
SECTION 7.0

CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Based on the results of PARE's system evaluation, the Southborough water distribution system is, in general, adequately serving its current customer base. System pressure and fire flow appear to be generally adequate. Most customers experience pressure between 35 and 90 psi and have over 1,000 gpm of available fire flow. However, there are some areas of Town that experience pressure below 35-psi on a regular basis, although those areas are limited to small areas in the immediate vicinity of the system storage tanks. No customers experience pressure below 20-psi on a regular basis. System-wide fire flow ranges from 625 gpm to more than 5,000 gpm, which is generally adequate in a primarily residential system such as Southborough.

However, the results of our evaluation indicate that currently there are three primary system deficiencies, which are;

- There is currently a significant deficit in pump capacity (i.e., 0.51 MGD) in the Low Service Area;
- There is currently a deficit in system storage in both service areas. The High Service Area has a deficit of approximately 1.6 MG. The Low Service Area has a deficit of approximately 1.2 MG; and
- There are three facilities in Town that have significant fire flow demands that the current system cannot meet. Those facilities include the Trottier School, the Finn School, and the business district on Cordaville Road.

In addition, in section 3.1.4, PARE identified nine pipe segments that the Town should consider replacing or should consider installing redundant mains elsewhere in the system. While these mains are not currently adversely impacting system performance, they are either undersized or pose a risk to the system if they are taken off-line. Of those nine pipe segments, there are 5 that appear to be critical to the system. The pipe on Sears Road is the sole source of supply to a large portion of the High Service Area. The pipe on Main Street between I-495 and Sears Road is a critical path for fire flow to the same portion of the High Service Area. The pipe on Main Street



beneath I-495 is the sole source of supply to a small neighborhood west of I-495. The pipe beneath the Hosmer Pump Station access road is the sole source of supply to the entire Low Service Area.

PARE also evaluated the performance of the system after the Town reaches build-out. While the Town is already approaching full build-out under their current zoning ordinance, PARE anticipates that the Town-wide demand could increase by as much as 40 percent. This large increase in water demand is primarily due to the potential build-out of non-residential parcels, particularly along Rt. 9. Water demand among non-residential parcels is anticipated to almost double (i.e., 89 percent increase) at build-out, while residential water demand is anticipated to increase by only 26 percent. The increase in water demand is anticipated to exacerbate the existing system deficiencies. Specifically, after full town-wide build-out, there will be a substantial deficit in pump capacity in both the Low Service Area (i.e., 1.0 MGD) and the High Service Area (i.e., 0.47 MGD). In addition, after full town-wide build-out, the deficit in useable storage in the system will increase significantly, to approximately 4.0 MG over what the system has currently.

7.2 RECOMMENDATIONS

PARE has three recommendations for the Town;

1. Institute a capital improvements program to address the immediate and long-term needs of the system;
2. Perform an evaluation of the Town's flushing program to address water quality concerns in the winter (this could also include the development of a unidirectional flushing program); and
3. Evaluate whether it is more cost effective to construct a new storage facility in the vicinity of Cordaville and Mt. Vickery Roads, or if it is more cost effective to pursue localized upgrades to facilities in this area for the purpose of reducing the fire flow requirement.

An expanded explanation of each recommendation is provided below.



7.2.1 *Capital Improvement Program*

To address the existing system deficiencies, and to ensure the long-term adequacy and reliability of the distribution system, PARE recommends the Town establish a long-term capital improvements program. The program should have the dual purpose of addressing the immediate needs of the distribution system as well as addressing the system's long-term needs. The program should prioritize capital improvements based on which improvements would provide the maximum benefit for the least cost and which ones would address the most critical system deficiencies. At the top of the list of potential improvements should be the functional capital improvements outlined in section 6.1, followed by the operational capital improvements outlined in section 6.2. However, there may be some operational improvements that could be completed relatively inexpensively that may provide an immediate benefit to the Town. For example, the development of a SCADA system in conjunction with upgrading the PRVs could address, to a degree, the pump capacity deficit in the Low Service Area by allowing the High Service Area to supply the Low Service Area in times of peak demand. For that reason, upgrading the PRVs and developing a SCADA system would be high on the priority list even though both improvements are considered operational rather than functional.

Conversely, there may be some functional capital improvements that are expensive and require extensive planning, such as increasing system storage, which might be given a lower priority in the capital improvements program. The Town may find that their resources are better spent on less expensive system improvements that provide system redundancy and that can be completed in the immediate future, such as a new water main between Fisher Road and Presidential Drive. Also, the Town may opt to wait on constructing new storage facilities until they have a better sense of the disposition of system build-out over the next few years. That would provide the Town the opportunity to better assess the required volume of system storage. In that time, the Town could also assess whether or not it makes sense to combine the Low Service Area and the High Service Area, which would impact both the size and elevation of future system storage tanks.

At a minimum PARE recommends that the Town include the capital improvements listed below in their future capital improvements program. Please note that the order listed below does not necessarily reflect PARE's opinion as to the priority in which these improvements should be completed. We recommend that the Town evaluate these capital improvements, with assistance



from PARE, and determine which improvements would provide the greatest benefit to the Town in the short-term and which are more suitable as long-term improvements.

1. Install a new 12-inch water main between Presidential Drive and Fisher Road;
2. Develop a town-wide SCADA system;
3. Upgrade existing PRVs and vaults;
4. Upgrade the Boland Pump Station;
5. Upgrade system storage in the High Service Area;
6. Upgrade Hosmer Pump Station;
7. Install a new 12-inch water main along the access road to the Hosmer Pump Station;
8. Install a new 12-inch water main on Flagg Road between Lovers Lane and the Trottier School;
9. Install a new 12-inch water main on Main Street across I-495;
10. Upgrade system storage in the Low Service Area;
11. Install a new 8-inch water main on Woodland Road at I-90 Crossing;
12. Install a new 12-inch water main on Rt. 9 between Crystal Pond and Deerfoot Roads; and
13. Install parallel 8-inch and 12-inch water mains on Rt. 9 between Willow Street and Winter Street.

7.2.2 Flushing Program Evaluation

PARE recommends that the Town perform an evaluation of their flushing program in order to identify the most effective means of circulating water in the southern half of Town by the Hopkinton town-line and along the western half of Rt. 9. The evaluation should consider what time of year pipes are flushed, the direction in which pipes are flushed, and the frequency of flushing.

The Town could also use this as an opportunity to create a unidirectional flushing (UDF) program, which would optimize the flushing program town-wide, not just in areas of elevated water age. A well planned and executed UDF program can save a substantial amount of water and can significantly increase scouring velocities over a traditional flushing program. Another benefit of a UDF is that if the Town experiences a contamination event, the UDF program can be utilized to effectively isolate and contain the contaminant outbreak and efficiently remove it from the system through flushing.



7.2.3 *Cordaville Road and Mt. Vickery Road Fire Flow Evaluation*

PARE recommends that the Town conduct a cost-benefit analysis to identify the most practical means of attaining adequate fire flow in the area of Cordaville Road and Mt. Vickery Road. This analysis should consider if it is more cost effective to construct a new storage facility in the vicinity of the DPW Garage or if it is more cost effective to make localized improvements to structures in the area that could reduce the needed fire flow. PARE recommends that the Town work with the Fire Department and consult with ISO on ways to reduce the needed fire flow in this area.



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