

To: Ms. Constance Preston
Councilor, City of Newburyport Government
From: Vladimir Novotny
Professor Emeritus, Northeastern University
Re: Restoration of Frog Pond

Good day:

I am a retired Professor specializing in water quality management, pollution abatement and restoration. In my sixty years long university teaching, research and consulting I have participated and consulted on restoration of number deteriorated and polluted lakes and rivers in US and abroad and assisted in development of their remediation plans. These included Florida Everglades and Lake Okeechobee, Clear Lake in California, Lagoon of Venice in Italy, many water supply reservoirs in Europe, Milwaukee River and Lincoln Creek, Des Plaines River in Illinois, and others. All recovered, including Everglades but not yet Lake Okeechobee which was hit by a hurricane lifting phosphorus from the sediment ,followed by severe cyanobacteria blooms.

Since 2017 we reside in Newburyport where soon after arrival, I was pointed by a friend to the poor quality of Frog Pond. He is the creator of the fountain. With little information I prepared a short assessment of solutions that was conveyed to the city mayor 6 years ago and exchanged ideas with Ms. Reid who might have been your predecessor. After she left more than a year ago the contacts with city ended but I was in contact with Mr. Griffin. Because of my age and other work I stayed away but when I saw the draft of the present project, I was little horrified and could not support it. The plan proposed drastic water quality actions that are recommended for swimming pools but are inappropriate for ponds and lakes, including complete dewatering and bottom solidification that will destroy biota and will change a historic pond into water storage basin. And the cost of electric energy and maintenance will be very high.

I have put together a short document showing the rich history and current biota which will disappear if the project is realized as is. The pond is declared by the Massachusetts Wetland Protection Act (WPA) as Inland Pond with restrictions that protect aquatic biota and water quality. The proposed plan violated several of them. I was informed the NBP CON COM has approved the plan and asked for a Variance which is an admission of the violation of the Act. As a matter of fact, after looking at the video of the meeting the members of the Commissions were not informed about the restrictions the act is imposing.

I was notified by Mr. Griffin that you have a plan that is very close to one I proposed originally six years ago, i.e., taking care of the sediment emissions, reducing the concentrations of phosphorus, and bringing fresh water to the pond with an outlet. That all it is necessary for the pond. The restoration must by law take into consideration the banks and surroundings of the pond because of amphibians. However, using a liner would conflict with the WPA but it can be easily fixed. There is no need for huge pumping, making bubbles, circulating all water. It may be even counterproductive to water quality and deadly to biota, meaning that new biota could not develop. No disinfection. Filtration can be natural. And the cost reduction could reach a million.

It may be too late.

Vladimir Novotny. Phone 617 240 4918. vnovotny@aquanovaLLc.com

END OF UNIQUE WILDLIFE OF THE FROG POND IN NEWBURYPORT

The two-acre Frog Pond in Newburyport (MA) is a part of City history. Surrounded by old cemeteries, the historic courthouse built in 1805, and mansions along High Street, this ancient pond is the heart of Bartlett Mall. It has an artistic fountain which, however, is not functioning because of poor water quality. The pond itself is a remnant of the glacial period and is one of few local water bodies which has looked roughly the same for the past 15 thousand years. Formed by glacial processes and categorized as a kettle pond, Frog Pond is not fed by surface water runoff as are most ponds but relies mainly on rainfall. Due to park construction and earlier military production at Bartlett Mall, the pond has been slowly filled by sediments flushed in from surrounding activities and by decomposing dead small and large plants growing in or around the pond. Hence, even the sediments show the origin and history of the pond and City.

The pond today has had its unique rich and lively flora and fauna in addition to seasonal algal blooms (Figure 1) and a moderate mosquito population in summer. Mosquito larvae and development in the pond may be annoying but they are used by biologists as an indicator of biotic toxicity. In July of 2022, hundreds of small amphibian frogs (tadpoles) were seen jumping (moving) from the surrounding grass areas to the pond, manifesting its name "Frog Pond" (video is available). Because of the thousand years of isolation, the frogs in the pond may be unique but they are endangered. Frogs are amphibians and lay their eggs in grassed wet areas surrounding the pond on three sides. The pond is also hosting a large family of turtles which also rely on the grass pond surrounding. It also has some fish and full microscopic flora and fauna. Frequently egrets, cormorants, cranes, ducks, and geese come to visit the pond to thrive on the rich biota (see figures). An otter was observed in the pond, but the city asked for otter's liquidation (why?). Turtles and frogs are endangered species and must be protected and certain turtles are protected by **Massachusetts Endangered Species Act** and federally are classified as endangered. It is illegal to kill turtles and frogs by construction as it could happen if the current City's project were implemented.

A recently produced city plan for the dewatering of Frog Pond and its conversion into a lifeless water storage basin seems to throw out the baby with the bathwater. It seems to neglect the ecological and historical significance of beloved natural pond, regulated by state and local rules as a resource area. It also appears to lack knowledge of recent decades of the City's failed attempts to treat this complex site with processes that have failed, precisely because they disregard the complexity of natural pond processes. By full dewatering of the pond, solidifying bottom and putting a plastic liner on the bottom and then refilling the pond with water of unknown quality pumped from a depth of 600 ft from a deep aquifer the plan would destroy the pond's living elements while replacing the pond with a lifeless water storage basin, all at exorbitant cost.

Because of the area of the pond is 2 acres (far over the 10,000 square feet threshold) and the pond has been in place for fifteen thousand years, Frog Pond has been designated as an "Inland Pond" by the Massachusetts Wetland Protection Act - (MWPA) (310 CMR Section 10.04). The act provides extensive protection to the biota developing and living in the pond and restrict

dredging, full dewatering and other modifications of the pond that would not only be harmful it would eliminate all biota which would be illegal. Apparently, City asked for a Variance to avoid these restrictions.

Even after the pond is transformed into a lifeless water basin, bringing biota back would be unlikely because the plan proposes excessive filtration and disinfection of the pond water. Original plan planned to use by ozone for disinfection which is a powerful toxic oxidant harmful to aquatic life and one of the six regulated air pollution gases killing the biota and harmful to people. Furthermore, because the source of water will be deep aquifer the future basin would have no nutrients and benthos to support healthy aquatic life.

The city project director and consultants and other citizens without close examination claimed that the pond is toxic and suffers from cyanobacteria harmful algal blooms. This observation is a guess without any documentation. Some algal blooms have been observed in the last six years but, unlike the cyanobacteria found in the Artichoke Lake (water supply for Newburyport), they were not the toxic cyanobacteria blooms, just a rich phytoplankton development (Figure 1) because of a high nutrient content. These blooms can be reduced by regulating chemistry of the pond which may not require full dewatering. While sediments contain some toxic compounds (arsenic, some metals) they are immobilized in the sediment rich on clay and organic carbon and will not penetrate the water above. Furthermore, the top layer could be removed and replaced by a clean gravel and clay. If the pond were toxic the rich living populations, we all observe there (from microscopic plankton to amphibians, to waterfowl) would not thrive there. Even if cyanobacteria appeared at some time the professional water body remediation and restoration practices avoid a complete elimination of biota, benthos, and nutrients.

Attached pictures show the rich wildlife that will be liquidated by the city project.? If the plan is implemented the water storage basin will need a new name.

Fishes were observed and fished occasionally by some younger fishermen. However, the fish population needs to be restocked with better quality species after restoration.

The plan proposes actions such as circulations by large 20 HP pumps connected to a sewer type 15 In diameter pipeline, compressors will be used to make air bubbles, excessive filtration that are used in swimming pools and manmade lagoons, and not for natural ponds, would prevent healthy biota to develop. Energy use will be excessive. In hot summer aeration is not effective and instead of bringing oxygen it dissolves nitrogen from air which promotes algal growth. All of this requires housing of very large and noisy pumps, compressors, and filters that that will obstruct the historic nature of the pond and entire Mall zone.

Fresh water should be brought to the pond and for the fountain. Pumping water from deep aquifer is suspicious because of the proximity of ocean water can be salty.

The cost of the construction and operation is excessive.



Figure 1

An algal bloom in the Frog Pond is not a Harmful Algal Bloom with cyanobacteria. The blooms that occur in the pond are typical for borderline eutrophic and hyper-eutrophic water bodies and can be reduced and even prevented by adjusting chemistry, for example, by bringing fresh water and having an outlet. Picture taken in Summer 2022



Figure 2

Wild duck and gees frequently visit. They may bring coliform bacteria so their entry into pond should be restricted.



Figure 3 and 4 Egrets visit frequently the pond. July 2021 and April 2022



Figures 5 and 6 Also cormorants visit frequently, September 2022 and April 2023



Figure 7 Egret and ducks



Figures 8 to 10 . Turtles living in the pond are plentiful and multiply in the pond. Most likely like frogs, turtles have been living in the pond for many years. Typical life span of a turtle is more than 20 years (Picture credit citizens walking around the pond). Figures 8 and 9 taken May 16, 2023. Picture 10 was taken July 22, 2023



Figures 11 and 12 In summer 2023 turtles were seen frequently and in all parts of the pond. By dewatering the turtles and frogs will be eliminated. Pictures taken in May and June 2023

From: Vladimir Novotny <vnovotny@aquanovallc.com>
Date: August 28, 2023 at 9:00:20 AM EDT
To: Connie Preston <CPreston@cityofnewburyport.com>
Subject: Designation of the pond

Good morning:

I am attaching a pond designation by the Massachusetts Wetland Protection Act (WPA) as Inland Pond that protects the aquatic life not just in water but also in benthos and surroundings.

Note that by dewatering and solidifying the bottom and liner besides being against the law the pond and eventual future implanted biota in it after finishing the basin would lose MWPA protection and become a manmade pool.

I doubt that the law allows the change from the pond with active protected biota into an impervious human made basin. There are or should be some restrictions what the NBP CC can allow.

Let me know if you need more information, There are extensive restriction in Section 10 of MWPA . In the deliberation of NBP CC MWPA restrictions were not considered.

The same message was sent in Oct 2022 to NBP ComCon.

Ms Alicis Geilen is a Wetland Scriber (Garden of wetlands and pond) at the Mass Northeast DEP.

Vladimir

On Oct 13, 2022, at 1:41 PM, Geilen, Alicia (DEP) <alicia.geilen@state.ma.us> wrote:

The Frog Pond appears to be over 100,00 sf in area, so it meets the definition of an Inland Pond, as defined at 310 CMR 10.04, **unless the pond has an impervious bottom** (e.g., concrete, asphalt): **Pond (Inland)** means any open body of fresh water with a surface area observed or recorded within the last ten years of at least 10,000 square feet. Ponds may be either naturally occurring or human-made by impoundment, excavation, or otherwise. Ponds shall contain standing water except for periods of extended drought. Periods of extended drought for purposes of 310 CMR 10.00 shall be those periods, in those specifically identified geographic locations, determined to be at the “Advisory” or more severe drought level by the Massachusetts Drought Management Task Force, as established by the Executive Office of Energy and Environmental Affairs and the Massachusetts Emergency Management Agency in 2001, in accordance with the Massachusetts Drought Management Plan (MDMP).

Notwithstanding the above, the following human-made bodies of open water shall not be considered ponds:

- (a) basins or lagoons which are part of wastewater treatment plants;
- (b) **swimming pools or other impervious human-made basins; and**

(c) individual gravel pits or quarries excavated from upland areas unless inactive for five or more consecutive years.

As such, the Newburyport Conservation Commission would determine if the work meets applicable performance standards, in response to a WPA filing that proposes work within the Frog Pond, or within 100' of it.
