

RESULTS

REDUCTION IN TSS The unit installed in Somerville is designed to reduce Total Suspended Solids discharged to the Brook at the outfall by 80%, consistent with MA DEP requirements.

REDUCTION IN FECAL COLIFORM: The City initially plans to install a leaching field to further reduce E. Coli and fecal bacteria. The cost to install the leaching field exceeded project funding so the City decided to delay installation until a later date.

LESSONS LEARNED

Develop an overall project budget including the costs to design, buy and install the unit.

A Vortechs Unit does not result in a significant reduction in fecal coliform bacteria. Additional treatment methods must be applied to reduce fecal coliform bacteria.

Predictable major storm events do not occur frequently. Do not plan on testing during freezing weather and allow several months time after snowmelt to gather representative samples

Obtaining a representative sample of Total Suspended Solids can be tricky. Review your system design and inform technicians of the best place to obtain a sample from the lower portion of flow. Do duplicate sampling at that location.

Distill out the most important details of the QAPP to ensure that the technicians in the field understand the number of samples needed and the best technique for obtaining a representative sample.

Sources: Field Project Report Tufts University Class UEP 255 Spring 2000. Prepared for the City of Somerville by Kristin Gardner, Nathan Kelly and Marjorie Steele.

Alewife Mystic River Advocates Shoreline Survey 1997.
<http://nils.lib.tufts.edu/MRWA/xml=http://nils.lib.tufts.edu/cgi-bin/pd>

National Resources Defense Council. Stormwater Strategies Community Responses to Runoff Pollution. May 1999
<http://www.nrdc.org/water/pollution/storm/stoinx.asp>



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REDUCING STORMWATER POLLUTION INTO THE ALEWIFE BROOK

Somerville's Solution



Somerville storm drains

Prepared by:

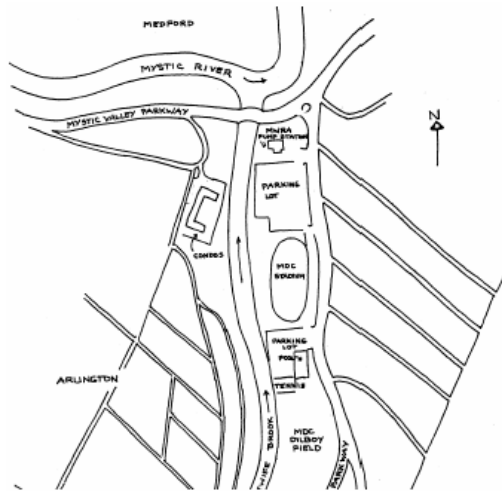
The City of Somerville
Department of Public Works
and Conservation Commission

Joseph A. Curtatone, Mayor

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HISTORY

Alewife Brook forms the western boundary of the City of Somerville. The brook flows from south to north, joining the Mystic River just north of the Mystic Valley Parkway.



Not too long ago, the Alewife Brook was a meandering stream running through rich marshlands and low-lying farms. The slow moving waterway was home to a wide variety of wildlife species from heron to shad and coyote. Development of adjacent land in the early 20th century took its toll on the natural systems in and around the brook. Waste from high polluting early industry entered into the brook via the area's first sewer systems. Marshlands were filled to allow for development. The last remaining wetlands were drained when the Alewife was rerouted into culverts in an effort to mitigate outbreaks of malaria. Storm drains and combined sewer overflows (CSO's) poured urban run-off and raw sewage into the Brook.

EXISTING CONDITIONS

In 1997 the Alewife Mystic Advocates undertook a detailed shoreline survey from its headwaters to its confluence with the Mystic River in Somerville. The survey noted that:

"Here, Alewife Brook's water is muddy, over 3 feet deep and not very clear. This is in sharp contrast to the clear water on the Mystic R. just upstream... Throughout our survey from the confluence at the Mystic to the Broadway Bridge we observed 15 pipes coming into the Brook. Seven had a flow of clear liquid. Some had a trickle and a couple

had a more steady flow; no unusual odors to note from the boat on June 10. However when we continued our survey from the land on June 21, the water coming from the Somerville pipes at Broadway and CSO 004 had a strong sewage smell. We also noted throughout our surveys several significant dumps of trash."

In response to an US EPA letter, the City Somerville tested dry weather outflows (DWOs) from those discharge pipes and found bacteria levels that exceeded Class B water quality standards for swimming and boating. In 2001, the City undertook an effort to identify and eliminate illicit connections related to the nine DWO sites. After this effort only one of these sites still consistently exceeded CWA standards during dry weather testing in 2002-2003.

Even when CSOs have been separated, and illicit connections with concurrent dry weather overflows eliminated, wet weather flows from virtually all storm drains continue to exceed MA DEP Class B bacterial standards at frequent intervals.

NEED FOR ACTION

Storm water pollution into the Alewife Brook has several adverse impacts including:

Human Illness - Stormwater carries disease-causing bacteria, viruses, and protozoa. Swimming in polluted waters can make you sick. Local communities support efforts to make the Mystic River swimmable and fishable. The 1997 shoreline survey observed residents do use the river:

"There is a tree house built in a tree on the right bank. On the left bank...a rope dangles in the water."

- **Harm to Aquatic Life** - Urban runoff can harm aquatic life in many ways. Sediment suspended in storm water increases infection and disease among fish by irritating their gills. Suspended sediment blocks sunlight that aquatic plants use to produce growth through photosynthesis.

When sediment settles, it can bury and smother bottom-dwelling insects and reduce the survival rate of fish eggs. At the same time, sediment deposition fills in the spaces between the gravel in streambeds that fish use to spawn and raise their young and in which invertebrate food sources live. Furthermore, sediment may carry excess nutrients, bacteria, toxic metals and organic chemicals to the water.

The breakdown of organic sediments can use up oxygen in the water necessary to support aquatic life.

Even in its degraded condition the Alewife Brook continues to support aquatic life. The 1997 survey noted:

"We observed Herring spawning along the right bank under the root of a weeping willow tree that made a low arch over the water. We also saw a Painted Turtle basking on a nearby rock. ... We saw a large number of Red-Winged Blackbirds and Grackles in this area of knotweed, including their young."

- **Aesthetic Losses** Runoff also carries litter and trash. Heavier materials sink and clog stream channels and can contribute to flooding. Lighter materials float until they wash into marshland and other habitat areas. Litter such as "six-pack" plastic rings can ensnare gulls.
- **Quality of Life** One advocate noted what an urban community loses when a local stream becomes polluted:

"When we go canoeing in Maine or New Hampshire the water is welcoming on a sunny day and you want to jump in... but down in Taunton it's not inviting, it's not something you want to jump into and it shouldn't be that way."

Somerville's Solution

The City implemented a structural Best Management Practice designed to reduce Total Suspended Solids by 80%. The BMP consists of a Vortech unit that captures sediments and litter in a circular baffle.

The BMP selected has the advantages of:

- **Compactness:** the unit requires much less land than a detention basin so it can readily fit in an urban setting,
- **Maintenance:** the sediments trapped are pumped out of the unit in a manner similar to deep sump storm drains;
- **Retrofit:** the unit can be installed at the end of a storm drain line.

