



WSCAC Meeting

Location: MWRA Facilities
Southborough, MA
May 14, 2019 – 10:00 A.M.

Members in Bold in Attendance:

Michael Baram, WSCAC Chair, BU
Whitney Beals, NE Forestry
Terry Connolly, Town of Ware & Trout
Unlimited
William Copithorne, Town of Arlington
Andrea Donlon, CT River Conservancy
Gerald Eves, Trout Unlimited
Bill Fadden, OARS

Bill Kiley, BWSC
Paul Lauenstein, NepRWA
Jean McCluskey, ACEC/MA
Martha Morgan, Nashua River Watershed
Martin Pillsbury, MAPC
Janet Rothrock, League of Women Voters
Kurt Tramposch, Wayland Wells
Roger Wrubel, Mass Audubon

Non-Members in Attendance:

Fred Brandon, MWRA
Lexi Dewey, WSCAC staff
Steve Daunais, Tata & Howard

Andreae Downs, WAC
James Guiod, MWRA Advisory Board
Ace Peckham, WSCAC staff

WSCAC Business

Michael Baram called the meeting to order and asked for comments on the April meeting summary. No comments were offered. Roger Wrubel moved to approve. The vote was seconded, and the minutes were approved unanimously. Michael turned the meeting over to Lexi Dewey.

Lexi and Ace reminded all WSCAC members to submit their travel and any other requested reimbursements by June 11, the final meeting of the fiscal year, at the very latest. Lexi also asked if anyone was interested in a boat tour at the June meeting, which will be held at the Quabbin. After confirming that members were not interested, it was determined that there will not be a boat tour offered this year.

Lexi also announced that at the Executive Committee's meeting next week, they will be discussing writing a letter to the Water Supply Protection Trust on the MassDEP Annual Report, the DCR Draft Work Plan and Third Quarter Progress Report. She also brought the attendees' attention to a recent article on PFAS in Massachusetts. Finally, she took a moment to introduce Steven Daunais, a Senior Project Engineer with Tata & Howard. Steven has been with Tata & Howard for twelve to thirteen years. His work focuses on designs for water treatment, pump stations, and similar subjects.

The meeting presentation was on the Metropolitan Tunnel Redundancy Program, given by Fred Brandon, the Director of Design and Construction for the recently-created Tunnel Redundancy Department at the MWRA. The presentation is available [here](#).

Currently, the MWRA water supply system has redundancy implemented for all sections west of Metro Boston, with the exception of Segment 2 (Quabbin Aqueduct), which can be safely taken off-line if needed, due to the storage capacity available at Wachusett Reservoir.

The MWRA and its predecessors have built many aqueducts since the 1840s. The early grade aqueducts (built between 1840 and 1903) were non-pressurized, and had a slope of approximately 1 foot per mile. Andreae Downs asked about high points in the pipeline, and Fred confirmed that tunnels are used to get through hills and siphons are used to get through low points and valleys such as the Sudbury River in Framingham and Rosemary Brook in Wellesley.

From 1939 until 1976, pressurized tunnels began to be used, starting with the Quabbin Aqueduct, which was completed in 1939. The Hultman Aqueduct, built in 1940, was initially planned to be constructed of two barrels in order to provide redundancy, but the second barrel was never built.

The MetroWest Water Supply Tunnel was built to provide redundancy for the Hultman Aqueduct, and was completed in 2003. At that point, Hultman was taken off line and went through rehabilitation. After the repair work on the Hultman was completed in 2013, for the first time since these plans were originally formed, the Metropolitan Water System had redundancy from the Carrol Water Treatment Plant to Shaft 5.

Janet asked why the MetroWest Tunnel was built instead of just adding the second barrel to the Hultman. Fred answered that there were construction impacts that made the MetroWest tunnel a more feasible option.

Fred also explained that the Metropolitan Tunnel, which carries 60% of the water supply for the Metro Boston area, is in good shape – the tunnels and shafts require little maintenance. The valves and pipes at the surface, however, are subject to corrosion and mechanical failure. Some valves are unoperable at this time, either broken in an open or shut position, or in such condition that they cannot be closed all the way.

Kurt asked about exercising the valves, and Bill Kiley asked if exercising the valves from the very beginning of their lifespan would be helpful. Fred said that they can't open and shut the valves all the way due to corrosion. The valves simply have a set lifespan, the end of which many of them are reaching. They can't be replaced until a redundant tunnel is operational.

One of the biggest issues is that a small hole can lead to a huge spill. For example, in 2010 in the MetroWest Tunnel, a failed coupling and a small gap in a pipe (less than 1" wide) caused a 250 MGD flow at Shaft 5. During that period, the Hultman Aqueduct was offline for rehabilitation, and so the MWRA had to activate emergency supplies from Sudbury Aqueduct and Chestnut Hill Reservoir. A state of emergency and a boil water order was issued for 30 communities. The pipe was repaired and the boil water order was lifted within two days. Bill Fadden asked whether the cost to businesses was reimbursed; Fred said no, the costs were absorbed by the community.

Michael commented that many of the risks seem to be related to internal failures, and asked what external issues may contribute to water main breaks (e.g. earthquakes). Fred responded that all new improvements and tunnels

are built to the latest codes, including security, and mechanical couplings at the surface will be placed inside chambers for easier inspection. Additionally, corrosion prevention has improved significantly over the years.

The Metropolitan Tunnel is especially important because if the water supply to Boston were cut off, the economic loss alone would be devastating, with an estimated impact of \$310 million per day. There is currently no way to close and reopen valves, which means there is no way to isolate a single portion of the Metro Tunnel. The incident in 2010 (referenced earlier) made very clear the importance of redundancy, and the ability to repair sections of the tunnel.

The process of creating redundancy was reviewed carefully before the decision to build a second tunnel was approved. A surface pipe, for example, was not feasible. The recommended tunnel alternative meets service objectives and goals.

The proposed Metropolitan Tunnel Project will be made of two tunnels, each starting in Weston. One will go north, connecting at WASM 3, while the other will go south, connecting to Shaft 7C. The entire project is expected to take 17-23 years, and once completed, it will provide redundancy for the entire Metropolitan Tunnel System, with no seasonal restrictions. It provides the ability to perform necessary maintenance year-round, and avoids the need to activate emergency reservoirs or boil water orders.

The MWRA is currently updating their Hydraulic Model, adding proposed new and rehabilitated pipelines, accounting for population and employment projections, potential system expansion, droughts and local emergencies, and water age and quality (ensuring that the water isn't sitting too long in a pipe).

Fred showed a map that indicates where water is traveling in the system during a high demand day (265 mgd), and then a comparison of how the water will travel in the new redundancy pipes. Some of the pipes that will be in use are or have recently undergone some repair, e.g. WASM 3 which is currently in design for rehabilitation.

Michael asked about lessons learned from past tunnels. One major change going forward, will be the location of valves. Valves will be placed inside the shaft structure, to allow for isolating the surface pipes while keeping the tunnel in service, rather than having to shut down the entire tunnel.

Kurt asked about communities that use MWRA for supplementation or emergency use. Fred explained that the MWRA has emergency response plans for all their communities, and these are taken into account in the hydraulic analyses that estimates what's needed during a high-demand period.

Fred reviewed the costs of the construction, which allows for annual construction cost escalation. This method of calculating costs expects that the first half of construction will be less expensive than the second half, due to increased costs of materials and labor. With this taken into account, the cost of the entire project is expected to be approximately \$1,475 million.

The MWRA Advisory Board reviewed the plan and offered three key recommendations: they supported the two-tunnel alternative, they recommended the creation of a dedicated department to manage the program (which is the new Redundancy Department), and recommended the concurrent construction of both tunnels, as a time- and cost-saving effort.

The question was asked as to whether the Tunnel Boring Machines are recovered. Fred explained that in order to get the TBM out, the receiving shaft must be large enough to take the machine out, so it becomes a question of land availability.

Kurt asked where the bored-out material is taken. Fred said that it depends on the timing of the work and where there is room or need for the material. They will have an extensive geotechnical program to comply with state regulations (which require that anything that's taken off site must be tested for chemical or other contamination).

The program will have seven phases in the budget: Program-Wide Support Services (for which the MWRA has hired a consultant as of spring 2019), Preliminary Design/Phase 1 Geotech/MEPA Review (to be hired in the next year or so), Final Design(s), Construction Management, Tunnel Construction, Surface Connections Construction, and Administration, Legal and Public Outreach. Fred then went deeper into what's involved with the Program-Wide Support Services, which includes planning, risk management, quality management, design criteria and review, design and construction package planning, critical path scheduling, and budget planning and management. Finally, he showed an outline of the Program Organization, with at least two design engineers, plus a construction manager. Kathleen Murtagh, the Director of the Tunnel Redundancy Program, reports directly to Fred Laskey.

The preliminary design engineering stage, which is issuing an RFQ late this summer, includes a major geotechnical program, plus evaluating shaft sites, setting alignment for the tunnel, and completing the environmental impact and other reports. This stage is expected to take approximately three years, with the notice to proceed scheduled for 2020. There is an estimated completion date for 2023 in time for the final design to start around 2024, and the beginning of construction to occur around seven years from now. The projected seventeen year time frame includes the planning time.

During a brief question and answer session, the subject came up of a recent water main break in Stoneham, and how the MWRA repaired that issue. Fred explained that they are still investigating how the error was made, but that they were able to isolate the water main for repairs, open emergency connections for the affected communities, and fly in a repair collar from Texas, to have the issue repaired within two days.

Bill F. asked if there are any larger scale maps of the MWRA system available, and Fred said there was one available [here](#).

Fred was thanked for his presentation.

The meeting was adjourned.

**WSCAC will meet again on June 11, 2019, at the Blue Meadow Conference Center at Quabbin Reservoir.
Please [visit our website](#) for more information on this meeting.**