concerns with turnover rates in each of the tanks. It is recommended to mix within the tanks to help improve the turnover rates and prevent water quality issues.

In order to maintain a comprehensive database of the condition of the system, it is recommended that the Town maintain a water main failure database. This data should be used to update the hydraulic model to create an updated Water Main Failure Map for identifying problem areas in the future. The map can be used to identify break locations and determine if any streets or areas have a higher frequency of failures, and to view any patterns in the location and type of failure. The water main failure database will aid the Town in making future water main replacement decisions.

In addition, it is recommended that the Town create a database of new or replacement water mains. The database should include water main diameter, material, lining, joint type, soil conditions, date of installation, and as-built schematic drawings. This data can be added to the existing database created for this study to maintain a comprehensive water main database.

It is recommended that prior to installation of all new ductile iron water mains, the Town test the soils in the area of the new main to determine if it has high corrosion potential. If the soil is found to be potentially corrosive, the Town should consider wrapping the main with polyethylene to protect it against external corrosion. Wrapping is a relatively inexpensive practice that can extend the life of new ductile iron pipe. In addition, wrapping helps to protect the pipe from stray currents that may develop near the main.

Whenever improvements or expansions of a water distribution system occur, factors such as size and location of the main should be considered in order to provide adequate flows and pressures. Any new main constructed is recommended to be a minimum of 8-inch diameter. Wherever possible, dead end mains should be eliminated by looping or interconnecting. Parallel water mains should be interconnected at reasonable intervals. In addition, “bottlenecks” such as a smaller water main being the sole means of transporting water between larger mains should be eliminated.

The Town should continue implement a regularly scheduled maintenance program which includes hydrant flushing and routine inspection and maintenance at the pump stations. The general maintenance program should include monitoring of the specific capacity of the sources so that the cleaning and redevelopment, when required, can be scheduled during low demand periods. The Town should continue to perform a leak detection survey annually, as well as, continue the Town’s master meter calibrations.

A comprehensive directional flushing program was completed by Tata & Howard in 2010. This should be conducted annually to prevent precipitated iron, manganese and other solids from accumulating in the water mains, particularly in the “dead end” mains. Periods of high demands, such as during a fire, will re-suspend these deposits and carry them to the customer’s tap. The results are likely to be a series of complaints due to colored and turbid water and stained laundry.

The Town should also conduct an annual water distribution system replacement program. Valves and hydrants which are identified during the yearly system-wide flushing program would be designated for repair or replacement. By eliminating components that are defective, proper system operation will be facilitated. In addition, by replacing hydrants that are old or broken, fire protection capabilities in the system will be improved.

The Town should continue to pursue an interconnection agreement with the Whitinsville Water Company. Some infrastructure is reportedly in place, and the interconnection would be a valuable asset in the event of an emergency. The Town should conduct a hydraulic evaluation to determine the hydraulic considerations and to verify any additional required infrastructure. The Town should also verify the interconnection agreement date for the Grafton interconnection and renew the agreement as necessary.

7.3 Prioritization of Improvements

Based on the Three Circles Approach, a prioritized list of improvements was created. Improvements were separated into three phases. The Phase I and Phase II Improvements are prioritized based on hydraulic needs, criticality and the condition of the water main. In general, the Phase I Improvements include water mains that fall into all three of the circles. Phase II Improvements include water mains that fall into two of the three circles. These improvements strengthen the transmission grid, eliminate potential asset management concerns and provide redundancy. Phase III Improvements generally include areas that fall into one circle. These improvements include areas with high asset management ratings. Phase III Improvements should be completed as funds become available and considered when reviewing road paving schedules. The hydraulically deficient areas, critical component considerations and asset management ratings are combined on one Three Circles Integration Map included in Appendix G.

It should be noted that due to the nature of this Master Plan and Capital Efficiency Plan™, the list of improvements is extensive. This results in a high associated cost if all of the suggested improvements were constructed. The intent of the prioritization, therefore, is to serve as a guide for implementation from the most needed to the least needed improvements based on the weighted criteria. These improvements would most logically be constructed over an extended period of time.

Table No. 7-1, at the end of this section, includes a prioritized list of Phase I Improvements and the hydraulic, critical component and asset management status of each improvement. Table No. 7-2 includes the linear footage and estimated cost of each Phase I Improvement. Table No. 7-3 includes a prioritized list of Phase II Improvements and Table No. 7-4 includes the linear footage and estimated cost of each Phase II Improvement. Table No. 7-5 includes a prioritized list of Phase III Improvements and the linear footage and estimated cost of each improvement. River and railroad crossings were budgeted into the estimated costs shown in Tables 7-1 through 7-4. The recommended improvements maps are included in Appendix H. It should be noted that paving schedules or highway department improvements were not evaluated as part of this

study. The Town may reprioritize the recommendations if paving or road work is scheduled on any of the roads recommended for water main improvements.

Phase I Improvements

1a. The Massachusetts Department of Environmental Protection (MassDEP) guidelines recommend that a system have adequate supply to meet the MDD. Recently, the yield of the Glen Avenue Wellfield has declined to approximately 0.08 mgd during the summer months, therefore, the total available withdrawal rate from the two sources is 0.510 mgd which is not adequate to meet the current MDD of 0.66 mgd. Replacement wells at the Glen Avenue Wellfield are recommended to regain the permitted capacity of the source. Once the rehabilitation of the Glen Avenue Wellfield is complete, the total available withdrawal rate is predicted to be 0.749 mgd, which is adequate to meet the current MDD of 0.66 mgd. The estimated probable construction cost is $286,000.

The Town has initiated the first phase of the recommendation, which is conductance of a test well investigation program to evaluate the feasibility of replacement wells and preliminary permitting with the MassDEP. The initial phase is not included in the above mentioned estimated cost. The estimated probable construction cost includes installation of the three gravel packed wells with submersible well pumps and pitless adapters, conductance of a 48 hour pump test, permitting with the MassDEP, Army Corps of Engineers, the Natural Heritage Endangered Species Program and the Upton Conservation Commission, construction of new mains from the replacement wells to the existing pump station, and an allowance for engineering and contingencies.

1b. In addition to the rehabilitation of the Glen Avenue Wellfield, an additional source is recommended to mitigate the projected supply deficit. MassDEP guidelines also recommend that a system have adequate supply to meet the projected SADD with the largest source offline. With the largest source offline, the West River Street Well, the system supply would be 0.317 mgd which is not adequate to meet the current SADD of 0.39 mgd. It is recommended to proceed with the development of the Richard Property Wellfield in order to meet the current SADD of 0.39 mgd. The Richard Property Wellfield will be considered the system's largest supply with an estimated safe yield of 0.5 mgd, and the rehabilitated Glen Avenue Wellfield and West River Street Well will supply 0.749 mgd. This is adequate for the 2031 projected SADD of 0.70 mgd. After the Richard Property Wellfield is in operation and the Glen Avenue Wellfield is rehabilitated, the estimated available withdrawal rate will be 1.249 mgd which is adequate for the 2031 projected MDD of 1.22 mgd. The estimated probable construction cost is $3,500,000. The project includes the construction of a pump facility with chemical feed systems, installation of the wellfield, electrical service and approximately 5,000 linear feet of 12-inch diameter water main on West River Street from the extremity of the existing system at River Bend Estates to the entrance to the wellfield and approximately 2,500 linear feet of 8-inch diameter water main from the wellfield to West River Street. The estimated

probable construction cost assumes that treatment for the removal of iron is not required. However, if the iron levels exceed the Secondary Maximum Contaminant Levels, MassDEP will require treatment.

Phase II Improvements

2a. The existing 10-inch diameter cross country water main between Glen Avenue and Farm Street should be replaced with a new 12-inch diameter water main. The existing 6-inch main on Farm Street between the cross country main and Main Street should be replaced with a new 8-inch diameter water main. The existing 12-inch main on Glen Avenue between the Pump Station and the cross country main should be replaced with a new 12-inch diameter water main. The existing cross country water main is a critical water main and has an asset management rating of 50. The main is considered critical because of its vicinity to the Glen Avenue Wellfield and crosses the West River. The high asset management rating can be attributed to the water main installation year, material and soil conditions. This main is located in a Priority Habitat of Endangered Species and Estimated Habitat of Rare Species. For ease of permitting, we suggest pipe bursting the cross country main. This would require pulling the replacement main through the existing main causing it to break. The remains of the existing main stay in the location in which it breaks, limiting the disturbance within the wetlands. The estimated probable construction cost for approximately 1,150 linear feet of 12-inch ductile iron water main is $437,000. The 6-inch diameter main on Farm Street has an asset management of 52. The high asset management rating can be attributed to the water main diameter, material, soil conditions and proximity to a critical user. The estimated probable construction cost of approximately 800 linear feet of 8-inch diameter ductile iron water main is $130,000. The 12-inch diameter main on Glen Avenue has an asset management rating of 48 and is considered fair to poor. The high asset management rating is due to the water main material, static pressure and poor soil conditions. The estimated probable construction cost for approximately 850 linear feet of 12-inch diameter ductile iron water main is $160,000, resulting in a total of approximately $727,000.

2b. The construction of a new 12-inch diameter water main on Harford Avenue South from Glen Avenue to Farm Street as well as an new 8-inch diameter main on Farm Street from Hartford Avenue South to the cross country main, will improve the system by increasing the asset management score associated with the critical main and improves the hydraulics in the system by decreasing the number of dead ends. The estimated probable construction cost for approximately 1,450 linear feet of 12-inch ductile iron water main, crossing both a river and a railroad, and 300 linear feet of 8-inch ductile iron water main is $384,000.

3. The existing 8-inch diameter water main on Mendon Street from Main Street to the existing ductile iron water main should be replaced with 12-inch diameter ductile iron water main. The water main has an asset management score of 48. The high asset management ratings are due to the water main material, installation year and water quality issues. An improvement in this main is recommended due to its proximity to the existing West River Street Well and proposed Richard Property Well. The new

water main would also improve the hydraulics in the system, increasing the flow from the well sites to the distribution system. The estimated probable construction cost for approximately 2,050 linear feet of 12-inch diameter ductile iron water main is $462,000.

4. A new 12-inch diameter ductile iron water main is recommended on Hartford Avenue North from Main Street to Warren Street. All mains on the road have high asset management scores ranging from 46 to 62. The high asset management rating is due to the water main diameter, material and history of breaks. A section of the water main is also considered critical due to its proximity to a medical facility. It is also considered critical because there would be a demand shortfall of approximately four percent in the event of a break. The probability of a break at this location is high due to the history of breaks along this main. The estimated probable construction cost for approximately 3,050 linear feet of 12-inch diameter ductile iron water main is $687,000. The Town is planning on conducting roadwork along Hartford Avenue North within the next five years. It is recommended to replace this main in conjunction with the paving project in an effort to reduce pavement costs.

5. The existing 8-inch diameter asbestos cement main on Plain Street located at the railroad crossing has an asset management rating of 48 and is considered fair to poor. The high asset management rating is due to the water main material and water quality. This water main is also considered critical because it is at a railroad crossing. The estimated probable construction cost for approximately 1,700 linear feet of 8-inch diameter ductile iron water main is $302,000.

6. A new 8-inch diameter ductile iron water main is recommended to replace the existing 6-inch diameter asbestos cement main on Station Street. This water main has an asset management rating of 52 due to its material and diameter and is considered fair to poor. This water main is also considered critical because it is at a river crossing. The estimated probable construction cost for approximately 1,100 linear feet of 8-inch diameter ductile iron water main is $204,000.

7. The existing 6-inch diameter asbestos cement main on Depot Street has an asset management rating of 48 and is considered fair to poor. The high asset management rating is due to the water main material and diameter. This water main is also considered critical due to its proximity to the railroad company's property. The estimated probable construction cost for approximately 3,200 linear feet of 8-inch diameter ductile iron water main is $520,000.

Phase III Improvements

8. A new 8-inch ductile iron water main on Old Grafton Road and Fowler Street is recommended to connect the existing water mains. This connection would decrease the number of dead ends in the system which will help strengthen the available flow, improve system pressures, and reduce water quality issues. This water main is not considered critical. The estimated probable construction cost for approximately 1,050 linear feet of an 8-inch diameter ductile iron water main is $171,000.

9. There are numerous water mains that are considered to be in fair to poor condition based on an asset management rating greater than 42. These water mains should be replaced based on available funding. The linear footage and estimated cost of these improvements are presented in Table No. 7-6.

Table No. 7-1
Prioritization of Improvements-Phase I Water Distribution System

Item No.	Location	From	To	Hydraulically Deficient?	Critical Area?	Asset Management Rating
1a	Glen Avenue Pump Station	N/A	N/A	N/A	N/A	N/A
1b	Richard Property Wellfield	N/A	N/A	N/A	N/A	N/A

Table No. 7-2
Estimated Improvement Costs-Phase I Water Distribution System

Item No.	Location	From	To	Water Main Diameter (in)	Length (LF)	Estimated Cost
1a	Glen Avenue Wellfield	N/A	N/A	N /A	N/A	$ 286,000
1b	Richard Property Wellfield	N/A	N/A	N/A	N/A	$ 3,500,000
					Total Estimated Phase I Cost:	**$ 3,786,000**

Table No. 7-3
Prioritization of Improvements-Phase II Water Distribution System

Item No.	Location	From	To	Hydraulically Deficient?	Critical Area?	Asset Management Rating
2a	Cross Country Main	Glen Avenue	Farm Street	No	Yes	50
	Farm Street	Cast Iron Main	Main Street	No	Yes	52
	Glen Avenue	Pump Station	Cross Country Main	No	Yes	48
2b	Hartford Avenue South	Gen Avenue	Farm Street	Yes	Yes	N/A
	Farm Street	Hartford Avenue South	Cross Country Main	No	No	52
3	Mendon Street	Main Street	End of AC Main	Yes	No	48
4	Hartford Avenue North	Main Street	Warren Street	No	Yes	46-62
5	Plain Street	Junction after railroad crossing	Bouthiette Lane	No	Yes	48
6	Station Street	Grove Street	End of Main	No	Yes	52
7	Depot Street	Main Street	DI Main	No	Yes	48

Table No. 7-4
Estimated Improvement Costs-Phase II Water Distribution System

Item No.	Location	From	To	Water Main Diameter (in)	Length (LF)	Estimated Cost
2a	Cross Country Main	Glen Avenue	Farm Street	12	1,150	$437,000
	Farm Street	Cast Iron Main	Main Street	8	800	$130,000
	Glen Avenue	Pump Station	Cross Country Main	12	850	$160,000
2b	Hartford Avenue South	Glen Avenue	Farm Street	12	1,450	$297,000
	Farm Street	Hartford Avenue South	Cross Country Main	8	300	$87,000
3	Mendon Street	Main Street	End of AC Main	12	2,050	$ 462,000
4	Hartford Avenue North	Main Street	Warren Street	12	3,050	$ 687,000
5	Plain Street	Junction after railroad crossing	Bouthiette Lane	8	1700	$ 302,000
6	Station Street	Grove Street	End of Main	8	1100	$ 204,000
7	Depot Street	Main Street	Railroad Avenue	8	3200	$ 520,000
					Total Estimated Phase II Cost:	**$ 3,199,000**

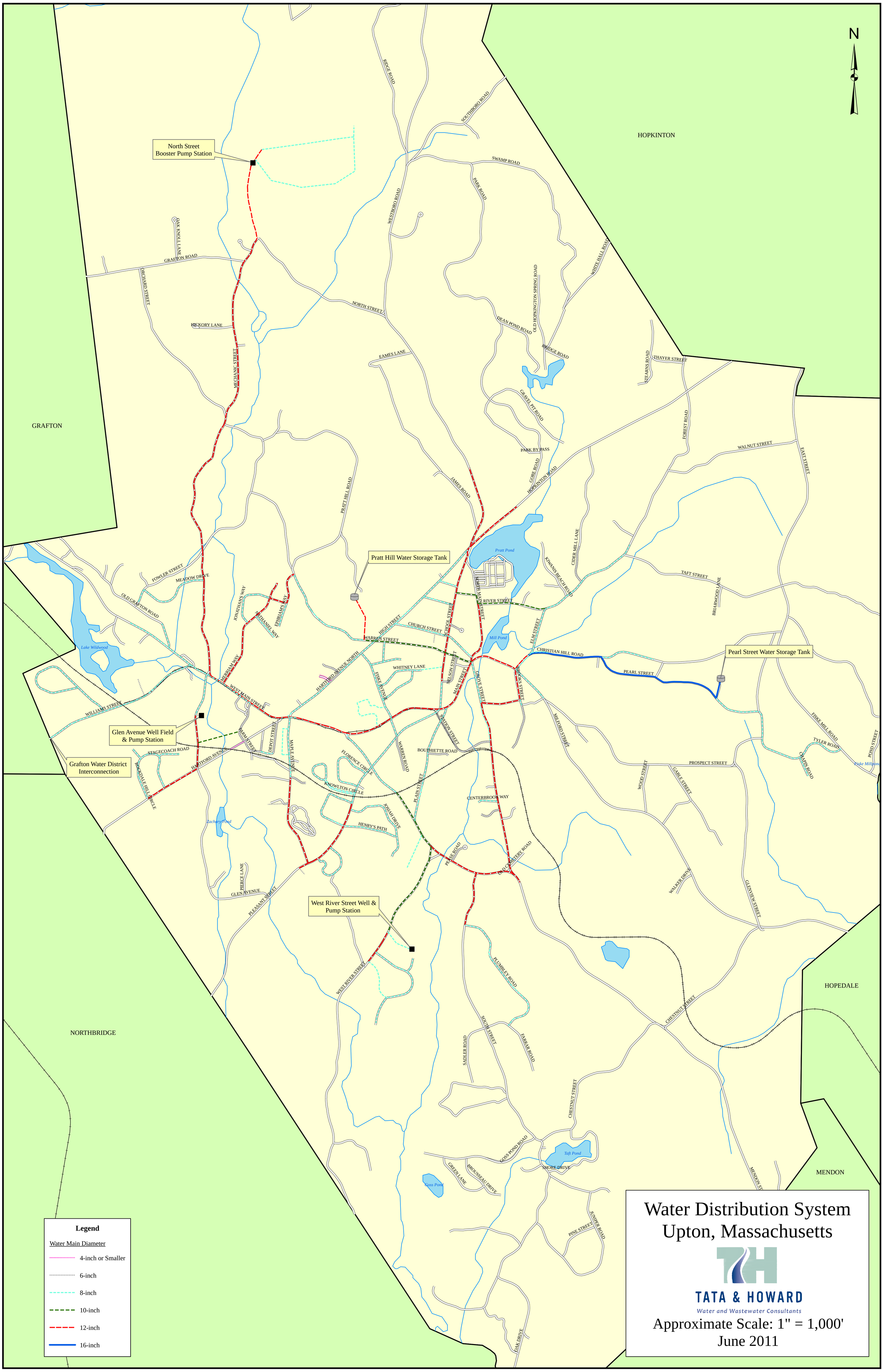
Table No. 7-5
Prioritization of Improvements-Phase III Water Distribution System

Item No.	Location	From	To	Hydraulically Deficient?	Critical Area?	Asset Management Rating
8	Old Grafton Road & Fowler Street	Connecting Two Mains	-	Yes	No	N/A
9	Maple Avenue	Main Street	Cast Iron Main	No	No	54
	Farm Street	Hartford Avenue S.	Railroad Ave	No	No	52
	Picadilly Street	Brooks Street	End of Main	No	No	52
	Brooks Street	Milford Street	Picadilly Street	No	No	52
	Nelson Street	-	-	No	No	52
	River Street	Elm Street	End of Main	No	No	52
	Warren Road	Pleasant Street	DI Main	No	No	52
	Plain Street	Mendon Street	Improvement II Main	No	No	48
	Plain Street	Improvement II Main	Main Street	No	No	48
	Christian Hill Road	Elm Street	End of Main	No	No	48
	Grove Street	Main Street	Station Street	No	No	48
	Milford Street	Brooks Street	End of Main	No	No	48
	Pleasant Street	Main Street	Florence Circle	No	No	48
	Fiske Avenue	Hartford Avenue N.	Main Street	No	No	46-44
	High Street	Stoddard Street	Cross Street	No	No	44
	Elm Street	Milford Street	Christian Hill Road	No	No	44
	School Street	Main Street	Nelson Street	No	No	44
	Cross Street	-	-	No	No	44
	Maple Street & N. Main Street	School Street	River Street	No	No	43

Table No. 7-6
Estimated Improvement Costs-Phase III Water Distribution System

Item No.	Location	From	To	Water Main Diameter (in)	Length (LF)	Estimated Cost
8	Old Grafton Road & Fowler Street	Connecting Two Mains	-	8	1050	$ 171,000
9	Farm Street	Hartford Avenue S.	Railroad Ave	8	600	$ 98,000
	Picadilly Street	Brooks Street	End of Main	8	200	$ 58,000
	Maple Avenue	Main Street	Cast Iron Main	8	2,000	$ 325,000
	Brooks Street	Milford Street	Picadilly Street	12	800	$ 150,000
	Nelson Street	-	-	8	900	$ 147,000
	River Street	Elm Street	End of Main	8	550	$ 90,000
	Warren Road	Pleasant Street	DI Main	8	750	$ 216,000
	Plain Street	Mendon Street	Improvement II Main	8	850	$ 139,000
	Plain Street	Improvement II Main	Main Street	8	1,900	$ 309,000
	Christian Hill Road	Elm Street	End of Main	8	450	$ 130,000
	Grove Street	Main Street	Station Street	8	2,150	$ 375,000
	Milford Street	Brooks Street	End of Main	8	1,050	$ 171,000
	Pleasant Street	Main Street	Florence Circle	8	2,600	$ 423,000
	Fiske Avenue	Hartford Avenue N.	Main Street	8	1,900	$ 309,000
	High Street	Stoddard Street	Cross Street	8	600	$ 117,000
	Elm Street	Milford Street	Christian Hill Road	8	600	$ 302,000
	School Street	Main Street	Nelson Street	8	750	$ 122,000
	Cross Street	-	-	8	500	$ 82,000
	Maple Street & N. Main Street	School Street	River Street	8	550	$159,000
					Total Estimated Phase III Cost:	**$ 3,799,000**

Appendix A


N
HOPKINTON
GRAFTON
NORTHBRIDGE
HOPEDALE
MENDON
North Street Booster Pump Station
Pratt Hill Water Storage Tank
Pearl Street Water Storage Tank
Glen Avenue Well Field & Pump Station
Grafton Water District Interconnection
West River Street Well & Pump Station
Lake Wildwood
Pratt Pond
Mill Pond
Zachery Pond
Goss Pond
Taft Pond
Fiske Millpond
RIDGE ROAD
SOUTHBORO ROAD
SWAMP ROAD
PARK ROAD
WESTBORO ROAD
WHITE HALL ROAD
OLD HOPKINGTON SPRING ROAD
DEAN POND ROAD
BRIDGE ROAD
STEARNS ROAD
THAYER STREET
GRAVEL PIT ROAD
FOREST ROAD
WALNUT STREET
EAST STREET
PARK BY PASS
GORE ROAD
HOPKINTON ROAD
JAMES ROAD
PRATT HILL ROAD
CIDER MILL LANE
KIWANIS BEACH ROAD
TAFT STREET
BRIARWOOD LANE
OAK KNOLL LANE
GRAFTON ROAD
ORCHARD STREET
HICKORY LANE
MECHANIC STREET
NORTH STREET
EAMES LANE
FOWLER STREET
MEADOW DRIVE
OLD GRAFTON ROAD
JONATHAN'S WAY
NATHANIEL WAY
EPHRIAM'S WAY
MERRIAM WAY
WEST MAIN STREET
WILLIAMS STREET
HIGH STREET
WARREN STREET
CHURCH STREET
SCHOOL STREET
NORTH MAIN STREET
RIVER STREET
ELM STREET
CHRISTIAN HILL ROAD
PEARL STREET
HARTFORD AVENUE NORTH
WHITNEY LANE
FISKE AVENUE
NELSON STREET
MAIN STREET
GROVE STREET
BROOKS STREET
MILFORD STREET
FISKE MILL ROAD
TYLER ROAD
POND STREET
CHAPIN ROAD
PROSPECT STREET
WOOD STREET
GABLE STREET
STAGECOACH ROAD
HARTFORD AVENUE
ROCKDALE HILL CIRCLE
FARM STREET
DEPOT STREET
MAPLE AVENUE
FLORENCE CIRCLE
WARREN ROAD
STATION STREET
BOUTHIETTE ROAD
KNOWLTON CIRCLE
PLAIN STREET
CENTERBROOK WAY
JOSIAH DRIVE
HENRY'S PATH
PEASE ROAD
OLD CEMETERY ROAD
WALKER DRIVE
GLENVIEW STREET
PIERCE LANE
GLEN AVENUE
PLEASANT STREET
WEST RIVER STREET
PLUMBLEY ROAD
CHESTNUT STREET
SOUTH STREET
SADLER ROAD
FARRAR ROAD
GOSS POND ROAD
GREEN LANE
BROUSSEAU DRIVE
SHORE DRIVE
PINE STREET
JUNIPER ROAD
OAK DRIVE
MENDON ST
Legend
Water Main Diameter
4-inch or Smaller
6-inch
8-inch
10-inch
12-inch
16-inch
Water Distribution System
Upton, Massachusetts
TATA & HOWARD
Water and Wastewater Consultants
Approximate Scale: 1" = 1,000'
June 2011

Appendix B

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
235	6	446	1958	Cast Iron	34	0	124	0	0	90	0
236	12	129	1980	Ductile Iron	13.5	0	124	0	0	120	0
237	12	11	2002	Ductile Iron	9.5	0	107	0	0	120	0
241	8	1,364	1979	Ductile Iron	19.5	0	105	0	0	130	1
243	8	1,273	1988	Ductile Iron	17.5	0	100	0	0	100	0
244	8	640	1988	Ductile Iron	16.5	0	97	0	0	100	0
245	8	1,076	1996	Ductile Iron	11.5	0	53	0	0	130	0
246	8	1,100	1996	Ductile Iron	21.5	0	79	0	3	130	0
249	12	673	1986	Ductile Iron	12.5	0	129	0	0	140	1
250	12	323	1991	Ductile Iron	10.5	0	90	0	0	120	0
252	10	905	1985	Ductile Iron	15	0	112	3	0	130	0
255	10	1,042	1995	Ductile Iron	13	0	119	0	0	130	1
257	12	701	2010	Ductile Iron	9.5	0	123	3	0	130	0
258	12	1,413	1988	Ductile Iron	11.5	0	113	0	0	130	0
259	12	1,013	2010	Ductile Iron	9.5	0	116	3	0	130	0
260	8	866	1991	Ductile Iron	16.5	0	90	0	0	110	0
261	8	518	1991	Ductile Iron	16.5	0	93	0	0	110	0
262	8	507	1991	Ductile Iron	13.5	0	73	0	0	110	0
263	12	530	1991	Ductile Iron	7.5	0	65	0	0	120	0
264	12	716	1962	Asbestos Cement	48.5	0	129	0	3	140	0
267	8	489	1958	Cast Iron	29.5	0	105	0	0	100	1
268	8	122	1958	Cast Iron	29.5	0	122	0	0	100	0
269	8	12	1958	Cast Iron	29.5	0	124	0	0	90	0
271	12	770	2004	Ductile Iron	9.5	0	112	0	0	120	0
272	12	446	1989	Ductile Iron	11.5	0	116	0	0	120	0
273	12	854	1988	Ductile Iron	10.5	0	82	0	0	130	0
274	12	465	1989	Ductile Iron	11.5	0	113	0	0	130	0
275	12	599	1989	Ductile Iron	11.5	0	113	0	0	130	0
276	12	268	1989	Ductile Iron	11.5	0	114	0	0	130	0
277	12	1,768	1989	Ductile Iron	11.5	0	114	0	0	130	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
278	6	291	1979	Ductile Iron	24	0	114	0	0	110	0
282	6	263	1954	Asbestos Cement	52	0	117	0	0	130	0
287	8	611	1995	Ductile Iron	17.5	0	116	0	0	110	0
288	8	577	1995	Ductile Iron	17.5	0	120	0	0	110	0
290	12	464	1980	Ductile Iron	13.5	0	116	0	0	120	0
293	8	917	1955	Asbestos Cement	47.5	0	113	3	0	130	0
294	8	352	1958	Cast Iron	29.5	0	112	0	0	90	0
295	8	490	1958	Cast Iron	29.5	0	113	0	0	90	0
296	8	296	1958	Cast Iron	29.5	0	112	0	0	90	1
298	8	1,087	1956	Asbestos Cement	47.5	0	103	3	0	130	0
299	8	10	1956	Asbestos Cement	47.5	0	103	0	0	130	0
300	8	1,029	1955	Asbestos Cement	47.5	0	100	3	0	130	0
302	8	389	1958	Cast Iron	29.5	0	113	3	0	90	0
303	8	935	1956	Asbestos Cement	47.5	0	112	3	0	130	1
305	8	243	1956	Asbestos Cement	47.5	0	113	3	0	130	0
306	12	361	2002	Ductile Iron	9.5	0	122	0	0	130	1
307	12	464	1979	Ductile Iron	13.5	0	112	0	0	120	0
309	12	1,684	1979	Ductile Iron	13.5	0	102	0	0	120	0
310	12	997	1977	Ductile Iron	13.5	0	103	0	0	120	0
311	12	333	1977	Ductile Iron	13.5	0	103	0	0	120	0
312	12	164	1977	Ductile Iron	13.5	0	103	0	0	120	0
313	12	1,565	1979	Ductile Iron	13.5	0	112	0	0	120	0
314	12	137	1979	Ductile Iron	13.5	0	109	0	0	120	0
315	8	1,080	1979	Ductile Iron	19.5	0	102	0	0	110	0
316	8	585	1958	Cast Iron	44.5	1	103	0	0	90	0
317	8	808	1954	Unlined Cast Iron	41.5	0	103	0	0	90	0
318	8	1,017	1979	Ductile Iron	18.5	0	99	0	0	110	0
319	8	556	1979	Ductile Iron	18.5	0	85	0	0	110	0
320	10	280	1962	Asbestos Cement	38	0	82	0	0	140	0
321	8	774	1953	Asbestos Cement	46.5	0	99	0	0	140	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
322	8	142	1979	Ductile Iron	18.5	0	82	0	0	110	0
323	8	465	1953	Asbestos Cement	46.5	0	81	0	0	140	0
327	8	368	1954	Asbestos Cement	46.5	0	82	0	0	130	0
329	8	556	1980	Ductile Iron	18.5	0	81	0	0	110	0
330	8	799	1980	Ductile Iron	26.5	0	97	0	2	110	0
331	12	375	1977	Ductile Iron	13.5	0	103	0	0	120	0
332	12	379	1977	Ductile Iron	13.5	0	103	0	0	120	0
333	12	299	1977	Ductile Iron	13.5	0	103	0	0	120	0
335	12	437	1977	Ductile Iron	13.5	0	100	0	0	120	0
337	10	340	1962	Asbestos Cement	38	0	99	0	0	140	0
338	8	350	1958	Cast Iron	29.5	0	103	0	0	90	0
342	12	151	2002	Ductile Iron	9.5	0	114	0	0	130	1
343	8	1,045	1956	Asbestos Cement	47.5	0	112	3	0	130	0
344	12	1,028	1979	Ductile Iron	13.5	0	112	0	0	120	0
345	12	788	1962	Asbestos Cement	52.5	1	108	0	0	140	0
347	8	166	1956	Asbestos Cement	47.5	0	108	0	0	130	0
348	6	182	1955	Asbestos Cement	52	0	108	0	0	130	0
351	12	506	2002	Ductile Iron	9.5	0	103	0	0	130	1
353	12	1,325	2002	Ductile Iron	9.5	0	107	0	0	130	1
354	8	1,319	1955	Asbestos Cement	47.5	0	107	3	0	130	0
355	8	728	1962	Asbestos Cement	43.5	0	103	0	0	130	0
356	12	1,247	2002	Ductile Iron	9.5	0	114	0	0	130	0
359	10	529	1953	Asbestos Cement	43	0	103	0	0	140	0
360	8	1,160	1962	Asbestos Cement	42.5	0	87	0	0	150	0
361	8	56	1962	Asbestos Cement	42.5	0	98	0	0	150	0
363	8	1,435	1979	Ductile Iron	15.5	0	75	2	0	110	0
365	8	659	1988	Ductile Iron	13.5	0	25	2	0	130	0
366	16	523	1979	Ductile Iron	8.75	0	21	0	0	120	0
367	16	3,381	1979	Ductile Iron	8.75	0	21	2	0	120	1
368	8	456	1994	Ductile Iron	17.5	0	113	3	0	110	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
369	6	240	2002	Ductile Iron	20	0	112	0	0	110	0
372	8	1,063	1958	Cast Iron	29.5	0	103	0	0	90	0
374	6	900	1956	Asbestos Cement	52	0	103	0	0	130	0
375	6	544	1986	Ductile Iron	22	0	114	3	0	110	0
376	6	1,075	1955	Asbestos Cement	52	0	116	0	0	130	1
377	6	535	1988	Ductile Iron	22	0	123	3	0	110	0
378	6	508	1993	Ductile Iron	29	0	99	0	2	110	0
380	8	1,162	1980	Ductile Iron	18.5	0	82	0	0	110	0
381	8	482	1962	Asbestos Cement	43.5	0	102	0	0	130	0
382	8	313	1991	Ductile Iron	13.5	0	68	0	0	110	0
383	8	543	1991	Ductile Iron	16.5	0	93	0	0	110	0
384	8	1,120	1954	Unlined Cast Iron	41.5	0	122	0	0	90	1
385	8	426	1988	Ductile Iron	16.5	0	97	0	0	100	0
386	6	987	1958	Cast Iron	33	0	87	0	0	90	0
387	8	1,005	1989	Ductile Iron	17.5	0	114	0	0	110	0
388	8	931	1994	Ductile Iron	17.5	0	116	0	0	110	0
390	8	730	1988	Ductile Iron	17.5	0	114	0	0	110	0
391	8	614	1988	Ductile Iron	16.5	0	82	0	0	110	0
393	8	1,046	1955	Asbestos Cement	47.5	0	107	0	0	130	0
394	8	527	1998	Ductile Iron	16.5	0	126	3	0	110	0
396	8	535	1988	Ductile Iron	13.5	0	68	2	0	130	0
397	8	1,234	1985	Ductile Iron	15.5	0	21	2	0	130	0
398	12	1,190	1954	Asbestos Cement	37.5	0	79	0	0	140	1
399	12	1,092	1985	Ductile Iron	13.5	0	119	0	0	120	0
414	12	247	2010	Ductile Iron	9.5	0	104	3	0	120	0
424	8	750	1995	Ductile Iron	17.5	0	124	0	0	110	0
430	6	104	1954	Unlined Cast Iron	57	0	129	0	3	90	0
431	10	1,119	1800	Unlined Cast Iron	50	0	129	0	2	60	0
434	12	1,231	2002	Ductile Iron	9.5	0	114	0	0	130	1
435	12	188	2002	Ductile Iron	9.5	0	108	0	0	130	1

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
436	8	377	1955	Asbestos Cement	47.5	0	113	3	0	130	0
443	8	1,178	1995	Ductile Iron	17.5	0	124	0	0	110	0
446	12	311	1996	Ductile Iron	9.5	0	116	0	0	120	1
447	8	1,124	1995	Ductile Iron	17.5	0	116	0	0	110	0
452	8	918	2005	Ductile Iron	14.5	0	98	0	0	110	0
455	8	1,178	1958	Cast Iron	29.5	0	102	0	0	90	0
456	8	740	1958	Cast Iron	29.5	0	116	0	0	90	0
458	8	666	2002	Ductile Iron	15.5	0	116	0	0	110	0
461	6	223	2001	Ductile Iron	20	0	113	0	0	110	0
463	8	588	1954	Asbestos Cement	46.5	0	81	0	0	130	0
464	8	399	1954	Asbestos Cement	43.5	0	78	0	0	130	0
468	10	257	1962	Asbestos Cement	38	0	82	0	0	140	0
469	10	1,266	1962	Asbestos Cement	38	0	83	0	0	140	0
471	8	524	2001	Ductile Iron	11.5	0	78	0	0	110	0
485	8	189	1958	Cast Iron	29.5	0	116	3	0	90	0
487	8	40	1958	Cast Iron	29.5	0	116	3	0	90	0
488	8	41	1958	Cast Iron	29.5	0	116	3	0	90	0
489	8	601	2002	Ductile Iron	15.5	0	116	3	0	110	0
491	12	172	1980	Ductile Iron	13.5	0	124	0	0	120	0
494	12	412	1980	Ductile Iron	13.5	0	119	0	0	120	0
495	12	665	1980	Ductile Iron	13.5	0	114	0	0	120	0
496	8	163	1996	Ductile Iron	15.5	0	114	0	0	110	0
498	12	164	1980	Ductile Iron	13.5	0	116	0	0	120	0
499	8	191	1958	Cast Iron	29.5	0	116	0	0	90	1
500	8	1,867	2002	Ductile Iron	15.5	0	116	0	0	110	0
502	12	393	2002	Ductile Iron	8.5	0	92	0	0	130	1
503	12	843	2002	Ductile Iron	8.5	0	90	0	0	130	1
505	8	345	1954	Asbestos Cement	46.5	0	92	0	0	130	0
506	8	186	1954	Asbestos Cement	46.5	0	84	0	0	130	0
507	8	1,944	2005	Ductile Iron	14.5	0	90	0	0	110	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
510	12	837	1979	Ductile Iron	13.5	0	104	3	0	130	0
511	12	228	1979	Ductile Iron	13.5	0	116	3	0	130	0
512	6	531	2001	Ductile Iron	20	0	116	3	0	110	0
519	8	730	1995	Ductile Iron	17.5	0	116	0	0	110	0
521	8	380	1995	Ductile Iron	17.5	0	124	0	0	110	0
525	12	1,491	2005	Ductile Iron	9.5	0	102	0	0	130	0
526	12	117	2005	Ductile Iron	9.5	0	114	0	0	130	0
527	8	1,096	1956	Asbestos Cement	47.5	0	112	3	0	130	0
528	8	830	1979	Ductile Iron	19.5	0	114	0	0	110	0
532	6	256	2000	Ductile Iron	20	0	101	0	0	110	0
535	12	850	2004	Ductile Iron	9.5	0	112	0	0	120	0
536	12	212	2004	Ductile Iron	9.5	0	108	0	0	120	0
540	12	466	2004	Ductile Iron	9.5	0	108	0	0	120	0
541	12	565	2004	Ductile Iron	8.5	0	89	0	0	120	0
542	12	706	2004	Ductile Iron	8.5	0	89	0	0	120	0
547	12	687	2004	Ductile Iron	8.5	0	85	0	0	120	0
548	12	304	2004	Ductile Iron	10.5	0	156	0	0	120	0
549	8	489	2005	Ductile Iron	14.5	0	92	0	0	130	0
552	10	385	1985	Ductile Iron	15	0	116	3	0	130	0
554	8	932	2000	Ductile Iron	15.5	0	112	0	0	110	0
557	6	217	1995	Ductile Iron	22	0	125	0	0	110	0
558	12	263	1980	Ductile Iron	13.5	0	125	0	0	120	0
560	6	290	1954	Asbestos Cement	52	0	114	0	0	130	0
561	6	285	1954	Asbestos Cement	52	0	123	0	0	130	0
563	2	445	1800	Galvanized Iron	57	0	123	0	0	100	0
566	8	580	1960	Cast Iron	39.5	0	120	0	3	90	1
568	6	424	1999	Ductile Iron	20	0	120	0	0	110	0
571	6	550	1975	Ductile Iron	27	0	126	0	0	110	0
574	8	1,264	1953	Asbestos Cement	62.5	1	107	0	0	140	1
583	1	321	1998	Copper	22	0	102	0	0	110	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
585	6	54	1953	Asbestos Cement	52	0	102	0	0	140	0
586	6	284	1953	Asbestos Cement	52	0	104	0	0	140	0
588	1	343	1998	Copper	22	0	104	0	0	110	0
590	6	346	1956	Asbestos Cement	52	0	113	0	0	130	0
591	6	457	1954	Asbestos Cement	52	0	120	0	0	130	0
608	6	482	1995	Ductile Iron	22	0	113	0	0	110	0
616	10	228	1954	Asbestos Cement	43	0	102	0	0	140	0
624	8	687	2005	Ductile Iron	15.5	0	102	0	0	110	0
625	8	184	2005	Ductile Iron	14.5	0	95	0	0	110	0
626	10	916	1979	Ductile Iron	15	0	102	0	0	130	0
627	10	897	1979	Ductile Iron	15	0	111	0	0	130	0
631	8	95	1979	Ductile Iron	19.5	0	113	0	0	130	1
633	8	349	1979	Ductile Iron	19.5	0	109	0	0	130	1
634	8	569	1979	Ductile Iron	18.5	0	98	0	0	130	1
635	8	228	1979	Ductile Iron	19.5	0	106	0	0	130	1
637	12	443	1977	Ductile Iron	13.5	0	116	0	0	130	1
639	12	84	2002	Ductile Iron	9.5	0	107	0	0	130	1
640	8	339	2002	Ductile Iron	11.5	0	78	0	0	110	0
641	8	468	2002	Ductile Iron	11.5	0	78	0	0	110	0
642	10	323	1962	Asbestos Cement	39	0	100	0	0	130	0
643	10	418	1962	Asbestos Cement	39	0	103	0	0	130	0
644	12	1,113	1979	Ductile Iron	13.5	0	116	3	0	130	0
645	12	1,039	1979	Ductile Iron	13.5	0	116	3	0	130	0
646	16	630	1979	Ductile Iron	12.75	0	106	2	0	120	1
647	16	1,276	1979	Ductile Iron	12.75	0	103	2	0	120	1
649	8	982	1995	Ductile Iron	17.5	0	116	0	0	110	0
650	12	594	1985	Ductile Iron	13.5	0	119	0	0	120	0
652	8	309	1958	Cast Iron	29.5	0	113	0	0	90	0
653	8	559	1958	Cast Iron	29.5	0	113	0	0	90	0
P-2	8	36	1986	Ductile Iron	13.5	0	68	2	0	130	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
P-3	8	1,293	1986	Ductile Iron	13.5	0	57	2	0	130	0
P-4	8	219	1962	Asbestos Cement	42.5	0	83	0	0	150	0
P-5	8	92	1962	Asbestos Cement	43.5	0	116	0	0	150	0
P-6	8	686	1962	Asbestos Cement	42.5	0	87	0	0	150	0
P-7	8	631	1962	Asbestos Cement	43.5	0	116	0	0	150	0
P-8	8	73	1955	Asbestos Cement	47.5	0	116	3	0	130	0
P-9	8	824	1955	Asbestos Cement	47.5	0	116	3	0	130	0
P-10	8	367	1955	Asbestos Cement	47.5	0	114	3	0	130	1
P-11	8	549	1955	Asbestos Cement	47.5	0	116	3	0	130	1
P-12	12	141	1996	Ductile Iron	9.5	0	124	0	0	120	1
P-14	12	187	1996	Ductile Iron	9.5	0	116	0	0	120	1
P-15	12	284	1996	Ductile Iron	9.5	0	116	0	0	120	1
P-16	8	371	1988	Ductile Iron	16.5	0	99	0	0	130	0
P-18	8	1,337	1988	Ductile Iron	17.5	0	116	0	0	130	0
P19	8	578	2006	Ductile Iron	16.5	0	156	0	0	110	0
P-19	8	1,980	1988	Ductile Iron	17.5	0	116	0	0	130	0
P-20	12	100	1977	Ductile Iron	13.5	0	100	0	0	130	0
P21	8	1,159	2006	Ductile Iron	16.5	0	144	0	0	110	0
P-22	12	809	1977	Ductile Iron	9.5	0	57	0	0	130	0
P23	8	657	2005	Ductile Iron	15.5	0	116	0	0	110	1
P-23	12	1,195	1977	Ductile Iron	9.5	0	57	0	0	130	0
P-24	8	64	1979	Ductile Iron	15.5	0	59	0	0	130	0
P25	8	372	2005	Ductile Iron	15.5	0	116	0	0	110	0
P-25	8	632	1979	Ductile Iron	18.5	0	99	0	0	130	0
P-26	8	54	1979	Ductile Iron	19.5	0	116	0	0	130	1
P27	8	361	2005	Ductile Iron	15.5	0	116	0	0	110	0
P-27	8	571	1979	Ductile Iron	15.5	0	78	0	0	130	1
P-28	12	82	1985	Ductile Iron	24.5	0	126	0	3	120	0
P29	8	481	2005	Ductile Iron	15.5	0	116	0	0	110	0
P-30	12	578	1985	Ductile Iron	22.5	0	85	0	3	120	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
P-31	12	14	1985	Ductile Iron	19.5	0	31	0	3	120	0
P33	8	256	1979	Ductile Iron	19.5	0	116	0	0	130	1
P35	12	655	1991	Ductile Iron	11.5	0	116	0	0	120	0
P-36	12	808	2002	Ductile Iron	9.5	0	119	0	0	130	0
P37	8	303	1996	Ductile Iron	15.5	0	116	0	0	110	0
P-37	12	1,121	2002	Ductile Iron	9.5	0	108	0	0	130	0
P-38	8	364	1958	Cast Iron	29.5	0	122	0	0	90	0
P39	8	540	1996	Ductile Iron	15.5	0	116	0	0	110	0
P-39	8	324	1979	Ductile Iron	19.5	0	116	0	0	120	1
P-40	6	830	1959	Asbestos Cement	48	0	108	0	0	130	1
P41	8	301	1996	Ductile Iron	15.5	0	116	0	0	110	0
P-41	6	728	1954	Asbestos Cement	52	0	100	3	0	130	0
P-42	6	195	1995	Ductile Iron	22	0	103	3	0	110	0
P43	8	416	1996	Ductile Iron	15.5	0	116	0	0	110	0
P-44	8	169	1958	Cast Iron	29.5	0	116	0	0	90	1
P45	8	488	1994	Ductile Iron	17.5	0	116	0	0	110	0
P-45	12	162	2002	Ductile Iron	9.5	0	107	0	0	130	1
P-46	12	727	2002	Ductile Iron	9.5	0	116	0	0	130	1
P47	8	577	1995	Ductile Iron	17.5	0	116	0	0	110	0
P-47	8	8	1958	Cast Iron	29.5	0	116	0	0	90	0
P49	8	587	1995	Ductile Iron	17.5	0	116	0	0	110	0
P51	8	408	2002	Ductile Iron	15.5	0	116	3	0	110	0
P53	8	453	2002	Ductile Iron	15.5	0	116	3	0	110	0
P55	8	514	2002	Ductile Iron	15.5	0	116	3	0	110	0
P57	8	502	2002	Ductile Iron	15.5	0	116	3	0	110	0
P59	8	531	2002	Ductile Iron	15.5	0	116	3	0	110	0
P61	8	211	1994	Ductile Iron	17.5	0	116	3	0	110	0
P63	8	634	1994	Ductile Iron	17.5	0	116	3	0	110	0
P65	8	636	1994	Ductile Iron	17.5	0	116	3	0	110	0
P69	8	507	1980	Ductile Iron	19.5	0	116	0	0	110	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
P71	8	176	1953	Asbestos Cement	47.5	0	116	0	0	140	0
P73	12	455	1979	Ductile Iron	13.5	0	116	3	0	130	1
P77	12	594	2004	Ductile Iron	9.5	0	116	0	0	120	0
P79	12	488	2004	Ductile Iron	9.5	0	116	0	0	120	0
P81	12	539	2004	Ductile Iron	9.5	0	116	0	0	120	0
P83	12	392	2004	Ductile Iron	9.5	0	116	0	0	120	0
P85	12	142	2004	Ductile Iron	9.5	0	116	0	0	120	0
P87	12	702	2004	Ductile Iron	9.5	0	105	0	0	120	0
P-87	8	312	1960	Asbestos Cement	53.5	0	112	0	3	130	0
P89	12	549	2004	Ductile Iron	9.5	0	116	0	0	120	0
P-89	8	665	1960	Asbestos Cement	53.5	0	116	0	3	130	0
P-90	8	136	1960	Asbestos Cement	53.5	0	116	0	3	130	0
P91	12	510	2004	Ductile Iron	9.5	0	116	0	0	120	0
P-91	8	152	2005	Ductile Iron	15.5	0	116	0	0	120	0
P-92	8	677	2005	Ductile Iron	15.5	0	116	0	0	120	0
P93	12	197	2004	Ductile Iron	9.5	0	116	0	0	120	0
P-93	8	186	2005	Ductile Iron	15.5	0	116	0	0	120	0
P95	12	476	2004	Ductile Iron	5.5	0	57	0	0	120	0
P97	12	257	2004	Ductile Iron	5.5	0	57	0	0	120	0
P99	12	600	2004	Ductile Iron	5.5	0	57	0	0	120	0
P101	12	602	2004	Ductile Iron	5.5	0	57	0	0	120	0
P103	12	69	2004	Ductile Iron	5.5	0	57	0	0	120	0
P105	8	785	2006	Ductile Iron	11.5	0	57	0	0	110	0
P107	8	898	2006	Ductile Iron	11.5	0	57	0	0	110	0
P109	8	1,615	2006	Ductile Iron	15.5	0	115	0	0	110	0
P111	8	365	2006	Ductile Iron	14.5	0	99	0	0	110	0
P113	8	888	2006	Ductile Iron	14.5	0	99	0	0	110	0
P115	12	431	2004	Ductile Iron	5.5	0	57	0	0	120	0
P117	12	604	2004	Ductile Iron	8.5	0	99	0	0	120	0
P119	8	404	1989	Ductile Iron	16.5	0	91	0	0	110	0

Pipe Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Diameter (in)	Length (ft)	Installation Year	Material	Material	Break History	Pressure (psi)	Water Quality	Corrosive Soil	Hazen Williams	Critical
P121	8	518	1996	Ductile Iron	11.5	0	78	0	0	130	0
P123	12	718	1979	Ductile Iron	13.5	0	115	3	0	130	0
P125	12	184	1979	Ductile Iron	13.5	0	119	3	0	130	0
P127	8	608	1991	Ductile Iron	13.5	0	74	0	0	110	0
P133	8	85	2006	Ductile Iron	15.5	0	101	0	0	110	0
P135	8	675	1986	Ductile Iron	13.5	0	26	2	0	130	0
P137	8	596	1986	Ductile Iron	13.5	0	31	2	0	130	0
P139	12	509	1977	Ductile Iron	13.5	0	103	0	0	120	0
P141	6	324	1988	Ductile Iron	22	0	112	0	0	110	0
P149	12	146	2002	Ductile Iron	9.5	0	103	0	0	130	1
P151	6	430	1992	Ductile Iron	22	0	107	0	0	110	0
P153	6	692	1994	Ductile Iron	22	0	108	0	0	110	0
P155	6	485	1994	Ductile Iron	22	0	105	0	0	110	0
P157	12	67	2004	Ductile Iron	10.5	0	156	0	0	120	0
P159	8	201	2006	Ductile Iron	15.5	0	106	0	0	110	0
P161	8	84	1962	Asbestos Cement	43.5	0	108	0	0	150	0
P163	8	447	1955	Asbestos Cement	47.5	0	108	0	0	130	0
P165	10	354	1985	Ductile Iron	15	0	112	3	0	130	0
P167	12	700	2010	Ductile Iron	9.5	0	125	3	0	130	1
P169	10	401	1995	Ductile Iron	13	0	119	0	0	130	1
P173	8	1,184	1962	Asbestos Cement	43.5	0	101	0	0	150	0
P175	6	548	1956	Asbestos Cement	52	0	101	0	0	130	0
P179	12	513	1962	Ductile Iron	19.5	0	107	0	0	120	0
P181	8	512	1962	Asbestos Cement	43.5	0	107	0	0	150	0
P185	10	1,119	1995	Ductile Iron	14	0	127	0	0	130	1
P191	6	101	1959	Asbestos Cement	48	0	116	0	0	130	1
U7000-A	12	46	2004	Ductile Iron	5.5	0	39	0	0	130	0
U7000-B	12	46	2004	Ductile Iron	9.5	0	116	0	0	120	0

Junction Input Data
Master Plan and Capital Efficency Plan™
Upton, MA

Label	Elevation (ft)	Demand (gpm)
71	502	2
72	473	0
78	370	0
79	305	1
80	320	1
81	318	0
82	423	0
85	305	2
86	285	0
87	302	1
88	299	1
89	272	0
90	295	1
91	322	0
92	335	0
93	302	3
94	295	1
95	266	0
96	279	1
97	276	0
98	289	0
99	295	0
100	413	0
101	407	0
102	394	0
103	305	0
104	348	0
105	354	0
106	266	0
107	266	0
108	427	0
109	328	0
110	320	1
111	282	0
112	295	0
113	276	0
114	339	0
115	339	1
116	305	0
117	331	1
118	440	1
119	367	0