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October 14, 2010

Office of Community Development
Homer Municipal Building
19 Moore Street
Belmont, Massachusetts 02478
Attn: Mr. Glenn Clancy, Director

Subject: Belmont, Massachusetts
Evaluation of Sewers and Storm Drains to Identify Illicit Connections in Areas Tributary to Outfalls 1, 2 & 10
**Report of Findings**

Dear Mr. Clancy:

This Report of Findings (ROF) outlines Fay, Spofford & Thorndike's (FST) sewer and storm drain investigations to identify illicit connections in areas tributary to Unity Ave. (Outfall 1), Huron Ave. (Outfall 2) and Winn's Brook (Outfall 10). Various neighborhoods in these areas have undergone sewer and storm drain rehabilitation including lining, service and mainline replacements, point repairs and manhole replacements. However, as described in the "2008 Storm Water Sampling and Analysis Program", December 2008 report, contamination levels at these outfalls have improved but are still above the DEP threshold (235 E. Coli Colonies per 100 mL Sample). This ROF includes a summary of investigations performed in each tributary area and provides recommendations for rehabilitation and/or further investigations.

## METHODOLOGY

In accordance with the recommendations of the 2008 report, areas that consistently exceeded 5,000 E. Coli colonies per 100mL (E. Coli) were the targets of these investigations. Building inspections, dyed-water testing and CCTV inspection were used to identify direct (sewer service connected to storm drain) and indirect (defect in sewer service or mainline exfiltrating to the storm drain) illicit connections.

In areas that have undergone previous rehabilitation, inspections and dyed-water testing were conducted in buildings originally flagged as direct or indirect sources during the 2001/2002 dyed-water testing program. CCTV inspection was not conducted in these areas. In new areas (i.e. no previous rehabilitation), inspection and dyed-water testing was attempted at all of the buildings. Sewers and storm drains in new areas were CCTV inspected, including with dyed-water flooding were applicable (i.e. sewer located above drain).

### Building Inspections & Dyed-Water Testing

Building inspections consist of a thorough inspection of basement sewer plumbing to identify all discharge locations from the house. The dyed-water test involves introducing dyed-water into a plumbing fixture, typically a sink or toilet. An inspector then monitors the downstream sewer and storm drain manholes in the vicinity of the building to determine the discharge location. For buildings with multiple sewer stacks, a separate dyed-water test was conducted for each stack.

### CCTV Inspection and Dyed-water Flooding

CCTV inspection establishes the condition of the pipe section and identifies exact locations of exfiltration point sources in the sewer (i.e. holes or cracks). Dyed-water flooding involves introducing large quantities of dyed-water into an upstream sewer manhole to simulate a surcharged or heavy flow condition. During CCTV inspection, the dyed-water may be observed leaking into the storm drain if an exfiltration source is present in the above sewer.

## RESULTS AND RECOMMENDATIONS

Dyed-water testing and CCTV inspection results are provided in Tables 1 and 2, respectively, and illustrated in Figures 1-4. In the figures, target areas are identified by sample numbers, which are provided along with the highest sample result recorded (E. Coli). For each individual sanitary sewer and storm drain section, Table 2 provides a detailed description of the recommended rehabilitation. Table 3 summarizes the complete sampling data for each location.

Figure 5 displays a graphical summary of all sewer and storm drain replacement and lining completed to date, inclusive of current Contract 1 - Sewer and Storm Drain Rehabilitation Wellington Brook Tributary Area. The results and recommendations for each tributary area are discussed below.

### OUTFALL AREA 1 (Figure 1)

18 - Houses Targeted for Dyed-Water Testing
17 - Negative (to sewer)
1 - Positive (indirect)

**Payson Road at Fairview Avenue (Sample OF1E2B)**
Approximately 300' of sewer and 690' of storm drain were CCTV inspected upstream of Sample OF1E2B. CCTV inspection showed both the sewer and the storm drain to be in fair to good condition. One sewer exfiltration point source was identified at a moderate/severe crack. However, with the sewer installed below the storm drain, the mainline does not appear to be a contributor of contamination. Sewer services from the targeted buildings were successfully dyed-water tested and showed no contamination to the storm drain. Table 3 shows that only the first of 5 samples returned a high E. Coli number (>15,000).

*As a result of these investigations, we do not believe a significant illicit connection exists in this area. To maintain structural integrity, we recommend two sewer point repairs and the lining of one section (172'). Refer to Table 2 for details.*

**Fairview Avenue between Payson Road and Lewis Road (Sample OF1E3D)**
Dyed-water tracing identified 58 Van Ness Rd. (service to Van Ness Rd.) as an indirect source upstream of Sample OF1E3D. Sewer section 03S022-03S007 on Van Ness Rd. was televised and dyed-water flooded. However, the CCTV inspection was incomplete due to access limitations and broken service connection and did not reach the service from 58 Van Ness Rd. Dyed-water flooding identified no contamination to the storm drain, indicating the contamination emanates from the sewer service at 58 Van Ness Rd. House 58 was dyed-water tested in 2001/2002 with no dye observed in the storm drain. Both the sewer and storm drain mainlines on Fairview Ave. have been lined to Payson Rd. A 10" VCP drain that tees into the mainline, approximately 290 ft from 03D008, has steady flow but its origin is unknown.

*We recommend replacement of the broken service connection to complete CCTV inspection of section 03S022-03S007 and the sewer service at 58 Van Ness Rd. The Town may also consider installation of a manhole on the 10" VCP drain to allow CCTV inspection.*

**OUTFALL AREA 2 (Figure 2)**

113 - Houses Targeted for Dyed-Water Testing
88 - Negative (to sewer)
2 - Positive (direct)
9 - Positive (indirect)
3 - Undetermined (not in sewer or storm drain)
11 - No Inspection

All streets tributary to Dalton Rd. including Washington St., Sharpe Rd., Shaw Rd., Livermore Rd., Betts Rd., Grosvenor Rd. and Sargent Rd. exhibited dry weather storm drain samples greater than 15,000 E. Coli colonies per 100 mL. All but two tributaries along Dalton Rd. had dyed-water identified in the storm drain from either a direct or indirect source. The sewer in this area is generally located above the storm drain, allowing sewage exfiltration to easily infiltrate the storm drain below. With the exception of Sharpe Rd. and one section on Grosvenor Rd., the sewer mainlines in this area have been either replaced or lined based on previous illicit connection investigations.

**Sharpe Road (Sample 10A)**
Approximately 655' of sewer and 670' of storm drain were CCTV inspected upstream of Sample 10A. The sewer is located above the storm drain and is in poor condition. Many exfiltration sources were identified including moderate cracks and severely broken pipe sections at the invert. Sewer services from the targeted houses were successfully dyed-water tested and showed no contamination to the storm drain. Strangely, at 22 Sharpe Rd., dye was not identified in either the sewer or the storm drain, possibly due to a blockage.

*We recommend lining of sewer sections 20S037-20S034 (510') on Sharpe Rd. and CCTV inspection of the service from house 22. One point repair and four service replacements are required prior to lining. One storm drain point repair is also required. Refer to Table 2 for details.*

**Washington Street (Sample 11A)**
Upstream of Sample 11A all sewer mainlines have been lined. Dyed-water testing showed three buildings to be indirect sources (186, 187, 192 Washington). One building at 215 Washington St produced an inconclusive dyed-water test due to the slope of the service (standing dyed-water was present in a service manhole in the yard). One building was not dyed-water tested.

*We recommend CCTV inspection of the sewer services from house numbers 186, 187 and 192 Washington St.*

**Shaw Road (Sample 18D & 19A)**
Two indirect sources were identified upstream of Sample 18D. Dyed-water testing revealed one source to be the sewer service at 35 Shaw Rd. House 35 was dyed-water tested in 2001/2002 with no dye observed in the storm drain. The other source was a short section of non-rehabilitated sewer (09S064-09S032) that connects the sewer service at 12 Shaw Rd. to the mainline. CCTV inspection shows exfiltration sources evident by intruding roots at the joints. Two buildings were not dyed-water tested.

Upstream of Sample 19A, dyed-water testing showed sewer services at 56 and 63 Shaw Rd. to be indirect sources. Houses 56 and 63 were dyed-water tested in 2001/2002 with no dye observed in the storm drain.

*We recommend replacement of section 09S064-09S032 (16') and CCTV inspection of the sewer services from house numbers 35, 56 and 63 Shaw Rd.*

**Livermore Road (Sample 7B & 8B)**
Dyed-water testing showed all but three buildings upstream of Sample 7B connected to the sewer. 106 & 109 Shaw Rd. were not inspected or dyed-water tested. At 21 Livermore Rd., dyed-water was not identified in either the sewer or the storm drain. The 2001/2002 dyed-water testing program determined 109 to be an indirect source while no dye was observed in the storm drain from 106 and 21.

Investigations upstream of Sample 8B identified a direct connection from 69 Livermore Rd. and an indirect connection from 64 Livermore Rd. The 2001/2002 dyed-water testing program also determined 64 to be an indirect source, but no dye was observed in the storm drain from 69. According to the owner of 69 Livermore, the house has undergone significant renovations since the 2001/2002 investigations, including modifications to the main plumbing stack. The owner maintains that all work was done with proper permitting. However, we believe the plumbing stack may have been relocated and inadvertently connect to the drain service. One building was not dyed-water tested.

*We recommend the Town verify that the plumbing in house number 69 Livermore Rd. has been installed in accordance with the plumbing code and direct the owner to correct any deficiencies. We also recommend CCTV inspection of the sewer services from house numbers 109 Shaw and 21 & 64 Livermore and continued efforts to dyed-water test 106 & 109 Shaw.*

**Betts Road (Sample 5B & 6B)**

Upstream of Sample 5B, one indirect source was found at 22 Betts Rd. 22 Betts was categorized as a direct connection during the 2001/2002 dyed-water testing program and, consequently, the service was replaced to 37' in 2004. One building was not dyed-water tested.

A direct source was found from 64 Betts Rd., upstream of Sample 6B. Dyed-water placed in the sewer service was observed coming back into the house through a perimeter drain and then entering the storm drain service (cover photo). No dye was observed in the sewer main. It appears the sewer service is significantly damaged. 64 Betts was categorized as an indirect connection during the 2001/2002 dyed-water testing program.

*We recommend CCTV inspection of the sewer services from house numbers 22 and 64 Betts Rd. At 22 Betts, it is possible that the cast iron portion of the service, close to and under the house, has developed a leak. Replacement of at least a portion of the sewer service at 64 Betts Rd. appears likely.*

**Grosvenor Road (Sample 3B2)**

Approximately 227' of sewer and 241' of storm drain were CCTV inspected upstream of Sample 3B2. The sewer is located above the storm drain and has two potential exfiltration point sources of moderate and severe broken pipe. Downstream sewer manhole 09S004 is potentially exfiltrating from the pipe connections.

*We recommend lining of section sewer 09S010-09S004 (227') and rehabilitation of manhole 09S004.*

**Sargent Road (Sample 3B1)**

All houses upstream of Sample 3B1 were inspected and dyed-water tested with no dye observed entering the storm drain. The entire sewer on Sargent Rd. (2 sections) has been replaced or lined.

*We recommend rehabilitation of manholes 09S005 and 09S006 as a final mitigation measure in this area.*

**Dalton Road**

House 253 Washington St. is determined to be an indirect source. This house has three separate plumbing stacks installed below the floor slab. Each stack was separately dyed-water tested with two showing 100% dyed-water to the storm drain on Dalton Rd. and one showing dyed-water to both the sewer and the storm drain on Dalton Rd. The sewer on Dalton was lined in 2006. Review of CCTV video from 2006 project shows no storm drain connections in the vicinity of 253 Washington, and therefore no direct connection. The sewer video shows two services in the

vicinity of 253, although, it is unclear from the video if both services were active (both were reinstated after lining). The sewer service(s) from 253 crosses over the storm drain.

*We recommend CCTV inspection of the sewer service(s) from house number 253 Washington St. Given that two of the dyed-water tests went 100% to the storm drain, we suspect a service break close to the storm drain in the street. Replacement of at least a portion of the sewer service(s) at 253 Washington St. appears likely.*

**OUTFALL AREA 10 (Figures 3 & 4)**

75 - Houses Targeted for Dyed-Water Testing
64 - Negative (to sewer)
1 - Positive (direct)
5 - Positive (indirect)
5 - No Inspection

**Claflin Street (Sample 13E)**
Approximately 720' of sewer and 790' of storm drain were CCTV inspected upstream of Sample 13E. The sewer was in fair to poor condition and the storm drain good to fair condition. In general, the storm drain is installed above and offset from the sewer. At the intersection of Claflin St. and Alexander Ave., the storm drain crosses under the sewer. This section of sewer on Alexander Ave. (34S035.1-34S035) was dye flooded during televising of the storm drain with no dye observed in the storm drain. This procedure was also performed in sewer sections 34S032 to 34S030 with similar negative results. All buildings dyed-water tested were connected to the sewer.

*As a result of these investigations, we do not believe a significant illicit connection exists in this area. To maintain structural integrity, we recommend the lining of three 8-inch sewer sections (510') and one 15-inch storm drain section (276'). One point repair and one service replacement are also required. Refer to Table 2 for details. Sewer section 34S035.1-34S035 on Alexander is scheduled for lining in 2011 as part of the Winn's Brook Sewer Overflow Mitigation project.*

**Pleasant Street to Munroe Street (Sample 9E3)**
Approximately 418' of sewer and 688' of storm drain were CCTV inspected upstream of Sample 9E3. The sewer was in fair condition with some minor/moderate cracks, intruding roots at some joints and one collapsing pipe section. The storm drain was in good condition with only some minor cracks. Sewer section 47S018-47S017 was dye flooded during the televising of the storm drain with no dye observed in the storm drain. Dyed-water testing identified no sources, with two buildings not inspected.

*We recommend lining of sewer sections 47S018-47S017 and 43S006-43S008 (418' total). One point repair and two service replacements are required prior to lining.*

**Chilton Street to Cowdin Street (Sample 9B6)**
Approximately 524' of sewer and 510' of storm drain were CCTV inspected upstream of Sample 9B6. Both the sewer and storm drain were in overall fair to poor condition. Sewer section 44S006-44S007 had offset joints with roots intruding along with a minor sag and some cracks exhibiting potential exfiltration sources. Dyed-water testing identified two indirect sources upstream of Sample 9B6. Both indirect sources, house nos. 22 and 23 Chilton St., are connected to deteriorated section 44S006-44S007 described above.

*We recommend the lining of sewer sections 44S006-44S009 and storm drain sections 44D005-44D015 (925' total) and three service replacements. We also recommend CCTV inspection of the sewer services from house numbers 22 and 23 Chilton St.*

**Sherman Street (Sample 5B)**
Approximately 524' of sewer and 510' of storm drain were CCTV inspected in the vicinity of sample 5B. The sewer and storm drain appeared to be in overall good condition. The sewer was dye flooded from manhole 37S022 during televising of the storm drain with no dye observed in the storm drain. Dyed-water testing identified two indirect sources upstream of Sample 5B from house 99 Sherman St. and 70 Waterhouse Rd. Both houses identified as an indirect source have sewer and storm drain services in close proximity to each other, with the storm drain located below the sewer.

*We recommend CCTV inspection of the sewer and storm drain services from house numbers 99 Sherman St. and 70 Waterhouse Rd. One structural storm drain point repair is also required.*

**Westlund Road (Sample 3B)**
All buildings upstream of Sample 3B were inspected and dyed-water tested with no sources identified. The entire sewer on Westlund Rd. (3 sections) has been replaced or lined. However, flow in the sewer is sluggish and standing sewage is evident in sewer manhole 37S030. The storm drain under manhole 37S030 (37D050-37D053) has not been rehabilitated. It is plausible that sewage is slowly exfiltrating from manhole 37S030 and not observed in the dyed-water testing.

*We recommend rehabilitation of manholes 37S029, 37S030 and 37S031 as a final mitigation measure in this area.*

**Waterhouse Road to Hoitt Road (Sample 4H)**
Dyed-water testing identified two sources upstream of Sample 4H. A direct connection was found at 67 Hoitt Rd. and an indirect connection from 55 Hoitt Rd. House 67 was dyed-water tested in 2001/2002 with no dye observed in the storm drain. House 55 was not dyed-water tested in 2001/2002. House no. 45 Waterhouse Rd. was not dyed-water tested during these or the 2001/2002 investigations. All sewer sections upstream of Sample 4H have been lined.

*We recommend the sewer service be disconnected from the storm drain and reconnected to the sewer. The sewer is approximately 1'-6" above the storm drain so that complete relaying of the*

*service and internal plumbing modifications may be necessary for a gravity service to be maintained. We also recommend CCTV inspection of the sewer service from house number 55. Entry to 45 Waterhouse is required for 100% complete dyed-water testing in this area.*

## CONTINUED SAMPLING PROGRAM

The sampling program continued in areas below 5,000 E. Coli to establish a more complete database. The results and recommendations of the continued sampling program are discussed below. Sampling results are presented in Table 3.

### OUTFALL AREA 2

Continued sampling at locations 12A (Elm/Foster) and 17A1 (Washington/Jackson) showed consistent low concentrations of E. Coli. *As a result of these investigations, we do not believe a significant illicit connection exists in these areas.*

Location 6H1 (Betts/Audrey) showed mixed results with some samples exceeding 5,000 E. Coli. The sewer in Audrey road has been lined and all houses confirmed connected to the sewer by the 2001 dyed-water testing program. However, as demonstrated by the case of 69 Livermore and 67 Hoitt, conditions may have changed following the 2001/2002 dyed-water tests. *Therefore, we recommend the eleven (11) houses tributary to 6H1 be dyed-water tested again.*

Similarly, location 4H (Dalton/Grosvenor) showed mixed results. The sewer on Dalton, Bacon (to Woods) and Woods has been lined and all houses confirmed connected to the sewer by the 2001/2002 dyed-water testing program. To date, no investigations have been conducted upstream on Bacon (past Woods) due the storm drain being dry (i.e. no samples collected). However, during this program, one sample was collected and showed greater than 30,000 E. Coli. *We recommend the thirteen (13) houses upstream of Bacon/Woods be dyed-water tested. We also recommend CCTV inspection of the sewer and storm drain in this area (approximately 1,025').*

### OUTFALL AREA 10

Continued sampling at locations 7B (Sherman/Dean), 9C2 (Munroe), 10A (Chilton/Dean) and 13B3 (Claflin from Leonard) showed consistent low concentrations of E. Coli. *As a result of these investigations, we do not believe a significant illicit connection exists in these areas.*

Locations 1E (Brighton/Hoitt) and 1F1 (Brighton/Cross) showed mixed results with 5 of 8 samples exceeding 5,000 E. Coli. *We recommend the twenty-one (21) houses along this storm drain be dyed-water tested. We also recommend CCTV inspection of the sewer and storm drain in this area (approximately 2,020').*

Almost all of the sewer mains and service connections in the area tributary to sample location 2D (Statler/Newcastle) are being replaced as part of the Winn's Brook Sewer Overflow Mitigation project. The project is anticipated to be complete by July 2011. *We recommend location 2 be resampled in July 2011 upon completion of the ongoing project.*

Locations 9C and 9A1 are downstream of confirmed illicit sources in the vicinity of Cowdin St. *We recommend locations 9C and 9A1 be resampled in upon completion of the rehabilitation work on Cowdin St.*

## SUMP PUMPS

Building inspections identified numerous sump pumps illegally connected to the sewer system as noted in Table 4. Fifteen (15) of the illicit sump pumps identified are not currently included in recommended SSES work. FST recommends these locations be added to any future sump pump removal program conducted by the Town.

## SUMMARY OF RECOMMENDED WORK & OPINION OF PROBABLE COST

FST's opinion of probable cost (OPC) to implement the recommended scope of additional investigations is **$75,100**. A detailed breakdown is presented in Table 5 and summarized below:

- 3,045 ft sewer and storm drain CCTV inspection
- 48 house inspections/dyed-water tests (includes unsuccessful attempts from these investigations)
- 19 sewer service CCTV inspections

The design and construction OPC is based on inclusion of the recommended work into a larger sewer rehabilitation contract. Including contractor's overhead & profit, engineering services, contingencies and police details, the OPC is approximately **$752,000**. A detailed breakdown is presented in Table 6 and summarized below:

- 2,360 ft sewer lining
- 680 ft storm drain lining
- 16 ft sewer replacement
- 7 point repairs
- 11 service replacements (main to edge of roadway)
- 1 service replacements (main to house)
- 19 probable service lining or replacements (CCTV required)
- 6 manhole rehabilitations

The recommended additional investigations can commence at any time. CCTV inspection of the 19 suspect services is required to complete design of the rehabilitation work. As previously mentioned, we recommend combining the illicit connection rehabilitation work into one construction contract with I/I removal related sewer rehabilitation.

We are available to meet with you to discuss the findings of this report at any time upon your request.

Very truly yours,
FAY, SPOFFORD & THORNDIKE, LLC.
By

Justin D. Gould, P.E.
Senior Principal Engineer

cc: Mr. Kevin Brander, MADEP

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# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 1
## RESULTS OF DYED - WATER TESTING
## MAY / JUNE 2009

| Outfall No. | Address | | No. of Tests Conducted | Dye Test Entry | Dye Discharge | | | | Sump Pumps | Sump Pump Discharge | Other Pipes | Sump Pit | Flow in Storm Drain |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Street | | | % Sewer | % Storm Drain | Direct/Indirect Connnection | Contaminate Source | | | | | |
| 1 | 267 | Payson Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 1 | 269 | Payson Road | 1 | Basement Sink | 100 | 0 | | | | | | 1 | Yes |
| 1 | 271 | Payson Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 1 | 275 | Payson Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 1 | 302 | Payson Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 1 | 308 | Payson Road | 2 | Basement Toilet, First Floor Sink | 100 | 0 | | | | | | | Yes |
| 1 | 314 | Payson Road | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 1 | 324 | Payson Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 1 | 50 | Pequossette Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 1 | 53 | Pequossette Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 1 | 146 | Fairview Ave | 1 | Basement Sink | 100 | 0 | | | | | Open Pipe | 1 | Yes |
| 1 | 157 | Fairview Ave | 1 | First Floor Toilet | 100 | 0 | | | | | | | No |
| 1 | 160 | Fairview Ave | 1 | Basement Sink | 100 | 0 | | | | | Separate Drain Pipe | | Yes |
| 1 | 165 | Fairview Ave | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 1 | 179 | Fairview Ave | 1 | Basement Sink | 100 | 0 | | | | | Separate Drain Pipe | | Yes |
| 1 | 58 | Van Ness Road | 1 | First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 1 | 55 | Van Ness Road | 1 | First Floor Sink | 80 | 20 | Indirect | Adjacent Drain Service | 1 | Ground Surface | | 1 | Yes |
| 1 | 75 | Stults Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | Open Pipe | 1 | Yes |
| 2 | 22 | Sharpe Road | 2 | Basement Toilet (2) | 100 | 0 | | | | | | | Yes |
| 2 | 10 | Sharpe Road | 2 | Basement Toilet, First Floor Toilet | 0 | 0 | Inconclusive | Defective Sewer Service | | | | | Yes |
| 2 | 11 | Sharpe Road | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 16 | Sharpe Road | 1 | Basement Toilet | 100 | 0 | | | | | | 1 | Yes |
| 2 | 19 | Sharpe Road | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 23 | Sharpe Road | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 192 | Washington Street | 1 | Basement Sink | 70 | 30 | Indirect | Defective Sewer Service | | | | | Yes |
| 2 | 186 | Washington Street | 1 | Basement Sink | 80 | 20 | Indirect | Defective Sewer Service | 1 | Ground Surface | | | Yes |
| 2 | 187 | Washington Street | 2 | Basement Sink, First Floor Toilet | 98 | 2 | Indirect | Defective Sewer Service | | | | 1 | Yes |
| 2 | 215 | Washington Street | 2 | Basement Toilet, First Floor Toilet | 0 | 0 | Inconclusive | Defective Sewer Service | | | | | Yes |
| 2 | 175 | Washington Street | 1 | Basment Sink | 100 | 0 | | | 1 | Sanitary Sewer | | 1 | Minimal |
| 2 | 181 | Washington Street | 1 | First Floor Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 182 | Washington Street | 1 | Basement Sink | 100 | 0 | | | 2 | Into Ground | | 2 | Yes |
| 2 | 198 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 219 | Washington Street | 1 | Basement Sink | 100 | 0 | | | 2 | Ground Surface | | 2 | Yes |
| 2 | 228 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 231 | Washington Street | 1 | Basement Sink | 100 | 0 | | | 2 | Sanitary Sewer | Separate Drain Pipe | 1 | Yes |
| 2 | 232 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | | 2 | Yes |
| 2 | 237 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | Separate Drain Pipe | | Yes |
| 2 | 240 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | Separate Drain Pipe | | Yes |
| 2 | 245 | Washington Street | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 248 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 254 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 275 | Washington Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 303 | School Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 316 | School Street | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 56 | Shaw Road | 1 | Basement Toilet | 95 | 5 | Indirect | | 1 | Ground Surface | | | Yes |
| 2 | 63 | Shaw Road | 2 | Basement Sink, First Floor Toilet | 85 | 15 | Indirect | Defective Sewer Service | | | | 1 | Yes |
| 2 | 62 | Shaw Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | | | | 1 | Yes |
| 2 | 35 | Shaw Road | 1 | First Floor Toilet | 85 | 15 | Indirect | Defective Sewer Service | | | | | Yes |
| 2 | 12 | Shaw Road | 3 | Basement Sink (2), First Floor Toilet | 90 | 10 | Indirect | Sewer Section (09S064-09S032) | 1 | Storm Drain MH | | 1 | Yes |
| 2 | 9 | Shaw Road | 2 | Basement Sink, Second Floor Tub | 100 | 0 | | | | | | | Minimal |
| 2 | 19 | Shaw Road | 2 | Basement Sink, Second Floor Shower | 100 | 0 | | | | | Basement Drain | | Yes |
| 2 | 24 | Shaw Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 25 | Shaw Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 2 | 36 | Shaw Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 42 | Shaw Road | 2 | Basmement Sink (2) | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 43 | Shaw Road | 2 | Basement Sink, Second Floor Tub | 100 | 0 | | | | | | | Yes |

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 1
## RESULTS OF DYED - WATER TESTING
## MAY / JUNE 2009

| Outfall No. | Address | | | | Dye Discharge | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Street | No. of Tests Conducted | Dye Test Entry | % Sewer | % Storm Drain | Direct/Indirect Connnection | Contaminate Source | Sump Pumps | Sump Pump Discharge | Other Pipes | Sump Pit | Flow in Storm Drain |
| 2 | 21 | Livermore Road | 2 | Basement Toilet, First Floor Toilet | 0 | 0 | Inconclusive | Defective Sewer Service | 2 | Ground Surface | | 2 | No |
| 2 | 9 | Livermore Road | 2 | First Floor Toilet (2) | 100 | 0 | | | 1 | Ground Surface | | 1 | No |
| 2 | 20 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 2 | 26 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 2 | 29 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 2 | 32 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | No |
| 2 | 38 | Livermore Road | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 39 | Livermore Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 44 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | 2 | Sanitary Sewer, Ground Surface | Separate Drain Pipe | 2 | Yes |
| 2 | 47 | Livermore Road | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 50 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 9 | Houghton Road | 3 | Basement Sink (2), Basement Toilet | 100 | 0 | | | | | | | Standing Water |
| 2 | 10 | Houghton Road | 1 | Basement Sink | 100 | 0 | | | | | | | Standing Water |
| 2 | 16 | Houghton Road | 2 | Basement Toilet, First Floot Toilet | 100 | 0 | | | | | | | Standing Water |
| 2 | 92 | Shaw Road | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 97 | Shaw Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 98 | Shaw Road | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | | | Minimal |
| 2 | 103 | Shaw Road | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 112 | Shaw Road | 2 | Basement Sink, First Floor Sink | 100 | 0 | | | | | Basement Drain | | Yes |
| 2 | 64 | Livermore Road | 2 | Basement Sink, Basement Sink | 80 | 20 | Indirect | Defective Sewer Service | 1 | Ground Surface | | 1 | Yes |
| 2 | 69 | Livermore Road | 2 | Basment Sink, Second Floor Tub | 0 | 100 | Direct | Direct to Strom Drain | 1 | Ground Surface | | 1 | Yes |
| 2 | 54 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 55 | Livermore Road | 1 | First Floor Sink | 100 | 0 | | | | | | | Yes |
| 2 | 60 | Livermore Road | 3 | Basement Sink, First Floor Sink, Second Floor Sink | 100 | 0 | | | | | | | Yes |
| 2 | 70 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | | | | | Standing Water |
| 2 | 79 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Standing Water |
| 2 | 84 | Livermore Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Standing Water |
| 2 | 10 | Hartley Road | 1 | Basement Sink | 100 | 0 | | | 1 | Sanitary Sewer | Separate Drain Pipe | 1 | No |
| 2 | 15 | Hartley Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | No |
| 2 | 22 | Hartley Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 2 | 9 | Herbert Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 2 | 10 | Herbert Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 2 | 14 | Herbert Road | 1 | Basement Sink | 100 | 0 | | | | | Open Pipe | | No |
| 2 | 64 | Betts Road | 1 | Basement Sink | 0 | 100 | Direct/Indirect | Adjacent Drain Service | | | | | No |
| 2 | 61 | Betts Road | 3 | Basement Sink, First Floor Toilet, Second Floor Sink | 100 | 0 | | | | | Open Pipe, Basement Drain | 1 | Yes |
| 2 | 91 | Betts Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 22 | Betts Road | 1 | Basement Sink | 90 | 10 | Indirect | Defective Sewer Service | | | | | Yes |
| 2 | 27 | Betts Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 2 | 28 | Betts Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | 1 | Dry Well | Basement Drain | 1 | Yes |
| 2 | 33 | Betts Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 39 | Betts Road | 1 | Basement Sink | 100 | 0 | | | 2 | Sanitary Sewer | | 2 | Yes |
| 2 | 40 | Betts Road | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 45 | Betts Road | 1 | Basement Sink | 100 | 0 | | | | | Open Pipe | | Yes |
| 2 | 49 | Betts Road | 1 | First Floor Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 2 | 45 | Grosvenor Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 3 | Sargent Road | 1 | Basement Sink | 95 | 5 | Indirect (mainline) | Defective Manhole-Pipe Conn. | 1 | Ground Surface | | 1 | Yes |
| 2 | 8 | Sargent Road | 1 | First Floor Sewer Stack | 90 | 10 | Indirect (mainline) | Defective Manhole-Pipe Conn. | 2 | Unknown | Foundation Drain to new Sump Pits | 2 | Yes |
| 2 | 14 | Sargent Road | 2 | Basement Sink | 90 | 10 | Indirect (mainline) | Defective Manhole-Pipe Conn. | 1 | Ground Surface | | 1 | Yes |
| 2 | 21 | Sargent Road | 1 | Basement Sink | 90 | 10 | Indirect (mainline) | Defective Manhole-Pipe Conn. | | | Basement Drain | | Yes |
| 2 | 2 | Sargent Road | 1 | Basement Sink | 100 | 0 | | | 1 | Sanitary Sewer | | 1 | Yes |
| 2 | 9 | Sargent Road | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 15 | Sargent Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 20 | Sargent Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 26 | Sargent Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 1
## RESULTS OF DYED - WATER TESTING
## MAY / JUNE 2009

| Outfall No. | Address | | | | Dye Discharge | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Street | No. of Tests Conducted | Dye Test Entry | % Sewer | % Storm Drain | Direct/Indirect Connnection | Contaminate Source | Sump Pumps | Sump Pump Discharge | Other Pipes | Sump Pit | Flow in Storm Drain |
| 2 | 253 | Washington Street | 3 | Basement Sink, First Floor Sink, First Floor Toilet | 50(100) | 50(0) | Direct (2) & Indirect | 2 - Direct to Storm Drain & 1 - Indirect to Storm Drain | | | | | Yes |
| 2 | 127 | Dalton Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 134 | Dalton Road | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | 1 | Into Ground | | 1 | Yes |
| 2 | 145 | Dalton Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 146 | Dalton Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 151 | Dalton Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 2 | 188 | Dalton Road | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 2 | 193 | Dalton Road | 2 | Basement Sink; First Floor Toilet | 100 | 0 | | | 1 | Ground Surface | Basement Drain | 1 | Yes |
| 2 | 195 | Dalton Road | 1 | Basement Sink | 100 | 0 | | | 2 | Sanitary Sewer | | 2 | Yes |
| 2 | 215 | Dalton Road | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 56 | Claflin Street | 2 | Basement Sink; First Floor Toilet | 100 | 0 | | | 2 | Sanitary Sewer, Septic Tank | | 2 | Yes |
| 10 | 60 | Claflin Street | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 10 | 68 | Claflin Street | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | 1 | Unknown | | 1 | Yes |
| 10 | 73 | Claflin Street | 2 | Basement Toilet, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 10 | | Leonard Street Fire Station | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 10 | | Leonard Street Verizon Bldg. | 2 | Basment Toilet (2) | 100 | 0 | | | | | | | Yes |
| 10 | | Locatelli Properties | 2 | Basement Toilet (2) | 100 | 0 | | | | | | | Yes |
| 10 | | Intersection of Claflin St & Alexander Ave | 1 | SMH 34S035.1 | 100 | 0 | | | | | | | Yes |
| 10 | 51 | Alexander Avenue | | No Test Conducted | | | | | | | | | Yes |
| 10 | 52 | Alexander Avenue | | No Test Conducted | | | | | | | | | |
| 10 | 15 | Munroe Street | 2 | Basement Sink, Basment Toilet | 100 | 0 | | | 1 | Ground Surface | Basement Drain | 1 | |
| 10 | 421 | Pleasant Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 422 | Pleasant Street | 2 | Basement Sink, Basment Toilet | 100 | 0 | | | | | | | No |
| 10 | 425 | Pleasant Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 432 | Pleasant Street | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | | | | | No |
| 10 | 193 | Claflin Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 22 | Chilton Street | 3 | Basement Sink and Toilet, First Floor Sink | 80 | 20 | Indirect | | 1 | Unknown | | 1 | No |
| 10 | 23 | Chilton Street | 2 | Basement Sink, First Floor Toilet | 80 | 20 | Indirect | | | | | | Yes |
| 10 | 9 | Chilton Street | 2 | Basement Toilet, First Floor Sink | 100 | 0 | | | | | | | Yes |
| 10 | 10 | Chilton Street | 3 | Basement Sink, Basement Toilet, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 15 | Chilton Street | 3 | Basement Toilet, First Floor Sink, Kitchen Sink | 100 | 0 | | | | | | | Yes |
| 10 | 16 | Chilton Street | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 11 | Cowdin Street | 1 | Basement Sink | 100 | 0 | | | | | Separate Drain Pipe | | Yes |
| 10 | 12 | Cowdin Street | 3 | Basement Sink, Basement toilet, First Floor Sink | 100 | 0 | | | | | | | Yes |
| 10 | 17 | Cowdin Street | 1 | First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 18 | Cowdin Street | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 23 | Cowdin Street | 1 | Basement Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 24 | Cowdin Street | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | Sepatate Drain Pipe | | Yes |
| 10 | 30 | Cowdin Street | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 99 | Sherman Street | 1 | Basment Sink | 70 | 30 | Indirect | Adjacent Drain Service | 1 | Ground Surface | | 1 | Yes |
| 10 | 70 | Waterhouse Road | 2 | First Floor Toilet (2) | 95 | 5 | Indirect | Adjacent Drain Service | | | | | Yes |
| 10 | 67 | Sherman Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 75 | Sherman Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 81 | Sherman Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 87 | Sherman Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | 93 | Sherman Street | 2 | Basement Sink, Second Floor Toilet | 100 | 0 | | | 2 | Ground Surface | | 2 | No |
| 10 | 105 | Sherman Street | 1 | Basement Sink | 100 | 0 | | | 1 | Sanitary Sewer | | 1 | No |
| 10 | 111 | Sherman Street | 1 | Basement Sink | 100 | 0 | | | | | | | Yes |
| 10 | | Winn's Brook School | 3 | First Floor Toilet (3) | 100 | 0 | | | | | | 1 | Yes |
| | | | | | | | | | | | | | No |

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 1
## RESULTS OF DYED - WATER TESTING
## MAY / JUNE 2009

| Outfall No. | Address | | | | Dye Discharge | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Street | No. of Tests Conducted | Dye Test Entry | % Sewer | % Storm Drain | Direct/Indirect Connnection | Contaminate Source | Sump Pumps | Sump Pump Discharge | Other Pipes | Sump Pit | Flow in Storm Drain |
| 10 | 3 | Westlund Road | 1 | First Floor Sink | 100 | 0 | | | | | | | No |
| 10 | 4 | Westlund Road | 1 | First Floor Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | Minimal |
| 10 | 9 | Westlund Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 10 | 10 | Westlund Road | 1 | First Floor Toilet | 100 | 0 | | | | | Separate Drain Pipe | | Minimal |
| 10 | 15 | Westlund Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 10 | 16 | Westlund Road | 1 | Basement Sink | 100 | 0 | | | 2 | Sanitary Sewer, Winn's Brook | | 2 | No |
| 10 | 21 | Westlund Road | 1 | Basement Sink | 100 | 0 | | | | | | | No |
| 10 | 22 | Westlund Road | 1 | First Floor | 100 | 0 | | | 1 | Other | | 1 | No |
| 10 | 27 | Westlund Road | 1 | Basement Sink | 100 | 0 | | | | | Separate Drain Pipe | | No |
| 10 | 28 | Westlund Road | 1 | Basement Toilet | 100 | 0 | | | 1 | Unknown | Separate Drain Pipe | 1 | No |
| 10 | 34 | Westlund Road | 1 | First Floor Toilet | 100 | 0 | | | | | | | No |
| 10 | 35 | Westlund Road | 1 | First Floor Toilet | 100 | 0 | | | | | | | No |
| 10 | 40 | Westlund Road | 1 | First Floor Toilet | 100 | 0 | | | 1 | Sanitary Sewer | Separate Drain Pipe | 1 | No |
| 10 | 44 | Westlund Road | 1 | First Floor Toilet | 100 | 0 | | | | | | | No |
| 10 | 48 | Westlund Road | 1 | First Floor Sink | 100 | 0 | | | | | | | No |
| 10 | 39 | Waterhouse Road | 2 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | Minimal |
| 10 | 54 | Waterhouse Road | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | | | | | Yes |
| 10 | 57 | Waterhouse Road | 2 | Basement Sink, Basement Toilet | 100 | 0 | | | 1 | Ground Surface | | 1 | Yes |
| 10 | 67 | Hoitt Road | 1 | Basement Sink | 0 | 100 | Direct | Direct to Strom Drain | | | | 1 | |
| 10 | 55 | Hoitt Road | 2 | Basement Toilet, First Floor Sink | 95 | 5 | Indirect | Defective Sewer Service | | | | | |
| 10 | 32 | Hoitt Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | 2 | Ground Surface | | 2 | No |
| 10 | 37 | Hoitt Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | 1 | Into Ground | | 1 | Minimal |
| 10 | 43 | Hoitt Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 10 | 49 | Hoitt Road | 2 | Basement Sink, First Floor Toilet | 100 | 0 | | | | | | | Minimal |
| 10 | 52 | Hoitt Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 10 | 58 | Hoitt Road | 1 | Basement Sink | 100 | 0 | | | | | | | Minimal |
| 10 | 61 | Hoitt Road | 2 | Basement Toilet, First Floot Toilet | 100 | 0 | | | | | | | No |
| 10 | 64 | Hoitt Road | 1 | Basement Sink | 100 | 0 | | | 1 | Sanitary Sewer | | 1 | Minimal |
| 10 | 70 | Hoitt Road | 1 | First Floor Toilet | 100 | 0 | | | 1 | Sanitary Sewer | | 1 | Minimal |
| 10 | 73 | Hoitt Road | 1 | Basement Sink | 100 | 0 | | | 1 | Ground Surface | | 1 | No |
| 10 | 76 | Hoitt Road | 1 | Basement Sink | 100 | 0 | | | | | | 1 | No |
| 10 | 79 | Hoitt Road | 2 | Basement Toilet, First Floot Toilet | 100 | 0 | | | | | | | No |
| 10 | 85 | Hoitt Road | 1 | First Floor Toilet | 100 | 0 | | | | | | | Yes |
| Other | 280 | Blanchard Road | 1 | | 0 | 100 | Direct | Direct to Strom Drain | | | | | Yes |

# BELMONT, MASSACHUSETTS
## OUTFALL AREAS 1, 2 & 10

## TABLE 2
## CCTV INSPECTION RESULTS & RECOMMENDED REHABILITATION

**SANITARY SEWER / STORM DRAIN**

| Street | Outfall Area | Disk No. | Priority* | Manhole No. | | | Pipe Diameter (inches) | Distance (feet) | Joint Spacing (feet) | No. of Point Repairs | Point Repair Locations ** | Recommended Rehabilitation | | No. of Service Connections | No. of Service Connections Replaced | Location of Services Replaced ** | NEW MH | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Direction | Start | End | | | | | | Line | Replace | | | | | |
| Payson Rd | 1 | 1 | 2 | Upstream | 04S018 | 04S017 | 8 | 130 | 3 | 0 | | NRR | NRR | 4 | 0 | | | Pipe in ok condition some minor cracks and 1 moderate crack; one service appears not active |
| Payson Rd | 1 | 1 | 3 | Downstream | 04S018 | 04S008 | 8 | 172 | 3 | 1 | 166'-172 | 172 | NRR | 4 | 0 | | | Severe broken pipe and sag at 166'-172'; one service appears not active |
| Payson Rd | 1 | 3 | 2 | Upstream | 04D010 | 08D026 | 15 | 519 | 3 | 1 | 261'-266' | NRR | NRR | 3 | 0 | | | Pipe in ok condition; 1 point repair with moderate to severe longitudinal cracks and broken pipe |
| Payson Rd | 1 | 3 | 2 | Downstream | 04D010 | 03D008 | 15 | 168 | 3 | 0 | | NRR | NRR | 2 | 0 | | | Some minor/moderate cracks no rehab immediately necessary. |
| Van Ness Rd | 1 | 1 | INC-3 | Downstream | 03S022 | 03S007 | 6 | 39 | 3 | 0 | | NRR | NRR | 1 | 1 | 38' | | Inspection Incomplete Total length 153'; broken pipe at service at 38'; no reverse setup camera can fit in downstream pipe |
| Sharpe Rd | 2 | 2 | 1 | Upstream | 20S038 | 20S039 | 8 | 89 | 3 | 0 | | NRR | NRR | 2 | 0 | | | Pipe in good condition. |
| Sharpe Rd | 2 | 2 | 2 | Downstream | 20S038 | 20S037 | 8 | 57 | 3 | 0 | | NRR | NRR | 0 | 0 | | | Pipe in good shape. Minor cracking. Little to no flow |
| Sharpe Rd | 2 | 2 | 2 | Upstream | 20D044 | 20D045 | 8 | 146 | 3 | 0 | | NRR | NRR | 1 | 0 | | | Pipe in good condition. Minor longitudinal cracking |
| Sharpe Rd | 2 | 2 | 2 | Downstream | 20D044 | 20D043 | 8 | 272 | 3 | 0 | | NRR | NRR | 8 | 0 | | | Inspection Complete, setups 31/32. Pipe in good condition with only minor to moderate cracking. |
| Sharpe Rd | 2 | 2 | 4 | Downstream | 20S037 | 20S036 | 8 | 147 | 3 | 1 | 44' | 147 | NRR | 5 | 1 | 10.4' | | Inspection Complete, setups 33/34. Pipe has heavy cracking and should be lined. Replace one service |
| Sharpe Rd | 2 | 3 | 4 | Downstream | 20S036 | 20S035 | 8 | 243 | 3 | 0 | | 243.4 | NRR | 6 | 2 | 39.6', 79.2' | | Pipe in poor condition, must be lined; service at 79.2'(#22) appears not active correlating with the dye-tracing(not in sewer or drain) |
| Sharpe Rd | 2 | 3 | 4 | Downstream | 20S035 | 20S034 | 8 | 118 | 3 | 0 | | 118 | NRR | 2 | 1 | 56.4' | | Inspection Complete, setups 40/42; Some minor cracks and 2 moderate and severe cracks, service replaced due to offset joint and standing sewage |
| Sharpe Rd | 2 | 3 | 2 | Downstream | 20D043 | 09D108 | 8 | 252 | 3 | 1 | 245'-252' | NRR | NRR | 5 | 0 | | | Inspection Complete, setups 41/45; pipe in ok condition one moderate logitudinal crack at 220' possible spot liner/point repair; several locations infiltrating w/ sewer above storm drain; spot liner at 245'-252' |
| Grosvenor Rd | 2 | 5 | 4 | Downstream | 09S010 | 09S004 | 8 | 227 | 3 | 0 | | 226.5 | NRR | 0 | 0 | | | Storm drain under sewer; Pipe has several severe broken pipe and several minor cracks. |
| Grosvenor Rd | 2 | 5 | 2 | Downstream | 09D019 | 09D011 | 12 | 241 | 3 | 0 | | NRR | NRR | 4 | 0 | | | Storm drain under sewer. Infiltrating sewer possibel al bend at206'; Some minor/moderate cracks no rehab immediately necessary. |
| Shaw Rd | 2 | 5 | 4 | Downstream | 09S064 | 09S032 | 6 | 16 | 2 | 0 | | NRR | 16 | 0 | 0 | | | Root control needed; line section |
| Claflin St | 10 | 1 | 3 | Upstream | 34S031 | 34S032 | 8 | 92 | 3 | 0 | | 92.2 | NRR | 2 | 0 | | | Moderate multiple cracks at 13.6' If not LINED then point repair necessary |
| Claflin St | 10 | 1 | 4 | Downstream | 34S031 | 34S030 | 8 | 217 | 3 | 0 | | 217.4 | NRR | 5 | 0 | | | Pipe has several severe broken pipe sections but must and can be lined; some offset joints several services appear not active |
| Claflin St | 10 | 2 | 2 | Downstream | 34D087 | 34D093 | 18 | 62 | 3 | 0 | | NRR | NRR | 0 | 0 | | | Pipe in good condition. |
| Claflin St | 10 | 2 | 2 | Downstream | 34D091 | 34D087 | 18 | 452 | 3 | 0 | | NRR | NRR | 6 | 0 | | | Inspection Complete, setups 28/29. Pipe in fair condition, Minor lo moderate cracking throughout with minor root intrusion. |
| Claflin St | 10 | PMP 2008 | 4 | Downstream | 34S037 | 34S033 | 8 | 201 | 3 | 0 | | 201 | NRR | 4 | 1 | 116.7' | | Several points of infiltration throughout; standing sewage in pipe possible sag in line |
| Claflin St | 10 | PMP 2008 | 2 | Upstream | 34S037 | 34S036 | 8 | 150 | 3 | 1 | 42.2' | NRR | NRR | 4 | 0 | | | Pipe in good shape other then potential collapse at 42.2' to be point repaired |
| Claflin St | 10 | PMP 2008 | 4 | Downstream | 34D093 | 34D074 | 15 | 276 | 3 | 0 | | 275.6 | NRR | 3 | 0 | | | Spikes through pipe, some cracked areas seem ready lo collapse |
| Alexander Ave | 10 | 5 | 3 | Downstream | 34S035.1 | 34S035 | 8 | 60 | 3 | 0 | | 60 | NRR | 0 | 0 | | | Sewer above storm drain; Pipe in ok condition 1 moderate crack at 42' |
| Pleasant St | 10 | 2 | 1 | Downstream | 47D008 | 47D040 | 24 | 23 | 3 | 0 | | NRR | NRR | 0 | 0 | | | Pipe in excellent condition. No defects |
| Pleasant St | 10 | 3 | 3 | Downstream | 47S018 | 47S017 | 8 | 187 | 3 | 0 | | 186.7 | NRR | 3 | 2 | 34.3', 165.6' | | Minor/moderate cracks throughout; fine/moderate roots throughout root control needed. |
| Pleasant St | 10 | 3 | 2 | Upstream | 47D008 | 47D008.1 | 24 | 406 | 3 | 0 | | NRR | NRR | 3 | 0 | | | Pipe in good condition few minor/moderate cracks; 2 sections were CCTVed 47D008-47D008.1 and 47D008.1-47D013; 47D008.1 T-in to mainline |
| Munroe St | 10 | 1 | 3 | Upstream | 43S007 | 43S008 | 8 | 91 | 3 | 0 | | 91.3 | NRR | 2 | 0 | | | Slight collapsed pipe 5% (slight egg shape @27'; concrete at joints throughout at Inverts causing minor blockage |
| Munroe St | 10 | 1 | 3 | Downstream | 43S007 | 43S006 | 8 | 140 | 3 | 1 | 32'-45' | 140 | NRR | 3 | 0 | | | Severe broken/collapsed pipe at 32'-45'; minor/moderate cracks throughout; one service appears inactive |
| Munroe St | 10 | 2 | 2 | Downstream | 47D040 | 43D020 | 30 | 259 | 3 | 0 | | NRR | NRR | 0 | 0 | | | Sag in line with minor cracking found throughout. Pipe in fair condition. Incorrectly labeled 47D040 to 47D020 |
| Chilton St | 10 | 5 | 2 | Upstream | 44D005 | Upstream | 10 | 109 | 3 | 0 | | NRR | NRR | 1 | 2 | 107',109' | | Sewer is above strom drain; Roots at joints throughout, poor connection at 107' and heavy roots at 109'; cap end of pipe if service at 109' is not active |
| Chilton St | 10 | 1 | 4 | Upstream | 44S007 | 44S006 | 8 | 111 | 3 | 0 | | 111 | NRR | 1 | 0 | | | Minor/moderate roots throughout, and a few minor offsel joints, sag with standing sewage from 0'-10' |
| Chilton St ROW | 10 | 1 | 4 | Downstream | 44D005 | 44D011 | 10 | 256 | 3 | 0 | | 256 | NRR | 4 | 0 | | | Minor to moderate longitudinal cracks at 12:00 for 200' of the pipe. Fine roots at joints throught and Infiltration. Sewer Is above drain |
| Chilton St ROW | 10 | 1 | 3 | Upstream | 44S008 | 44S007 | 8 | 266 | 3 | 0 | | 266.2 | NRR | 4 | 1 | 42' | | Inspection Complete, setups 3/4 combined, some minor/moderate cracks and broken pipe can be lined |
| Cowdin St | 10 | 1 | 3 | Upstream | 44S009 | 44S008 | 8 | 147 | 3 | 0 | | 147 | NRR | 2 | 0 | | | Inspection Complete, setups 5/7 combined, moderate crack/broken pipe at 81' liner can fix to avoid PR |
| Cowdin St | 10 | 1 | 4 | Downstream | 44D011 | 44D015 | 15 | 145 | 3 | 0 | | 144.8 | NRR | 4 | 0 | | | Pipe in poor shape, moderate to severe longitudinal cracks at 12:00 for 120' of the pipe section |
| Sherman St | 10 | 1 | 1 | Upstream | 37S022 | Dead End | 8 | 5 | 3 | 0 | | NRR | NRR | 1 | 0 | | | Service for 70 Waterhouse Rd; roots at 6" to 4" transition at service |
| Sherman St | 10 | 1 | 2 | Downstream | 37S022 | 37S020.1 | 8 | 46 | 5 | 0 | | NRR | NRR | 0 | 0 | | | Pipe in ok condition 1 moderate crack at 44'; storm drain under sewer. |
| Sherman St | 10 | 1 | 1 | Downstream | 37S020.1 | 37S020 | 8 | 128 | 5 | 0 | | NRR | NRR | 2 | 0 | | | Pipe in good shape but storm drain under sewer. |
| Sherman St | 10 | 1 | 1 | Downstream | 37S020 | 37S019 | 8 | 205 | 5 | 0 | | NRR | NRR | 3 | 0 | | | Pipe in good shape but storm drain under sewer. |
| Sherman St | 10 | 1 | 2 | Downstream | 37S019 | 37S018 | 8 | 204 | 5 | 0 | | NRR | NRR | 2 | 0 | | | Pipe in good shape 2 minor sags; standing water in services and offset joints, storm drain under sewer |
| Sherman St | 10 | 1 | 2 | Upstream | 37S017 | 37S018 | 8 | 16 | 5 | 0 | | NRR | NRR | 0 | 0 | | | Pipe in good shape; Standing sewage, water level 20%, storm drain under sewer |
| Sherman St | 10 | 1 | 3 | Downstream | 37S017 | 27S016 | 8 | 69 | 5 | 0 | | 69 | NRR | 0 | 0 | | | Cast Iron pipe section is corroded/tuberculated |
| Sherman St | 10 | 2 | 2 | Upstream | 37D029 | 37D031 | 12 | 269 | 2 | 1 | 33'-44' | NRR | NRR | 5 | 0 | | | Inspection Complete, setups 24/25. Mostly minor to moderate cracking. Heavy cracking from 33.4' to 44'. |
| Sherman St | 10 | 2 | 2 | Downstream | 37D029 | 37D026 | 12 | 405 | 3 | 0 | | NRR | NRR | 5 | 0 | | | Inspection Complete, setups 26/38. Pipe in good condition with minor to moderate cracking. |
| | | | | | | | | | | | | | | | | | | |
| **TOTALS** | | | | | | | | **7,205** | | **7** | | **3,165** | **16** | **116** | **11** | | **0** | |

Incomplete inspection

* 1 (Excellent Condition) - 5 (Severe Deterioration)
** Distance from Starting Manhole in feet

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 3
## DRY WEATHER STORM WATER SAMPLING RESULTS

| MH No. | Location | Sample No.* | E. Coli. Colonies per 100 ml - Date Sampled | | | | | | | | | FIRST QUARTER | | SECOND QUARTER | | THRID QUARTER | | FOURTH QUARTER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7/8/08 | 7/9/08 | 7/14/08 | 7/18/08 | 10/21/08 | 11/3/08 | 11/4/08 | 11/5/08 | 11/20/08 | 5/21/2009 | 5/22/2009 | 8/18/2009 | 8/28/2009 | 5/18/2010 | 7/2/2010 | 8/30/2010 | |
| OUTFALL 1 | Outfall Area 1 - Oxford Cir | OF1E/OF1E2/OF1E3 | | | 260 | | 5,600 | >30,000 | | | | | | | | | | | |
| 01D032 | Park Rd at Unity Ave | OF1E2A/OF1E3A | | | | | 5,950 | >30,000 | | | | | | | | | | | |
| 10D026 | Fairview Ave at School St | OF1E3C | | | | | | 14,400 | | | | | | | | | | | |
| 03D038 | Fairview Ave between Stults Rd and Lewis Rd | OF1E3D | | | | | | >30,000 | | | | | | | | | | | |
| 03D008 | Payson Rd at Fairview Ave | OF1E2B/OF1E5B/OF1EB6 | | | | | >15,000 | No Sample/ Trickle | | | | | | 500 | | ND | | DRY | |
| 04D010 | Payson Rd at Benton Rd | OF1E4E | | | | | DRY | DRY | | | | | <100 | | | | | DRY | |
| 08D026 | Townsend Rd at Payson Rd (ADDED SAMPLE) | OF1E5F/OF1E6F | | | | | | | | | | | | 200 | | ND | | DRY | |
| 03D008 | 12" pipe from Pequosette Rd at Payson Rd (ADDED SAMPLE) | OF1E7G | | | | | | | | | | | DRY | DRY | | DRY | | ND | |
| 03D044 | Pequossette Rd - 3" pipe into DMH 03D044 | OF1E7G2 | | | | | | | | | | | DRY | DRY | | DRY | | ND | |
| 03D008 | 24" pipe from Pequosette Rd at Payson Rd (ADDED SAMPLE) | OF1E7H | | | | | | | | | | | DRY | DRY | | DRY | | 5,800 | |
| OUTFALL 2 | Outfall Area 2 - Huron Ave/Grove St | OF2E/OF2E2/OF2E3/OF2E4/OF2E5/OF2E6 | | | 2,100 | | 11,050 | >30,000 | | 16,900 | 21,700 | 8,700 | | | | | | | |
| 19D002 | Washington St at School St | 17/17A/17C/17D | | | | | 7,850 | >30,000 | | | >30,000 | 13,500 | | DYE TESTED | | | | | |
| 19D004 | Jackson Rd at Washington St | 17A1/17C1/17D1/17E1/17F1/17H1 | | | | | | 2,300 | | | 100 | 400 | | 600 | | 1,600 | | 400 | |
| 09D108 | From Sharpe Rd at Washington St | 10/10A | | | | | >15,000 | >30,000 | | | | | | | | | | | |
| 09D108 | From Washington at Sharpe Rd | 11/11A | | | | | 3,900 | 26,600 | | | | | | | | | | | |
| 09D046 | Shaw Rd at Dalton Rd | 18/18A/18D | | | | | 5,600 | 15,100 | | | | 17,600 | | DYE TESTED | | | | | |
| 09D054 | Shaw Rd at Herbert Rd | 18A1/18H1 | | | | | | 2,600 | | | | DRY | | DRY | | DRY | | 800 | |
| 09D046 | Shaw Rd at Dalton Rd | 19/19A | | | | | >15,000 | >30,000 | | | | | | | | | | | |
| 10D005 | Elm St at Foster Rd | 12A/12B/12C/12D/12G/12H | | | | | | 2900 | | <100 | 200 | <100 | | | | | 520 | 100 | |
| 10D046 | Elm ST at Dalton Rd | 12A1 | | | | | | 210 | | | | | | | | | | | |
| 09D009 | Grosvenor Rd at Dalton Rd | 3A/3B | | | | | | >30,000 | | >30,000 | | | | | | | | | |
| 09D011 | Sargent Rd at Grosvenor Rd | 3B1/3E1/3F1/3H1 | | | | | | | | >30,000 | | DYE TESTED | | >30,000 | | 15,000 | | >20,000 | |
| 09D011 | Grosvenor Rd at Sargent Rd | 3B2 | | | | | | | | 30,000 | | | | | | | | | |
| 09D009 | Dalton Rd at Grosvenor Rd | 4A/4B/4D/4E/4F/4H | | | | | | 530 | | 3600 | | 6,600 | | 4,900 | | 400 | | 6,700 | |
| 09D086 | Bacon Rd at Woods Rd(from Bacon Rd - ADDED SAMPLE) | 4E2/4F2 | | | | | | | | | | | | >30,000 (first Identified) | | ND | | DRY | |
| 09D003 | Betts Rd at Dalton Rd | 5B | | | | | | | | >30,000 | | | | | | | | | |
| 09D003 | Betts Rd at Dalton Rd | 6B/6D | | | | | | | | >30,000 | | 900 | | DYE TESTED | | | | | |
| 09D074 | Audrey Rd at Betts Rd | 6B1/6D1/6E1/6F2/6H1 | | | | | | | | >30,000 | | 300 | | 400 | | 1,100 | | 9,700 | |
| 09D041 | Livermore Rd at Dalton Rd | 7B/7D | | | | | | | | 3,500 | | 900 | | DYE TESTED | | | | | |
| 09D029 | Shaw Rd at Livermore Rd | 7B1/7D1/7E1/7G1/7H1 | | | | | | | | >30,000 | | <100 | | <100 | | | | | |
| 09D042 | Livermore Rd at Dalton Rd | 8B/8D | | | | | | | | 10,100 | | 26,000 | | DYE TESTED | | | | | |
| 09D064 | Livermore Rd from Easement across from Hartley Rd | 8B1 | | | | | | | | >30,000 | | | | | | | | | |
| 09D009 | Dalton Rd at Grosvenor Rd | OF2E3A | | | | | | | | <100 | | | | | | | | | |
| 09D009 | Dalton Rd at Grosvenor Rd (8" possible service - ADDED SAMPLE) | 20F | | | | | | >30,000 | | | | DRY | | DRY | | 500 | | DRY | |

* Sample Numbers are in order of Date Sampled
ND - None Detected (<100)

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 3
## DRY WEATHER STORM WATER SAMPLING RESULTS

| MH No. | Location | Sample No.* | E. Coli. Colonies per 100 ml - Date Sampled | | | | | | | | | FIRST QUARTER | | SECOND QUARTER | | THRID QUARTER | | FOURTH QUARTER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7/8/08 | 7/9/08 | 7/14/08 | 7/18/08 | 10/21/08 | 11/3/08 | 11/4/08 | 11/5/08 | 11/20/08 | 5/21/2009 | 5/22/2009 | 8/18/2009 | 8/28/2009 | 5/18/2010 | 7/2/2010 | 8/30/2010 | |
| OUTFALL 10 | Outfall Area 10 - Little Pond | OF10E/OF10E2/2-OF10E3/OF10E4/OF10E5/OF10E6/OF10E7 | 2,040 | 1,200 | 750 | 970 | | | 8,600 | 19,500 | 5,000 | | 300 | | | | | | |
| 37D036 | Intersection of Hoitt Rd and Brighton St | 1/1A/1B/1D/1E/1F/1H | 2,740 | | 700 | | | | 3,800 | | | | 6,000 | 8,800 | | 3,000 | | 6,100 | |
| 41D046 | Brighton Rd. at Cross St | 1A1/1B1/1D1/1E1/1F1/1H1 | | | 610 | | | | 7,000 | | | | 200 | 6,200 | | 16,000 | | 700 | |
| 44D047 | Albert Ave at Brighton St | 1A2/1B2 | | | 100 | | | | <100 | | | | | | | | | | |
| 44D047 | Albert Ave at Brighton St | 1A3/1B3 | | | 90 | | | | <100 | | | | | | | | | | |
| 45D009 | Albert Ave | 1A4 | | | 100 | | | | | | | | | | | | | | |
| 45D009 | Albert Ave | 1A5 | | | 80 | | | | | | | | | | | | | | |
| 38D006 | Intersection of Statler Rd. and Newcastle Rd. | 2/2D/2E | 2,000 | | | | | | | | | | 14,000 | 1,800 | | | | | |
| 38D002 | Eliot Rd at Newcastle Rd | 2D1/2E1 | | | | | | | | | | | >30,000 | 100 | | | | | |
| 37D055 | Intersection of Westland Rd. and Waterhouse Rd.; flow from Westland Rd. | 3/3A/3B/3C/3E/3G/3H | 2,440 | | 10 | | | | >30,000 | | >30,000 | DYE-TESTED | | 28,400 | | | >20,000 | 7,200 | |
| 37D055 | Intersection of Westland Rd. and Waterhouse Rd.; flow from Waterhouse Rd. | 4/4A/4B/4C | 830 | | No Sample/ Trickle | | | | >30,000 | | >30,000 | | | | DYE TESTED - CONTAMINATE FOUND | | | | |
| 37D042 | Hoitt Rd. at Waterhouse Rd | 4A1/4B1/4C1 | | | 160 | | | | >30,000 | | 6,200 | | | | | | | | |
| 37D042 | Hoitt Rd. at Waterhouse Rd | 4A2/4B2/4C2 | | | 120 | | | | 700 | | <100 | | | | | | | | |
| 37D028 | Sherman St | 5/5B/5C | 2,550 | | No Sample | | | | >30,000 | | >30,000 | | | | | | | | |
| 37D013 | Intersection of Hoitt Rd and Dean St | 6/6A | 370 | | 50 | | | | | | | | | | | | | | |
| 37D009 | Dean St at Hoitt Rd | 6A1 | | | 10 | | | | | | | | | | | | | | |
| 34D009 | Intersection of Sherman St and Dean St | 7/7B/7H | 580 | | | | | | 2,100 | | | | DRY | | No Sample/ | No Sample/ Trickle | | ND | |
| 42D019 | MH-42D019 (WINN'S BROOK SCHOOL FIELD) | 8 | 220 | | | | | | | | | | | | | | | | |
| 42D016 | Cross St between Munroe St and Broad St | 9/9A/9B/9C/9D | | 1,500 | | >3,000 | | | 3,400 | | 7,200 | | 200 | CONTAMINATED UPSTREAM | | | | | |
| 43D014 | Munroe St. at Cross St. | 9A1/9B1/9C1/9D1 | | | | >3,000 | | | 1,800 | | 1,000 | | <100 | CONTAMINATED UPSTREAM | | | | | |
| 43D014 | Munroe St. at Cross St. | 9A2/9B2/9C2/9D2/9E2/9F2 | | | | 470 | | | <100 | | 600 | | <100 | | 100 | ND | | | |
| 43D020 | Intersection of Munroe and Claflin | 9A3/9B3/9C3/9E3/9F3/9H3 | | | | >3,000 | | | 100 | | 6,900 | | | | >30,000 | ND | | 800 | |
| 47D008 | Pleasant St. at Munroe St. | 9A4/9B4 | | | | 2,280 | | | 100 | | | DYE-TESTED | | | DRY | No Sample/ Trickle | | DRY | |
| 44D042 | Frost St | 9A8 | | | | | | | 800 | | | | DRY | | DRY | DRY | | DRY | |
| 44D024 | Middlecott St. at Hurley | 9A5/9B5/9D5 | | | | 1,400 | | | 3,200 | | | | 200 | CONTAMINATED UPSTREAM | | | | | |
| 44D015 | Cowdin St. coming from Brighton St. | 9A6/9B6/9C6 | | | | 560 | | | >30,000 | | 2,000 | | | CONTAMINATED UPSTREAM | | | | | |
| 44D005 | Chilton St. close to Brighton St. | 9A7/9B7 | | | | >3,000 | | | >30,000 | | | | | CONTAMINATED UPSTREAM | | | | | |
| 43D002 | Intersection of Chilton St and Dean St | 10/10A/10B/10D/10E/10G/10H | | 460 | | 610 | | | 300 | | | | 100 | <100 | | | 250 | ND | |
| 43D001 | Claflin St. at Dean St - Catch Basin | 10A1 | | | | 230 | | | | | | | | | | | | | |
| 43D022 | Claflin St MH-43D022 | 10A2/10B2/10D2/10E2/10G2/10H2 | | | | 1,150 | | | 400 | | | | <100 | 100 | | | 700 | 200 | |
| 34D082 | Intersection of Claflin St and Winn St | 11 | | 30 | | | | | | | | | | | | | | | |
| 34D082 | Intersection of Claflin St and Winn St | 12 | | 160 | | | | | | | | | | | | | | | |
| CB | Dead end of Claflin St from Alexander Ave; middle catch basin | 13/13A/13B/13C/13E/13F/13H | | 2,710 | | 2,850 | | | | 5,500 | 3,000 | | | | >30,000 | 100 | | 700 | |
| 34D093 | Claflin St. at Alexander Ave | 13A1/13B1 | | | | <10 | | | | 100 | | | | | | | | | |
| 34D087 | Claflin St. at Alexander Ave | 13A2/13B2/13C2/13D2/13E2/13F2/13H2 | | | | 1,000 | | | | >30,000 | 3,000 | | <100 | | >30,000 | 200 | | 1,200 | |
| 34D091 | Claflin St. from Channing St | 13A3/13B3/13C3/13E3/13H3 | | | | 70 | | | | 300 | <100 | | | | 200 | | | ND | |
| 48D024 | Clifton St at Fletcher Rd | 14 | | 30 | | | | | | | | | | | | | | | |
| 48D011 | Prospect St at Clifton St | 15 | | 20 | | | | | | | | | | | | | | | |
| 48D011 | Prospect St at Clifton St | 16 | | 230 | | | | | | | | | | | | | | | |
| 54D025 | Belmont Hill School parking lot | 17 | | 70 | | | | | | | | | | | | | | | |

* Sample Numbers are in order of Date Sampled
ND - None Detected (<100)

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 4
## ILLICIT SUMP PUMP CONNECTIONS

| Address | | | | | | |
|---|---|---|---|---|---|---|
| No. | Street | No. of Sump Pumps | Sump Pump Discharge | Other Pipes | Sump Pits | Comments |
| 33 | Betts Road | 2 | Sanitary Sewer | | 2 | All plumbing is correct to main sewer stack; Access to cleanout on sewer stack |
| 56 | Claflin Street | 2 | Sanitary Sewer, Septic Tank | | 2 | Toilet, shower, and sump pump are connected to sewer; Kitchen sink, dish washer, and second sump pump discharge to septic tank in back yard; Only pays half of sewer bill due to septic tank and leaching field in backyard |
| 195 | Dalton Road | 2 | Sanitary Sewer | | 2 | Homeowner was upset when told about the sump pumps connecting to the sewer |
| 10 | Hartley Road | 1 | Sanitary Sewer | Separate Drain Pipe | 1 | All plumbing is correct other than sump pump to sewer stack; Separate drain pipe in cleanout pit |
| 64 | Hoitt Road | 1 | Sanitary Sewer | | 1 | All plumbing is correct except for sump pump discharging to sewer |
| 70 | Hoitt Road | 1 | Sanitary Sewer | | 1 | All plumbing to one sewer stack including sump pump; No access to cleanout |
| 44 | Livermore Road | 2 | Sanitary Sewer, Ground Surface | Separate Drain Pipe | 2 | Sump pump discharges into basement sink - all other plumbing is correct; Access to Cleanout on stack |
| 2 | Sargent Road | 1 | Sanitary Sewer | | 1 | Sump pump discharges into basement sink - pump rarely turns on; Garden hose discharges to sink as well; Cleanout is located in sump pit along with sump pump |
| 93 | Sherman Street | 1 | Sanitary Sewer | | 1 | IN SSES REPORT No access to storm drain until conduit; Sump pump dischaarges to sink; Access to cleanout on sewer stack |
| 175 | Washington Street | 1 | Sanitary Sewer | | 1 | All plumbing is correct to main sewer stack; Access to cleanout in front of house |
| 232 | Washington Street | 2 | Sanitary Sewer | | 2 | Both sump pumps are piped to SMH in yard - saw flow from 2" pipe |
| 16 | Westlund Road | 2 | Sanitary Sewer, Winn's Brook | | 2 | Sewer plumbing is correct; French drain around perimeter and first sump pump discharge to Winns Brook; Second sump pump is only for emergency - discharge into sink |
| 40 | Westlund Road | 1 | Sanitary Sewer | Separate Drain Pipe | 1 | All plumbing is correct except for sump pump to sewer; Separate drain pipe drains out back |
| **TOTAL** | | **16** | | | | |
| **UNDETERMINED DISCHARGE LOCATIONS - SUMP PUMPS** | | | | | | |
| 68 | Claflin Street | 1 | Unknown | | 1 | All plumbing in walls - Could not identify; Sump pump most likely drains outside of house to a dry well; Sewer main crosses Winn's Brook conduit - probably under conduit |
| 193 | Claflin Street | 1 | Unknown | | 1 | All Plumbing is correct, Access to cleanout in back of house; Portable sump pump used when necessary |
| 8 | Sargent Road | 1 | Unknown | Foundation Drain to New Sump Pits | 2 | Reconstructing house - Sewer stack was accessed; Contamination of storm drain similar to other houses on Sargent Rd (Defect in invert in downstream SMH) |
| **TOTAL** | | **3** | | | | |

# BELMONT, MASSACHUSETTS
# OUTFALL AREAS 1, 2 & 10

## TABLE 5
## RECOMMENDED ADDITIONAL INVESTIGATIONS
## OPINION OF PROBABLE COST

| | |
|---|---|
| PROJECT MANAGEMENT | $1,200 |
| CCTV INSPECTION (MAIN LINE) | $12,800 |
| CCTV INSPECTION (SERVICES) | $27,300 |
| HOUSE INSPECTION & DYED-WATER TRACING | $14,200 |
| FOLLOW-UP DRY WEATHER SAMPLING | $4,600 |
| PRELIMINARY DESIGN REPORT | $12,300 |
| MEETING WITH TOWN OFFICIALS | $1,800 |
| **TOTAL** | **$74,200** |

**BELMONT, MASSACHUSETTS**
**OUTFALL AREAS 1, 2 &10**

**TABLE 6**
**RECOMMENDED REHABILITATION**
**OPINION OF PROBABLE COST**

| ITEM NO. | ITEM OF WORK | ESTIMATED QUANTITIES | UNITS | UNIT COST | AMOUNTS |
|---|---|---|---|---|---|
| 1 | 8-INCH SEWER - FULL LENGTH REPLACEMENT | 16 | LS | $7,500 | $7,500 |
| 2 | 8-INCH SEWER - FULL LENGTH LINING | 2,360 | LF | $45 | $106,187 |
| 3 | 10-INCH DRAIN - FULL LENGTH LINING | 256 | LF | $55 | $14,080 |
| 4 | 15-INCH DRAIN - FULL LENGTH LINING | 420 | LF | $65 | $27,326 |
| 5 | REINSTATEMENT OF SERVICE CONNECTIONS | 54 | EACH | $150 | $8,100 |
| 6 | SEWER OR DRAIN POINT REPAIR REPLACEMENT (6-10 INCH) | 5 | EACH | $5,000 | $25,000 |
| 7 | 12" DRAIN POINT REPAIR REPLACEMENT | 1 | EACH | $6,000 | $6,000 |
| 8 | 15" DRAIN POINT REPAIR REPLACEMENT | 1 | EACH | $7,000 | $7,000 |
| 9 | SERVICE REPLACEMENT (main to edge of roadway) | 11 | EACH | $5,000 | $55,000 |
| 10 | SERVICE REPLACEMENT (main to house, 67 Hoitt) | 1 | EACH | $10,000 | $10,000 |
| 11 | PROBABLE SERVICE LINING/REPLACEMENT (CCTV required) | 19 | EACH | $7,500 | $142,500 |
| 12 | CCTV INSPECTION OF SEWER | 165 | LF | $4 | $660 |
| 13 | MANHOLE REHABILITATION | 6 | EACH | $3,000 | $18,000 |
| 14 | TEMPORARY PAVING (trench) | 225 | SY | $15 | $3,380 |
| 15 | PERMANENT PAVING (trench) | 273 | SY | $40 | $10,929 |
| 16 | MOBILIZATION | | LS | 5% of Total | $22,083 |
| | SUBTOTAL | | | | **$463,744** |
| | CONTRACTOR OVERHEAD & PROFIT @ | 20% | | | $92,749 |
| | ENGINEERING & CONTINGENCIES @ | 40% | | | $185,498 |
| | TRAFFIC POLICE | 240 | HOURS @ | $40 | $9,600 |
| | **TOTAL** | | | | **$751,591** |

# BELMONT, MA
# UNITY AVE TRIBUTARY AREA

## FIGURE 1

BUILDING INSPECTION/DYED-WATER TESTING
& CCTV INSPECTION RESULTS
OUTFALL 1

OCTOBER 2010

1 inch = 40 feet

ENGINEERS FST Since 1914

**Legend**
- Sewer Manholes
- SEWER
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Drain Manhole
- CB - Curb Inlet
- CB - Round Grate
- CB - Square Grate
- PUMP WELL
- STORM DRAIN
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Outfall Points
- Mystic River Watershed
- Water

**Sewer Service**
- REPLACED SERVICE
- Buildings

**DYE-TRACING RESULTS**
- SEWER
- NEITHER
- DRAIN
- SEWER/DRAIN INDIRECT
- NO ENTRY
- Parcels

N

OF1E5F (200)

OF1E2B (15,000)

OF1E3D (30,000)

Steady Flow at T-in connection approximately 290 ft from 03D008

TOWNSEND ROAD
ELM STREET
FREEDE GARDENS ROAD
OLD MIDDLESEX ROAD
ESSEX ROAD
BENTON ROAD
PAYSON ROAD
STULTS ROAD
VAN NESS ROAD
FAIRVIEW AVENUE
LEWIS ROAD

# BELMONT, MA
# HURON AVE TRIBUTARY AREA

## FIGURE 2

BUILDING INSPECTION/DYED-WATER TESTING
& CCTV INSPECTION RESULTS
OUTFALL 2

OCTOBER 2010

1 inch = 120 feet

ENGINEERS
FST
Since 1914

Legend
- Sewer Manholes
- SEWER
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Drain Manhole
- CB - Curb Inlet
- CB - Round Grate
- CB - Square Grate
- PUMP WELL
- STORM DRAIN
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Outfall Points
- Mystic River Watershed
- Water

Sewer Service
- LINED
- REPLACED SERVICE
- Buildings

DYE-TRACING RESULTS
- SEWER
- NEITHER
- DRAIN DIRECT
- SEWER/DRAIN INDIRECT
- NO ENTRY
- Parcels

Sample 17A1 (2,300)
Sample 17A (30,000)
Sample 10A (30,000)
Sample 11A (26,600)
Sample 19A (30,000)
Sample 18D (17,600)
Sample 7H1 (20,000)
Sample 8B (30,000)
Sample 7B (30,000)
Sample 5B (30,000)
Sample 6B (30,000)
Sample 6H1 (9,700)
Sample 4E2 (30,000)
Sample 12A (2,900)
Sample 3B1 (30,000)
Sample 3B2 (30,000)
Sample 4H (6,700)
Exfiltration source from Downstream Pipe Connection at SMH 09S004

OUTFALL 3
OUTFALL 2

HILLCREST ROAD
LONG AVENUE
GODEN STREET
HOWARD STREET
LINCOLN STREET
RANDOLPH STREET
MADISON STREET
BOW ROAD
ADAMS STREET
TEMPLE STREET
LOCUST STREET
SCHOOL STREET
SHARPE ROAD
RICHARDSON ROAD
WATSON ROAD
BRIGHT ROAD
TAYLOR ROAD
WASHINGTON STREET
JACKSON ROAD
HURD ROAD
SELWYN ROAD
PAYSON TERRACE
CHESTER ROAD
HILLSIDE TERRACE
PAYSON RD
ELIZABETH ROAD
PHILIP ROAD
JACOB ROAD
HERBERT ROAD
HARTLEY ROAD
LEWIS ROAD
HOUGHTON ROAD
SHAW ROAD
GROVE STREET
LIVERMORE ROAD
BETTS ROAD
ANIS ROAD
SARGENT ROAD
GROSVENOR ROAD
WOODS ROAD
AUDREY ROAD
BACON ROAD
ELM STREET

# BELMONT, MA
# WINN'S BROOK TRIBUTARY AREA

## FIGURE 3

BUILDING INSPECTION/DYED-WATER TESTING
& CCTV INSPECTION RESULTS
OUTFALL 10

OCTOBER 2010

1 inch = 50 feet

ENGINEERS FST Since 1914

**Legend**
- Sewer Manholes
- SEWER
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Drain Manhole
- CB - Curb Inlet
- CB - Round Grate
- CB - Square Grate
- PUMP WELL
- STORM DRAIN
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Outfall Points
- Mystic River Watershed
- Water

**Sewer Service**
- REPLACED SERVICE
- Buildings

**DYE-TRACING RESULTS**
- SEWER
- NEITHER
- DRAIN DIRECT
- SEWER/DRAIN INDIRECT
- NO ENTRY
- Parcels

Sample 13E (30,000)

Sample 13B2 (30,000)

Sample 13B3 (300)

WELLINGTON LANE
POMERSET STREET
PLEASANT STREET
LEONARD STREET
CLARLIN STREET
FARNHAM STREET
WINN STREET
CROSS STREET
ALEXANDER AVENUE
CHANNING ROAD
FARM ROAD

# BELMONT, MA
# WINN'S BROOK TRIBUTARY AREA

## FIGURE 4

BUILDING INSPECTION/DYED-WATER TESTING
& CCTV INSPECTION RESULTS
OUTFALL 10

OCTOBER 2010

1 inch = 120 feet

ENGINEERS FST Since 1914

**Legend**
- Sewer Manholes
- SEWER
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Drain Manhole
- CB - Curb Inlet
- CB - Round Grate
- CB - Square Grate
- PUMP WELL
- STORM DRAIN
- No Recommended Rehabilitation
- Recommended Rehabilitation
- Outfall Points
- Mystic River Watershed
- Water

**Sewer Service**
- REPLACED SERVICE
- Buildings

**DYE-TRACING RESULTS**
- SEWER
- NEITHER
- DRAIN DIRECT
- SEWER/DRAIN INDIRECT
- NO ENTRY
- Parcels

Sample 9E3 (30,000)
Sample 9B6 (30,000)
Sample 1F1 (16,000)
Sample 10A (610)
Sample 9C2 (600)
Sample 9A1 (3,000)
Sample 9C (7,200)
Sample 7B (2,100)
Sample 5B (30,000)
Sample 4B (30,000)
Sample 3B (30,000)
Sample 2D (14,000)
Sample 2D1 (30,000)
Sample 1E (8,800)

OUTFALL 12
OUTFALL 11
OUTFALL 10
OUTFALL 9

ERNEST ROAD
STELLA ROAD
BARBARA ROAD
CLAFLIN STREET
ARTHUR ROAD
BRADFORD ROAD
PILGRIM ROAD
PLYMOUTH AVENUE
ALBERT AVENUE
TOBEY ROAD
LITTLE POND ROAD
GILMORE ROAD
GARRISON ROAD
OLIVER ROAD
STEARNS ROAD
LOOSE ROAD
STANTON ROAD
MIDDICOTT STREET
COWDIN STREET
HURLEY STREET
FROST ROAD
MONROE STREET
CHILTON STREET
PLEASANT STREET
COOLIDGE ROAD
WATERHOUSE ROAD
BRIGHTON STREET
LARCH CIRCLE
HOITT ROAD
SHERMAN STREET
SANDRICK ROAD
ELIOT ROAD
TROY ROAD
NEWCASTLE ROAD
POND STREET
STATLER ROAD
WESTLUND ROAD
JASON ROAD
DEAN STREET
CHANNING ROAD
VALE ROAD
BROAD STREET
CROSS STREET
WINN STREET

N

OUTFALL 10

OUTFALL 15

OUTFALL 13

OUTFALL 12

OUTFALL 11

OUTFALL 14

OUTFALL 9

OUTFALL 8

OUTFALL 7

OUTFALL 6

OUTFALL 5

OUTFALL 4

OUTFALL 3

OUTFALL 2

OUTFALL 1

**Legend**

- OUTFALLS
- Sewer Manholes
- SEWER

**REHABILITATION**

- LINED
- REPLACED
- Outfall Points
- Drain Manhole
- CB - Curb Inlet
- CB - Round Grate
- CB - Square Grate
- PUMP WELL
- STORM DRAIN

**REHABILITATION**

- LINED
- REPLACED
- Water
- Mystic River Watershed
- Buildings

**HOUSE SERVICE REPAIR**

- ALREADY PVC
- LINED
- REPLACED SERVICE
- Parcels
- Roads

# BELMONT, MA

## SEWER & STORM DRAIN REHABILITATION WORK COMPLETED

## FIGURE 5

OCTOBER 2010

1 inch = 400 feet

ENGINEERS FST Since 1914