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July 15, 2009

Mr. Robert Josey
Douglas Water Department
29 Charles Street, P.O. Box 624
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Subject: **Town of Douglas, Massachusetts**
Review of Water Resource Protection Overlay District By-law

Dear Bob:

Fay, Spofford & Thorndike (FST) has reviewed the Town's Water Resource Protection Overlay District By-law as it applies to the northeast corner of the Town near Route 146. This area currently is zoned for industrial use. The major question posed is whether the overlay district should include this industrial zoned area near Route 146. FST considered the hydrogeologic setting and its potential to support a municipal well, water quality issues, Town's projected water needs and the definitions within the current By-law.

Hydrogeology

Surficial geology data available from MassGIS indicates the presence of sand and gravel deposits in this area. The outline of the Water Resource Overlay District follows the extent of the sand and gravel. Wells drilled at the gravel pit by Route 146 and adjacent to Gilboa Pond had yields indicating that the material could supply sufficient water to support a municipal well.

Water Quality

This area has a number of potential threats to the long-term water quality of a well in this area. They include:

- The Town's wastewater treatment plant discharges to the Mumford River just upstream of this area. The river likely would be a major source of recharge to the aquifer for a well in this area.
- A former industry (Guilford Industries) has a sewage treatment plant in this area.
- Sutton has a sewage treatment plant nearby that discharges to the ground.

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- Route 146 and Lackey Dam Road represent major transportation corridors. Route 146 is heavily salted during winter storms. Road salt represents a demonstrated long-term threat to water quality. Accidents along these major transportation corridors, such as a tanker rollover similar to the one that contaminated wells in the Town of Reading, represent contamination threats.
- Current land use has potential for negative effects on water quality.
 - A gasoline station along Lackey Dam Road has documented groundwater contamination.
 - A junkyard sits just outside the Town boundary.
 - Both of these are in Uxbridge, outside the authority of the Douglas Water Resource Protection Overlay District By-law.

Any future well in this area may have a recharge area that potentially extends into Sutton and Uxbridge. This complicates the implementation of wellhead and aquifer protection as the Town of Douglas has no control of land use outside of its boundaries.

Need for Additional Drinking Water Sources

It is FST's opinion that the Town has no foreseeable need to develop a well in this area. Evaluations of projected water demand and available supply performed as part of the updated Master Plan prepared by FST for the Town indicates that the Town has sufficient water for the next 20 year planning period. Additionally, it indicates that the Town has other more attractive areas to test for increasing its water supply. There are potential well sites near the Town's current wells on land owned by the Town. A well in these areas would require minimal water main to connect with the distribution system. Additionally, the Town would have to purchase little or no land as the sites are on Town-owned land. A well near Route 146 would require a significant extension of the Town's distribution system and the purchase of land. DEP regulations require that the Town control a 400' radius around a well. A square encompassing this circle has an area of 15 acres that the Town would have to acquire.

Applicability of the Water Resource Protection Overlay District By-law to this Area

The Town of Douglas has a Water Resource Protection Overlay District in its zoning by-laws. Its purpose is "To promote and protect the health, safety and general welfare of the Community by preserving and protecting surface and groundwater resources of the Town. It is necessary to prevent contamination of these water supplies from any use of land or building which may reduce the quality and/or quantity of the water resources." The by-law applies to the Water Resource District as delineated in 1986. The following are the applicable definitions from the by-law.

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Primary Recharge Area: Those areas surrounding municipal wells including the stratified deposits in the area that are affected by a projected cone of influence that would develop by pumping the wells continuously (24 hours a day) for 180 days.

Secondary Recharge Area: Those areas of stratified drift outside, but up gradient of the projected 180 days cone of influence. The water contained therein will eventually intersect and flow into the cone of influence thereby providing secondary recharge to the well.

Tertiary Recharge Area: The areas of adjacent and up gradient glacial till which supply groundwater to the stratified drift deposits identified in the primary and secondary recharge areas.

Water Resource District: Regions that include primary recharge areas, and secondary recharge areas.

It is unclear as to why the Water Resource Protection Overlay District included the area near Route 146. Per the definitions in the By-law, the Water Resource Protection Overlay District applies to recharge areas contributory to municipal wells. The Town's zoning map indicates that the Water Resource Protection Overlay District area extends east from the West Street Wells to Route 146 in the northeast corner of Town. The part of this area east of the Town's commercial center appears to be outside of the cone of influence of the existing municipal wells and thus not contributory to these wells.

The attached Figure 1 shows the Town's existing wells and the Water Resource Protection Overlay District. It also shows the delineated DEP-approved Zone II for the wells. A Zone II aquifer protection area has been developed for the wells and approved by DEP. Per DEP regulations, a Zone II is the area of an aquifer that contributes water to a well after 180 days of pumping at the approved yield, with no recharge from precipitation. This is similar to the combined primary and secondary recharge areas.

The delineated Zone II has a defined down gradient edge. Considering the similarity between the DEP definition of a Zone II and the By-law definition of a Secondary Recharge Area, it is expected that the Secondary Recharge Area, and consequently the Water Resource Protection Overlay District, should have a similar down gradient boundary. In the area down gradient of this edge, the groundwater should flow away from the wells, and this area is not contributory to the wells and thus would be outside the Water Resource Protection Overlay District. Figure 1 displays an area that, in FST's opinion, can be removed from the Water Resource Protection Overlay District without jeopardizing the Town's current and foreseeable future water supply.

Summary

While this area towards Route 146 has the hydrogeologic potential to support a municipal well, other factors offset this advantage. They are:

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- The area has existing threats to water quality,
- The Town would have to buy land,
- The Town does not need the water for the foreseeable future, and
- The Town has other more attractive places to test for additional water supplies.

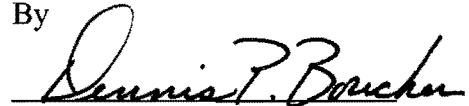
Additionally, the area appears not to meet the definition of the Water Resource Protection Overlay District.

It is FST's opinion that removing the area shown on Figure 1 from the Water Resource Protection Overlay District does not jeopardize the Town's current and foreseeable future water supply.

As always, FST appreciates the opportunity to provide these services to the Town. Please contact either Dennis (781-221-1238) or Bill (781-221-1276) if you desire additional information.

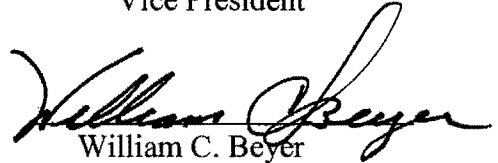
Very truly yours,
Fay, Spofford & Thorndike, LLC

By



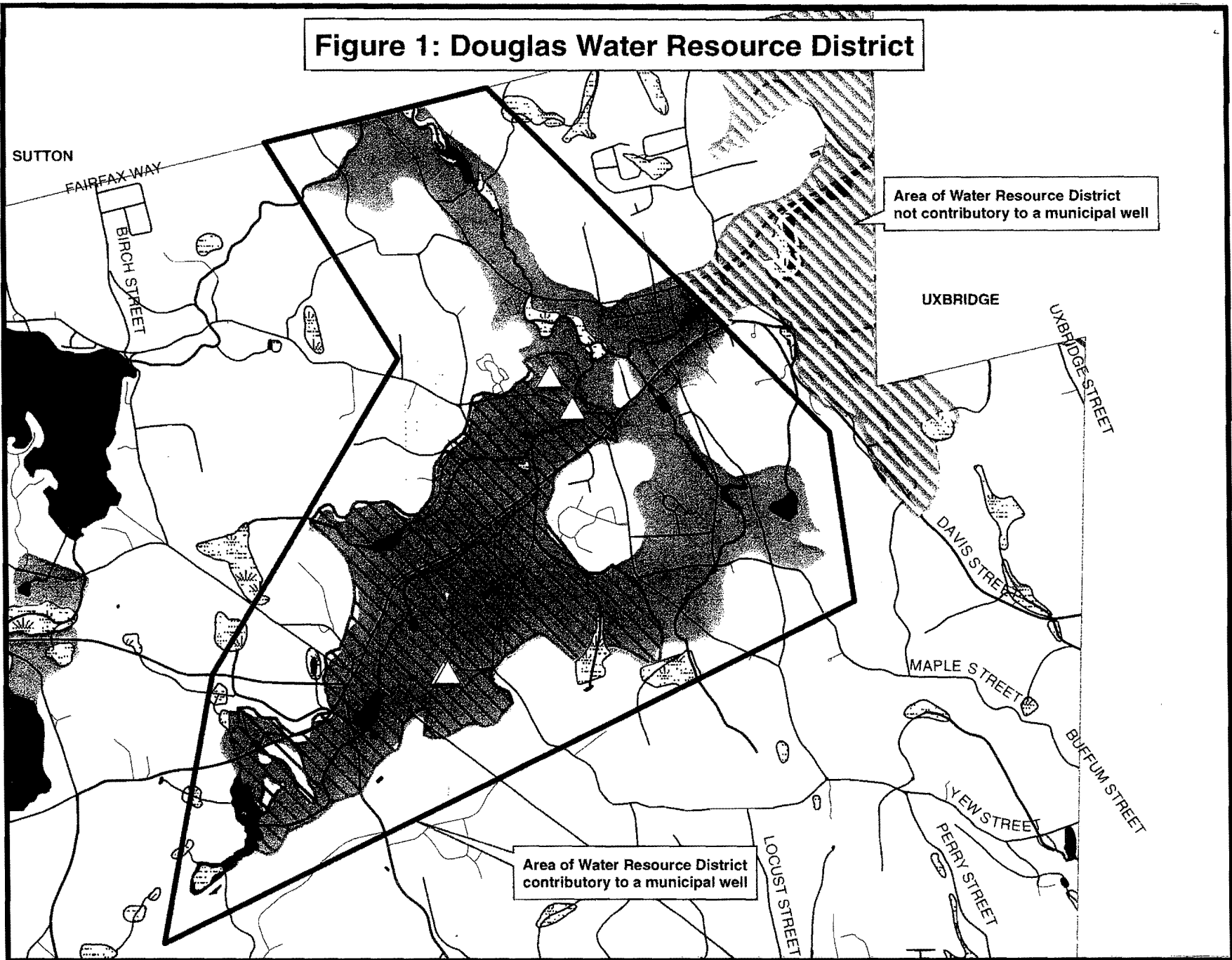
Dennis P. Boucher, P.E.

Vice President






William C. Beyer
Principal Hydrogeologist

Figure 1: Douglas Water Resource District



Legend

-  Town of Douglas municipal wells
-  Water Resource District - Secondary Recharge
-  Zone 2 wellhead protection area

