The discussion of duration of 40-80 years was in respect to the HDPE/LDPE liner. The actual HDPE/LDPE product will be selected by the contractor; therefore we cannot identify the manufacturer guarantee period at this time. However, 20 mil HDPE has been identified by several manufacturers as having a 100-year lifespan when placed “underground” (UV protected). See Longview Supply’s, Americover’s, and Pro Fabric Supply’s websites for 20 mil HDPE , for examples.

5. There was reference to both a geological and hydrological study of the pond. Is the city in possession of these to be used as reference?

Both the June 2021 Preliminary Alternatives Analysis and the March 2022 Investigation Summary, Detailed Alternatives Evaluation & Recommendations, authored by GEI and Aqueous, LLC, are available on the City website, under the Parks Commission page, under a tab labelled ‘Bartlet Mall Restoration Project’. These documents include all the technical data from the geological and hydrological testing, references from previous reports, an executive summary and extensive discussion about what information was gained from the testing and how that information was used to inform the project design.

6. What are the known risks involved in the location of drilling for ground water? Placement of wet well? Placement of Dry wells and the distribution of water out of these when filled?

Geosphere, a subconsultant to Aqueous performed an FTA of Bartlet Mall. FTA is a remote sensing method that is used to mark the intersections of fractures within the bedrock at the ground surface. Fracture traces often represent zones of weakness in rock where surface water and groundwater travel through open fractures in the rock. Therefore, areas of high concentration of fractures typically yield high amounts of groundwater.

Based on typical drilling operations for bedrock wells in the Merrimack Valley area, the well will be drilled to 600 feet below the ground surface. The well will undergo 72 hours of pump testing to confirm that it can be pumped 24 hours per day throughout the spring, summer, and fall to maintain pond water level. Additionally, the well will also be tested for water quality to confirm that it is acceptable for Pond water as agreed to with the Conservation Commission. A sustainable flow of 40 – 50 gallons per minute (gpm) at the surface is ideal for this system.

Bedrock well drilling is not guaranteed to produce appreciable water supply. We have mitigated as much risk as possible of not finding water quantity by using Geosphere and their FTA. They have provided backup drilling locations in the event our preferred location does not product water. There are not any known risks associated with the wet well, nor the dry wells at this time. The geotechnical investigations indicate that the existing subsurface material is freely draining materials with groundwater 30 feet below grade that is suitable for use with a dry well application.

7. Is this engineered solution stamped by a licensed engineer?

Yes.

8. If the engineered solution fails, what recourse does the city have? Will the engineering firms stand behind their engineered proposal for 10 years?

GEI and Aqueous, LLC have a contract with the City. In that contract it states that “The Contractor will perform its services under this Agreement in a manner consistent with that degree of skill and care ordinarily exercised by members of the Contractor’ profession currently practicing in the same locality under similar conditions.” Further, the state of repose in Massachusetts is 7 years.

9. Please describe the engineered solution during winter months, with the assumption that the pond may freeze through. This is a common area for ice skaters, what precautions are advised for the city to allow winter activities? Are there any potential impacts to the solution of which the City should be aware?

The team has accounted for these activities in the design and does not foresee any impacts to the solution. In an effort to biomimic a natural system, the pump equipment will be shut down in anticipation of the winter season, likely mid-October. The dock will also be removed and stored at Perry Way. Prior to ‘winterization’, the pond’s water level may be lowered to aid in freezing. Access by skaters in winter will not be hindered and the pond will function much the same as it does today during the winter months.

10. What are the tolerances of the “bonded” poly-piping in use of the manifold circulation system? Specifically, the likelihood of cracking during extraordinary cold snaps? How would these pipes be replaced (if cracked)?

Polyethylene pipe is more tolerant than PVC pipe due to cracking because it is more flexible. The portion of pipes that are above the frost line in dry land would be drained and winterized. The portion of pipes that are below the liquid level in pond would remain filled with water. Therefore, the water within the intake pipe, wet well, recirculation pipe, and discharge and aeration lines are anticipated to remain liquidized year-round.

Polyethylene pipe above the water line can be repaired with a fused patch or by cutting the faulty piece out and adapting a new piece. Pipe below the water line would require the Pond to be dewatered prior to the repair occurring.

11. Please describe the expectation of this solution to handle large rainfalls (or snowfalls) during winter (or “off”) months? Specifically, if the solution has been winterized and we experience an unusual rainfall, how will the solution handle the overflow without reactivation?

The pond will have the ability to hold excessive precipitation events much as it does today, we will just have greater control over maintaining the water level. During Spring/Summer/Fall operation, the Pond’s water level will be maintained at elevation 48.0. During winter, the Pond’s water level will be pumped down 6-inches to elevation 47.5. At its lowest point, the back of / Pond-side of the granite seat-height block’s base is elevation 49.0. Therefore, during winter there is 1.5 feet of freeboard to allow for rain and snow-melt accumulation within the Pond limits.

Please note, that the surrounding crushed granite path and hillsides will be micro-graded to direct rainfall and/or snow-melt away from the Pond.

Unless the Pond water freezes through to elevation 45.5, which is not anticipated, the Pond will remain hydraulically connected to the wet well through the winter via the intake pipe. As rain/snow occurs, the wet well water level will continue to adjust accordingly until the water level within the wet well reaches the overflow elevation of 48.2. The water will then overflow from the wet well to the dry wells until the water elevation recedes below 48.2. Since portions of the dry wells are below the frost line, the dry wells will remain in operation throughout the winter.

12. The plan calls for autonomous and continuous operation (when in service), please describe the requirements for the computer console. Please give examples of the types of alerts and notifications to be received by our support staff?

Only a web-enabled device (phone, tablet, laptop, remote desktop) is required to view the output of the pump station through the manufacturer’s web application. The pre-packaged pump station components will be controlled via a control panel which will be connected to the internet via an antenna and internet router.

The exact alerts and notifications will not be available/selected/selected until the awarded contractor selects a pre-packaged pump station manufacturer.

Typical alerts/notifications include:

- *Loss of Power or Phase to Wet Well Pumps*
- *Loss of Power or Phase to Bedrock Well Pumps*
- *Low, Low Level in Wet Well (Below Pump Failsafe Set Point)*
- *High Pump Temperature in Wet Well Pumps*
- *Temperature and Overcurrent Protection on Bedrock Well Pump Starter*
- *Filtration System Faults (Loss of Power)*
- *High System Pressure*
- *Low System Pressure*
- *Overcurrent*

13. What areas, and related impacts, of value engineering might be made in the technical area?

We feel that we have designed a modest system for the needs of this pond. That said, if costs come in higher than what is budgeted, the first element that we can eliminate is the granite seat height blocks and the prep beneath them.

The Design Team anticipates the items listed below could be value engineering discussion items. It should be noted that the design, maintenance, and operation intents of the Bid Documents will still need to be met regardless of the proposed value engineering option:

- *Pump Building layout for a smaller building footprint*
- *Pump Building structure*

14. Instead of using a liner system, could we install 12” of rock without dewatering the pond and save the City \$1M?

This would likely result in a temporary solution that destroys habitat instead of improving it, and would need to be redone at some point in the near future. It would not be a permanent solution for the following reasons:

- *There would be no cutoff of the impacted sediments. Over some unknown time period (months or years) the issues would resurface since the sediment is not actually sealed off.*
- *Since the sediments are soft, there is no way of knowing how much stone would need to be placed to achieve a 12-inch cover. It could be 12-inches or it could be far more import and placement.*
- *The water should be drained since it is already in a eutrophic to hypertrophic condition. Further, if it were to stay, without water circulation, replenishment, and aeration the existing water would remain a problem, especially if the existing sediment is not cut off.*
- *This action would result in a shallower water body which we’re actively trying to avoid. Shallower water means higher temperatures.*
- *We’d need to go back to ConCom since the banks would now be stone covered and the stone bottom would reduce habitat.*
- *Uniformly placing 12-inches of stone through water column (without dewatering) would likely bury and potential kill most, if not all, of the frogs, turtles, etc.*
- *Adding stone on top of existing sediment precludes us from installing any recirculation pipe or fountain, i.e. the whole water quality system would be impossible.*
- *If the water is not drained/cleaned, it would render the newly restored Swan Fountain inoperable within a matter of weeks (as was witnessed in the 1980’s)*

Construction Subsection

15. How long is the project plan from day-1 to day-last?

The construction timeline is at the discretion of the contractor, but the City can identify a hard end date for the contract.

16. Is there any forecast of any elements that may have an extended lead time?

The ordering and lead time for equipment is under the purview of the contractor. Please see question 17. D. 3. below.

17. What areas of the park will be blocked for use during construction?

The limit of work line is identified on sheet C-103 of the bid set (see City website/Parks Commission/Bartlet Mall Restoration Project) and includes the vast majority of the park with the exception of the playground and the City sidewalks at the perimeter of the park, which will remain accessible throughout the duration of construction. There are two construction access points that are identified on sheet C-103. The first is at the northwest corner of the park along Auburn St and is anticipated to be the most active throughout the project. The second access point is along High St opposite Park St and is anticipated to be used while the bedrock well is being drilled, at the beginning of the project.

18. Describe the loss of parking and any other impact to the surrounding neighborhoods?

Per the contract documents:

A. Minimizing Disruption to Public Ways

Disruption to the public ways shall be kept to a minimum at all times, and at no point may primary access along High St or to the Superior Courthouse, be obstructed so as to prevent the safe passage of emergency vehicles or the general public. The Contractor shall coordinate any necessary/temporary street closures with the Owner (through its designated Project Manager, and in coordination with the Newburyport Police Department, Fire Department and Department of Public Services). Throughout construction the Contractor shall maintain access for both emergency vehicles and the general public within all roadways and sidewalks.

B. Hours of Construction

Unless otherwise approved in writing (or email) by the Owner (through its designated Project Manager), the Contractor's work shall be limited to the following hours:

- Monday-Friday: 7am – 6pm*
- Saturday: 8am – 6pm*
- Sunday: No Construction Activities*

C. Staging Areas

As depicted in the Drawings, the Contractor will have access to two optional staging and refueling areas outside of the 100-foot Buffer Zone.

D. Sequencing Constraints

- 1. Installation of bedrock well must occur first in project sequence, after the Pre-construction meeting with Newburyport Conservation Commission.*
- 2. Full dewatering of the pond cannot be performed after November 15 or before March 1.*
- 3. Lead times for equipment should be accounted for in the project schedule. No additional project time will be given due to long lead times.*

Architectural (and General)

19. Stated during presentation was 9 separate approvals, Please list out the approvals to date: please list out the agency and what type of approval was granted. If possible please include any conditions on these approvals.

Please see memo titled 'Community Services Memo 8-30-23 permitting overview'

20. Please describe the impact of removing the granite block edging to the original design. Are the granite blocks intended to be curbing or bench-height?

The granite blocks are seat-height (+/-18") and will be placed outside the bank (resource area), and therefore outside the waterline, of the pond on a compacted gravel base. The granite blocks are not integral to the liner system and can therefore be phased in, if need be, for budget reasons.

21. How will potential architectural changes to the solution affect the efficiency of the technical solution. Specifically, in keeping water fowl discharge out of the pond water. It was suggested we could use "fake coyotes"?

Architectural changes will not be permitted if they negatively impact the design intent in the opinion of the Design Team.

The added benefit of the granite seat-height blocks is that they will tend to deter waterfowl from entering the pond. In the absence of the granite, there are other detractors such as metallic

ribbon and faux predators that can be used to deter waterfowl. These would be used on a temporary basis while plantings are established or until a full granite edge could be realized.

22. The Plan Board granted an approval with 4 conditions. Please describe the impact of these conditions to the overall project plan.

- a) Pump house must look like one of the two approved elevations: will not impact the overall plan, these renderings were included in the bid set specifications.*
- b) Materials must be natural stone (brick and slate) or a request for a minor modification must be made: will not impact the overall project plan, this was included in the bid set specifications.*
- c) Pump house may shift back into the hillside if feasible: this was requested by the Planning Board as an option, once a contractor is engaged, to explore ways to further reduce the visual impact of the pump house on the park. It would require additional geotechnical testing and amendments to one or more permits. This is not a requirement of the Planning Board, but rather a request for exploration. If the change could reduce costs, we would explore it.*
- d) Noise immediately adjacent to the pump house must not exceed 45 dBA: the decibel level of the naked equipment as specified is 60 dBA. We believe that the sound of that equipment outside the pump house will drop by at least 15 dBA. If additional soundproofing is needed, we would add insulation to the interior of the building or else add planting to the exterior of the building. This should not greatly impact the project.*

22. Why was the outbuilding not in the bid? How will this impact the value engineering of the solution? What quality controls are present in a delegated design? Please give an example of where in Nbpt a delegated design was used by the Planning Board?

The pump house is included in the bid specifications and elevations are included in the bid plans. Delegated design gives the contractor flexibility to find value engineering items that can end up saving the City money as opposed to being forced to provide what is shown on a traditional Design-Bid-Build approach. Delegated design is done at the direction of the City and its representatives (the Parks Commission and the design team). Delegated design does not mean the Contractor has complete free reign to design and install whatever they desire in the name of saving time and money. The Contractor must carry the proper licensed designers and engineers to do the work, and they are bound to the necessary mechanical, structural, and electrical requirements by law. They must submit all products, finishes, and equipment to the design team for approval. Prospective Contractors have to pass qualifications for themselves, their subcontractors, and designers.

23. Please explain why the pump house is proposed as a standalone structure vs collocating in the Court House.

The design team explored several options for the location of the pump house, which were all described during presentations to the Planning Board earlier this summer. Those presentations are available on the City website/Parks Commission page/Bartlet Mall Restoration Project. The potential to include the pump equipment in the basement of the courthouse was eliminated very early on for several reasons: a) there is not enough space for what is needed to be housed, b) there are issues with access within a highly secured building, and c) it would have required drilling into the building for hookups.

24. Please describe the Dock System plan. Annual installation plan, In season Use, and Annual removal and storage plan. Is the Dock plan operational in nature or aesthetic?

The dock system is a light-weight, aluminum, rolling dock system that is installed in segments. As each section is rolled in, the next is connected to it. Its purpose is two-fold: a) to protect the intake pipe that rests beneath it and b) to provide access to a future recreational boating program. The dock will be rolled out of the pond when the pump system is shut down in the fall and the dock will be stored at Perry Way.

25. Vehicular access may be required for annual Dock work, will the access from West end allow for that especially given the design requirements for both ADA access needs and the use of flexipath as a base?

Just as small vehicles access the Frog Pond today via the ramp off Pond St, they will be able to access the pond via the new access ramp off Auburn St, which will be an equal slope. Periodic, light, vehicular traffic is not an issue for the Flexipave system. The Parks Division currently rides over the Flexipave along Pond St with its large mowers and small pickup trucks and it has not damaged the walkway. We do not envision more than 2-3x/annual driving over the Auburn St ramp. If larger equipment is necessary, the path could be protected with plywood sheets.

26. There was a question posed in the meeting, "is it possible to make the pond size smaller?" (intended to reduce costs). The Ans was: Technically Yes, but it would affect the architectural plan. Additionally, it was stated that with a smaller pond area may require some re-approvals. Please state which approvals would need to be sought?

If the pond were made smaller, it would reduce the resource areas of bank and Land under Water Bodies and Waterways, which would trigger the need for a replication 2x the size of the taking, which could be a costly endeavor. Depending upon the amount of the reduction, there may not be adequate space within the park for said replication, prompting a need for the City to pay for wetland credits. The approvals needed would likely involve Conservation Commission and DEP, as well as the Parks Commission and CPC.

27. The original plan approved by the CPA did not have a free-standing structure, the new proposal does, although it is still undefined as to location, building materials, etc. CPA funds prohibit expenditures on free-standing structures except bathrooms. Please provide a reapproval from the CPA committee, or a source of funds for the proposed building?

This information will be forthcoming.

28. What items are targeted for removal during a value engineering phase? What impact, both visual and functional, would these cause?

The granite seat-height blocks and the prep beneath them. Please see question 19 above.

Ongoing Operational

29. Please provide the annual estimated maintenance costs once this project is completed? Please include hard costs (e.g. materials, utility costs etc.) as well as other costs (e.g. labor costs etc). Specifically, please separate costs for technical solution (e.g. pumps, manifolds, wells, docks etc). Additionally, please include support costs for ongoing park items: grass and grounds (e.g. walkways etc)?

The Contractor will own the first year of maintenance for the pond equipment. This will allow time for any issues or tweaks to be made before handing the system over to the City. It will also allow ample time to train City staff on how to operate the equipment. Because it is fully automated system, the estimated man hours are expected to be roughly 150/year (vs 245 for Atkinson Lily Pond and 460 for the Inn St fountain). That equates to roughly one staff person

spending 3 hours/week at the pond. Additionally, the utility costs are estimated to be between \$10-15K/annually.

30. How will ongoing maintenance upkeep be funded? What is a projection of additional DPS/Parks staff be required?

We don't anticipate the need to hire an additional staff person to absorb the 150 hours/year for the park.

31. Please provide an estimated quote for an annual maintenance support contract for a 3rd party vendor.

Refer to the August 2022 Basis of Design – Water Quality report authored by Aqueous (available on the City website) where this was discussed.

32. When would the net capital expense (e.g. pump replacement, liner replacement) be expected? And please provide estimates (e.g. pump replacement est at \$30k)

This was discussed during the August 15th presentation. For your convenience, the meeting recording is provided below.

https://us02web.zoom.us/rec/play/uDNI-8VB6ivkPphl4M9hY-1oPy3OxYzx1iomxdGivD27BqD_M-OJAulh1iA9ZpEOtS57ojoD5VloGcZV.r2M2wg98wiOL_aPu?canPlayFromShare=true&from=share_recording_detail&continueMode=true&componentName=rec-play&originRequestUrl=https%3A%2F%2Fus02web.zoom.us%2Frec%2Fshare%2FRQ9p-9_VoAcNRa8QO5uFr7fLIS00F-B4onpvD6UVad-DyglDo8vB95Qxa5XfXrdu.XKuOx6XoxHKXYPIU

33. It was stated that support costs would be offset by a “boat ride” program. Please provide the proforma for this plan

Please see the City website/Parks Commission/Bartlet Mall Restoration Project for the 2016 Bartlet Boating Program pro forma.

We look forward to continuing this conversation during the Community Services Committee/COTW meeting on September 5. In the meantime, please do not hesitate to contact me with any additional questions or concerns.

Sincerely,



Kim Turner, Manager of Special Projects