Ownership of Pressure Sewer Systems

"The only thing we have to fear, is fear itself"

Henry S. Albro, F. R. Mahony & Associates

With Key contributions from the Towns of Chelmsford and Marion, MA

Abstract

After 45 years of installations of Low Pressure and Pressure Sewer Systems throughout the world, this paper will investigate the ownership costs that follow the design and construction decisions used for the selection of these technologies. Two large installations in New England have been well documented with regard to construction costs and the expected benefits for these installations.

This paper will take a retrospective look at the service history of these systems and discuss the actual reliability records and ownership costs. Each of these communities has followed a different path regarding system ownership. We will discuss the variations and results seen. We will point out the key factors of these successful installations as well as the changes made to operating methods from lessons learned from more than a dozen years of operation.

Actual cost data and Mean - Time - Between - Service - Calls (MTBSC) will be presented. Service classifications with regards to installation issues, abuse, and wear and tear will be compared. Political and public perception issues will also be introduced.

This paper looks at the service records which clearly demonstrate that successful installations and reliable operation and maintenance can be achieved when communities share in the oversight and operation of these systems.

Key Words

Pressure Sewer, Grinder Pumps, Sewer Fairness Alliance, Chelmsford, Marion

Introduction

In June of 2013 I attended the MWPCA Quarterly Meeting with the main theme of service lateral and infiltration issues. Key Presenters were Jeffery A. Murawski, P.E. Fitchburg DPW Civil Engineer and Chairman of MWPCA Collections Committee and Dave Beauchamp and Andy Bryant of the Ted Berry Company. My takeaways from their presentations got me thinking.

- EPA estimates there are 75 million service laterals in the United States
- EPA estimates 80% of these laterals are failing or are in need of repair
- The infiltration from laterals account for 50% to 80% of the infiltration of groundwater
- Approximately 50% to 80% of inflow to public collections systems is from "Private Owned" systems
- "If you solely focus on 'Public Sewers' you are missing a large portion of the I/I source." -Jeffrey A. Murawski

I left this meeting wondering if abdicating the maintenance of private service laterals was really the best way to manage a public wastewater collection system.

About the time of this meeting some residents in Chelmsford, MA began to raise issues regarding the cost of service repairs for their privately owned grinder pumps. The "Sewer Fairness Alliance" was formed with the key objective of convincing the Town to take over the cost of service and maintenance of approximately 525 private grinder pumps. At the time of this paper a Fall Town Meeting Article was presented with voters opting to postpone action and to form a study committee to report back recommendations for the Annual Town Meeting in the spring of 2014.

From past project experience we as a company have found that communities that take an active role in their collection system construction often fair better with regards to reducing maintenance issues and are better equipped to answer questions from the public. This is not solely related to ownership or providing maintenance. This involvement can be simply as facilitators or liaisons with equipment and service providers. We have also seen communities who for many reasons may choose to not become involved in the ownership and maintenance of private grinder pump installations.

Some communities like Marion, MA had little choice in the matter. As a condition of grant funding, Marion had to establish a maintenance program and agree to carry on maintenance as part of the overall collection system. Marion has a system in place to manage the repairs and collect for service repairs that are the result of abuse. Service repairs are coordinated through the Sewer Department and the Department is directly in contact with the local service providers F. R. Mahony & Associates, Inc.

Chelmsford, MA

Issues in Chelmsford grew out of a long plan to construct and install sewers. Several phases of construction took place and conditions changed as funding and onsite disposal regulations changed. The key change that occurred was the requirements of 310 CMR 15.000 "Title 5" specifically 15.301(1) Inspection at time of transfer and the requirements to verify that on-site systems were in compliance with current standards of 12/27/1996.

Many communities saw a change in the attitude toward public sewers as a result of this change. Chelmsford was no different. Plans to expand the public sewers grew to include the entire community. By nature of elevation, limits in funding and limits of existing infrastructure; alternative sewage collection methods were necessary to achieve the desired goals. Pressure sewer systems began to take the place of costly and otherwise difficult gravity sewers. Costs drove pressure sewers over the cost of larger lift stations.

Private developments also followed this trend. Construction of pressure sewers or private pumping stations became very commonplace. Some residents resisted this trend and tried to convince the Town to install more conventional gravity sewers and pumping stations. Some of this resistance lingers today and is part of the ongoing political debate regarding the ownership of grinder pumps and previously developed private lift stations. The joining of these two factions seemed to gain strength in numbers for support of Town ownership. The joining of these two groups also raised more concerns regarding the real cost the Town would be assuming. This led to the decision to form a study group to look at all of the ramifications of the desire to have the Town own and maintain grinder pumps on private property and to assume ownership of existing private pumping stations. At this time there are over 525 individual grinder

pumps installed in Chelmsford, 41 Public lift stations and an estimated 39 private lift stations in various degrees of age and operating condition. Many of these private lift stations are old and do not have equipment that would be considered equivalent to Town or Public specifications. The Town will need to know the cost to rehabilitate and update these stations as part of the plan of acceptance that is being considered.

Other factors include legal access, review of special permit conditions, and economic review of private escrow funds that may exist now for maintenance and how the fees and assessments have been applied over the many years of development of this complex system. Some fees and assessments were reduced to compensate for the acceptance of grinder pumps. The Town may need to build in some cost recovery of those assessments if the ownership is to revert back to the Town.

A great deal of media coverage has reported concerns with service and cost of repairs driving the public push to get the Town to take over the maintenance. Based on the statements of some of the residents in this movement, it would appear that there is a great issue and that the system is in complete failure. Issues with the private lift stations at times were blurred into the concerns of the grinder pumps making it difficult for the rest of the residents to discern the difference.

The focus of this paper will deal solely with the individual grinder pumps and how they have performed. This information is based on the service records of F. R. Mahony & Associates, Inc. Rockland and Southbridge, MA who is believed to be the predominant service provider in the area. Data from private installers, plumbers and outside service providers was not available to present.

Claims of service performance and costs by the key manufacturer of grinder pumps in Chelmsford state that Mean-Time-Between-Service-Calls (MTBSC) can be expected to be 8-10 years. Examples of service costs are commonly given based on communities that perform service work and maintain records of these costs.

Common Examples:

Carbondale, Pennsylvania	>500 Pumps serviced from 1988 through 1997 Cost to maintain $46/year.
Fairfield Bay, Arkansas	> 564 Pumps from 1996 through 2004 Cost to maintain $19.45/year.
Fairfield Glade, Tennessee	>2,341 Pumps serviced from 1978 through 2004 Cost to maintain rolling average $42.04/year.

The population of grinder pumps in Chelmsford has grown from 1996 to present day. The total population of 525 grinder pumps includes a small population of Myers® Grinder pump stations and the predominate population of Environment One® Grinder pump stations. The data used in this study is from the Environment One® service history.

To determine the MTBSC history we must look at the age of the pumps along with the frequency of service. MTBSC does not denote a complete pump failure or replacement rather a service interval. Service repairs can be mechanical or electrical. Service may result from manufacturing defect under warranty, normal wear and tear, and installation issues such as improper backfilling, poor grading, improper wiring and so forth. Damage can also occur from extreme weather or homeowner abuse or neglect.

The data shows a population with over 3,610 pump years of service and a MTBSC of > 13 years.

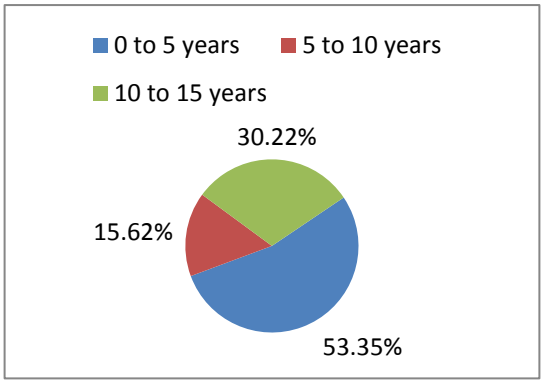
Table 1

"Pump Year" Calculation Chelmsford, MA

2014	Report Year		Cumulative		Cumulative	Service Calls	Cumulative	Percent of Pumps (2)	MTBSC
	Age in Years	Pumps Sold	Pumps in sys.	Pump Years (1)	Pump years	Per Year (5)	Service Calls	Serviced Per Year	"Pump Year"
2000	14	136	136	1904	1904	4	4	2.94%	476.00
2001	13	10	146	130	2034	1	5	0.68%	406.80
2002	12	3	149	36	2070	7	12	4.70%	172.50
2003	11	4	153	44	2114	3	15	1.96%	140.93
2004	10	8	161	80	2194	7	22	4.35%	99.73
2005	9	27	188	243	2437	12	34	6.38%	71.68
2006	8	22	210	176	2613	17	51	8.10%	51.24
2007	7	16	226	112	2725	15	66	6.64%	41.29
2008	6	32	258	192	2917	21	87	8.14%	33.53
2009	5	28	286	140	3057	28	115	9.79%	26.58
2010	4	41	327	164	3221	29	144	8.87%	22.37
2011	3	61	388	183	3404	46	190	11.86%	17.92
2012	2	101	489	202	3606	40	230	8.18%	**15.68**
2013	1	4	493	4	3610	45	275	9.13%	**13.13**
TOTAL		493		3610					
Weighted MTBSC based on growing age of pumps (3)									13.13

Figure 1

Concerns about age of pumps and the service life can be addressed when we compare the average life of these pumps to the current age. Grinder pump systems are generally a reliable product with life expectancies of over 15-20 years. The pump basins have a longer life expectancy and have been known to exceed 30 years with perhaps a replaced pump "core" at some point in the life of the basin.



Pump life is greatly influenced by the quality of the installation and the use of the owners.

The pump population in Chelmsford presently has an average age of 7.3 years*. Approximately 30% of the pumps are near their expected useful life. Future repairs of these pumps must be weighed against the useful life and return on investment which will be shown a little later in this discussion.

Notes:

(1) "Pump Year" is number of pumps in service over the life of system in years. (2) Percent of pumps serviced are usually expected to be 8 to 10 percent. Data includes repairs for service and installation issues. (3) MTBSC Mean-Time-Between-Service-Calls expected to be 8 to 10 years. (4) Total parts and service may include spare parts or replacement of damaged tank or other large items that may skew this data. Data includes repairs for service, abuse and installation issues. (5) 2013 Service calls exclude 12 warranty calls and 1 upgrade to competitor station.

**Pump age includes products installed prior to the year 2000 when the data collection of the FRMA Service Department was developed.*

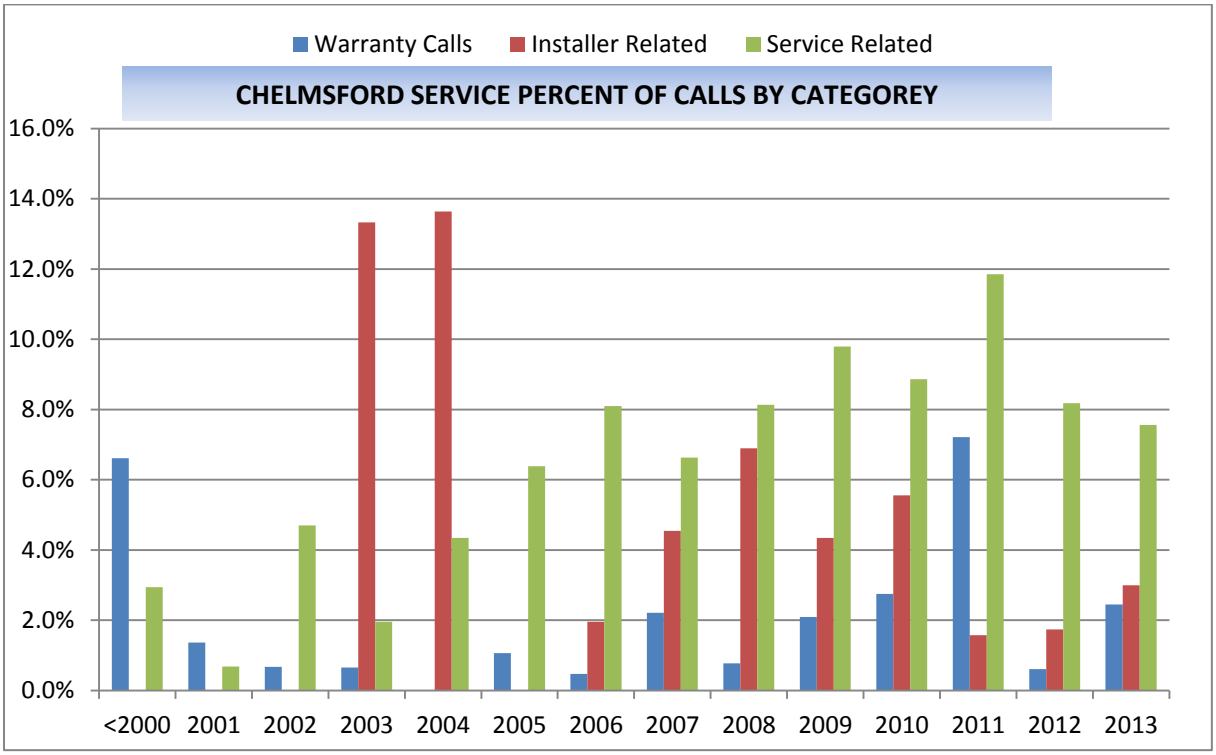
Table 2

AGE

Pump Years	Pumps	Average Age
3610	**493**	**7.32**
Percentage		
53.35%	263	0 to 5 years
15.62%	77	5 to 10 years
30.22%	149	10 to 15 years

Looking back over the period from 1999 to present day, the data shows service from all of these sources. Recent service policies further distinguish the root cause of service calls to better isolate the areas that require attention though stepped up training and education. We did pull records for Chelmsford and isolated many of the sources of the service calls to gain a better understanding of the types of calls and what portions of these calls are presently beyond the control of the manufacturer. (See Figure 2 Below)

Figure 2



The Key takeaways from this information are the following:

- Warranty Calls average 2% of the installed pumps (0-7%)
- Installer Issues average 4% of the installed pumps (0-14%)
- Service Issues average 6% of the installed pumps (1-12%)

Installer training efforts were stepped up in 2004 to stem the spike in service from improper installations. Chelmsford began to require grinder pump endorsements on drainlayers installing pumps in Town.

Actual “Service Calls” show that this installation has a MTBSC > 13 years. Ownership costs are the final measure of performance. As noted at the beginning of this discussion, projections of cost range generally from $20 to $45. Chelmsford residents do not seem to deviate from this trend as can be seen from the repair costs during this timeframe.

Using accounting records for total year payments from the Town we can construct the following cost table in Figure 2. Accounting records for the years from 2000 to 2013 do not break out all of the itemized costs as these costs were not sorted by repairs, parts or spare cores during those years. It is believed that, in 2001 and 2003, some parts or spare cores may have been purchased.

Table 3

	Service Cost Total / Year	Average Cost Per "Pump Year'	Cost Per Serviced Pump (4)	Comments	Average Annual Cost Per Installed Pump
2000			$ -		
2001	$ 2,801.77	$ 1.38	$ 2,801.77	Parts Purchase?	$ 19.19
2002	$ 5,068.88	$ 2.45	$ 724.13		$ 34.02
2003	$ 6,075.22	$ 2.87	$ 2,025.07	Parts Purchase?	$ 39.71
2004	$ 5,249.45	$ 2.39	$ 749.92		$ 32.61
2005	$ 2,643.50	$ 1.08	$ 220.29		$ 14.06
2006	$ 10,892.31	$ 4.17	$ 640.72		$ 51.87
2007	$ 6,726.32	$ 2.47	$ 448.42		$ 29.76
2008	$ 12,721.91	$ 4.36	$ 605.81		$ 49.31
2009	$ 13,732.01	$ 4.49	$ 490.43		$ 48.01
2010	$ 28,641.54	$ 8.89	$ 987.64		$ 87.59
2011	$ 35,932.20	$ 10.56	$ 781.13		$ 92.61
2012	$ 31,931.15	$ 8.86	$ 798.28		$ 65.30
2013	$ 36,696.06	$ 10.17	$ 815.47		$ 74.43
TOTAL	**$ 199,112.32**	**$ 55.16**	**$ 929.93**	**AVERAGE**	**$ 49.11**

(4) Total parts and service may include spare parts or replacement of damaged tank or other large items that may skew this data. Data includes repairs for service and installation issues.

Based on the history in Chelmsford, the cost of ownership of these pumps has fallen within expected ranges. Service costs do not include power costs which are estimated at $22 per year based on $0.11/kWh.

When we look at the types of service calls we find a wide range of possible reasons for the call beyond a pump issue. At present, these items are included in the total service calls and may not truly reflect the actual service calls for actual pump service to Environment One Pumps.

- Calls to service pumps found to be from another manufacturer
- Submerged generator transfer switches
- Broken or blocked discharge lines
- Blocked drain Lines
- Nothing wrong
- Sand in station
- Circuit breakers off
- Excessive grease
- Rags

In 2013 we began to code service call invoices with prefix letters to denote type of call.

- "S" - Denoted pump Service calls
- "N" - Non-service related or non-pump related issue such as plumbing clog before the pump
- "W" - Manufacturer warranty call or FRMA warranty

This information proved helpful in classifying the types of calls more accurately. This information will be helpful in reducing future calls as it points out areas for education of the installer, customer and service provider. The following classifications occurred during this recent year.

Table 4

2013 Service Call Breakout		**% of Total Pumps**
Total Calls	58	11.8%
Warranty	9	1.8%
FRMA Warranty	3	0.6%
Installer Issue	8	1.6%
Abuse	6	1.2%
Upgrade Competitor station	1	0.2%
Service	31	6.3%

- Warranty work was covered by the manufacturer
- FRMA warranty covered service issues missed during an initial call and identified service training areas that need attention
- Installer issues included improper wiring, stations buried below grade, cut power cords, and leaking panels from improper penetrations
- Abuse issues included excessive rags and baby wipes which are common issues in wastewater collection systems, excessive grease, sand or latex paint
- Abuse also included refusal of service from owner betting the Town would assume service in the fall of 2013 and opting to not repair their pump
- One competitor station was upgraded with a new pump

- The remaining calls were actual pump service issues

Table 5

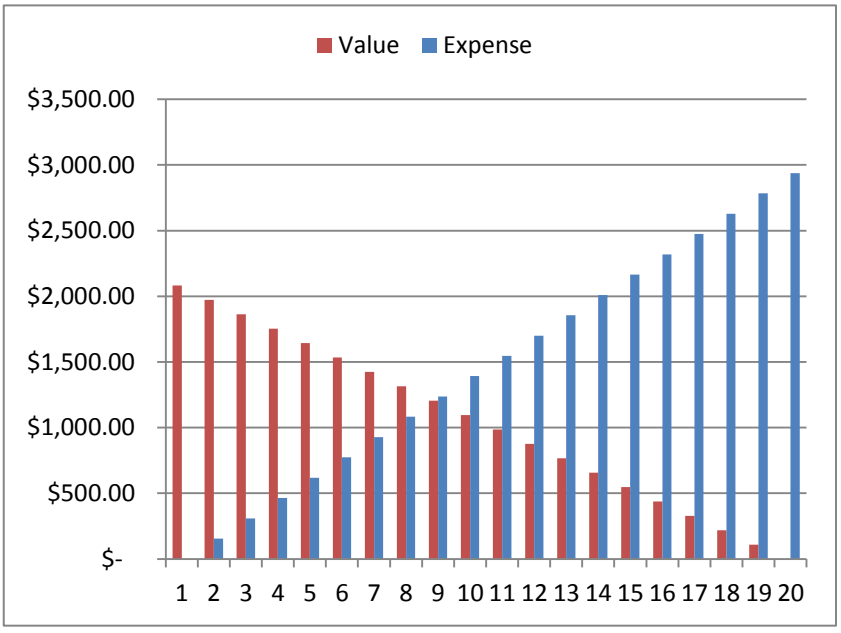
Year	Value	Expense
1	$ 2,083.00	$ -
2	$ 1,973.37	$ 154.63
3	$ 1,863.74	$ 309.26
4	$ 1,754.11	$ 463.89
5	$ 1,644.47	$ 618.52
6	$ 1,534.84	$ 773.15
7	$ 1,425.21	$ 927.78
8	**$ 1,315.58**	$ 1,082.41
9	**$ 1,205.95**	$ 1,237.04
10	**$ 1,096.32**	$ 1,391.67
11	$ 986.68	$ 1,546.30
12	$ 877.05	$ 1,700.93
13	$ 767.42	$ 1,855.56
14	$ 657.79	$ 2,010.19
15	$ 548.16	**$ 2,164.82**
16	**$ 438.53**	**$ 2,319.45**
17	**$ 328.89**	**$ 2,474.08**
18	**$ 219.26**	**$ 2,628.71**
19	**$ 109.63**	**$ 2,783.34**
20	**$ 0.00**	**$ 2,937.97**

Long term ownership costs of these important capital assets should include the future replacement cost. Depreciation of capital assets was common practice before the days of the credit card. Some property owners may struggle to meet current expenses let alone setting money aside to replace the roof, the furnace or the grinder pump. Nonetheless, it is important to plan for these major items and be prepared.

The table in Table 5 shows the straight line depreciation based on a pump "core" replacement cost of $2,083.00 spread over a 20 year period. Setting aside $104.15 per year covers the replacement cost at the end of the useful life. Allowing for service repairs in years 8-10 (MTBSC average) we set aside an additional $50.48 each year allowing for cost inflation for repairs over the 20 year life.

Over the life of the pump the owner should be able to pay for repairs and plan for the replacement of the core at the end of the useful life. If the service interval were to go beyond the projected time; then by year 15 the owner would have nearly invested or set aside the funds needed to replace the pump core in the event of a major repair or complete failure.

Figure 3



Graphically we can see the depreciation of the asset compared to the cost of maintenance and replacement. Based on Table 5 it would make sense that a repair estimate of say $900 in year 12 would generate a discussion regarding the expected life beyond this repair. Can enough life be projected to gain a return on this investment? In many cases the answer would be yes if the basic pump motor casting is sound and there are no major structural flaws.

Actual life expectancy of the pump core is dependent on the use habits and the installation issues at each location. Monitoring the service history of each location can

help in understanding if there are repeat calls for a particular reason that may or may not be able to be corrected.

Political and Economic Decisions

Since this paper was initially written before the Town had gone to Town Meeting, we had not been able to state the final outcome. The Town has since voted to enter into a pump inspection and maintenance contract. The Town has awarded a service contract that began on September 29, 2014. All pumps will be inspected over a 3 month period. Pump panels and alarms will be brought up to current standards with redundant alarms and generator connection capabilities. Pumps found to need repair will be serviced before major issues develop.

While this paper looks at average costs there are certainly times when a homeowner or business owner would have seen a repair bill that could exceed the "average". Maintaining pumps under a general service agreement will eliminate the major service charges to residents as costs are recovered over a longer term. Cost recovery will be through Sewer Use charges.

Marion, MA

As noted earlier in this paper the Town of Marion was required to establish a maintenance plan as part of the grant acceptance in 2004. This project was a focus of a presentation at NEWEA in 2006, presented at WEFTEC in 2007 and later published in the February 2008 WEF Journal **"Beyond Gravity- Lessons from the largest low-pressure sewer project in New England" by** *Deborah Primeau Mahoney, Thomas Parece, Jay Hall and Robert Zora.*

The following Excerpt is directly from the presentation given at NEWEA in 2006.

Homeowner Results

Homeowners had a certain amount of responsibility to maintain their units. But how the service agreement worked was easy and limited the amount of effort on the homeowner's part. Each grinder pump unit is equipped with an exterior mounted control panel as shown in Figure 4 to indicate alarm conditions. In alarm conditions residents call the number on the box, or the same number which is located on an O&M pamphlet given to the residences and F.R. Mahony, who the service agreement is with, will come out to the home and determine cause of the problem and how to fix it. In addition, each resident was provided with an interior alarm panel which will sound in case of high water.

Figure 4 – Typical Exterior Control Panel

Each resident was provided an O&M manual to help the Town and the residents know who is responsible for what and how to maintain their units. This O&M helps the Town with less frequent involvement in the process. The first year is still the residents trying to figure out who is in charge of what, however the Town has less O&M than if they would have put in any other type of system. This O&M manual includes winterization procedures and what to do in case of long down times. This also includes policies that the Town has put in place for proper maintenance and homeowners responsibilities with their grinder pumps, including specifications for personal generators.

Town of Marion Results

DPW Operations and Maintenance and Training program for DPW employees to be proactive in case a homeowner calls the DPW. As part of the Contract the Town had the Contractor buy three emergency generators, one for each neighborhood. In extreme emergency cases, these generators would allow the Town DPW staff to go to each neighborhood and pump down pumps while waiting for power to be restored such was in the case of Hurricane Bob where power was lost in the Town of Marion for a period greater than three days.

Since substantial completion of the project, the Town has experienced only a few resident calls mostly dealing with property restoration during the contractor's warranty period and only a handful of equipment warrantee issues.

LESSONS LEARNED

- *Client Education on Alternatives and Impacts*
- *Increased and Informative Public Education and Outreach*

- *Specific Requirements in Contract Documents Regarding Sequence of Construction, Resident Responsibility, Equipment Warranty, Equipment Guarantee, and Formalized Startup System (Sign Offs from Manufacturer)*
- *Responsive and Cooperative Resident Engineer*

- *Solid Relationships Between Town, Residents, Engineer, Field Resident, Contractor Manufacturer's Representative, and Manufacturer*
- *Modify Municipality Regulations and Standards for Installation of Grinder Pumps and LPS*
  Key to this project was the overall cost savings and timesaving from Pressure Sewers compared to construction of gravity sewers and several lift stations. *(End of Excerpt)*

Marion had its challenges to convince residents of the benefits of pressure sewers verses installing what were considered to be more conventional gravity sewer with multiple lift stations. Attempts were made by residents to stop the grinder pump installations and to force the project toward what some felt to be more reliable. The referenced article provides more details on this subject and demonstrates the cost advantage of installing pressure sewers.

While the funding argument was settled at a Town Meeting, there are some still that express concerns about reliability and remind Town officials of their feelings at times.

As stated in the presentation this project was completed in October 2006 and included a 5 year warranty from the Manufacturer, Environment One Corporation, Niskayuna, NY and local distributor F. R. Mahony & Associates, Inc. Rockland and Southbridge, MA.

Following the initial 5 year warranty an additional and renewable service agreement was executed between the Town of Marion and FRMA. Service data has been maintained for this 442 grinder pump population.

Service calls have been categorized as "Real Calls" for actual pump issues, "Warranty Calls" under the original 5 year warranty agreement, "Installer Issues" for calls related to wiring issues and other non-pump related problems. As an Example, some pumps were damaged by excavation or power cords were damaged as an example.

Table 6

TOWN OF MARION
GRINDER PUMP ANALYSIS

1/9/2014

		TOTAL	REAL SERVICE CALLS			WARRANTY SERVICE CALLS			INSTALLER ISSUES			
YEAR	PUMPS IN SERVICE	SERVICE CALLS	CALLS	%	CUM	CALLS	%	CUM	CALLS	%	CUM.	ANNUAL MTBSC
2005	118											
2006	439	7	0	0%	0	3	1%	3	4	1%	4	62.71
2007	441	22	1	0%	1	12	3%	15	9	2%	13	20.05
2008	441	21	1	0%	2	14	3%	29	6	1%	19	21.00
2009	442	37	4	1%	6	26	6%	55	7	2%	26	11.95
2010	443	28	7	2%	13	11	3%	66	10	2%	36	15.82
2011	444	35	10	2%	23	16	4%	82	9	2%	45	12.69
2012	445	41	31	7%	54	2	0%	84	8	2%	53	10.85
2013	450	42	33	8%	87	1	0%	85	8	2%	61	10.71
								AVERAGE MTBSC YEARS 2007 THRU 2013				14.72

Grinder pumps in Marion were installed at the same time by the general contractor performing the main service line work. Pumps were inspected prior to start-up. The startup included a visual inspection of the pump and testing to make certain that the pump was wired properly, had adequate power supply and operated within acceptable parameters. The relative low percentage of installer issues seen in Table 6 of 2% or less compares well against the installer issues in other installations.

The MTBSC average includes some grace period from the warranty. The current MTBSC exceeds the commonly predicted of 8-10 years.

Actual service costs beyond the initial 5 year warranty are shown in Table 7. Service costs are included in the sewer use budget for 'normal wear and tear'. The Town reviews service invoices with the service provider to determine if abuse or neglect issues are the cause of a call.

The Town will forward charges to residents when service is due to neglect or abuse. Normal service is supported by the Town and is presently funded in operating budgets.

Marion has a large percentage of seasonal homes. Seasonal dormancy may contribute to service issues of corrosion or moisture in controls when power is turned off for 3 months of the year. Residents are instructed on the proper winterization procedure to minimize these issues.

Table 7

MARION SERVICE COST PER PUMP

FISCAL YEAR	Service Cost Residents	Service Cost Town	Service Cost Total / Year	SERVICE CALLS	Cost Per Serviced Pump (4)	Comments	Average Annual Cost Per Installed Pump
2007	$ -	$ 1,682.68	$ 1,682.68				
2008	$ -	$ 4,104.47	$ 4,104.47	21	$ 195.45		$ 9.35
2009	$ 939.31	$ 2,387.51	$ 3,326.82	37	$ 89.91		$ 7.54
2010	$ 612.19	$ 2,597.95	$ 3,210.14	28	$ 114.65		$ 7.28
2011	$ 1,585.57	$ 6,792.04	$ 8,377.61	35	$ 239.36		$ 18.95
2012	$ -	$ 21,839.04	$ 21,839.04	41	$ 532.66		$ 49.30
2013	$ 272.63	$ 5,813.97	$ 6,086.60	42	$ 144.92		$ 13.71
				204			
TOTAL	**$ 3,409.70**	**$ 43,534.98**	**$ 46,944.68**	**34**	**$ 219.49**	**AVERAGE**	**$ 17.69**

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Additional research

As part of the preparation for this paper other communities were queried to gain understanding of ownership costs.

A survey form was sent to communities that currently manage pressure sewer systems asking the total number of grinder pumps in their system and if they are residential, commercial or industrial uses. The information provided was based on estimates of cost and age of these systems.

Palmer, MA **Figure 5**

Palmer has a customer base of 3,621 single family homes, 465 commercial properties and 4 industrial properties. Palmer reports they have a population of 60 grinder pumps averaging 10 years. The basins were actually installed over 18 years ago with a blend of 200 Series Environment One® pumps that were produced until 1996. The Town provides full maintenance and rebuilds pump cores.

Palmer is very unique as they fully rebuild pumps that are in for service and replace all wear parts when the core is in the shop.

Figure 5 shows a first generation 200 Series pump after a "Town of Palmer overhaul" beside a new "Extreme Series" Update core being sized up for future installation.

This level of service has been the practice until recently when the Town began to replace these older cores with the newer "Extreme Series" cores. The Town reports they spend between $5,000 and $10,000 per year maintaining grinder pumps or replacing the oldest with new cores.

Edgartown, MA

This seasonal community has 899 single family homes, 201 commercial properties and 0 industrial users. The rest of the customers are public buildings, churches and museums bringing the total customer base to 1,112.

Edgartown services 321 residential grinder pumps and 48 commercial grinder pump stations. The average age is balanced 1/3 (1-3 years), 1/3 (5-7 years) and 1/3 over 10 years.
Edgartown estimates the annual expense to maintain the grinder pumps at $12,500 with an additional $3,600 to $7,900 spent repairing main lines from damage by excavators and landscapers.

Because of the unique location and limited access to Edgartown, Edgartown staff has been factory trained to perform some service locally. They are supported by the local Distributor F. R. Mahony & Associates, Inc. From this report we see costs to maintain the pumps in Edgartown averages $33.87/year. This lower cost is due in part to the local service work performed by the plant staff which avoids travel charges that would otherwise be included in service costs. Labor costs are part of the operating budget. There is no revolving fund system in place to recover the cost of labor; therefore labor is not counted in the total maintenance cost.

Conclusions

Knowing rather than fearing the true cost of maintenance better equips towns to engage in the discussion to embrace the servicing of grinder pumps in their system. The actual service cost is very manageable as can be seen by these examples.

Installer training and startup inspections play a key component in low service costs.

The Town of Chelmsford has to deal with a blend of betterment assessment issues that evolved over time. They also have to address if their potential involvement of private grinder pumps opens the door to issues with the private condominium association's lift stations. Other issues that come to the surface are the overall responsibility to gravity sewer customers who may presently rely on their plumber or drainlayer for service. Policy changes will be difficult to implement and satisfy all the residents' issues or desires.

The Town of Marion case was much cleaner. The Town needed to accept the maintenance through increased staffing or contract these services in order to receive State funding. Marion chose the latter and works with and supports the service provider. Assessments were dealt with during the project construction. This timing made things much easier and left little to question.

System owners should be involved with the pressure sewer system though specifications, construction and startup. Pressure Sewers are a "system" requiring the understanding and proper management of the all components.

Support and education for the residents is crucial to the projects' success. While it may sound easy to simply draw a line at the pipe connection or the property line, the long term success depends on everyone fully understanding how these systems work.

Keys to successful installation:

- Active owner involvement
    - Know how the system works and what they can expect
    - Learn how they can help make the project successful
    - Develop a partnership between Owner, Engineer, Contractor, and Suppler
- Education of residents
    - How the system works and the limitations
    - What they can expect
    - How they can help make their installation successful
- Proper training for installers and Startup Inspections
    - Solve problems before they become major issues
    - Verify performance
    - Reduce issues ranging from external issue of inflow, improper grading, wiring issues and much more

At the beginning of this paper it was suggested that we have fallen short in the proper management or maintenance of the 75 million private lateral connections in the United States.

"If we always do what we've always done, we'll always get what we have always gotten."
-Unknown

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