ASHBY VILLAGE PUBLIC WATER FEASIBILITY STUDY

Prepared by:

Montachusett Regional Planning Commission (MRPC)
and
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&
The Town of Ashby

INTRODUCTION ... 3
Public Outreach ... 3
Consultant Hiring Process ... 4
PROJECT AREA ... 5
WATER SUPPLY ANALYSIS ... 5
Existing Flows ... 5
Future Flows (Developable Land) ... 6
Future Flows (Growth Projections) ... 6
WATER SUPPLY ALTERNATIVES ... 10
Alternative 1 – Individual Supplies ... 10
Alternative 2a – Public Surface Water Supply Source ... 11
Alternative 2b – Public Groundwater Supply Source ... 13
Alternative 3 – Interconnections ... 14
SCREENING OF ALTERNATIVES ... 15
Individual Supplies ... 15
Public Water Supply ... 15
Interconnections ... 18
COST SUMMARY AND FUNDING OPTIONS ... 20
Individual / Small Community Wells ... 20
Public Groundwater Supply ... 20
Interconnections ... 22
Funding Options ... 22
RECOMMENDATIONS ... 25

APPENDIX A - Scope of Services

APPENDIX B – Maps

Figure 2 – Existing Public Water Supplies

Figure 3 – Potential New Well Sites

INTRODUCTION

The Town of Ashby has been working to develop more sustainable land use practices. Ashby Village Public Water Feasibility Study has been completed to support this effort. Ashby has a strong vision to maintain its rural and agricultural character by moving away from a suburban sprawl model of development to a denser village center. This will take the pressure off building in the outlying areas of Town. However, to compact development in the Town Center there must be infrastructure to handle a public water supply. According to the Town's 2004 Community Development Plan, the plan recommends to "study wastewater management options for Ashby Center that would permit more development". The Ashby Village Public Sewer Feasibility Study will meet this objective and Ashby has requested the Montachusett Regional Planning Commission's (MRPC) assistance to develop this study.

In February 2013, the Town of Ashby submitted a request for District Local Technical Assistance (DLTA) from the Montachusett Regional Planning Commission (MRPC). MRPC awarded DLTA to the Town on March 4, 2013 to undertake half of the cost of an Ashby Village Public Water Feasibility Study. The DLTA program provides technical assistance at no cost to the Town and is funded through the Massachusetts Department of Housing and Community Development (DHCD). The DLTA program was established by Chapter 205 of the Acts of 2006, which enables staff of Regional Planning Agencies (RPAs) such as MRPC to provide technical assistance to communities for "any subject within regional planning expertise".

The Ashby Village Public Water Feasibility Study funded through the DLTA program provides the Town of Ashby with guidance for well development or interconnection options with costs and funding sources for appropriate public water supply in their village center. Suitable public water supply will allow for public buildings in the Town Center to be fully utilized and will permit further business development. Even without additional development, the current water system of private wells is no longer sustainable in the village center due to its generally small sized lots. Some of the existing well systems are failing or are in danger of not meeting DEP standards. This study will present options to solve Ashby's public water supply issues.

Public Outreach

Montachusett Regional Planning Commission held an initial public kick-off meeting for the Ashby Village Public Water Feasibility Study Project on September 25th, 2013 at 7 PM at Ashby Town Hall. There were additional phone and email contact with town officials regarding this study.

Consultant Hiring Process

In order for the Montachusett Regional Planning Commission (MRPC) to complete the Ashby Village Public Water Feasibility Study, it required assistance from an engineering consultant. In August of 2013 MRPC issued a Request for Service Delivery or Request for Quotes (RFQ) for consultant services for the Ashby Village Public Water Feasibility Study. The RFQ invited consultants to submit proposals by 12:00 PM on August 30, 2013, and included information on the project background, scope of services, specifications, evaluation criteria, general conditions that needed to be met, the contract period, price proposal requirements, and other miscellaneous articles. A map of the proposed water district area, parcel tax assessor information for that same area and general GIS soil data for the Town was also attached. The RFQ was sent out by email to a list of 8 engineering firms.

RFQs were received by MRPC until 12:00 PM on Friday, August 30, 2013. One proposal was received, opened and disseminated to MRPC staff for review. The following consultant submitted the proposal:

- Weston & Sampson, 5 Centennial Drive, Peabody, MA 01960-7985

MRPC staff completed the evaluation, using pre-established criteria, on Tuesday, September 3rd, 2013. After evaluating all four consulting firms and opening their sealed bids, the hiring committee endorsed Weston & Sampson. Weston and Sampson has substantial experience with water feasibility projects plus a high degree of familiarity with the Montachusett Region especially with inter-municipal agreements relating to Fitchburg; it followed all written procedures in the RFQ, received excellent recommendations and illustrated in written form the necessary skills to best complete the tasks in the RFQ.

MRPC and the Town of Ashby hired Weston and Sampson of Peabody, Massachusetts for consulting services described in the RFQ on September of 2013. The project is funded by the MA Department of Housing and Community Development (DHCD) District Local Technical Assistance (DLTA) Program. The consultants started work on September 23, 2013 and completed work on December 31, 2013 at a fee not to exceed $9,500 with the District Local Technical Assistance (DLTA) Program responsible for $4750, and the Town responsible for the remaining portion of $4750.

PROJECT AREA

The project area and parcels to be studied for potential sewer treatment for the 2010 Sewer Feasibility Study were chosen by the Town of Ashby. This water supply analysis will focus on the same project area and parcels as the sewer feasibility study. The proposed project area contains a core and extended area. The size of the core area is approximately 11 acres. It is situated in the center of Town and its parcels have frontage on New Ipswich Road, Common Road and Main Street. The area includes one single-family home, three two-family homes, the Ashby Market & Hardware, an office building, the Ashby Free Public Library, two churches, Ashby Grange Hall and a historical building. The town commons, a cemetery and a horse and carriage shed is also included as well as three vacant undevelopable parcels owned by the Town.

The extended area expands out from the core location to the West and East along Main Street. All the parcels have frontage on Main Street except one single-family home has frontage on Allen Road. This area adds an additional 68 acres to be potentially served by a public water supply. This extended area contains 24 single-family homes, one multiple-use residential building, one three-family house, an office, the Lyman Building, the Ashby Police Department and the Ashby Elementary School plus two parcels of developable vacant land.

A map of the core and extended areas can be viewed in Figure 1.

WATER SUPPLY ANALYSIS

To determine the feasible water supply options for the project area, an estimation of existing and projected future water demands in gallons per day (gpd) is required. The following explains how these flow estimates and projections were calculated.

Existing Flows

Chapter 2 of the Massachusetts Department of Environmental Protection's "Guidelines for Public Water Systems" states that "The system, including the water source and treatment facilities, shall be designed for maximum day demand at the design year." It also states that in respect to distribution systems, "all service connections shall have a minimum residual water pressure at street level of at least 20 pounds per square inch under all design conditions of flow." Current basis for system design in Massachusetts also must take into account the provisions of the Water Management Act. As of the writing of this document, the Act regulates withdrawals in excess of 100,000 gpd. However, it notes that this threshold volume may be adjusted downward at the discretion of the DEP in the future in order to protect the waters of the Commonwealth. Therefore, utilizing the following engineering practices for planning purposes is warranted.

It is common engineering practice to use the Title V wastewater design flows as the basis for the peak water supply demand. Based on available information pertaining to the existing properties within the project area and using Title 5 regulations, the Department of Environmental Protection (DEP) State Environmental Code regulating septic systems (310 CMR 15.000), estimated flows for the existing properties have been established (see Table 1). Based on these estimates, current wastewater flows for the core area are approximately 6,344 gallons per day (gpd) and current wastewater flows for the extended area are approximately 15,959 gpd, for a total project area wastewater flow of 22,303 gpd.

Future Flows (Developable Land)

Based on available parcel information, there is no developable vacant land within the core area and only two developable parcels within the extended area (Parcel 9-5 and Parcel 9-26.1). These parcels are 1.4 acres and 1.637 acres and they are both split into two different zoning districts (Residential-Residential/Commercial and Residential-Residential/Agricultural, respectively). Since no bylaw in Ashby exists that prescribe the development of split lots, an assumption was made that the development of one single-family home per acre would be allowed. This would result in one 4-bedroom home per parcel. The future wastewater flows based on this assumption are approximately 440 gpd per parcel using Title 5 regulations for residential single-family dwellings (see Table 1).

Future Flows (Growth Projections)

In order to estimate potential future water demand to be generated by build-out of the entire project area, available growth projections were utilized. Based on the 2007 Montachusett Regional Transportation Plan, the estimated current population for the Town of Ashby is 3,075 and the projected population in 2030 is 3,490, resulting in a growth rate of 13.5% over the next 20 years. For the general purpose of this feasibility study, future water demand will be calculated based on this 13.5% growth rate.

Using the current Title V flows calculated below and the 13.5% growth rate, future water demand for the core area is approximately 7,200 gpd or 5.0 gallons per minute (gpm) and future water demand for the extended area is approximately 18,994 gpd or 13.2 gpm, for a total project area wastewater flow of 26,194 gpd or 18.2 gpm.

Figure 1 – Proposed Public Water Supply Area for the Town of Ashby

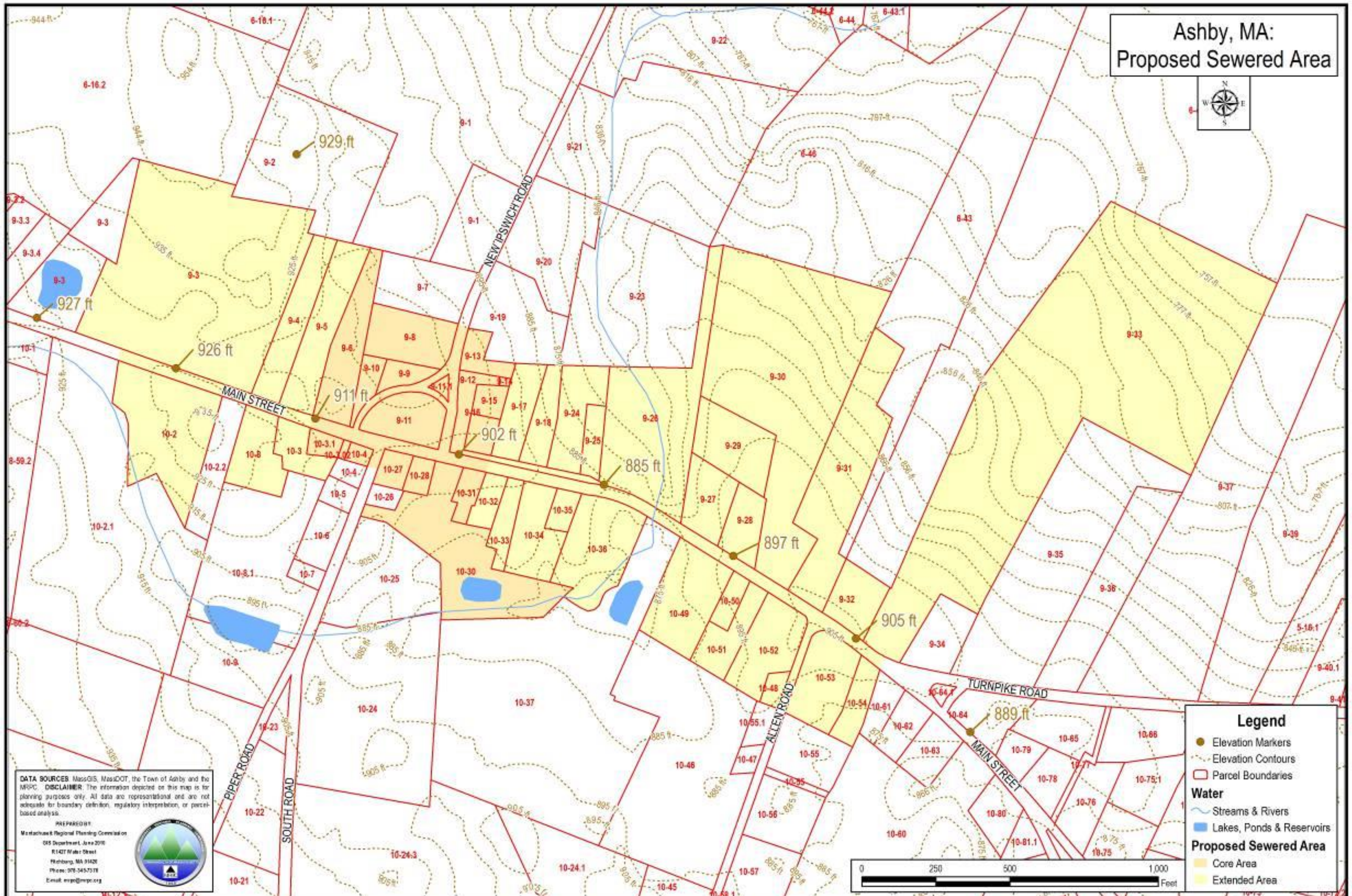


Table 1
Town of Ashby, Massachusetts
Water Feasibility Study
Estimated Wastewater Flows / Water Demand

Area	Map	Lot	Assessor Code	Property Address	Property Description	Building Size (s.f.) (if applicable)	Misc. Title V Flow Information	Title V Flow Criteria Type	Title V Flow Criteria (gal. per day)	Estimated Title V Flows (gal. per day)	Future Wastewater Flows (gal. per day)
Core	9	13	905	35 New Ipswich Road	Ashby Grange Hall	3,910		Office	75 gpd/1,000 s.f.	293	333
Core	9	9	906	20 Common Road	First Parish Church Unitarian Universalist		220 pews	Institutional	3 gpd/seat	660	749
Core	9	15	906	21 New Ipswich Road	Ashby Congregational Church		220 pews	Institutional	3 gpd/seat	660	749
Core	9	6	340	10 Common Road	General Office Building	6,493		Office	75 gpd/1,000 s.f.	487	553
Core	9	10	903	Common Road	Town Horse and Carriage Shed					0	0
Core	9	11	903	Main Street	Town Common					0	0
Core	9	11.1	903	Main Street	Vacant (Undevelopable)					0	0
Core	9	12	903	Main Street	Vacant (Undevelopable)					0	0
Core	10	3.1	903	846 Main Street	Historical Building - Old Engine House	2,756		Office	75 gpd/1,000 s.f.	207	235
Core	10	3.2	903	Main Street	Historical Building - Old Engine House					0	0
Core	10	30	903	812 Main Street	Library	9,910		Office	75 gpd/1,000 s.f.	743	844
Core	9	8	903	3 New Ipswich Road	Cemetery					0	0
Core	9	14	903	New Ipswich Road	Vacant (Undevelopable)					0	0
Core	10	27	101	830 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Core	10	4	325	840 Main Street	Ashby Market & Hardware	4,270		Retail	50 gpd/1,000 s.f.	214	242
Core	9	16	104	801 Main Street	Two-Family House			Residential	110 gpd/bedroom	880	999
Core	10	28	104	818 Main Street	Two-Family House			Residential	110 gpd/bedroom	880	999
Core	10	31	104	804 Main Street	Two-Family House			Residential	110 gpd/bedroom	880	999
									Core Area Subtotal (gpd)	6,344	7,200

Table 1 (continued)

Area	Map	Lot	Assessor Code	Property Address	Property Description	Size (s.f.) (if applicable)	Title V Flow Information	Criteria Type	Criteria (gal. per day)	Title V Flows (gal. per day)	Wastewater Flows (gal. per day)
Extended	9	26.1	131	Main Street	Developable Land		1.637 Acre parcel			0	440
Extended	9	4	340	873 Main Street	Office Building	3,012		Office	75 gpd/1,000 s.f.	226	256
Extended	10	53	13	662 Main Street	Multi-use Residental Use	2,838		Office	75 gpd/1,000 s.f.	213	242
Extended	9	3	903	911 Main Street	Lyman Building (Town Offices)	10,004		Office	75 gpd/1,000 s.f.	750	852
					Police Department	1,776		Office	75 gpd/1,000 s.f.	200	227
					Ashby Elementary School	27,220	269 student/faculty w/caf & gym	Elementary School	10 gpd/person	2,690	3,053
Extended	10	48	101	27 Allen Road	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	17	101	791 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	18	101	783 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	24	101	773 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	25	101	763 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	26	101	751 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	27	101	719 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	28	101	703 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	30	101	699 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	31	101	679 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	32	101	665 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	2	101	896 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	3	101	860 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	8	101	876 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	32	101	796 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	33	101	790 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	34	101	782 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	35	101	772 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	36	101	762 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	49	101	708 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	50	101	704 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	51	101	692 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	52	101	676 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	10	54	101	650 Main Street	Single Family House			Residential	110 gpd/bedroom	440	499
Extended	9	33	105	649 Main Street	Three-Family House			Residential	110 gpd/bedroom	1,320	1,498
Extended	9	29	132	Main Street	Undevelopable Land					0	0
								Extended Area Subtotal (gpd)		15,959	18,554
Notes/Assumptions:								Core & Extended Area Total (gpd)		22,303	25,754
1. Assume that all single-family homes are 4-bedrooms									Total (gpm)	15.5	17.9
2. Assume that all multi-family homes are multiples of 4-bedroom homes											
3. Future wastewater flows for developable land parcels are based on one 4-bedroom home per acre of parcel size											

WATER SUPPLY ALTERNATIVES

This section identifies potential long-term water management alternatives for the properties within both the core and extended portions of the project area. The alternatives investigated were:

- Alternative 1 – Individual Supplies
- Alternative 2 – Public Water Supply (Surface Water or Groundwater)
- Alternative 3 – Interconnection to Nearby Communities

This section includes a preliminary screening of the identified alternatives as well as a screening of potential water infrastructure needed for those sources of supply.

Alternative 1 – Individual Supplies

Currently, the entire project area is served primarily by individual drinking water supply wells. In addition, two low capacity public water supply systems are currently permitted as public water supplies by the Massachusetts Department of Environmental Protection (DEP). These public water supplies are listed in Table 2 below and are shown on Figure 2 located in Appendix B. Using the Interim Wellhead Protection Area Radius, the permitted rate of each of the withdrawals was determined and is listed in Table 2. In addition, at least one other public well, the Ashby Library Well, which has not been permitted through the DEP, is located in the study area and is included in Table 2 although little is known about its existing withdrawal rate (as it was not tested).

Table 2: Public Water Supplies in Study Area

SOURCE ID	SITE NAME	PWS TYPE	WITHDRAWAL RATE (GPM)
2012002-01G	Ashby Elementary School	Non-Transient Non-community	6.9
2012012-01G	Ashby Legion/Grange/Church	Transient Non-community	0.7
	Ashby Library, 104 Main St.	Transient Non-community	

In addition, the project team has identified two private wells located within the study area, the Ashby Market Well and the DLR Realty Trust Well, which may contribute to public water supply alternatives. The existing withdrawal rate of the Ashby Market is unclear at this time, although the withdrawal rate of the DLR Realty Trust Well, as determined from its Permit Approval letter, is 1.2 gpm.

Comparing the permitted rates of withdrawal to the water demand indicates that none of the existing public water supplies are capable of providing the current and future water demand for the extended area. While the current permitted withdrawal rate of the School Well, 6.9 gpm, would be sufficient to supply the 5.0 gpm future demand of the core area, permitting requirements would limit the water available to be transported from the School Well to the core area to no more than 0.6 gpm (this breakdown is discussed in more detail below in the Existing Wells Section). Therefore, a review of existing individual supplies in the project area indicates that no single existing source is currently permitted to supply sufficient water for the projected future water demand of either the core or extended project areas. However, this fact does not necessarily mean that the wells in Table 2 are not capable of producing the required 18.2 gpm, simply that the wells are supplying the demand that the owner requires. However, a review of land area surrounding each of the three public water supplies and the two private supplies reveals that none have sufficient land area or acceptable land uses to significantly increase their Zone I sanitary protective area as required by the DEP when seeking increased withdrawal rates.

In addition, although an individual source of supply is the cheapest alternative, it does not provide for fire flow, typically has water quality concerns (metals), and does not provide for redundancy in the event of a well failure.

Alternative 2a – Public Surface Water Supply Source

Many of the surrounding communities have long established surface water reservoirs serving the community, and in fact, Fitchburg operates the Fitchburg Reservoir located in the southwest corner of Ashby. In order to identify a feasible candidate for a water supply reservoir, an understanding of a potential site's contributing drainage basin area, storage capacity of the reservoir, precipitation and evapotranspiration rates, and streamflow contributions must be known. Often times, impoundments (dams) will be required to be constructed to achieve the desired storage capacity.

Drinking water regulations have been established to protect the health of customers consuming the public water supply. Surface water supplies generally have to meet more regulations and follow more guidelines than groundwater sources. The following list summarizes the major drinking water rules and the major components included in each rule.

<u>Surface Water Treatment Rule (SWTR) and Interim Enhanced Surface Water Treatment Rule (IESWTR)</u>

- Applies to public water systems supplied by surface water or groundwater under the direct influence (GWUDI) of surface water.
- IESWTR is an amendment to the SWTR that applies to systems that serve at least 10,000 people.
- WTP must achieve a 99 percent (2-log) removal of Cryptosporidium, 99.9 percent (3-log) removal of Giardia cysts and 99.99 percent (4-log) removal of viruses.
- Disinfectant residuals entering the distribution system have to be monitored continuously and cannot be less than 0.2 mg/L for more than 4 hours.
- Combined filter effluent turbidity must be measured at least once every four hours, and turbidity levels must be less than or equal to 0.3 NTU for at least 95 percent of the measurements per month with no turbidity samples exceeding 1 NTU at any time.
- Established disinfection contact time (CT) requirements based on water temperature, pH, and inactivation requirements for various disinfectants including ozone, chlorine, chlorine dioxide, and chloramines.
- Requires that disinfection profiling be conducted by any system whose one year running annual average of TTHMs or HAA5 levels are greater than or equal to 80 percent of the MCLs. The 80 percent thresholds for TTHMs and HAA5 are 64 µg/L and 48 µg/L, respectively.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

- Applies to public water systems supplied by surface water or groundwater under the direct influence (GWUDI) of surface water.
- Rule provided additional public health protection from Cryptosporidium requiring systems to monitor their source water to determine potential additional treatment requirements for Cryptosporidium.
- Systems serving greater than 10,000 people must conduct two years of sampling for Cryptosporidium, turbidity, and E. Coli. Sampling is used to classify water system into one of four different treatment categories called bins. Additional treatment may be required based on which bin a system is assigned.

Stage 1 Disinfection Byproduct Rule (Stage 1 DBPR)

- Applies to all public water systems.
- Set the MCL for TTHM at 80 µg/L and for HAA5 at 60 µg/L based on the running annual average (RAA) of quarterly samples.
- At least 25 percent of samples must be taken at locations with a maximum residence time within the distribution system; the remaining 75 percent of samples are collected at locations with an average residence time.
- Established requirements for Total Organic Carbon (TOC) removal from surface water and GWUDI systems using conventional treatment based on the RAA monthly raw water alkalinity and percent removals.

Stage 2 Disinfection Byproduct Rule (Stage 2 DBPR)

- Applies to all public water systems, but the number of required sampling locations is greater for surface water or GWUDI public water supplies.
- Requires water systems to meet “locational” running annual averages (LRAA) of 80 µg/L for TTHM and 60 µg/L for HAA5.
- Requires water system suppliers to conduct Initial Distribution System Evaluations (IDSE) to select new Stage 2 DBPR compliance monitoring locations that more accurately represent peak disinfection byproducts in the distribution system.

Total Coliform Rule (TCR)

- Applies to all public water systems.
- Established MCLs for the presence of total coliforms in drinking water. Systems must not find coliforms in more than five percent of the samples collected each month.
- The number of monthly samples collected are based on the population served.
- Each total coliform positive routine sample must be tested for the presence of fecal coliforms or E. coli.
- If any routine sample is total coliform positive, at least three repeat samples must be collected and analyzed for total coliforms. Repeat samples follow the same requirements of the initial routine samples.

The requirements of the rules and regulations were considered when evaluating the Town's future water supply alternatives as some regulations may make certain alternatives more difficult to implement. As a result of the aforementioned water quality regulations, this alternative requires extensive capital costs associated with water quality treatment in addition to the long term operation and maintenance costs once in operation. Additionally, the DEP has not issued a new permit for a surface water supply source in approximately 30 years, therefore this option was not considered further as an alternative for this project.

Alternative 2b – Public Groundwater Supply Source

The most common method of providing a municipal drinking water supply in New England is by locating a groundwater supply. This source water provides many benefits with respect to water quality, cost of treatment, and availability. Considering the subject area, two sources are available, including an overburden (sand and gravel) aquifer deposit and a fractured bedrock aquifer. These two will be treated separately in the following discussion.

Surficial Deposits: A municipal well has to be located in permeable material with adequate saturated thickness and sufficient long-term recharge. Sand and gravel deposits hydraulically coupled to surface water bodies are the first choice for municipal aquifers in the Northeast. With such aquifers, recharge is furnished not only by precipitation on the sand and gravel itself, but also by induced infiltration from an adjacent pond, lake, stream, or river.

Bedrock: Municipal wells in crystalline bedrock of the region must be located where the bedrock is sufficiently fractured to be permeable, and where there is a good source of recharge to such fractures. While the fractured bedrock is the permeable medium in which a well can be located, it is the overlying glacial sediments that provide the ground water storage, which sustains the yield of the well. Direct hydraulic coupling with surface water bodies is not desired in the case of fractured bedrock wells, but indirect coupling through glacial deposits is beneficial.

Given these fundamental hydrogeologic requirements, the general technical approach used by Weston & Sampson typically includes the following steps:

1. Interpretation of aerial photographs and topographic maps to delineate:
   a) Permeable glacial deposits
   b) Pre-glacial bedrock channels potentially filled by sand and gravel
   c) Bedrock fracture zones (Fracture Trace Analysis)
   d) Hydraulic coupling among glacial deposits, bedrock fractures, and surface water
   e) Primary and secondary recharge areas
   f) Wetlands and floodplains where well construction is restricted

2. On-site inspection and mapping to determine:
   a) Validity of remote sensing interpretations
   b) Detailed hydrogeologic information to improve well site selection
   c) Potential for groundwater contamination within area of contribution
   d) Interpretation of water quality data incorporation of natural groundwater quality considerations (radon, iron, manganese, etc.) into water supply development strategies
   e) Physical access to potential well sites for test drilling
   f) Availability of electric power (3-phase is preferred for pump motors)
   g) Likely availability of land for purchase at reasonable cost

h) Engineering practicality

3. Geophysical investigations for identification of:
   a) Saturated thickness and general texture of glacial deposits
   b) Depth to bedrock
   c) Depth to the water table
   d) Bedrock fracture locations
   e) Specific test well locations

The first step in the typical sequence of events is to identify one or more potential well site(s) that warrant further examination. These must not only be hydrogeologically favorable, but also suitable within all the practical constraints while including an awareness of nearby contaminant threats and potential water quality issues. Engineering and Town input is needed to properly recognize and evaluate the practical constraints.

Step two is to complete geophysical investigations if they are needed to pinpoint test well locations. For sand and gravel formations, various geophysical techniques can be used to determine depth to bedrock, saturated thickness, and general texture of the underlying materials. Drilling where the depth to bedrock is too shallow is not cost effective. Often times, geophysical investigations can reveal shallow bedrock conditions at less cost than installing a test well. In the case of bedrock formations, geophysics is used to improve our interpretations of aerial photographs and topographic maps.

Fracture-trace analysis is a photogrammetric technique for mapping fractures in bedrock. The technique uses stereoscopic aerial photographs that enable mapping of fractures that lie buried by overburden sediments. Weston & Sampson commonly uses fracture-trace analysis to locate high-yielding fracture zones in bedrock for development of municipal or industrial water wells.

Alternative 3 – Interconnections

Securing a sustainable, reliable, interconnection with one or more of the surrounding towns is another option for the town of Ashby. This option will save the town money on the costs of water supply investigation, permitting, and the capital costs associated with water treatment, and infrastructure improvements. In addition, long term operation and maintenance costs are also reduced. Potential water suppliers will be discussed in the next section; however this alternative is considered to be a) a substantial capital cost to construct the distribution line b) would leave the town beholden to another community for their water supply and c) may involve permitting associated with an interbasin transfer of water.

SCREENING OF ALTERNATIVES

This section provides a screening of the water supply alternatives discussed above and analyzes their potential effectiveness in addressing the problems within the project area.

Individual Supplies

This alternative relies on the continued use of individual supplies and small public water supply systems to provide the demand needed to supply the water needs of the town. If the project area were to be built out, additional supplies would be required to be developed and permitted (depending on the use). The individual supply alternative does not encourage growth within the region as it does not support municipal buildings or commercial business. This alternative also does not support the supply of fire flows. Also, and perhaps most importantly, maintaining individual supplies would require costly water quality treatment of existing wells with documented water quality issues for them to continue being used for public consumption. While the Ashby Market well is no longer used in that manner, the Grange Well is and would require treatment. While costly, this alternative was used as a “baseline” to evaluate the long-term capital and operation/maintenance costs of other alternatives.

Public Water Supply

Public water supplies provide a benefit to the community from a water quality perspective, a growth perspective, and a safety perspective. Typically a public water supply will provide a higher level of treatment than a standard homeowner well.

Sand & Gravel Wells

As mentioned previously, sand and gravel deposits are the first choice for municipal aquifers in the Northeast. A cursory review of the project area was conducted in an effort to understand whether a Public Water Supply is feasible within the study area under consideration. Unfortunately, the latest surficial geology mapping by the USGS suggests that no sand and gravel deposits are located within the project area. However, there are two sand and gravel deposits located approximately 3,000 feet to the south and 5,000 feet to the east. Of the two deposits, the eastern one is perhaps more promising from a hydrogeologic perspective as a large portion of the deposit is mapped to a depth of 50-100 feet. In fact, the eastern deposit is currently tapped by four Transient Non-Community wells. In contrast, the southern deposit is smaller in area, mapped to a depth of 0-50 feet, and currently tapped by a single Transient Non-Community well. In addition to considering the subsurface material, based on a demand of approximately 18.2 gpm, a Zone I protective radius was calculated to be 313 feet for a total land area of approximately 7.1 acres. Using existing information available from the Massachusetts Office of Geographic Information (MassGIS), parcels that met the following criteria were selected:

- > 7.1 acres (for Zone I protective radius)
- Overlying mapped sand and gravel deposits

Within the two mapped sand and gravel deposits, the town of Ashby owns four parcels, only two of which exceed 7.1 acres, 0 Turnpike Road and 1140 Greenville Rd. Unfortunately, given the shape of the Turnpike Road parcel, it does not contain any potential well sites that are at least

313 feet from any non-town controlled lot, as required for Zone I protection. While the 1140 Greenville Rd. site is of satisfactory size and shape, there are several factors that make it relatively unsuitable for source development, including its location at the extreme edge of the mapped sand and gravel deposits, its distance from the project area (>9,000 feet by road), and its use as the town landfill. While neither town-owned parcel appears suitable for source development, there are several privately-owned parcels that are of sufficient size and shape to satisfy wellhead protection regulations, approximately 11 parcels in the eastern deposit and 6 parcels in the southern deposit. However, given the relatively high cost of land acquisition in relation to bedrock well development, the sand and gravel well alternative was not evaluated further.

Bedrock Wells

Given the lack of sand and gravel deposits within the project area and the lack of town-owned parcels overlaying nearby deposits, the use of bedrock wells appears to be a more viable option. In examining the potential for using bedrock wells to satisfy the projected 18.2 gpm future demand of the study area, three scenarios were considered – increasing the capacity of an existing bedrock well, combining withdrawals from several existing wells, or locating new bedrock well sources.

Existing Wells

As discussed in the previous section, the project team has identified five wells that may be relevant to public water supply alternatives. Those wells include the School Well, Library Well, Grange Well, and two private wells, the Ashby Market and DLR Realty Trust Well.

The Ashby School Well is currently permitted to withdraw up to 10,000 gallons per day, or an average of 6.9 gpm. Based on the well's Permit Approval letter, it has the potential to physically withdraw greater than 50 gpm. Unfortunately, based on correspondence with the DEP, the current Zone I extends right up to the school building if not further. That Zone I cannot be increased sufficiently to support additional withdrawals without relocating the building and parking areas. Further, the well was permitted to supply the Elementary School, Police Department, and town offices. If water is diverted to additional parcels, such as those in the core area, the well will have to be re-permitted and the location of the school building and parking lots will result in a significant reduction in the permittable withdrawal rate due to the required Zone I sanitary protective radius requirements.

The current withdrawal rate of the Ashby Library Well is unknown as it is neither permitted through the DEP nor is that information on file with the Board of Health. Based on a Well Completion Report on file with the Board of Health, the well appears to have a maximum theoretical yield of 11.5 gpm. In practice, its maximum withdrawal rate would likely be somewhat less than 10 gpm. A review of the surrounding land area indicates that withdrawal rates greater than 1.0 gpm would entail a Zone I sanitary protection area that would require the purchase of several neighboring properties.

The Ashby Grange Well is currently permitted to withdraw 0.7 gpm. A review of the surrounding land area indicates little to no room to expand the Zone I. In addition, the well has well documented water quality issues that have resulted in an Administrative Consent Order (ACO) from the DEP, regarding high levels of iron and manganese.

The Ashby Market Well is relatively similar to the Grange Well. While the current withdrawal is unknown, the well is highly unlikely to be included as a future public water supply given its ongoing issues with high levels of iron and manganese. In addition, the site lacks sufficient land area to support the Zone I required for withdrawals greater than 0.3 gpm.

The DLR Realty Trust Well is located on the privately owned lot, 873 Main St., immediately east of the Ashby Elementary School. While the well is currently permitted to withdraw only 1.2 gpm, information contained with the Permit Approval Letter suggests that it could physically support a withdrawal rate as high as 16 gpm. Unfortunately, the parcel is relatively long and narrow, and could only support the Zone I required for withdrawals up to 2.8 gpm if it was owned by the town.

Increase Capacity of an Existing Well

Based on a review of all available information, none of the five wells examined in this study could be relied upon to serve as a sole public water supply for either the core area or the extended area, satisfying demands of up to 5.0 and 18.2 gpm, respectively. While the School Well and perhaps the DLR Realty Trust Well or Library Well could physically support such withdrawal rates, their locations and the ownership and usage of surrounding land area would not support the DEP-required Zone I sanitary protection radius requirements.

Combine Several Existing Wells

The total of the maximum permittable withdrawal rates of the five wells is approximately 11.7 gpm, significantly less than the required demand of 18.2 gpm for the entire project area. As a result, no combination of existing wells could be relied upon as a public water supply for the extended area. If the five identified wells were harnessed together to supply just the core area, the total permittable withdrawal rate would not exceed 5.4 gpm, and could potentially be less depending on how the School Well would be re-permitted. Considering the limited capacity of the five wells compared to the 5.0 gpm projected future demand of the core area, and the costly treatment required by two of the five wells, this alternative of combining existing wells is not favorable.

Locate a New Bedrock Well Sources

As no single existing well or combination of existing wells could satisfy future water supply demands, the final bedrock well alternative would be to locate and install a new bedrock well source. The project team first focused on identifying town-owned parcels that could satisfy the Zone I protection requirements, namely a protective radius of 313 feet as required to support a withdrawal of 26,200 gpd or 18.2 gpm. A total of 14 town-owned parcels were identified within or near the project area, of which four parcels have potential bedrock well sites that could satisfy the Zone I protection requirements. Those four parcels are summarized in Table 3 and presented in Figure 3 located with Appendix B.

Table 3: Favorable Town-owned Parcels for Bedrock Water Supply

MAP	LOT	ADDRESS	BOOK / PAGE	AREA (AC)
6	16	1093 MAIN ST	8408 / 269	34.4
6	46	3rd P, 0 MAIN ST (1)	49832 / 096	13.0

10	37	0 ALLEN RD	Unavailable	11.8
10	24-3	0 SOUTH ROAD	31616 / 586	12.5

(1) It should be noted that the 0 Allen Rd. parcel is the town cemetery, which would not meet DEP requirements for land uses within a Zone I.

Often consideration must be given to any planned wastewater discharge facilities in the vicinity of a proposed groundwater withdrawal to avoid impacts. Typically, a 200 day travel time is considered sufficient distance to filter the groundwater prior to withdrawal for public water supply. Using some basic assumptions about the aquifer properties in the area, a 200 day travel time would translate into a distance of approximately 13 feet. The relatively short distance is a function of the glacial till material underlying the project area, suggesting that the location of any wastewater discharge facilities will not have a significant bearing on the siting of a potential bedrock well. In contrast, the Zone I protection requirements will play a much greater role in identifying a suitable location for supply development.

Recommendation

Based on a review of existing bedrock wells in the study area, it is clear that no existing well or combination of existing wells could likely be relied upon to serve as a public water supply for either the core or extended project areas. However, there are four town-owned parcels that could potentially support a new bedrock well that may serve that purpose. Given the available information of the four sites, including parcel size and shape, ownership, location relative to the study area, topography, and the known quantity and quality of other bedrock sources, the project team recommends the 1093 Main St. site above the others.

The 1093 Main St. parcel is located behind and adjacent to the Ashby Elementary School. The School Well, which has undergone a pumping test, could physically support withdrawals greater than 50 gpm. While the School well is limited by Zone I requirements, there are areas in the southeastern corner of the 1093 Main St. parcel, generally 100-200 feet north and/or west of the School Well that could satisfy those permitting requirements. Given its close proximity to the School Well, it is likely that the area could support a bedrock well with a yield in excess of the estimated 5.0 or 18.2 gpm future demand of the core and extended areas, respectively. In addition, the site is located upgradient of much of the project area, simplifying construction and decreasing the cost of a public water distribution system.

The cost of a new well and distribution system is discussed in following sections, including a breakout of costs with and without treatment for iron and manganese, as well as with and without fire protection, for both the core and extended areas.

Interconnections

Our research has determined that of the surrounding communities, Lunenburg, Townsend, and Greenville, NH currently have public groundwater supplies and Ashburnham, Westminster, and Fitchburg currently have a public surface water supply source and distribution system. These communities could be approached to determine a) if they have surplus water to sell and b) negotiate a cost for the water. According to the 2012 Massachusetts Water Rate Survey and the 2012 New Hampshire Water Rate Survey, the aforementioned towns have the following retail rates.

Table 4: Local Retail Water Rates

TOWN	SOURCE TYPE	RETAIL WATER RATE ($/1000 GALS)
Ashburnham, MA	Surface Water	$4.68 (1)
Westminster, MA	Surface Water(2)	$8.57
Fitchburg, MA	Surface Water	$4.22
Lunenburg, MA	Groundwater	$5.61 (3)
Townsend, MA	Groundwater	$4.01 (4)
Greenville, NH	Groundwater	$6.50

(1) Based on quarterly usage of >4,500 ft^3; usage <500 ft^3 billed at $46.80/1000 gallons.
(2) Purchased from Fitchburg.
(3) Based on quarterly usage of >2,000 ft^3; usage <600 ft^3 billed at $13.37/1000 gallons.
(4) Rate determined from Townsend Water Dept. website.

Of the six neighboring communities, Fitchburg or Townsend would appear to be the most promising partner for an interconnection agreement. Greenville is located across the state border in New Hampshire; any interconnection would require permitting hurdles not required for interconnections with the other communities. Westminster is served through a wholesale agreement with Fitchburg and would likely be unable to enter into a similar agreement with Ashby. Ashburnham and Lunenburg are also relatively unpromising as the nearest point in their respective water systems is located relatively far from the Ashby project area, requiring the installation of prohibitively long and expensive water mains.

Townsend is a potential partner, although an interconnection with Townsend would still require the installation of roughly 14,100 feet of 8” transmission main along Wheeler Road in Townsend and Turnpike Road in Ashby. The transmission main would include two relatively costly stream crossings, one over Trapfall Brook and one over a smaller tributary. Similarly, while the Fitchburg water system extends to the Ashby town line, approximately 15,800 feet of 8” transmission main would be required along Rt. 31. As with Townsend, there appear to be two stream crossings, one over Willard Brook and one over a smaller tributary. Interconnections with either partner would also require approximately 2,200 feet or 3,000 feet of 8” distribution main within the core or extended areas, respectively. In addition to requiring the shortest transmission mains of any potential interconnection partners, Fitchburg and Townsend also have two of the three lowest wholesale rates of the neighboring six communities. In contrast to Townsend, Fitchburg has already entered into water wholesale agreements with other communities and has recently reiterated their openness to additional partners. Ultimately, the most cost-effective choice for an interconnection partner may be a function of the negotiated wholesale rate and/or political considerations.

The cost of such an interconnection and a water distribution system within the study area is discussed in the following sections based on the assumption that Fitchburg was selected as a partner.

COST SUMMARY AND FUNDING OPTIONS

This section of the report includes planning level costs for each of the investigated alternatives:

- Individual/Small Community Wells
- Public Groundwater Supply
- Interconnections

Individual / Small Community Wells

Considering that the individual and small community wells are already in place and operating, there is no additional capital cost for developing these sources within the core area. However, if the core area is to be supplied by existing sources, costly water quality treatment systems would be required for the Grange Well. This system would cost roughly $350,000 including rebuilding the well pump, piloting and permitting a treatment system, constructing a building to house the treatment system, installing the treatment system, installing an 800-gallon backwash tank as well as a 6,000-gallon residual tank. Annual Operation & Maintenance (O&M) for the Grange Well would be expected to be on the order of $24,000, including the trucking of backwash residual to a disposal facility and weekly oversight of the treatment system from a 2-T operator. In addition, the existing residential wells would require roughly $10,000 in annual maintenance costs, giving the alternative a total annual O&M cost of roughly $34,000.

If the extended area were to be supplied on a parcel by parcel basis as it is currently, future sources would be necessary to supply undeveloped areas and to allow for potential growth. It is estimated, based upon the available developable land, that an additional two 4-bedroom residential homes and some moderate increase in commercial water would be required at full town buildout. Assuming the average cost of a newly installed residential well, pump, and water softener is approximately $15,000, the projected additional cost for two individual wells is $30,000, resulting in a total capital cost for the core and extended areas of roughly $380,000. Annual O&M of the individual wells located in the extended area would be expected to add on the order of $30,000 distributed among all well owners, bringing total O&M costs to roughly $64,000 for the core and extended areas together.

While the bulk of the capital costs and, to a lesser degree, O&M costs associated with this alternative are related to treating the Grange Well water, it may be that some of those costs could be shared among several nearby private property owners that are also facing water quality issues.

As discussed earlier in this report, this alternative was used as a “baseline” to evaluate the long-term capital and operations/maintenance costs of other alternatives.

Public Groundwater Supply

Sand and Gravel Wells

Considering the lack of available sand and gravel deposits within the project area, Weston & Sampson does not recommend pursuing investigation of a sand and gravel aquifer groundwater supply. While there are two sand and gravel aquifers located 5,000 to 10,000 feet from the site, there are no suitable town-owned parcels in those areas. The high cost of land acquisition and transmission from those areas to the study area strongly recommends against such an alternative.

Bedrock Wells

While none of the existing bedrock wells located within or near the study area are capable of supporting a public water system in either the core or extended areas, there are several town-owned parcels in the area that could house a new bedrock well. The southeast corner of the parcel at 1093 Main is particularly promising for several reasons relative to well capacity, permitting requirements, water distribution, and cost-effectiveness. A new groundwater supply will require a hydrogeologic investigation to locate a specific suitable location, followed by testing of yield and quality to determine if the source is a) sufficient to supply the demand and b) able to provide high quality water. Once a source is identified that meets the aforementioned criteria, the source must then be permitted through the DEP. Since the proposed withdrawal is less than 100,000 gpd, the permitting is fairly limited and would not require Massachusetts Environmental Policy Act (MEPA) permitting.

The costs of a public groundwater supply can vary depending on whether treatment for iron and manganese is required and whether the system is designed to support fire protection. For that reason, this alternative has been divided into four sub-alternatives. Each of the four alternatives, 2A-2D, are very similar in nature and in cost for providing service to the core or extended areas. The only significant difference would be the length of the distribution system – 4,000 feet for the extended area and 2,500 feet for the core area.

Alternative 2A, which does not include treatment or fire protection, is estimated to cost approximately $410,000 and $500,000 for the core and the extended areas respectively. That sum includes well exploration and pump installation costs, permitting costs, a pre-fabricated building, a 50,000-gallon ground tank and booster pumps, and installation of a 3-inch PVC distribution system, 4,000 (extended) or 2,500 (core) feet in length.

Alternative 2B, which does include treatment for iron and manganese but no fire protection, is estimated to cost approximately $710,000 and $800,000 for the core and the extended areas respectively. That sum includes well exploration and pump installation costs, permitting costs, a pre-fabricated building, a 50,000-gallon ground tank and booster pumps, installation of a 3-inch PVC distribution system, 4,000 (extended) or 2,500 (core) feet in length, and a piloted greensand plus treatment system with lagoons.

Alternative 2C, which does supports fire protection but does not account for treatment, is estimated to cost approximately $1,070,000 and $1,340,000 for the core and the extended areas respectively. That sum includes well exploration and pump installation costs, permitting costs, a pre-fabricated building, a 50,000-gallon ground tank and booster pumps, installation of an 8-inch distribution system, 4,000 (extended) or 2,500 (core) feet in length, and a steel tank for fire flows.

Alternative 2D, which includes both treatment and support for fire protection, is estimated to cost approximately $1,370,000 and $1,640,000 for the core and the extended areas respectively. That sum includes well exploration and pump installation costs, permitting costs, a pre-fabricated building, a 50,000-gallon ground tank and booster pumps, installation of an 8-inch

PVC distribution system, 4,000 (extended) or 2,500 (core) feet in length, a steel tank for fire flows, and a piloted greensand plus treatment system with lagoons.

Interconnections

As mentioned previously, once an agreement can be made with a local municipality with surplus water, the capital costs associated with an interconnection largely reside in the engineering and construction of water main, in addition to a pump station.

Table 5 below, provides an overall cost summary of the three alternatives discussed herein.

Table 5
Overall Cost Summary of the Alternative

PROJECT AREA	OPTION	CONSTRUCTION	ANNUAL O&M
Core	1 - Individual Wells (1)	$350,000	$34,000
Extended	1 - Individual Wells (1)	$380,000	$64,000
Core	2A - Public Water Supply (2)	$410,000	$16,000
Extended	2A - Public Water Supply (2)	$500,000	$20,000
Core	2B - Public Water Supply w/Treatment (3)	$710,000	$28,000
Extended	2B - Public Water Supply w/Treatment (3)	$800,000	$32,000
Core	2C - Public Water Supply w/Fire (4)	$1,070,000	$43,000
Extended	2C - Public Water Supply w/Fire (4)	$1,340,000	$54,000
Core	2D - Public Water Supply w/Treatment & Fire (5)	$1,370,000	$55,000
Extended	2D - Public Water Supply w/Treatment & Fire (5)	$1,640,000	$66,000
Core	3 - Interconnection (6)	$3,200,000	$68,000
Extended	3 - Interconnection (6)	$3,350,000	$71,000

(1) Includes treatment of Grange Well. Annual O&M costs include removal and disposal of backwash residual and operator oversight for the Grange Well as well as residential well maintenance costs.
(2) Includes design, permitting, and construction of a well and water distribution system (including 3-inch PVC mains, 50,000 gallon ground tank, booster pumps, and a pre-fab building).
(3) Includes design, permitting, and construction of a well, water distribution system (including 3-inch PVC mains, 50,000 gallon ground tank, booster pumps, and a pre-fab building), and a treatment system (including pilot program, treatment system, and lagoons).
(4) Includes design, permitting, and construction of a well and water distribution system capable of supporting fire protection (including 8-inch mains with hydrants, 50,000 gallon ground tank, booster pumps, a pre-fab building, and a 300 gallon steel tank for fire flows).
(5) Includes design, permitting, and construction of a well, water distribution system capable of supporting fire protection (including 8-inch mains with hydrants, 50,000 gallon ground tank, booster pumps, a pre-fab building, and a 300 gallon steel tank for fire flows), and a treatment system (including pilot program, treatment system, and lagoons).
(6) Includes design and construction of a water distribution system capable of supporting fire protection (including 8-inch mains with hydrants) and pumping station.

Funding Options

Rural Development
The 1972 Rural Development Act established the Rural Development Insurance Fund under the Department of Agriculture to provide loans for wastewater and drinking water infrastructure.

Today, Rural Development's Water and Environmental Programs (WEP) provides loans, grants and loan guarantees for drinking water, sanitary sewer, solid waste and storm drainage facility improvements in rural areas and cities and towns with populations of 10,000 or less. Public entities, non-profit organizations, and recognized Indian tribes may qualify for assistance. Rural Development has a number of funding and loan programs under its WEP umbrella. These include: (1) Direct Water and Waste Disposal Loan Program; (2) Water and Waste Disposal Grant program; and (3) Guaranteed Water and Waste Disposal Loan program.

U.S. Department of Housing and Urban Development
In 1974, the Department of Housing and Urban Development initiated the Community Development Block Grant (CDBG) Program. There are two available funding programs: (1) Community Development Block Grant - Entitlement Communities Grants; and (2) State Administered CDBGs which enable local and state governments to target their own economic development priorities. The rehabilitation of affordable housing has been the largest single use of these grants, with the CDBG program as an important catalyst for job growth and business opportunities for lower income families and neighborhoods. The programs identify a wide range of eligible activities, including the construction of public facilities and improvements, such as water and sewer infrastructure. It is estimated that roughly 10-20 of such block grants are utilized to support water and wastewater infrastructure.

Clean Water State Revolving Fund Program
The Clean Water Act Amendments of 1987 authorized the Clean Water State Revolving Fund (CWSRF) Program, an innovative method of financing for a range of water quality/wastewater environmental projects. Under the program, the EPA provides grants or "seed money" to all 50 states plus Puerto Rico to capitalize state loan funds. The states, in turn, use these funds in addition to a 20% match provided by the states to make low interest rate loans to communities for high priority water quality projects. As money is paid back into the revolving fund, new loans are made to other recipients enabling them to maintain the long-term integrity of their wastewater treatment and collection infrastructure.

Drinking Water State Revolving Fund Program
On a similar path, the Safe Drinking Water Act (SDWA) Amendments of 1996 authorized the Drinking Water State Revolving Fund (DWSRF) Program. Like the CWSRF program, the DWSRF allows states to make low interest loans with capitalization grant dollars and state match funds to public water systems for drinking water related infrastructure projects. By funding these infrastructure projects, the DWSRF program supports the goals of the SDWA by assisting public water systems achieve and maintain compliance with drinking water standards. This, in turn, helps to ensure a safe drinking water supply for the protection of public health nationwide.

MassWorks
The MassWorks Infrastructure Program provides a one-stop shop for municipalities and other eligible public entities seeking public infrastructure funding to support economic development and job creation The MassWorks Infrastructure Program provides for municipalities and other eligible public entities seeking public infrastructure funding to support:

- Economic development and job creation and retention
- Housing development at density of at least 4 units to the acre (both market and affordable units)
- Transportation improvements to enhancing safety in small, rural communities

The MassWorks Infrastructure Program is administered by the Executive Office of Housing and Economic Development, in cooperation with the Department of Transportation and Executive Office for Administration & Finance.

RECOMMENDATIONS

The purpose of this planning level study was to determine the feasibility of various water supply options and to assess each option from a cost perspective. If the Town is interested in building out the central area of the town, the recommended alternative to water supply within the study area is a public groundwater supply. As shown herein, this alternative is a more cost effective approach for the Town and it provides added measure of safety (fire flow) and health (water quality). Several assumptions have been made as part of this initial feasibility study in developing each of the alternatives and in preparing a cursory cost estimate of each one. Those assumptions are described above in the detailed discussion of each alternative and its cost. If and when an alternative is selected for further study, those assumptions should be confirmed with field investigations or more detailed analyses.

APPENDIX A

Attachment A
Scope of Services

Ashby Town Village Infrastructure Feasibility Study

1) Determine the potential yield of existing Wells
2) Locate other possible sites for the water infrastructure
3) Prepare analysis of affected parcels
4) Complete Project Benefits and Detriments Analysis for both Water and Sewer Infrastructure
5) Provide Cost Analysis and Estimated for Water Infrastructure
6) Investigate Funding scenarios for the Town for both Water and Sewer Infrastructure
7) Report should also include project narrative of work performed, water system map, possible well locations, soft and hard project costs and likely timeline.
8) Work will include two (2) public meetings and correspondence with the Town of Ashby.
9) Provide a draft report and address minor comments after Town's review of draft report.
10) Present data for final report to the Town with MRPC at a public meeting.

Final Report to be completed by December 13, 2013.

APPENDIX B

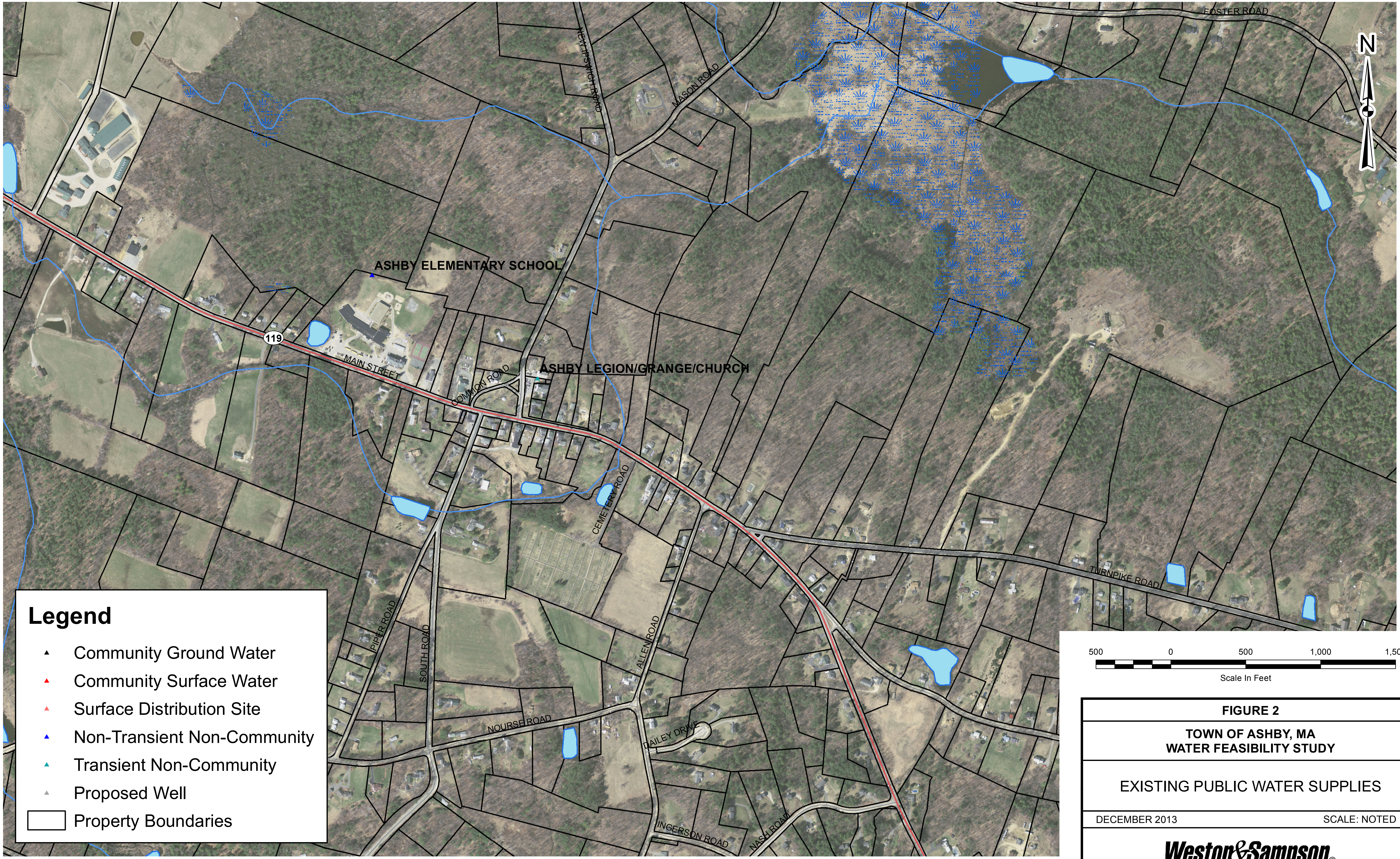


FIGURE 2

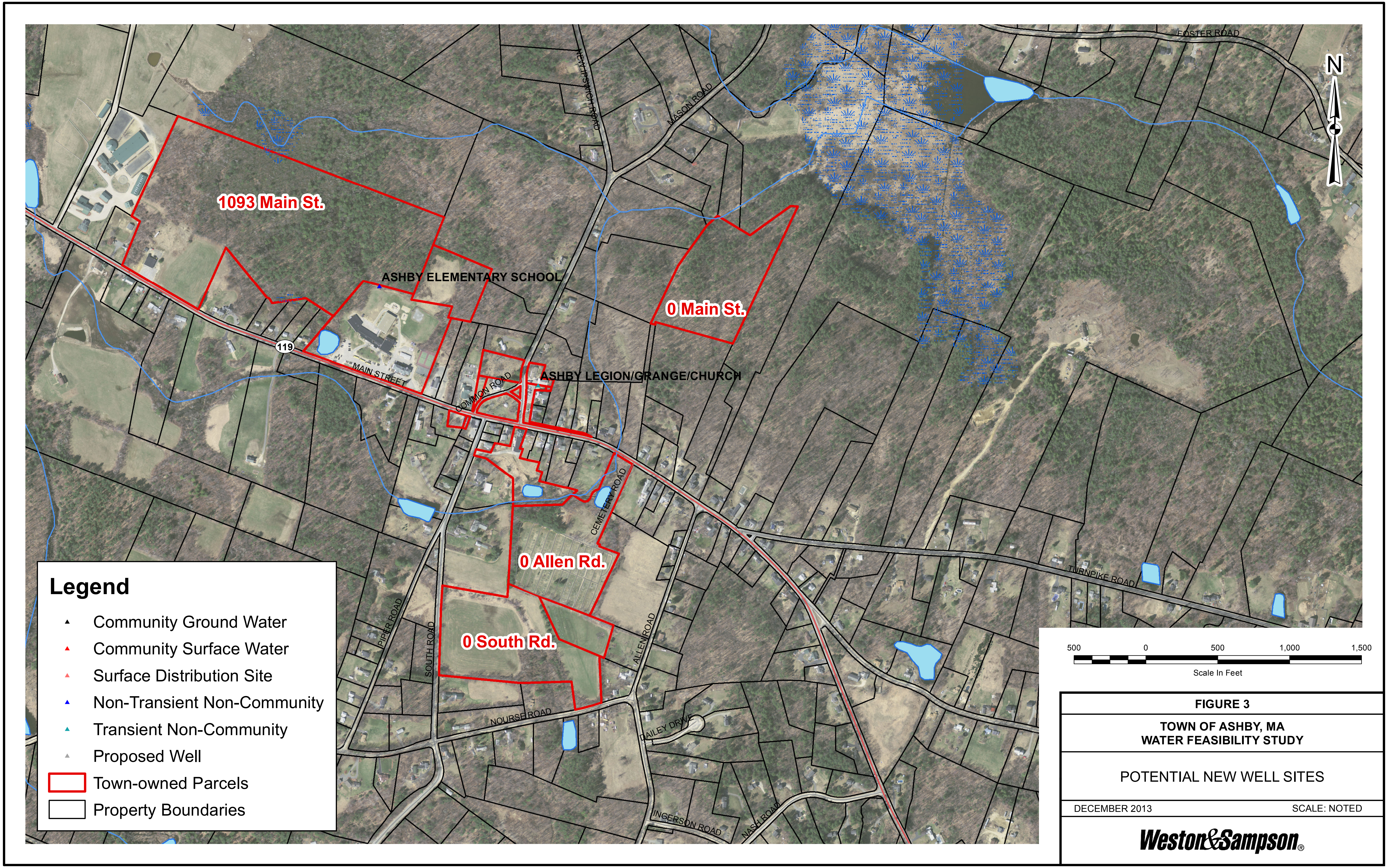
TOWN OF ASHBY, MA
WATER FEASIBILITY STUDY

EXISTING PUBLIC WATER SUPPLIES

DECEMBER 2013 SCALE: NOTED

Weston&Sampson

Path: O:\Ashby\Water Feasibility Study (MRPC)\GIS\Mapfiles\Figure 2 - Existing Public Water Supplies.mxd **User:** walkera **Saved:** 1/9/2014 10:30:47 AM **Opened:** 1/9/2014 10:31:13 AM



Path: O:\Ashby\Water Feasibility Study (MRPC)\GIS\Mapfiles\Figure 3 - Potential New Well Sites.mxd User: walkera Saved: 1/9/2014 10:19:41 AM Opened: 1/9/2014 10:21:09 AM