

# Meeting Water Supply Needs Now and into the Future

Finding more water is challenging...

While the Northeast has an abundance of water relative to many areas in the country, it has been challenging to find new permissible water supply sources.

Most of the high quality sources have been developed. The remaining sources tend to be more challenging to access and permit, and often have more challenging treatment requirements.

The City of Haverhill's current and projected water demands are placing extreme pressure on the current supplies. The 2016 drought is compounding the problem because the reservoirs are not refilling.

For these reasons, the City is looking to the last viable water source for its current and long-term needs; riverbank filtration from along the banks of the Merrimack River.



**Unique radial collector well adjacent to the Merrimack River will provide much needed redundancy to the City of Haverhill's water supply.**

The City of Haverhill's current water supply consists of surface water from Kenoza Lake, supplemented by flows which are pumped from Crystal Lake and the Millvale reservoir. The safe-yield of these sources has been estimated at 7.1 million gallons per day (MGD). Haverhill currently supplies an average of 6.0 MGD to approximately 56,000 customers, or approximately 85% of the safe-yield. There are no other viable surface water supply sources leaving the City without much needed redundancy.

To ensure that the safe yield of the supplies can be met under all expected conditions, the City is targeting the Merrimack River as a back-up water source. Understanding that a direct intake was not a viable alternative to Haverhill, the City's consultant Wright-Pierce recommended a unique radial collector groundwater well system to be constructed adjacent to the river. The radial collector well system would consist of a deep vertical caisson constructed on shore, and horizontal laterals constructed in a fan-like pattern beneath the bed of the Merrimack River. Groundwater and induced infiltration from the Merrimack River will be drawn into the laterals and pumped out of the caisson. The design takes advantage of the "natural" filtration provided by the riverbed (riverbank filtration) which will substantially enhance the quality of the water and reduce subsequent water treatment needs. This process is recognized and approved by the USEPA to meet stringent *Cryptosporidium* removal requirements. Groundwater sources provide consistent water quality benefits and are much less susceptible to contamination or other health threats.

The groundwater withdrawn from the radial collector wells will be pumped directly to Kenoza Lake to replenish the source when needed. An alternative will be to pump the water directly to the head of the City's water treatment plant, which is slated for modernization during 2016-2019.

