

Update from Little River Dam Project Feasibility Study

Open Public Community Forum held on Wednesday, March 24th, 2021 – 6:00-8:30 pm

Watch recordings of the Forum sessions (conducted in English & Spanish) [HERE](#):

English Open Forum: <http://haverhillcommunitytv.org/video/the-little-river-dam-project-forum>

Spanish Open Forum: <http://haverhillcommunitytv.org/video/little-river-dam-project-forum-spanish>

Introduction

Over 70 people logged on to participate in the two forums, which were held in English language from 6:00-7:30 pm and Spanish language from 7:30 - 8:30 pm.

Haverhill's Mayor James Fiorentini welcomed participants, stating that the forum was "your chance to be heard and we would like to hear from all of you, your opinion, your concerns and your ideas" on this project which is being considered by the City. The Mayor also spoke about the history of the dam, noting that the adjacent building was originally a cotton mill. He stated that both it and the dam were built around 1800. He stated that the dam was built, not to power the mill, but to collect water for the dyeing operation that took place in the mill. The dam never had anything to do with flood control.

The informational part of the program was presented by Julianne Busa and Phil Moreschi, a senior environmental scientist and dam engineer at Fuss and O'Neill, the engineering firm engaged by the City to conduct a feasibility study of the proposal. Arnold Robinson, a community planner with Fuss and O'Neill, moderated the program. Graciela Trilla, member of the Latino Coalition Haverhill translated the presentation for the Spanish version of the program and provided interpretation.

17 people, mostly "live" and some through the "Chat" function asked questions and voiced their opinions both for and against the potential removal of the Little River Dam. Those who opposed removal of the dam generally expressed doubt about the likelihood of extreme flooding and voiced concerns with the effects of removal of the dam. Those in favor of the dam removal expressed general support for removal of the dam and returning the river and the area's plant and wildlife to its natural state, as it would be if not impacted by the dam, a man-made structure. A number of questions were raised during the event – the following document offers more detailed responses to many of these questions based on additional information from the City's engineers and new results from the ongoing feasibility analyses.

How you can stay informed and share your support for or concerns about the project:

- Email: Christine Soundara, Project Community Liaison, cpsoundara@gmail.com and John Cuneo, Project Community Volunteer, john.cuneo@outlook.com
- Join an email subscription for project updates:
<https://lp.constantcontactpages.com/su/AAOrIoG/HaverhillMVPCitizenForm>
- Fill out a survey about your top concerns and priorities for climate resilience:
<https://www.surveymonkey.com/r/7MSY6CS>

- City of Haverhill Climate Change Chemically Hazardous Sites Map:
https://www.cityofhaverhill.com/Haverhill%20Climate%20Change%20-%20Chemically%20Hazardous%20Sites_FINAL.pdf
- Learn more about climate resiliency and the City of Haverhill Municipal Vulnerability Preparedness (MVP) Program: <https://www.cityofhaverhill.com/Haverhill%20Climate%20Resilience%20Survey.pdf>
- City of Haverhill, Community Resilience Building Workshop Summary of Findings, June 2020 (full report): https://www.cityofhaverhill.com/FINAL_8.5x11_CRB_Report_Haverhill_20200601_JB_Optimized.pdf
- City of Haverhill, MVP Program Environmentally Impacted and Chemically Hazardous Sites Vulnerability Assessment, June 2020 (full report):
[https://www.cityofhaverhill.com/Municipal%20Vulnerability%20Preparedness%20\(MVP\)%20Program%20EI%20and%20Chem%20Haz%20Sites%20Vol%20Assessment.pdf](https://www.cityofhaverhill.com/Municipal%20Vulnerability%20Preparedness%20(MVP)%20Program%20EI%20and%20Chem%20Haz%20Sites%20Vol%20Assessment.pdf)

Questions Raised at the March 24, 2021 Little River Dam Project Open Public Community Forum and Responses from the Project Team:

QUESTION: What kinds of flooding are possible if the dam is not removed?

RESPONSE: Future extreme precipitation events brought about by climate change will impact the Little River and the dam at Winter Street in coming years. Estimates indicate that peak flow rates during storm events will be 48% higher 50 years from now than they are currently. This has the potential to increase flood risk at individual properties upstream, even where flooding has not been seen historically. Significantly higher volumes of water during storm events may also result in increased risk of scour and erosion along riverfront properties. It also significantly increases the risk of a catastrophic dam failure, which would result in uncontrolled release of contaminated sediment, debris, and the large volume of impounded water currently held back by the dam. The damages from such a failure could be significant. The City’s consultants will be preparing mapping during the next project phase to help owners understand where future projected flood levels are expected to be relative to their property lines.

Peak Flood Event Inflow Rates Projected for 2070

| Location | Present-Day 10-Year Flood (cfs) | Projected 10-Year Flood (cfs) | Present-Day 50-Year Flood (cfs) | Projected 50-Year Flood (cfs) | Present-Day 100-Year Flood (cfs) | Projected 100-Year Flood (cfs) |
|--|---------------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|--|--------------------------------------|
| RS 15341 - Upstream Limit of Model | 980 | 1,450 | 1,640 | 2427 | 1,990 | 2,945 |
| RS 11387 – Upstream of I- 495 and Riprap Obstruction | 1,160 | 1,717 | 1,920 | 2,842 | 2,330 | 3,448 |

Sea level rise will also play a role in the future dynamics at the Little River Dam. Although tidal effects within the River between the Dam and the Little River Conduit are relatively minor under present-day conditions, it should be noted that the sea level around Boston has risen by 8 inches since 1950 and is expected to continue rising. As documented within the *Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)*, sea levels surrounding Boston are expected to rise by approximately 1.7 feet by 2040, 2.4 feet by 2050, 4.2 feet by 2070, and 7.6 feet by 2100 assuming a ‘high’ scenario. The following table summarizes projected mean lower low water (MLLW), mean low water (MLW), mean high water (MHW), and mean higher high water (MHHW) levels within the Little River in the vicinity of the Dam due to sea level rise (SLR). Current sea level rise projections indicate that mean high water levels are expected to regularly (daily) extend as far upstream as the Dam sometime between 2050 and 2070.

Estimated Present-Day versus Projected Tidal Elevations at Little River Dam

| Time | SLR Increase | MLLW (feet) | MLW (feet) | MTL (feet) | MHW (feet) | MHHW (feet) |
|-------------|--------------|-------------|------------|------------|------------|-------------|
| Present Day | ---- | -1.38 | -1.26 | 1.60 | 4.46 | 4.92 |
| 2040 | +1.7 feet | 0.32 | 0.44 | 3.30 | 6.16 | 6.62 |
| 2050 | +2.4 feet | 1.02 | 1.14 | 4.00 | 6.86 | 7.32 |
| 2070 | +4.2 feet | 2.82 | 2.94 | 5.80 | 8.66 | 9.12 |
| 2100 | +7.6 feet | 6.22 | 6.34 | 9.20 | 12.06 | 12.52 |

Removal of the dam will decrease flood elevations in the area between the dam and the MBTA bridge, with flood elevation reductions ranging from 1.4 feet to 5.5 feet during a 10-year flood event. Reductions for the 100-year flood event will be nearly 1 foot in this reach of the river.

QUESTION: How will dam removal reduce the risk of flooding and catastrophic dam failure in and near the Acre neighborhood?

RESPONSE: Planning now to remove the dam in a controlled fashion will prevent the risks of upstream flooding as precipitation increases (current flood levels in the Acre Neighborhood will be decreased by 3.1 feet for the 10-year flood, 1.9 feet for the 50-year flood, and 0.7 feet for the 100-year flood). Dam removal will also eliminate the downstream risks of a catastrophic dam failure. This proactive step would restore the river to its natural hydrology in a planned fashion, allowing the City to work with residents to develop a design that addresses residents' goals and concerns and ensures that all materials are handled safely and that thorough river cleanup and restoration are part of the design before construction even begins.

QUESTION: After the removal of the dam, what will be the amount of flow in the Little River above Winter Street during the different seasons of the year? Will dam removal reduce the river to a trickle or a small stream?

RESPONSE: The width and depth of the river will be significantly reduced after the dam is removed. In general, these changes will be most pronounced in the immediate vicinity of the dam and will gradually lessen further upstream or north. Minimal changes in width are expected upstream of the I-495 Bridge. Based on the results of modeling analyses for the dam removal scenario, water levels are expected to drop between 4.6 and 9.8 feet immediately upstream of the dam up to the MBTA bridge, and about 2.8 feet from the MBTA bridge up to the Utility Conduit Crossing. The change in water level will lessen from 2.7 feet to essentially no change from the utility crossing up to the I-495 bridge.

The anticipated width of the restored, free-flowing river will range from about 20 to 35 feet under low-flow conditions anticipated during the August and September (late summer) months when water levels will be at their lowest and the river at its narrowest.

Modeling of the dam removal scenario was also used to predict water levels at different stretches of the river during average (Normal Design), high (Maximum design), and low (Minimum Design) flows that are anticipated during the spring and early summer season (which coincides with the upstream migration fish passage season). The following table characterizes predicted velocities and flow depths under each of these conditions.

| Upstream Migration Flow Condition | Flow Velocities (ft/sec) | Average Flow Velocity (ft/sec) | Flow Depths (feet) | Average Flow Depth (feet) |
|--|--------------------------|--------------------------------|--------------------|---------------------------|
| Stretch of River between Little River Conduit and Winter Street | | | | |
| Minimum Design Flow (Q95%) | 0.34 – 2.57 | 1.22 | 0.42 – 1.66 | 0.95 |
| Normal Design Flow (Q50%) | 0.79 – 3.94 | 1.86 | 0.73 – 2.37 | 1.61 |
| Maximum Design Flow (Q5%) | 1.63 – 4.13 | 2.70 | 1.85 – 3.48 | 2.78 |
| Stretch of River between Winter Street and MBTA Railroad | | | | |
| Minimum Design Flow (Q95%) | 0.25 – 3.37 | 0.86 | 0.67 – 2.26 | 1.40 |
| Normal Design Flow (Q50%) | 0.46 – 3.47 | 1.25 | 1.23 – 3.49 | 2.44 |
| Maximum Design Flow (Q5%) | 0.73 – 3.92 | 1.78 | 2.58 – 5.25 | 4.06 |
| Stretch of River between MBTA Railroad and I-495 Bridges | | | | |
| Minimum Design Flow (Q95%) | 0.24 – 1.86 | 0.88 | 0.99 – 3.82 | 2.01 |
| Normal Design Flow (Q50%) | 0.56 – 2.26 | 1.29 | 1.94 – 5.11 | 3.10 |
| Maximum Design Flow (Q5%) | 1.03 – 3.06 | 1.85 | 3.37 – 7.12 | 4.82 |

Values shown in red in the above table indicate conditions that may fall outside of the range of acceptable values for fish passage for targeted species that are expected to benefit from dam removal. However, during the design process, channel design and restoration measures will be explored and analyzed which would provide added depths under these flow conditions in order to achieve appropriate water depths and velocities for fish passage -- and recreation (kayaking and canoeing). Such measures could include the creation of a low-flow channel and/or the installation of natural rock or log vanes. These techniques create variation in the river habitat that also support a variety of different fish and aquatic organisms while avoiding adverse impacts to flood levels.

Under drought or extreme low-flow conditions, there may be some locations in the river where it could be necessary to step out of your boat and float over these rock or log vanes before getting back in, but the intent is to maintain the necessary depths for these activities, and based on current information, we have every reason to expect that this can be accomplished.

QUESTION: After the removal of the dam, will there be additional river access points and public green space from land recovered by reducing the pond immediately upstream of the dam?

RESPONSE: Yes! The current concept being developed would incorporate a fishing platform and canoe/kayak launch at Cashman Park. The land area revealed when the impoundment recedes would be cleared of debris/cleaned up in partnership with various property owners and restored with native vegetation to create a natural river border. The City is exploring options for a walking path on the east side of the river, which would not infringe on residential private property, but would allow users to enjoy the river and would include a pedestrian bridge for access to Cashman Park. The concept also includes an overlook platform and pocket park at Winter Street. Tree planting along the river edge would also increase shade and cooling for the river and adjacent properties. Visual representations of this larger river restoration and public access concept are expected to be available for residents to review around mid-May.

QUESTION: Will the removal of the dam expose potentially dangerous sediments in the river?

RESPONSE: Testing of the sediments as part of this project show that there are areas of contamination where sediments will need to be dredged and transported off site for disposal at a licensed disposal facility. As mentioned above, the dam removal project allows for these contaminated sediments to be handled properly in a controlled manner, whereas failure of the dam would release these sediments downstream without any remediation.

The majority of the accumulated sediment in the impoundment does not represent a hazard to humans or the aquatic environment. With the approval of permitting agencies, the non-hazardous sediments can be allowed to redistribute naturally downstream. Modeling has shown that these sediments will pass through the downstream flood conduit without issue and ultimately out to the Merrimack River.

Additional sampling will be conducted during the next project phase to determine exactly which areas of sediment and how much sediment will need to be disposed of off-site. While this disposal is costly, grant funding is available through a variety of state programs to support this activity.

It is also expected that a variety of trash and debris will be exposed along the river when the dam is removed. The project will include removal of this debris and clean-up of the river.

QUESTION: Will the removal of the dam undermine existing infrastructure (such as bridges and utilities) in and around the dam as well as upstream?

RESPONSE: As part of the modeling of the dam removal, flow velocities and scour potential have been analyzed to assess potential risks to infrastructure, including upstream bridges and utilities. The design will include any necessary protections to ensure that these structures are not negatively impacted by the dam removal project.

QUESTION: What will be the impact of the dam removal on the existing plants and animals that inhabit the area?

RESPONSE: In general, dam removal results in a shift in plant and animal communities from lacustrine species (those that live in ponds and lakes) toward riparian species (those that thrive along rivers and their adjacent wetlands). We expect to see similar shifts here as removal of the dam restores what is currently a ½ mile long dammed reach of the Little River to a free flowing condition. Riparian habitat—that is wetland/floodplain habitat along the river—will be expanded at the river’s edge and within larger newly exposed floodplain expanses.

Dam removal will expand potential habitat for anadromous fish (those fish that need access to both freshwater and saltwater habitats at different points in their life cycle) and resident fish by reconnecting tidal reach to approximately 4 miles of upstream river corridor and additional mileage on tributary streams. City volunteers are monitoring fish at the base of the dam during the spring 2021 migration season to help inform an understanding of which fish species are able to make it through the flood conduit. These species will be the focus of fish passage considerations during channel design, and the design will be developed around the preferred habitat conditions of the species expected to be present in the Little River after dam removal.

Existing bird species are not expected to change dramatically—in fact, more birds might be attracted by the free-flowing river and improved fish habitat.

Some shift in the location and extent of wetlands and associated plants is expected as the river returns to its natural free-flowing hydrology. Detailed wetland assessments will be included in the design phase which will help to better quantify what shifts might be expected. While the exact conditions cannot be fully predicted in advance, ecologists agree that dam removals restore natural ecosystem conditions, and that these shifts in habitat and species offer a net benefit for the river system. The following additional resources from public agencies and organizations highlight some of the other habitat benefits associated with dam removals and agency guidance regarding habitat:

U.S. Fish and Wildlife Service: <https://www.fws.gov/southeast/pdf/fact-sheet/dam-removal.pdf>

Massachusetts DEP: <https://www.mass.gov/doc/dam-removal-and-the-wetlands-regulations/download>

Massachusetts Division of Ecological Restoration—Video Case Studies: <https://www.mass.gov/info-details/river-run-a-story-of-dam-removal-in-massachusetts>

The Nature Conservancy: <https://www.nature.org/en-us/what-we-do/our-priorities/tackle-climate-change/climate-change-stories/removing-barriers-river-health/>

The Solutions Journal: <https://thesolutionsjournal.com/2016/02/22/removing-dams-benefits-for-people-and-nature/>

QUESTION: How can the reconfigured impoundment area contribute to increased resilience in the Acre and downtown areas of Haverhill?

RESPONSE: In the long-term, we expect that dam removal will provide protection against flooding conditions brought on by predicted increases in heavy precipitation events. In the more immediate future, residents will benefit from increased tree cover and shade that can help provide relief from extreme temperatures brought about by climate change. Dam removal will eliminate the impounded water environment that is much more susceptible to high temperature extremes, sediment deposition, low oxygen levels and excessive aquatic plant growth, replacing it with a free flowing, more well-shaded, cooler temperature, higher oxygen level water condition. The site currently experiences stagnant water conditions and algal blooms at the impoundment during certain times of summer. This condition is expected to occur more frequently as climate change results in hotter summer conditions.

Public access and recreation improvements will also help to give residents improved access to the river to enjoy the water and cool down during hot periods.

QUESTION: What are the environmental benefits associated with removal of a barrier to fish passage along the Little River?

RESPONSE: As noted above, dam removal will expand potential habitat for anadromous fish (those fish that need access to both freshwater and saltwater habitats at different points in their life cycle) by reconnecting tidal reach to approximately 4 miles of upstream river corridor and additional mileage on tributary streams. City volunteers recently began a program of monitoring fish at the base of the dam during the spring 2021 migration season to help inform an understanding of which fish species are able to make it through the Little River flood conduit. These species will be the focus of fish passage considerations during channel design.

QUESTION: How will the removal of the dam and the restoration of the river affect abutters' real estate values and quality of life?

RESPONSE: Abutters will see changes to their back yards. Those with riverfront property will still have riverfront property, but many will gain additional dry land as well. Restoration of these areas will be included in the overall project and funded through the same grant programs, and at the same time, as the funding of the physical removal of the dam. It is expected that residents' property values will benefit from the increased public amenities and walkability afforded by the trail, overlook, fishing platform, and kayak launch that are being incorporated into the overall project concept. At the same time, we listened carefully to residents' concerns about having strangers on their property, which is why the City is pursuing the option of a trail on the east side of the river to ensure that residents' privacy is maintained. Access to the public trail and other amenities will be through Cashman Park and along Winter Street; parking improvements will be proposed at Cashman Park to accommodate any additional traffic, but the improvements are primarily intended to benefit local residents who will access them via foot.