# **Detecting and Eliminating Illicit Discharges in Montpelier: Final Report**





PROJECT NO.

16-002

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Cover photo: Catchbasin at Main Street Middle School after dye testing neighboring apartment building

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# 1. Introduction

Illicit discharges contribute to the degradation of local receiving waters and can pose a public health risk. Illicit Discharge Detection and Elimination (IDDE) studies are performed to identify contaminated discharges, locate the sources of contaminants, and plan infrastructure repairs of other corrective actions. Without special study many illicit discharges can go undetected for years, even decades.

Among the many types of illicit discharges that have been identified in Vermont, sanitary wastewater is generally considered as having the greatest impact. Wastewater flowing to storm drains from directly connected municipal sewers or building sewer pipe connections can result in significant nutrient and microbial pollution. Sanitary wastewater can also enter storm drains through indirect connections, leaking from sanitary sewers, sewer service laterals, and malfunctioning septic systems into stormwater pipes and structures. Other types of illicit discharges encountered in previous studies include graywater connections (washwater from laundry machines, sinks, dishwashers, etc.), mop water and oil dumping via floor drains and catchbasins, pet waste and trash dumping, vehicle washing runoff, and (infrequently) industrial discharges. Municipal water leaks are also discovered in IDDE studies.

Diluted wastewater flows may appear clean and may travel a circuitous path to reach the storm drain outfall. Other discharges, such as illegal dumping to catchbasins, are intermittent; hence difficult to catch. Without exception, our experience has been that municipalities and private owners on whose properties we have discovered an illicit discharge were previously unaware the discharge was occurring. Through the sustained efforts of Vermont Department of Environmental Conservation (DEC), municipalities, organizations, and private contractors the prevalence of illicit discharges in Vermont has been declining over the last decade. However; it must also be recognized that new illicit discharges arise every year as aging infrastructure fails, and plumbing mistakes are inevitably made.

The goal of this Montpelier IDDE project was to improve water quality by identifying and eliminating contaminated, non-stormwater discharges (illicit discharges) entering stormwater drainage systems and discharging to the Winooski and North Branch Rivers in Montpelier. This project follows a successful Montpelier IDDE project conducted by the Friends of the Winooski River (FWR) and Stone in 2008, under a Section 319 (EPA) grant administered by DEC. In 2008, FWR and Stone assessed 246 stormwater discharge points in Montpelier. FWR and Stone provided the City of Montpelier with valuable information regarding contaminated outfalls, which the Department of Public Works (DPW) followed up on, identifying and eliminating wastewater discharges from the Montpelier Inn (system NB-130), the Rite Aid building (system NB-460), and a private home on Cummings Street (system NB-010). A link to the final report for this project may be found at: <a href="https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/IDDE/erp\_Montpelier2009Report.pdf">https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/IDDE/erp\_Montpelier2009Report.pdf</a>. Subsequent testing by Stone indicated there was a second direct wastewater connection to system NB-460, which the City identified and eliminated within the French Block in 2015.

While the 2008 study was very successful, it was limited in several respects. This study was completed without the benefit of comprehensive stormwater infrastructure mapping, which DEC completed for Montpelier in 2014. It focused almost exclusively on the major outfalls discharging to the Winooski and North Branch Rivers. Smaller drainage systems throughout the City were not assessed and large systems were generally

assessed only at the outfall, which is not always adequate to detect contaminant flows occurring a long distance from the outfall (due to dilution and degradation of contaminants within the drainage system). Little bracket sampling was performed to isolate illicit discharges because infrastructure maps were not available

In advance of the current Montpelier IDDE project, Stone compared the 2008 assessment data with DEC's more recent stormwater infrastructure mapping to determine which systems warranted assessment or reassessment. Montpelier's stormwater systems were categorized as follows:

- I. Systems not previously assessed (194). This figure excludes storm drains on Interstate 89, which do not warrant assessment;
- II. Systems with evidence of contamination in 2008 (20). This category includes both systems where discharges were eliminated and systems in which no specific pollutant sources had been confirmed;
- III. Large municipal systems assessed only at the outfall in 2008 with no evidence of contamination (19);
- IV. Small and medium sized systems assessed in 2008 with no evidence of contamination (179).

Stone recommended that the stormwater drainage systems in categories I, II, and III be reassessed. Regarding category II, in several cases (systems WR-500, WR-690, WR-210, WR-220, WR-770), contaminants were detected intermittently at the outfall, and more intensive sampling within the drainage systems was required to demonstrate whether a pollution source was present. Reassessment was also planned for systems in which discharges were eliminated following the 2008 study to ensure additional illicit discharges were not present (as was the case in NB-460, where one wastewater discharge "masked" another). Nineteen large systems with no prior evidence of contamination (category III) were judged to warrant reassessment given the extent of these drainage systems and the possibility that dilution of flow and degradation of contaminants within the system could have resulted in our missing an illicit discharge in 2008.

The current project extended and improved upon FWR's and Stone's 2008 study. A total of 228 stormwater drainage systems were assessed or reassessed. Using DEC's detailed stormwater infrastructure mapping, Stone and FWR collaborated with the City of Montpelier to conduct a more comprehensive and intensive illicit discharge detection and elimination project, applying our collective knowledge of Montpelier's stormwater infrastructure and our detective skills to identify and eliminate remaining illicit discharges within city limits.



# 2. Methods

# 2.1. Dry Weather Survey

Stormwater drainage systems designated for assessment were observed and tested during dry weather to minimize dilution by stormwater runoff. Dry weather was defined as negligible rainfall (less than 0.1 inches), beginning at approximately 12:00 p.m. the previous day. Stormwater drainage systems with ten or fewer inlets were typically assessed only at the outfall. Within larger stormwater drainage systems, catchbasins and junction manholes were also assessed to account for any effects of dilution. Stormwater structures were accessed along the public right-of-way or from the receiving waterbody, as appropriate. Where access permission was obtained, stormwater structures located on private property were also assessed, particularly if these structures were connected to a municipal drainage system.

At every outfall, a visual inspection was made of the structure and the area immediately below it. If present, dry-weather flows were observed for color, odor, turbidity, and floating matter. Obvious deficiencies in the structure, such as severe corrosion, were noted. Dry weather flows were sampled by hand or using a telescoping pole. At catchbasins and manholes located at junctions in the storm sewer, samples were collected independently from each in-flowing pipe, when possible. Field data were entered on printed assessment forms (Appendix A).

In order to identify potential illicit discharges from laundry facilities, leaking sanitary sewers, and crossconnections, each dry weather discharge was tested for ammonia, methylene blue active substances (common detergents), and the presence of optical brighteners. Specific conductance was measured as an indication of the dissolved solids content. To detect treated municipal water leakage, samples were analyzed for free chlorine concentration.

With few exceptions, structures that were not flowing at the time of the initial inspection were assumed not to have illicit connections and no further assessment of these structures was performed. Our general procedure is to provide additional assessment of non-flowing structures only if there is evidence of contamination, such as suds, odors, or certain deposits.

# 2.2. Water Analysis Methods

The ammonia concentration was tested using Aquacheck ammonia test strips. Samples were tested for methylene blue active substances using CHEMetrics test kit K-9400, a method consistent with American Public Health Association Standard Methods, 21st ed., Method 5540 C (2005). Free chlorine analysis was conducted with powdered DPD reagent (Hach Method 8167, equivalent to USEPA method 330.5) and a portable Hach DR/900 colorimeter. Specific conductance was measured using an Oakton model conductivity meter, according to Stone Environmental Standard Operating Procedure (SOP) 5.23.3 (Appendix B).



Optical brightener monitoring was performed at outfalls and selected catchbasins and manholes that were flowing at the time of inspection, in accordance with Stone Environmental SOP 6.38.0 (**Appendix B**). To test for optical brightener, a cotton pad was placed in the flow stream for a period of 4–10 days, after which the pad was rinsed, dried, and viewed under a long-wave ultraviolet light ("black light"). Florescence of the pad (seen on the pad in Figure 1) indicates the presence of optical brightener. Pads were held in a sleeve of fiberglass window screen, clipped to the rim of the outfall pipe or secured with fishing line to a rock or other anchor. At catchbasins and manholes located at junctions in the storm sewer, pads were deployed in incoming pipes if possible, but were often hung from the catchbasin grate or manhole rung into the sump. An advantage of optical brightener monitoring is that some intermittent or dilute wastewater discharges can be detected due to the multiple-day exposure of the pad, whereas the contaminant may not be detected in tests performed on grab samples.



Figure 1. Positive optical brightener monitoring pad under fluorescent (left) and UV (right) lamps.

Table 1, below, lists the water quality tests that Stone performed at all discharge points and selected catchbasins and manholes that were flowing at the time of inspection.

| Parameter                             | Sample Container | Analytical Method                                        |
|---------------------------------------|------------------|----------------------------------------------------------|
| Ammonia                               | Plastic vial     | Aquacheck ammonia test strips                            |
| MBAS detergents (anionic surfactants) | Plastic vial     | APHA Standard Methods, 21st ed., Method 5540 C<br>(2005) |
| Free chlorine                         | Glass jar        | By DPD, Hach Method 8167 (EPA 330.5)                     |
| Specific conductance                  | Glass jar        | Stone SOP 5.23.3                                         |
| Optical brightener                    | Cotton test pads | Stone SOP 6.38.0                                         |

| Tahle | 1. | Water  | Quality | Tests | Performed | at | Flowing  | Structures |
|-------|----|--------|---------|-------|-----------|----|----------|------------|
| Iable | 1. | vvalei | Quanty  | 16313 | renonneu  | aι | iiowiiig | Junctures  |

# 2.3. Advanced Investigations

Stormwater drainage systems suspected of passing illicit discharges—as identified in Table 2—were investigated further, employing bracket sampling procedures, camera inspection, dye testing, and/or smoke testing. The goal of bracket sampling is to isolate the contaminant source between adjacent structures, such a

catchbasin and a down-pipe manhole. DEC's stormwater infrastructure mapping was used to guide this effort.

The most reliable method to bracket sources of wastewater contamination is usually optical brightener monitoring throughout the drainage system. In several instances, we used optical brightener results to narrow the search area for illicit discharges to a specific structure or to the pipe between two structures. The presence and appearance of dry-weather flows were also useful in isolating sources of contamination within storm sewer segments.

After bracketing the discharge source as closely as possible using the water quality test methods, Stone worked with the City of Montpelier to find specific improper connections, leaks, and other problems contributing to the contaminated flows observed in the stormwater drainage systems. Engineering plans were reviewed to identify possible cross-connections between sanitary sewers and stormwater drainage systems, particularly locations where leakage from a sanitary line could be intercepted by the stormwater system. Dye testing, camera inspections, and smoke testing were performed to identify specific improper connections.

| Test                                                   | Benchmark                     | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E. coli                                                | >= 400 <i>E. coli</i> /100 mL | Undiluted municipal wastewater can have <i>E. coli</i> levels an order of magnitude higher than this benchmark. Pet waste and wildlife sources also cause elevated <i>E. coli</i> levels.                                                                                                                                                                                                                                                                                                                                  |
| Ammonia                                                | >= 0.25 mg/L                  | In the absence of other wastewater indicators, follow-up investigation is<br>performed when the ammonia concentration is 0.5 mg/L or higher. If<br>other wastewater indicators are present, then the 0.25 mg/L benchmark is<br>used. Decomposing vegetation under anoxic conditions can release<br>ammonia to water, which can cause misleading results.                                                                                                                                                                   |
| Detergents<br>(methylene blue<br>active<br>substances) | >=0.2 mg/L                    | Detection of low concentrations (0.1-0.3 mg/L) of anionic detergents is<br>common at stormwater outfalls. Most detections are not correlated with<br>other wastewater indicators and do not lead to a definite source. These<br>detections may be attributable to outdoor washing. However,<br>concentrations as low as 0.2 mg/L have occasionally led us to significant<br>wastewater sources that might otherwise have been missed; therefore,<br>this is a useful test to trigger additional sampling or investigation. |
| Optical<br>brightener                                  | presence                      | Presence usually indicates contamination by sanitary wastewater or<br>washwater. Exposure of the test pad for 4-10 days means that diluted and<br>intermittent discharges can be detected. Unfortunately, petroleum<br>fluoresces at the same wavelength as optical brighteners. Optical<br>brightener testing in catchbasins and manholes has proven to be our most<br>effective method to bracket sources of contamination in storm sewers.                                                                              |
| Free chlorine                                          | >=0.10 mg/L                   | The field test used for free chlorine analyses is sufficiently sensitive to detect municipal tapwater sources diluted by groundwater or runoff approximately 3- to 10-fold, depending on the strength of the tapwater chlorine residual. Chlorine is a good indicator of tapwater leaks and graywater sources. Chlorine is degraded in the presence of organic materials; therefore, it is not a good wastewater indicator.                                                                                                |
| Specific<br>conductance                                | >1000 µS/cm                   | Specific conductance is not a reliable indicator of wastewater contamination. Road salt and metals from pipe corrosion often result in levels in the 1,000-10,000 $\mu$ S/cm range, whereas flows contaminated with wastewater generally have specific conductance in the 600-1,000 $\mu$ S/cm range. Although infrequent, this measurement has proven most useful in identifying certain industrial discharges.                                                                                                           |

#### Table 2: Benchmark Levels for Determining Illicit Discharges



#### 2.3.1. E. coli and Phosphorus

In the stormwater drainage systems investigated under this contract, water samples were collected for total phosphorus and *E. coli* analyses at outfalls, unless the outfall was dry or prior testing demonstrated negligible concentrations of these constituents. The State of Vermont Agriculture and Environmental Laboratory (VAEL) performed both analyses. Phosphorus was analyzed because of its impact on the ecology and use of Lake Champlain. *E. coli* bacteria levels provide an indication of fecal contamination; due to human health concerns, *E. coli* enumeration is recommended for all fresh waters used for contact recreation or for water supply.

Samples for E. *coli* analysis were collected in sterile, plastic 100-mL bottles and analyzed using Quanti-tray. Total phosphorus was analyzed by DEC's Standard Operating Procedure (SOP) for Determination of Phosphorus by Flow Injection, Revision 6. The preservation and holding time requirements are given in Table 3.

| Parameter | Sample Container        | Analytical Method                  | Sample Preservation               | Holding Time |
|-----------|-------------------------|------------------------------------|-----------------------------------|--------------|
| Total P   | Glass vial (50 mL)      | DEC SOP, Revision 6                | Cool (4]]C)                       | 28 days      |
| E. coli   | Plastic bottle (100 mL) | SM 9223B<br>(Colilert Quanti-Tray) | Cool (4°C), sodium<br>thiosulfate | 6 hours      |

#### Table 3. Laboratory Sample Analyses

At the same time that water samples were collected for *E. coli* and total phosphorus analyses, flow measurements were made to enable calculation of total phosphorus mass loading. Flow was measured by timing the filling of a container of known volume or using the float method.



# 3. Results

Illicit discharge detection was performed in Montpelier in 2016 and 2017. A total of 228 systems were assessed. Results of the initial assessment are included in **Appendix** C. The results and status of advanced investigations of individual drainage systems is described in detail below.

# 3.1. MP010

The MP010 system drains the entirety of Westwood Drive and a portion of Murray Road and Towne Hill Road (Appendix D, Map 1). It discharges to the ditch line that runs along the north side of Towne Hill Road. Water quality data for this system are presented in Table 4.

| Tabla 1  | Mator Anal  | veie Data | ford | Outfall | NADO 1 | n |
|----------|-------------|-----------|------|---------|--------|---|
| Taple 4. | vvaler Anai | ysis Dala | 101  | Jutiali | IVIPUI | J |

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result         | Observations                                                              |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-------------------|---------------------------------------------------------------------------|
| 5/17/16          | Trickling         | 0.2               | 0.02                       | 0.1            | 981                          | Positive (strong) | Clear, no odor. Suds and sheen present on 5/27/16 when pad was retrieved. |
| 7/26/16          | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a               | Suds present.                                                             |
| 10/4/16          | Dry               | n/a               | n/a                        | n/a            | n/a                          | Positive (strong) | No flow or suds present.                                                  |
| 8/17/17          | Trickling         | n/a               | n/a                        | n/a            | n/a                          | n/a               | Clear, no odor. Suds present.                                             |
| 8/29/17          | Trickling         | n/a               | n/a                        | n/a            | n/a                          | Positive (strong) | Clear, no odor. Suds present. Red dye from sanitary sewer found on pad.   |

- Optical brightener was detected, and suds were observed, at the outfall during the initial assessment in May 2016.
- Monitoring pads were deployed throughout the system on three dates in June, August, and October 2016. Optical brightener was detected only at the outfall.
- Suds were observed at the outfall on multiple dates in 2016 and 2017, including August 17, 2017 (Figure 2).
- On August 25, 2017, red sewer dye was added in the sanitary manhole (SM1) at the intersection of Westwood Drive and Towne Hill Road. This manhole is adjacent to CB1. There was no flow in CB1, yet the outfall was trickling. A monitoring pad was deployed at the outfall.
- The pad was retrieved from the outfall on August 29, 2017. Red dye (Figure 3) and optical brightener were observed.



Figure 2. Suds at the MP010 outfall, August 17, 2017

Figure 3. Red dye on pad, August 29, 2017

• On January 7, 2020 Montpelier DPW staff led by Eric Ladd smoke tested the MP010 system. They plugged off the storm lines upstream of CB1, restricted the outlet, and injected smoke in CB1. Smoke was observed issuing from the roof vent at 498 Towne Hill Road. Given how quickly smoke reached the roof vent, Eric Ladd suspects there is a cross connection rather than a leak or break. Smoke was also observed at a sanitary manhole, though it is possible that this was due to wind blowing the smoke around. However, smoke was eventually observed coming from the vent at 513 Town Hill Road, across the street. The stormdrain was evacuated and then the sanitary system was tested. The house at 498 Town Hill Road smoked immediately from the same vent as before. Eventually there appeared to be a small amount of smoke in CB1 and a definite sewer odor. Eric Ladd's working theory is that there is a gray water line (washing machine) at 498 Towne Hill Road connected to a basement drain line that shares a common roof vent with their sewer lateral. His next step is to gain access to the house and dye test the washer and toilets.

**Conclusion:** The recurring positive optical brightener results and suds present at the outfall suggest a wastewater or washwater source. The lack of flow or optical brightener at CB1 and upstream catchbasins indicate that the contaminated flow is entering the stormdrain downstream of CB1. This was confirmed by a dye test at the sanitary manhole (SM1) located at the intersection of Westwood Drive and Towne Hill Road. The City of Montpelier's recent smoke testing indicated either 1) there is a gray water line at 498 Towne Hill Road connected to a basement drain line that shares a common roof vent with their sewer line, or 2) there is a washwater cross connection at 498 Towne Hill Road and a second problem, a leak in the sanitary sewer main. Given the dye test we performed of the sewer main, we expect the second explanation is correct.

**Resolution:** The City of Montpelier is now actively pursuing investigation and resolution of the illicit discharge(s) to system MP010.

# 3.2. MP110

The MP110 is a simple system consisting of a single catch basin and an outfall that discharges to the North Branch River. The system drains a portion of Elm Street, a driveway, and the hillside to the west of Elm Street. Water quality data for this system are presented in Table 5.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations                  |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-------------------------------|
| 5/17/16          | Flowing           | 0.0               | 0.01                       | 0.1            | 356                          | Negative  | Clear, no odor, suds present. |
| 7/26/16          | Flowing           | 0.1               | 0.04                       | 0.1            | 267                          | Negative  | Clear, no odor, no suds.      |
| 10/4/16          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | n/a       | Clear, no odor, no suds.      |
| 8/17/17          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | n/a       | Clear, no odor, no suds.      |

Table 5. Water Analysis Data for Outfall MP110

Findings:

- On May 17, 2016, minor suds were observed at the outfall. Optical brightener and MBAS were not detected.
- No suds or other indications of contamination were observed at the outfall on three subsequent dates in 2016 and 2017.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

## Resolution: n/a

# 3.3. MP130

The MP130 outfall is a 4-inch diameter PVC pipe (Appendix D, Map 2). It appears to be an underdrain piped under Elm Street (Route 12). It discharges to the North Branch River. Water quality data for this system are presented in Table 6.

| Table 6. | Water Anal | vsis Data | for Outfall | MP130     |
|----------|------------|-----------|-------------|-----------|
| Table 0. | Water Anai | ysis Data | ior outrail | 1011 1 30 |

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result         | Observations                   |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-------------------|--------------------------------|
| 5/17/16          | Flowing           | 0.0               | 0.00                       | 0.1            | 103                          | Positive (strong) | Clear, no odor.                |
| 7/26/16          | Flowing           | 0.5               | 0.01                       | 0.1            | 96.3                         | Positive          | Clear, no odor, iron staining. |

- Optical brightener was detected at the outfall in May 2016.
- A second pad deployed on July 26, 2016 also indicated presence of optical brightener. A low concentration of ammonia was also detected.

**Conclusion:** We suspect that MP130 is a subsurface drain and that partially renovated wastewater from the leachfield at 2068 Elm Street migrates into this drain. We do not suspect a direct wastewater connection because the discharge appears clear, is not malodorous, and does not contain wastewater solids.

**Resolution:** City of Montpelier Engineer Kurt Motyka indicated that the City does not plan to pursue this issue with the homeowner. Onsite wastewater disposal systems are under the purview of the DEC. Therefore, we hereby refer this issue to DEC.

# 3.4. MP150

The MP150 system drains Vine Street and Pearl Street and portions of Summer Street and Elm Street (Appendix D, Maps 3). It discharges to the North Branch River. Water quality data for this system are presented in Table 7.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations                               |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|--------------------------------------------|
| 5/20/16          | Trickling         | 0.3               | 0.06                       | 0.1            | 402                          | Negative  | Clear, no odor, iron staining and floc.    |
| 7/26/16          | Trickling         | 2.0               | 0.02                       | 2.0            | 213                          | Negative  | Clear, no odor, iron staining<br>and floc. |

Table 7. Water Analysis Data for Outfall MP150

# Findings:

- Elevated ammonia was detected at the outfall on May 20, 2016. On this date, we observed iron staining at the outfall and iron floc flowing into the river. No optical brightener was detected.
- On July 26, 2016, high concentrations of both ammonia and MBAS were measured at the outfall. Iron staining and floc were present. Heavy iron staining was observed in catchbasins on Elm Street on the main stormline between the Vine Street and Summer Street intersections.
- There are no contaminated sites indicated in the ANR Atlas in the vicinity of the Elm Street/Vine Street intersection.

**Conclusion:** We do not suspect sanitary wastewater or washwater contamination of this system. Rather, we suspect that the iron staining and floc observed at the outfall and in catchbasins on Elm Street result from a substantial petroleum release at one or more properties on Elm Street. There was no petroleum odor at the outfall and there are no contaminated sites indicated in the ANR Atlas in the vicinity of the Elm Street/Vine Street intersection; therefore, the suspected petroleum release likely occurred decades ago. The ammonia results are likely accurate; we often observe elevated ammonia associated with discharges of iron flocs. The elevated MBAS result on July 26, 2016 is likely invalid (a chemical interference caused by the iron floc).

# Resolution: n/a

# 3.5. MP230

The MP230 system drains the Community College of Vermont's parking lot. It discharges across Elm Street to a ditch north of Ball Park Drive. The outfall could not be located, so the first upstream catchbasin (CB1) was assessed. Water quality data for this system are presented in Table 8.

| Table 8. W      |                  |                   |                   |                            |                |                              |           |                 |  |  |  |  |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|--|--|--|--|
| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |  |  |  |  |
| CB1             | 5/26/16          | Trickling         | 0.3               | 0.05                       | 0.2            | 1460                         | Negative  | Clear, no odor. |  |  |  |  |
| CB1             | 7/26/16          | Trickling         | 0.1               | 0.02                       | 0.1            | 1734                         | Negative  | Clear, no odor. |  |  |  |  |
| CB1             | 8/17/17          | Dripping          | 0.2               | n/a                        | n/a            | n/a                          | n/a       | n/a             |  |  |  |  |

# Findings: On May 26, 2016, a slightly elevated ammonia concentration was measured in the CB1 sump. The specific conductance was also above the typical range. No optical brightener was detected. Only Pipe B was flowing.

• We sampled the CB1 sump on two subsequent dates and no contaminants were detected.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

# **Resolution:** n/a

# 3.6. MP250

The MP250 system drains a portion of Elm Street (Appendix D, Map 4). It discharges to the North Branch River at the Montpelier Recreation Facility. Water quality data for this system are presented in Table 9.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations               |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|----------------------------|
| 5/26/16          | Flowing           | 0.1               | 0.03                       | 0.0            | 790                          | Negative  | Clear, no odor, some suds. |
| 7/26/16          | Flowing           | 0.25              | 0.02                       | 0.1            | 1924                         | Negative  | Clear, some suds.          |
| 10/4/16          | Flowing           | NA                | NA                         | NA             | NA                           | Negative  | Clear, some suds.          |
| 8/25/17          | Flowing           | NA                | NA                         | NA             | NA                           | Negative  | Clear, no odor, some suds. |

# Table 9. Water Analysis Data for Outfall MP250

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- On May 26, 2016 suds were observed at the MP250 outfall. Ammonia, MBAS, and free chlorine concentrations were below detection and optical brightener was not present.
- OB monitoring was performed on three subsequent dates in 2016 and 2017; no OB was detected. However, suds (Figure 4) were observed on each visit.
- Mapped catchbasins CB1 and CB2 (Appendix D, Map 4) could not be located, which limited our ability to bracket contaminants in the system.

Conclusion: Based on repeated observations of suds at the outfall, under high and low flow conditions, and the lack of optical brightener or elevated ammonia concentrations, we suspect there is a washwater connection to this system. We suspect, but have not confirmed, that the source of the washwater is in the baseball stadium. A roof drain from the area of the baseball stands is mapped as connected with the MP250 stormdrain. It is possible there is a sink or drain used for washing connected to this roof drain. This possibility should be investigated further with the assistance of Montpelier DPW.



Figure 4. Outfall MP250 with suds (time-lapse camera image)

**Resolution:** Pending identification of a washwater source. Dye testing of any facilities at the baseball stadium is recommended.

# 3.7. MP290

The MP290 system drains a portion of North Park Drive. It discharges to a vegetated area southeast of the culde-sac. Water quality data for this system are presented in Table 10.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations                                             |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|----------------------------------------------------------|
| 5/26/16          | Flowing           | 0.0               | 0.05                       | 0.1            | 305                          | Negative  | Clear, no odor. Light iron<br>staining and suds present. |
| 7/26/16          | Flowing           | 0.1               | 0.02                       | 0.2            | 533                          | Negative  | Clear, suds present.                                     |
| 10/4/16          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | n/a       | Clear, no suds or odor.                                  |

Table 10. Water Analysis Data for Outfall MP290

#### **Findings:**

- On May 26, 2016, iron staining and minor suds were observed at the outfall. Optical brightener was not present and concentrations of ammonia, free chlorine, and MBAS were below detection. Similar results were obtained on July 26, 2016.
- On October 4, 2016, no suds were observed at the outfall.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location. In this case, the source of the suds observed in May and July 2016 was likely transient, such as vehicle washing.

**Resolution:** n/a

# 3.8. MP350

The MP350 system drains a portion of Elm Street. It discharges to the North Branch River. Water quality data for this system are presented in Table 11.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|
| 5/27/16          | Flowing           | 0.1               | 0.12                       | 0.1            | 101.8                        | Negative  | Clear, no odor. |
| 7/26/16          | Flowing           | 0.1               | 0.03                       | 0.1            | 94.8                         | Negative  | Clear, no odor. |

Table 11. Water Analysis Data for Outfall MP350

#### Findings:

- On May 27, 2016, an elevated chlorine concentration was measured at the outfall. Concentrations of ammonia and MBAS were below detection and optical brightener was not present.
- No contaminants were detected in follow-up sampling on July 26, 2016.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

## **Resolution:** n/a

# 3.9. MP370

The MP370 system drains portions of Franklin Street, Main Street, North Street, and the Montpelier Main Street Middle School property (Appendix D, Map 5). It discharges to the Winooski River. Water quality data for this system are presented in Table 12.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|
| MP370           | 5/27/16          | Flowing           | 0.75              | 0.00                       | 0.1            | 2820                         | Positive  | Clear, WW odor. |
| CB1             | 5/27/16          | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | n/a       | n/a             |
| CB2             | 5/27/16          | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Positive  | n/a             |
| CB3-Pipe B      | 5/27/16          | Flowing           | 2.0               | 0.00                       | 0.7            | 3320                         | Positive  | WW odor.        |
| CB4             | 5/27/16          | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Negative  | n/a             |
| MP370           | 10/4/16          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Positive  | Clear, no odor. |
| CB3             | 10/4/16          | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Positive  | n/a             |
| CB6             | 10/4/16          | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Positive  | n/a             |

Table 12. Water Analysis Data for Outfall MP370

#### Findings:

• Ammonia and wastewater odor were detected at the outfall on May 27, 2016. The flow was followed back to a catchbasin on the Main Street Middle School property. In CB6, we observed suds, toilet paper, and feces (Figure 5). The flow and suds were coming from a pipe aligned toward North Street (in the opposite direction from the school).

- On June 1, 2016 Montpelier DPW deployed a tracked camera at CB6. Four pipes were identified draining to the main line entering CB6. There are two pipes entering at roughly 43 ft upstream from the catchbasin and a third around 68 ft that all appeared greasy around the outlet. While we were watching the catchbasin the flow picked up and some suds came through.
- On June 7, 2016 Stone and Montpelier DPW staff dye tested toilets in 24, 32, and 46



Figure 5. Catchbasin CB6 on the Main Street Middle School property

North Street and in 172 and 176 Main Street. The sanitary sewer from the apartment building at 172 Main Street/1 Scribner Place was directly connected to the stormdrain above the manhole (labelled CB7) under the basketball hoop. At 24 and 32 North Street we inspected basement plumbing connections, which looked OK. We could not access the basement at 176 Main Street. The front unit at 176 Main is connected properly; however, the dye test in the back apartment was inconclusive. Orange dye was added at the same time red dye was used at 172 Main. This test either needs to be repeated or the basement needs to be accessed to rule out a connection to the stormdrain. While dye testing houses on North Street, DPW staff observed flow and detergent suds pass through catchbasin CB6 but not the manhole under the basketball hoop. This observation suggests a yet undiscovered connection to one of the two pipes discharging to the storm sewer between CB6 and the manhole under the basketball hoop.

- Samples collected at the outfall on July 27, 2016 had exceedingly high *E. coli* (9,804 MPN/100 mL) and elevated total phosphorus concentrations (248 µg/L) (Table 33).
- Montpelier DPW installed a new sewer service along Scribner Place and a plumber connected the internal piping from 172 Main St./1 Scribner Place to the new sewer service on September 6, 2016.
- A set of pads was deployed on October 4, 2016, a month after the cross connection was eliminated from the apartment house at 172 Main St./1 Scribner Place. OB was detected on all three pads.

**Conclusion:** A substantial wastewater connection was eliminated from the apartment house at 172 Main St./1 Scribner Place. However, one or more illicit discharges remain in this system. The most likely source of a second cross connection is the rear apartment unit at 176 Main Street. Access to this unit has been difficult.

**Resolution:** We recommend additional investigation in this system, now that the major problem at 172 Main St./1 Scribner Place has been resolved. We recommend smoke testing this system at a time when school is not in session. If necessary, we also recommend a dye test in the rear apartment unit at 176 Main Street.

# 3.10. MP380

The MP380 system drains Cross Street and portions of Franklin Street, North Franklin Street, Peck Place, Mechanic Street, North Street, and Ewing Street (Appendix D, Map 5). It discharges to the North Branch River. Water quality data for this system are presented in Table 13.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result     | Observations    |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|---------------|-----------------|
| MP380           | 5/27/16          | Flowing           | 0.0               | 0.00                       | 0.0            | 725                          | Negative      | Clear, no odor. |
| CB4-Pipe A      | 5/27/16          | Flowing           | 0.0               | 0.02                       | 0.0            | 651                          | Negative      | Clear, no odor. |
| CB4-Pipe B      | 5/27/16          | Flowing           | 0.0               | 0.00                       | 0.2            | 1026                         | Negative      | Clear, no odor. |
| CB5             | 5/27/16          | Flowing           | 0.0               | 0.01                       | 0.0            | 757                          | Negative      | Clear, no odor. |
| MP380           | 7/26/16          | Flowing           | 0.1               | 0.02                       | 0.7            | 1233                         | Indeterminate | Clear, no odor. |
| CB4-Pipe A      | 7/26/16          | Flowing           | 0.25              | 0.04                       | 0.0            | 1045                         | Negative      | Clear, no odor. |
| MP380           | 10/4/16          | Flowing           | n/a               | n/a                        | 0.1            | n/a                          | n/a           | Clear, no odor. |
| CB4-Pipe A      | 10/4/16          | Flowing           | n/a               | n/a                        | 0.1            | n/a                          | n/a           | Clear, no odor. |

Table 13. Water Analysis Data for Outfall MP380

#### Findings:

- The concentrations of all measured constituents were below detection when the system was assessed on May 27, 2016.
- On July 26, 2016 an elevated MBAS concentration was measured at the outfall and the optical brightener result was indeterminate. On October 4, 2016, MBAS concentrations were below detection at the outfall and CB4-Pipe A.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

## **Resolution:** n/a

# 3.11. MP450

The MP450 system drains Greenfield Terrace and portions of Greenfield Drive and Dairy Lane. It discharges to a vegetated area south of Dairy Lane. Water quality data for this system are presented in Table 14.

Table 14. Water Analysis Data for Outfall MP450

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations                  |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|-------------------------------|
| 6/1/16           | Flowing           | 0.3               | 0.00                       | 0.1            | 336                          | Negative     | Clear, no odor, iron stained. |
| 7/26/16          | Flowing           | 1.0               | 0.04                       | 0.0            | 1042                         | Negative     | Clear, no odor, iron stained. |
| 10/5/16          | Flowing           | 1.0               | n/a                        | n/a            | n/a                          | n/a          | Iron stained.                 |

- The MP450 system was initially assessed on June 1, 2016. The ammonia concentration measured at the outfall was slightly elevated. There was significant corrosion and iron staining at the outfall. Optical brightener was not detected.
- On July 26 and October 5, 2016, iron staining was observed, and the ammonia concentration was moderately high (1.0 mg/L).
- According to the ANR Atlas, properties with leaking underground heating oil storage tanks proximate to the outfall are 3 and 6 Greenfield Terrace. These tanks have been removed. The iron staining and elevated ammonia concentrations found at the MP450 outfall may be associated with these documented petroleum releases.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location. The only constituent found at levels of concern was ammonia and this is likely associated with degradation of petroleum released from leaking underground storage tanks on Greenfield Terrace.

**Resolution:** n/a

# 3.12. MP580

The MP580 system drains a small portion of State Street and the intersection of State Street and Bailey Avenue (Appendix D, Map 6). It discharges to the Winooski River south of State Street. Water quality data for this system are presented in Table 15.

| Structure<br>ID | Date    | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result       | Observations                 |
|-----------------|---------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------------|------------------------------|
| MP580           | 6/1/16  | Flowing           | 2.0               | 0.00                       | 0.7            | 1059                         | Positive           | Clear, no odor.              |
| CB3             | 6/15/16 | Trickling         | 0.4               | n/a                        | n/a            | n/a                          | n/a                | Toilet paper, feces, WW odor |
| MP580           | 7/26/16 | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a                | WW odor.                     |
| CB3             | 10/4/16 | Intermittent      | 2.0               | n/a                        | n/a            | n/a                          | n/a                | WW odor, toilet paper, feces |
| CB4             | 10/4/16 | Wet (no flow)     | 0.5               | n/a                        | n/a            | n/a                          | n/a                | Brown in color, WW odor.     |
| CB6             | 10/4/16 | Wet (no flow)     | 0.25              | n/a                        | 1.5            | n/a                          | n/a                | WW odor, possible feces.     |
| MP580           | 9/11/17 | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Negative           | No odor.                     |
| CB3             | 9/11/17 | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Positive           | WW odor when pad retrieved.  |
| CB3             | 9/29/17 | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Positive<br>(weak) | No odor.                     |
| CB3-Pipe C      | 9/29/17 | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Positive           | No odor.                     |

#### Table 15. Water Analysis Data for Outfall MP580

#### **Findings:**

• In June 2016, feces and toilet paper were observed entering catchbasin CB3 near 153 State Street. via a small diameter pipe in the corner of the basin (Figure 6). The outfall tested positive for presence of optical brightener. Ammonia concentrations were elevated both at the outfall and in CB3. Stone notified the City of Montpelier of this findings on June 17, 2016. We suspected a direct connection from the building at 153 State Street. Montpellier DPW dye tested a bathroom at 153 State Street and

inspected the basement plumbing. Dye was observed in the sanitary sewer and not in the storm sewer. Since there appeared to be only one sewer pipe exiting the building's basement, Montpelier DPW concluded there was no illicit connection from this building. Montpelier DPW also dye tested facilities and inspected basement plumbing in adjacent buildings on State Street, again finding no problems. Stone dye tested the sanitary sewer on lower State Street west of catchbasin CB3 and did not observe dye in the separate storm sewer.

On October 19, 2016, Stone, Montpelier DPW (Kurt Motyka, Eric Ladd, and Mike Pappineau), and Wayne Graham of Vermont Rural Water Association performed camera inspection and smoke testing of the sanitary sewer and storm sewer on lower State Street. Smoke testing did not reveal any inappropriate cross connections from buildings on State Street to the storm sewer. However, immediately east of catchbasin CB3 smoke did cross over between the sanitary sewer and a corrugated steel underdrain that discharges to catchbasin CB3. While there did not appear to be a direct connection between the sanitary and the storm sewers, the approximate location where the smoke entered each pipeline was visible on camera within each pipeline. When smoking catchbasin CB3, it appeared that the smoke flowed through the underdrain



Figure 6. Hole (connected pipe not visible) in corner of CB3

and entered the sanitary sewer at a pipe joint. Stone observed an accumulation of sediment and pools of water near the point at which the underdrain crosses under the sanitary sewer. Stone made the preliminary recommendation to repair or replace the section of the sanitary sewer pipe crossing over the underdrain to eliminate this indirect connection.

- During multiple visits over the summer of 2016, the outfall was not flowing; therefore, no *E. coli* samples could be collected.
- In June 2017, a DPW employee noted wastewater flushing into catchbasin CB3. This employee dye tested a toilet in the dentist office located in the back portion of 153 State Street. The test indicated a direct connection from the bathroom to CB3. Further inspection by Montpelier DPW revealed there was a second sewer pipe encased in the wall in the back portion of 153 State Street. On June 30, 2017,

the sanitary wastewater piping from the dentist's office was rerouted to eliminate this direct connection. The sewer line encased in the wall was abandoned.

• On September 11, 2017, we deployed monitoring pads at CB3 and the outfall. At this time, the City of Montpelier had already disconnected the illicit connection. Optical brightener was detected on the monitoring pad in CB3. On September 29, 2017 we inserted pads in both the CB3 sump and in the underdrain (CB3-Pipe C). Optical brightener was detected on both pads.

**Conclusion:** The City of Montpelier eliminated a direct wastewater connection to system MP580 from 153 State Street. However, subsequent optical brightener testing has confirmed the existence of a second, indirect wastewater discharge to this system. As indicated by smoke testing conducted in October 2016, it appears that sanitary wastewater is leaking from the sewer main into the underdrain and discharging into catchbasin CB3.

**Resolution:** The second wastewater discharge to this system requires correction. We recommend sliplining a section of the sewer main on State Street where it crosses over the underdrain east of catchbasin CB3.

# 3.13. MP590

The MP590 system drains the majority of Bailey Avenue, as well as portions of Baldwin Street, Terrace Street, Chapman Road, Clarendon Avenue, and the entirety of Dwinell Street, Dewey Street, and Sunnyside Terrace (Appendix D, Map 7). It discharges to the Winooski River beneath the Bailey Avenue Bridge. Water quality data for this system are presented in Table 16.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations          |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|-----------------------|
| MP590           | 6/1/16           | Flowing           | 0.1               | 0.01                       | 0.2            | 1028                         | Negative     | Clear, WW odor.       |
| MP590           | 6/15/16          | Flowing           | 0.1               | 0.02                       | 0.0            | 1039                         | Positive     | Clear, WW odor.       |
| CB8             | 6/15/16          | Dry               | n/a               | n/a                        | n/a            | n/a                          | Negative     | n/a                   |
| CB13            | 6/15/16          | Flowing           | 0.1               | 0.19                       | 0.0            | 1407                         | n/a          | Clear, no odor.       |
| CB14            | 6/15/16          | Wet (no flow)     | n/a               | 0.00                       | n/a            | n/a                          | n/a          | n/a                   |
| CB15            | 6/15/16          | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a          | n/a                   |
| CB23-Pipe A     | 6/15/16          | Flowing           | 0.2               | 0.07                       | 0.1            | 1766                         | n/a          | Clear, no odor.       |
| CB23-Pipe B     | 6/15/16          | Flowing           | 0.0               | 0.04                       | 0.1            | 221                          | Negative     | Clear, no odor.       |
| CB24            | 6/15/16          | Flowing           | 2.0               | 0.00                       | 0.4            | 322                          | Negative     | Brown color, WW odor. |
| CB25            | 6/15/16          | Trickling         | n/a               | 0.00                       | n/a            | n/a                          | n/a          | Clear, no odor.       |
| CB26            | 6/15/16          | Trickling         | n/a               | 0.01                       | n/a            | n/a                          | n/a          | Clear, no odor.       |
| MH4             | 6/15/16          | Flowing           | n/a               | 0.24                       | n/a            | n/a                          | n/a          | Clear, no odor.       |
| MP590           | 9/11/17          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Negative     | Clear, no odor.       |
| CB6             | 9/11/17          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Indeterm.    | Clear, no odor.       |
| CB14            | 9/11/17          | Flowing           | n/a               | 0.04                       | n/a            | n/a                          | n/a          | Clear, no odor.       |
| CB14-X          | 9/11/17          | Flowing           | n/a               | 0.08                       | n/a            | n/a                          | n/a          | Clear, no odor.       |
| CB15            | 9/11/17          | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a          | Clear, no odor.       |

Table 16. Water Analysis Data for Outfall MP590



| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations    |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|-----------------|
| CB6             | 9/21/17          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Negative     | Clear, no odor. |

#### **Findings:**

- The MP590 system is a combined sewer overflow (CSO) system that was initially assessed on June 1, 2016. On this date, no contaminants were measured above levels of concern. However, a wastewater odor was detected.
- Further assessment was conducted on July 15, 2016. On this date, a wastewater odor and a high ammonia concentration were detected in CB24. MBAS was also elevated. An elevated chlorine concentration was also measured in CB13.
- In 2017 the City of Montpelier identified two illicit discharges in the MP590 system. A short section of sewer main serving two properties on Dwinell Street was found to be connected to the stormdrain on Clarendon Street. In the summer of 2017, a repair was made at the intersection of Clarendon and Bailey Avenues to eliminate this cross connection. We are unsure whether this cross connection could have been related to the contaminants detected in CB24, which is an off-line structure. The City has also addressed significant water leaks on Terrace Street above CB13 (where we detected chlorine). More recently, the City has installed new water lines on Terrace Street and Clarendon Street. The details of these repairs are unclear to Stone at the present time.

**Conclusion:** The City of Montpelier has performed major repairs to the sanitary sewer and water lines in the Terrace Street/Bailey Avenue/Clarendon Avenue neighborhood since 2016, reportedly eliminating a direct wastewater connection and leaking water lines.

**Resolution:** Further testing of structures in the Terrace Street/Bailey Avenue/Clarendon Avenue neighborhood should be performed to confirm that any wastewater cross connections were indeed eliminated.

# 3.14. MP600

The MP600 system drains a portion of Towne Street and North College Street. It discharges to a stormwater pond south of Towne Street. Water quality data for this system are presented in Table 17.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|
| 6/2/16           | Trickling         | 0.1               | 0.11                       | 0.0            | 1194                         | Negative  | Clear, no odor. |
| 7/26/16          | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a       | Dry, no odor.   |

Table 17. Water Analysis Data for Outfall MP600

- The MP600 system was assessed on June 2, 2016. The chlorine concentration was slightly elevated. No optical brightener was detected.
- On July 26, 2016, the MP600 outfall was dry.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

Resolution: TBD

# 3.15. MP890

The MP890 system drains a section of Northfield Street, Derby and Colonial Drives, and adjoining streets (Appendix D, Map 8). Water quality data for this system are presented in Table 18.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations               |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|----------------------------|
| MP890           | 6/14/16          | Flowing           | 0.1               | 0.00                       | 0.1            | 300                          | Negative     | Clear, laundry odor, suds. |
| CB9             | 6/15/16          | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a          | n/a                        |
| MP890           | 7/26/16          | Flowing           | 0.25              | 0.00                       | 0.1            | 349                          | n/a          | Clear, no odor.            |
| MP890           | 10/5/16          | Flowing           | 0.1               | 0.00                       | 0.1            | 223                          | Negative     | Clear, no odor.            |
| CB1             | 10/5/16          | Flowing           | 0.1               | 0.00                       | 0.1            | 227                          | n/a          | Clear, no odor.            |
| MP890           | 9/11/17          | Flowing           | 0.1               | 0.02                       | 0.1            | 140                          | Negative     | Clear, laundry odor, suds. |

Table 18. Water Analysis Data for Outfall MP890

#### **Findings:**

- The MP890 outfall was initially assessed on June 14, 2016. Ammonia, chlorine and MBAS concentrations were below detection and optical brightener was not detected. However, a laundry odor and suds were observed.
- Due to the laundry odor and suds, we repeated testing of the outfall and selected catchbasins in 2016 and 2017. No contaminants were detected above levels of concern. However, on September 11, 2017 laundry odor and significant suds were again observed.
- Investigation of this system was complicated by the reconstruction of Northfield Street in 2017-2018. As part of this reconstruction, the City of Montpelier installed an underdrain along the east side of the road up-gradient of outfall to drain a particularly wet area. When this pipe was connected the discharge began foaming.

**Conclusion:** We suspect, but have not been able to confirm, a washwater discharge on the east side of Northfield Street between CB1 and the outfall.

**Resolution:** Because reconstruction of Northfield Street is now complete, we recommend further investigation in the vicinity of the new underdrain to identify any potential washwater discharges.

# 3.16. MP1030

The MP1030 system drains portions of Wheelock Street and Berlin Street (Appendix D, Map 9). It outlets to a wooded area west of Wheelock Street. Water quality data for this system are presented in Table 19.

| Tahla 19  | Water Anal  | vsis Data | for Outfall | MP1030    |
|-----------|-------------|-----------|-------------|-----------|
| Table 19. | vvalei Anai | ysis Dala |             | IVIF 1050 |

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|
| MP1030          | 6/14/16          | Flowing           | 0.0               | 0.02                       | 0.1            | 460                          | Positive  | Clear, no odor. |
| MP1030          | 8/4/16           | Flowing           | 0.1               | 0.00                       | 0.1            | 531                          | Negative  | Clear, no odor. |
| MP1030          | 10/4/16          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Negative  | Clear, no odor. |
| CB3             | 10/4/16          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Negative  | Clear, no odor. |

#### **Findings:**

- The MP1030 system was assessed on June 14, 2016. Concentrations of all constituents were below detection. However, OB was present at the outfall.
- Monitoring pads were deployed in the system on August 4, 2016 and again on October 4, 2016. No
  optical brightener was detected on these pads.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location. The source of optical brightener detected on June 14, 2016 was apparently transient.

#### Resolution: n/a

# 3.17. MP1310

The MP1310 system drains a portion of State Street and the parking lots of the Christian Science Reading Room, Union Mutual Vermont Companies, Vermont Defender General, Vermont Department of Buildings & General Services, and the Vermont Department of Taxes. It outlets to the Winooski River behind the Vermont Department of Motor Vehicles and the Vermont Arts Council (Appendix D, Map 10). Water quality data for this system are presented in Table 20.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations                             |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|------------------------------------------|
| MP1310          | 7/1/16           | Flowing           | 0.1               | 0.02                       | 0.0            | 4200                         | Negative     | Clear, no odor                           |
| CB2             | 7/1/16           | Dry               | n/a               | n/a                        | n/a            | n/a                          | Negative     | n/a                                      |
| CB3             | 7/1/16           | Wet (no flow)     | 0.5               | n/a                        | n/a            | n/a                          | Indeterm.    | WW odor                                  |
| CB5-Pipe B      | 7/1/16           | Flowing`          | n/a               | n/a                        | n/a            | 5400                         | Negative     | Clear, no odor                           |
| CB8             | 7/1/16           | Flowing           | n/a               | n/a                        | n/a            | 5190                         | Negative     | Clear, no odor                           |
| CB11-Pipe A     | 7/1/16           | Flowing           | 0.5               | n/a                        | n/a            | n/a                          | Negative     | Clear, WW odor                           |
| CB13            | 7/1/16           | Trickling         | 2.0               | n/a                        | n/a            | n/a                          | Negative     | Clear, WW odor                           |
| MP1310          | 9/11/17          | Trickling         | n/a               | n/a                        | n/a            | n/a                          | n/a          |                                          |
| CB3             | 9/21/17          | Flowing           | 0.75              | n/a                        | n/a            | n/a                          | n/a          | Cloudy, WW odor.                         |
| CB10            | 9/21/17          | Flowing           | 1.0               | n/a                        | n/a            | n/a                          | n/a          | Clear, WW odor, Pipe C is source of suds |
| CB11            | 9/21/17          | Flowing           | 0.15              | n/a                        | n/a            | n/a                          | n/a          | Clear, no odor.                          |

Table 20. Water Analysis Data for Outfall MP1310



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#### **Findings:**

- The MP1310 system was initially assessed on July 1, 2016. At that time elevated ammonia levels were measured in the CB3 branch and high specific conductance was measured in the CB2 branch of the system. No optical brightener was detected in the system, although the test at CB3 was indeterminate.
- High specific conductance was measured on July 1, 2016 in catchbasin CB8 downstream from a deep pump vault. The pump vault is reportedly used to dewater basements in a state office complex. Flows at CB8 were substantial when the pump cycled on.
- Considerable time was spent attempting to find a source of ammonia on the Vermont Mutual Insurance property (CB11, CB12, CB13). The source of ammonia in CB11 and CB13 is now believed to be decomposition of organic matter in the stagnant catchbasin sumps.
- On September 21, 2017, elevated ammonia levels were detected in CB10 and downstream catchbasin CB3. Furthermore, a wastewater odor was observed in both basins and a small amount of suds appeared to enter CB10 from an unidentified pipe (Pipe C; Figure 7).

**Conclusion:** Pipe C in catchbasin CB10 requires further investigation. This unmapped pipe appears to be a source of ammonia and suds and its origin is unknown. Investigation was complicated by the busy traffic on State Street.

The high specific conductivity (~5 mS/cm) measured in the CB2 branch of the system appears to arise at the pump vault upstream of CB8. We suspect that the vault is discharging chloride contaminated groundwater. Given the complexity of this issue and the size of the Winooski River, addressing this issue is probably a low priority.

**Resolution:** The origin and connection to Pipe C in catchbasin CB10 require further investigation. We recommend the Montpelier DPW inspect this pipe with a sewer camera.



Figure 7. Unmapped Pipe C in catchbasin CB10, September 21, 2017

# 3.18. MP1350

The MP1350 system drains portions of Berlin Street, the Wilson Street neighborhood, and Cedar Hill Lane (Appendix D, Map 11). It discharges to the Winooski River north of River Street. Water quality data for this system are presented in Table 21.

Advanced investigation of the MP1350 system was complicated by an inaccurately mapped combined sewer system on Highland Avenue off Wilson Street. The Wilson Street line is one of three branches of the system. The other two branches of the system are on Berlin Street and Cedar Hill Lane and these are entirely separated.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result         | Observations                      |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-------------------|-----------------------------------|
| CB22            | 7/1/16           | Flowing           | n/a               | 0.26                       | n/a            | 540                          | Negative          | Clear, no odor.                   |
| CB23            | 7/1/16           | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | n/a               | n/a                               |
| CB24            | 7/1/16           | Flowing           | 1.0               | 0.00                       | n/a            | n/a                          | Negative          | WW odor, brown color.             |
| CB25            | 7/1/16           | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | n/a               | n/a                               |
| CB26            | 7/1/16           | Wet (no flow)     | 2.0               | 0.00                       | n/a            | n/a                          | Positive (strong) | WW odor, toilet paper,<br>sewage. |
| CB31            | 7/1/16           | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | Negative          | Clear, no odor.                   |
| MP1350          | 7/12/16          | Flowing           | 0.1               | 0.00                       | 0.1            | 645                          | Positive          | Clear, no odor.                   |
| CB13            | 7/12/16          | Flowing           | 0.25              | 0.05                       | 0.0            | 790                          | Negative          | Clear, no odor.                   |
| CB20            | 7/12/16          | Flowing           | 0.1               | 0.01                       | 0.0            | 667                          | Positive (strong) | Clear, no odor.                   |
| CB22            | 8/25/17          | Flowing           | n/a               | 0.19                       | n/a            | n/a                          | n/a               | Clear, no odor.                   |

Table 21. Water Analysis Data for Outfall MP1350

- The MP1350 system was assessed on July 1, 2016. Water quality data and observations suggested two significant problems, a wastewater cross connection on Highland Avenue and a municipal water leak on Wilson Street at the Highland Avenue intersection. However, it was unclear at the time that Highland Avenue has combined sewer. According to an email (July 28, 2016) from Tom McArdle, then Public Works Director, the Highland Avenue combined sewer is connected to the Wilson Street sewer. Wilson and George Street have separate storm and sewer mains. The Wilson Street storm line connects to the Berlin Street storm line as indicated in Appendix D, Map 11.
- On July 1, 2016, we measured a high chlorine concentration (0.26 mg/L) in significant flow at CB22.
- OB detected on July 12, 2016 in CB20 on the Wilson Street line is not consistent with the information from Montpelier DPW that this line is a separate storm line, unless CB20 is actually a single catchbasin on the sanitary sewer. This contradiction has only recently become apparent to Stone.
- On July 1, 2016, there was no flow in the system from Cedar Hill Lane and no OB was detected on a pad placed at CB31. These results indicate there is no illicit discharge present in the Cedar Hill Lane branch.
- On July 12, 2016, a sample at catchbasin CB13 contained no contaminants above levels of concern and no OB was detected on a pad placed at CB13. These results indicate there is no illicit discharge present in the Berlin Street line above CB13.

- The City of Montpelier conducted a leak detection survey in August 2016 and found leaks at both 21 Wilson and 2 Highland Avenue. The leakage rate was estimated to be 20 gallons per minute. The leaks were promptly fixed.
- On August 25, 2017 a sample collected from CB22 had a chlorine concentration of 0.19 mg/L, which indicated that one or more additional leaks remain in this area.
- The positive OB result at the outfall on July 12, 2017 was unexpected, and it appears we did not retest this outfall or attempt to bracket the source of this OB. If verified, a possible source is one or more cross connections on the Wilson Street stormline above CB20.

**Conclusion:** Two branches of this drainage system are not contaminated. However, we conclude that a wastewater cross connection likely exists on the Wilson Street branch (at or above CB20), which has not been resolved. We also suspect that one or more additional water leaks are present near the intersection of Wilson Street and Highland Avenue.

**Resolution:** Further investigation is needed to verify the presence of optical brightener at the outfall and in the Wilson Street stormline and to more closely bracket its source. Additionally, after confirming chlorine is still present in CB22 at the intersection of Wilson Street and Highland Avenue, leak detection should be repeated in this area.

# 3.19. MP1360

The MP1360 system drains portions of Granite Street, Barre Street, Sibley Avenue, College Street, and adjoining streets (Appendix D, Map 12). It discharges to the Winooski River immediately downstream of the Granite Street bridge. Water quality data for this system are presented in Table 22.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|
| MP1360          | 7/12/16          | trickling         | n/a               | n/a                        | n/a            | n/a                          | negative  | clear, no odor. |
| CB1-Pipe A      | 7/12/16          | flowing           | 0.25              | 0.03                       | 0.0            | 3720                         | negative  | clear, no odor. |
| CB1-Pipe B      | 7/12/16          | flowing           | 0.25              | 0.04                       | 0.1            | 1425                         | n/a       | clear, no odor. |
| MH1             | 7/12/16          | flowing           | 0.10              | 0.00                       | 0.0            | 1728                         | n/a       | clear, no odor. |
| MP1360          | 10/4/16          | trickling         | n/a               | n/a                        | n/a            | n/a                          | n/a       | clear, no odor. |
| CB1             | 10/6/17          |                   | n/a               | n/a                        | n/a            | n/a                          | negative  |                 |
| CB2             | 10/6/17          |                   | 0.05              | n/a                        | n/a            | n/a                          | n/a       |                 |
| CB3             | 10/6/17          |                   | 0.05              | n/a                        | n/a            | n/a                          | n/a       |                 |

Table 22. Water Analysis Data for Outfall MP1360

## Findings:

- The MP1360 system was initially assessed on July 12, 2016. No contaminants were detected above levels of concern.
- Given the extent of this system, assessment was repeated on October 6, 2017 at multiple catchbasins. As in the earlier assessment, no indicators of an illicit discharge were observed.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

#### Resolution: n/a

# 3.20. MP1370

The MP1370 system drains portions of Stone Cutters Way, Barre Street, Hubbard Street, and East State Street, and the entirety of Wilder Street, Nelson Street, First Avenue, Kent Street, Tracy Street, and Guernsey Avenue (Appendix D, Map 13). It outlets to the Winooski River north of Biggam, Fox & Skinner Attorneys. Water quality data for this system are presented in Table 23.

| Structure |         | Flow          | Ammonia | Free<br>Chlorine | MBAS   | Specific<br>Cond. |                 |                                  |
|-----------|---------|---------------|---------|------------------|--------|-------------------|-----------------|----------------------------------|
| ID        | Date    | Condition     | (mg/L)  | (mg/L)           | (mg/L) | (µs/cm)           | OB Result       | Observations                     |
| MP1370    | 7/12/16 | Flowing       | 0.2     | 0.07             | 0.3    | 3070              | n/a             | Clear, no odor                   |
| CB11      | 7/12/16 | Slow flow     | 0.25    | 0.08             | 0.1    | 1808              | Indeterminate   | Sheen, no odor.                  |
| CB12      | 7/12/16 | Wet (no flow) | 0.5     | 0.06             | 1.2    | 293               | Negative        | Brown color, motor oil odor.     |
| CB13      | 10/5/16 | Flowing       | 0.1     | 0.30             | 0.1    | 3125              | Indeterminate   | Clear, no odor.                  |
| MH1       | 7/7/17  | Flowing       | 0.2     | n/a              | n/a    | n/a               | Positive (weak) | Clear, faint laundry odor.       |
| MH3       | 7/7/17  | Flowing       | 0.2     | n/a              | n/a    | n/a               | n/a             | Clear, faint laundry odor.       |
| CB1       | 7/7/17  | Flowing       | n/a     | n/a              | n/a    | n/a               | Positive (weak) | Clear, faint laundry odor.       |
| CB11      | 7/7/17  | Flowing       | 0.2     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |
| CB12      | 7/7/17  | Wet (no flow) | 0.2     | n/a              | n/a    | n/a               | Negative        | Cloudy, no odor.                 |
| CB13      | 7/7/17  | Flowing       | 0.2     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |
| MH1       | 8/25/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Positive (weak) | Clear, no odor.                  |
| MH3       | 8/25/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Positive (weak) | Clear, no odor.                  |
| CB11      | 8/25/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |
| CB12      | 8/25/17 | Wet (no flow) | n/a     | n/a              | n/a    | n/a               | Negative        | Cloudy, sheen, no odor.          |
| CB13      | 8/25/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |
| CB14      | 8/25/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Negative        | Cloudy, sheen, suds, no<br>odor. |
| CB15      | 8/25/17 | Wet (no flow) | 0.8     | 0.00             | 0.15   | 531               | Negative        | Cloudy, faint ammonia odor.      |
| CB16      | 8/25/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |
| CB17      | 8/25/17 | Wet (no flow) | n/a     | n/a              | n/a    | n/a               | Negative        | Cloudy, faint ammonia odor.      |
| CB18      | 8/25/17 | Wet (no flow) | n/a     | n/a              | n/a    | n/a               | Negative        | Cloudy, faint WW odor.           |
| CB19      | 8/25/17 | Dry, no flow  | n/a     | n/a              | n/a    | n/a               | Negative        | Dry, faint ammonia odor.         |
| CB11      | 9/21/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |
| CB12      | 9/21/17 | Wet (no flow) | n/a     | n/a              | n/a    | n/a               | Negative        | Cloudy, sheen, no odor.          |
| MH3       | 9/21/17 | Flowing       | n/a     | n/a              | n/a    | n/a               | Negative        | Clear, no odor.                  |



- The MP1370 system was initially assessed on July 12, 2016. The outfall is impossible to assess without a boat. Elevated concentrations of ammonia and MBAS were measured in CB12 and a motor oil odor was observed. Optical brightener was not detected.
- Monitoring pads were deployed throughout the system on July 7, 2017. OB was detected at MH1 and CB1, although fluorescence was weak.
- Monitoring pads were deployed throughout the system again on August 25, 2017. OB was detected at MH1 and MH3, although fluorescence was weak. While deploying monitoring pads we observed ammonia odors from the catchbasins on Wilder Street. The catchbasin at the intersection of Hubbard Avenue and Wilder Street (CB15) had an ammonia concentration of 0.8 mg/L, but optical brightener was not detected.
- Monitoring pads were deployed once more on September 21, 2017. No optical brightener was detected at MH3, CB11, or CB12.
- When catchbasin CB15 was inspected, it was full of rotting crab apples, which gave off a strong odor of fermentation.

**Conclusion:** Based on repeated and extensive testing, we do not believe there is a chronic illicit discharge in this system. Rather, we suspect that occasional improper waste disposal in catchbasins is responsible for the weak fluorescence observed on the pads at MH1, MH3, and CB1.

#### **Resolution:** n/a

# 3.21. MP1390

The MP1390 system drains portions of Main Street, Baird Street, St. Paul Street, Liberty Street, and Jay Street (Appendix D, Map 14). It outlets to the North Branch River downstream of the Spring Street bridge. Water quality data for this system are presented in Table 24.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations    |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------|
| 7/21/16          | Flowing           | 0.10              | 0.02                       | 0.0            | 968                          | Positive  | Clear, WW odor. |
| 8/4/16           | Flowing           | n/a               | n/a                        | n/a            | n/a                          | Positive  | Clear, WW odor. |

#### Table 24. Water Analysis Data for Outfall MP1390

#### **Findings:**

• The MP1390 system was initially assessed on July 21, 2016. The outfall is downstream of a CSO weir located under Main Street. Optical brightener was detected at the outfall, while no other contaminants where measured above levels of concern.



On July 17, 2017 Montpelier DPW eliminated a direct wastewater connection from a home at 22 St. Paul Street to the MP1390 system (Figure 8). This connection was found in response to an odor complaint. This is the same brick arch pipe that sewer laterals from the Montpelier Inn were previously connected to (~10 years ago).

**Conclusion:** The City of Montpelier eliminated a direct wastewater connection to this system.

**Resolution:** This City Engineer stated that the City plans to abandon entirely the section of the brick arch pipe between CB1 and CB2 after rerouting CB2.



Figure 8. Top of brick arch stormdrain, July 17, 2017

# 3.22. MPF170

The MPF170 system drains the Montpelier Department of Public Works property as well as drainage from a portion of the interstate (Appendix D, Map 15). The system outlets to the Dog River floodplain west of Dog River Road. Water quality data for this system are presented in Table 25.

| Table 25. Water Ana | lysis Data for Ou | tfall MPF170 |
|---------------------|-------------------|--------------|
|---------------------|-------------------|--------------|

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result Observations |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|------------------------|
| CB1             | 7/22/16          | Flowing           | 0.3               | 0.04                       | 0.70           | 775                          | Negative               |

## **Findings:**

- The MPF170 system was assessed on July 22, 2016. The outfall was not located; therefore, the first upstream catchbasin (CB1) was sampled. Optical brightener was not detected at CB1, however the MBAS concentration was elevated.
- On July 27, 2016, a vacuum truck was observed releasing water to a catchbasin behind the public works garage. The truck had reportedly been cleaning catchbasins on State Street. This release was likely the source of flow observed at CB1. Eric Ladd indicated that the floor drains in the garage empty into septic tank that in turns flows to WWTF.

**Conclusion:** Since optical brightener was not detected in this system, we conclude that there is not a sanitary wastewater connection. It is possible that the source of MBAS and ammonia detected in CB1 on July 22, 2016 was water released by the vacuum truck. It is also possible that air conditioning units in the public works

garage release condensate and residual cleaning agents to the MPF170 system. In either case, we conclude that there are insufficient grounds for further investigation.

#### **Resolution:** n/a

# 3.23. MPF290

The MPF290 system drains a residential area off Freedom Drive (Appendix D, Map 16). It outlets to a grassed swale and ultimately to the Winooski River. Water quality data for this system are presented in Table 26.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations                             |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|------------------------------------------|
| MPF290          | 7/27/16          | Dripping          | 0.3               | 0.46                       | 0.10           | 462                          | Negative     | No odor.                                 |
| MPF290          | 9/29/17          | Dripping          | 0.0               | 0.07                       | n/a            | n/a                          | n/a          | Clear, no odor.                          |
| CB1             | 9/29/17          | No flow           | 0.3               | 0.01                       | n/a            | n/a                          | n/a          | Clear, ammonia odor,<br>grass clippings. |
| CB2             | 9/29/17          | No flow           | 0.4               | 0.09                       | n/a            | n/a                          | n/a          | Clear, ammonia odor,<br>grass clippings. |

Table 26. Water Analysis Data for Outfall MPF290

#### **Findings:**

- The MPF290 system was initially assessed on July 27, 2016. At that time, the chlorine concentration at the outfall was high and the ammonia concentration was slightly elevated. Optical brightener was not detected.
- On September 29, 2017 slightly elevated ammonia concentrations were recorded in catchbasins CB1 and CB2, which were not flowing. An ammonia odor was observed in these basins, which may have been caused by decomposing grass clipping.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location. We believe the source of chlorine in the system is the residential swimming pool located approximately 30 feet from the outfall. Splash water and/or deck washwater likely infiltrates this system. Given the negligible flow observed in this system, we do not believe this issue warrants further investigation or action.

#### **Resolution:** n/a

# 3.24. MPF570

The MPF570 system drains the Wayside Diner parking lot. It outlets to a drainage ditch east of the Barre-Montpelier Road that discharges to the Stevens Branch. Water quality data for this system are presented in Table 27.



| Table 2 | 7  | Water Anal | vsis  | Data | for | Outfall | MPF57   | 0 |
|---------|----|------------|-------|------|-----|---------|---------|---|
| Table Z | /. | valer Anar | ysis. | Data | 101 | Outraii | 1111 37 | υ |

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations                            |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-----------------------------------------|
| MPF570          | 8/5/16           | Flowing           | 0.5               | 0.07                       | 0.1            | 576                          | Negative  | No odor, suds present.                  |
| MPF570          | 10/6/16          | Flowing           | 0.2               | n/a                        | 0.3            | 550                          | Negative  | Clear, no odor.                         |
| MPF570          | 9/29/17          | Flowing           | 0.0               | 0.06                       | n/a            | n/a                          | Negative  | Clear, no odor, suds present.           |
| CB1-Pipe A      | 9/29/17          | Flowing           | 0.0               | 0.02                       | n/a            | n/a                          | n/a       | Clear, no odor, only Pipe A<br>flowing. |

#### **Findings:**

- The MPF570 system was initially assessed on August 5, 2016. At that time, the ammonia concentration at the outfall was slightly elevated. Optical brightener was not detected.
- No contaminants were detected above levels of concern in sampling conducted on October 6, 2016 and September 29, 2017.

**Conclusion:** Based on repeated observations, we do not believe there is a chronic illicit discharge at this location.

#### Resolution: n/a

# 3.25. MPF660

The MPF660 system appears to be a roof drain in the Tractor Supply building that discharges to a stormwater detention pond behind the building (Appendix D, Map 17). There are no mapped surface inlets to this system. Water quality data for this system are presented in Table 28.

#### Table 28. Water Analysis Data for Outfall MPF660

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations      |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|-------------------|
| 8/17/16          | Trickling         | 4.00              | 0.19                       | 0.10           | 618                          | Negative  | Pond, algae odor. |

#### **Findings:**

• The MPF660 system was initially assessed on August 17, 2016. At that time, the outfall pipe was trickling, and the ammonia and chlorine concentrations were high. This outfall and pond are located behind a fence on private property.

**Conclusion:** We suspect that air conditioning units visible on the roof of this building discharge to the mapped roof drains. We suspect that air conditioning condensate and residual cleaners are the source of the ammonia and chlorine measured at the outfall. This is a permitted stormwater system; therefore, no further investigation or action was taken, especially considering the restricted access.

#### Resolution: n/a

# 3.26. MPF680

The MPF680 system drains a short section of the Barre-Montpelier Road and the parking area at Fecteau Homes. It discharges overland to the Stevens Branch. Water quality data for this system are presented in Table 29.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB<br>Result | Observations                                                   |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|--------------|----------------------------------------------------------------|
| 8/17/16          | Wet (no flow)     | n/a               | n/a                        | n/a            | n/a                          | n/a          | Plaster odor; light grey deposit at outfall and on vegetation. |
| 10/6/16          | n/a               | n/a               | n/a                        | n/a            | n/a                          | n/a          | Could not locate.                                              |
| 9/29/17          | n/a               | n/a               | n/a                        | n/a            | n/a                          | n/a          | Could not locate.                                              |

Table 29. Water Analysis Data for Outfall MPF680

#### Findings:

- The MPF660 system was initially assessed on August 17, 2016. There was no flow at the outfall. A plaster odor was noted, and light grey deposits were observed on the vegetation below the outfall.
- The outfall was buried under a large amount of solid waste when rechecked on October 6, 2017 and September 29, 2017.

**Conclusion:** We do not believe there is an illicit water discharge in this system. Rather, solid waste has been dumped on the property, burying the outfall.

**Resolution:** n/a

# 3.27. MPF840

The MPF840 system drains a short section of River Street and outlets near the railroad tracks and some storage units adjacent to the Winooski River (Appendix D, Map 18). Water quality data for this system are presented in Table 30.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result       | Observations                   |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------------|--------------------------------|
| 8/25/16          | Dripping          | 0.0               | 0.07                       | 0.1            | 997                          | Positive (weak) | Oily deposits.                 |
| 9/21/17          | Dripping          | n/a               | 1.14                       | n/a            | n/a                          | n/a             | Clear, no odor, oily deposits. |

## Table 30. Water Analysis Data for Outfall MPF840

- The MPF840 system was initially assessed on August 25, 2016. Oily deposits were noted, and weak fluorescence was observed on the optical brightener pad.
- On September 21, 2017, oily deposits were again observed at the outfall. The chlorine test yielded an unrealistically high result, possibly caused by chemical interference.
- There is a mapped underdrain in the right-of-way along the south side of River Street that discharges to this system. This underdrain borders the Walker Motors property. According to reports accessible

via the ANR Atlas, leaking underground storage tanks containing heating oil and gasoline were removed from this property. Free petroleum product was observed in groundwater.

**Conclusion:** We suspect groundwater contaminated with petroleum products migrates from the Walker Motors property to the underdrain on River Street and discharges from this system. The fluorescence on the monitoring pad was likely caused by oil rather than optical brightener. Given the negligible flow at this outfall and documented petroleum releases in this area, we do not believe further investigation or action is necessary.

# Resolution: n/a

# 3.28. MPF900

The MPF900 system drains portions of Pioneer Street and River Street and the entirety of Taplin Street and Blackwell Street (Appendix D, Map 19). This system was formerly identified as WR-0170. It outlets to the Winooski River west of the Pioneer Street bridge. Water quality data for this system are presented in Table 31.

| Structure<br>ID | Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result       | Observations    |
|-----------------|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------------|-----------------|
| MPF900          | 9/2/16           | Flowing           | 0.10              | 0.40                       | 0.10           | 1829                         | Positive (weak) | No odor.        |
| CB1             | 9/2/16           | Trickling         | 0.10              | 0.00                       | 0.10           | 1880                         | Negative        |                 |
| CB2             | 9/2/16           | No flow           | n/a               | n/a                        | n/a            | n/a                          | Negative        |                 |
| CB1             | 9/8/16           | Trickling         | n/a               | n/a                        | n/a            | n/a                          | n/a             | Petroleum odor. |
| CB3             | 9/8/16           | Dry               | n/a               | n/a                        | n/a            | n/a                          | n/a             | Petroleum odor. |
| MPF900          | 9/29/17          | Flowing           | n/a               | n/a                        | n/a            | n/a                          | n/a             | Clear, no odor. |

Table 31. Water Analysis Data for Outfall MPF900

# Findings:

- The MPF900 system was initially assessed on September 2, 2016. The pad deployed at the outfall appeared positive, although the fluorescence was weak.
- On September 8, 2016 a petroleum odor was observed at catchbasins CB1 and CB3. There was no flow in CB2, and CB3 through CB6 were dry. A trickle of flow was observed in CB1 from the pipe connecting CB1 to upstream catchbasin CB3.

**Conclusion:** The only dry weather flow observed upstream of the outfall was in CB1 from the line connected with CB3. A petroleum odor was observed in catchbasins CB1 and CB3 on September 8, 2016. Therefore, we believe contaminated groundwater enters the system between CB3 and CB1. This result is consistent with earlier findings reported in FWR's Central Vermont IDDE Study (FWR 2009). At the time of FWR's 2009 report the DEC Sites Management Program indicated that a fuel oil spill had occurred years earlier at the Montpelier Stove and Flag Works. Therefore, we conclude that MPF900 system is still discharging contaminated groundwater from the area of the Montpelier Stove and Flag Works.

# **Resolution:** n/a

# 3.29. MPF910

The MPF910 system drains groundwater in the vicinity of the Montpelier Stove and Flag Works on the corner of River Street and Pioneer Street (Appendix D, Map 19). This system was formerly identified as WR-0180. It

outlets to the Winooski River west of the Pioneer Street bridge. Water quality data for this system are presented in Table 32.

| Date<br>Assessed | Flow<br>Condition | Ammonia<br>(mg/L) | Free<br>Chlorine<br>(mg/L) | MBAS<br>(mg/L) | Specific<br>Cond.<br>(µs/cm) | OB Result | Observations                         |
|------------------|-------------------|-------------------|----------------------------|----------------|------------------------------|-----------|--------------------------------------|
| 9/2/16           | Flowing           | 0.40              | 0.95                       | n/a            | 2090                         | Positive  | Iron stained, strong petroleum odor. |
| 9/29/17          | Dripping          | n/a               | n/a                        | n/a            | n/a                          | n/a       | Iron stained, strong petroleum odor. |

Table 32. Water Analysis Data for Outfall MPF910

#### Findings:

• The MPF910 system was initially assessed on September 2, 2016. At that time, petroleum odors and iron staining were observed at the outfall. A monitoring pad deployed at the outfall appeared positive.

**Conclusion:** This system is still discharging contaminated groundwater from the area of the Montpelier Stove and Flag Works. See conclusion for system MPF900.

Resolution: n/a


# 4. Phosphorus Loading and *E. coli* Concentrations

Samples were collected on July 27, 2016 for *E. coli* and total phosphorus analysis by VAEL. Where feasible, a discharge measurement was made immediately following sampling. Daily total phosphorus loads were calculated from the concentration and discharge data. These data are presented below (Table 33).

| System | Date    | <i>E. coli</i><br>(MPN/100 mL) | ΤΡ<br>(μg/L) | Discharge<br>(L/min) | TP loading<br>(g/day) |
|--------|---------|--------------------------------|--------------|----------------------|-----------------------|
| MP370  | 7/27/16 | 9,804                          | 248          | 2.0                  | 0.7                   |
| MP590  | 7/27/16 | 52.1                           | 25           | 0.9                  | 0.03                  |
| MP890  | 7/27/16 | 133.6                          | 18.1         | 32                   | 0.8                   |
| MP1030 | 7/27/16 | 20.2                           | 12.9         | 4.9                  | 0.1                   |
| MP1370 | 7/27/16 | 62.6                           | 104          | 0.18                 | 0.03                  |

Table 33. E. coli and Total Phosphorus Data for Selected Drainage Systems

These data generally reinforce the interpretations made from earlier data and observations. Many of the systems investigated are quite extensive. The generally low *E. coli* levels measured, even in systems with confirmed wastewater contributions, may have been due to retention and die off within the storm lines.

Total phosphorus concentrations were low at all sampling points. In certain systems, we would expect higher total phosphorus concentrations and loads during stormwater flows as accumulated wastewater solids are flushed from the storm lines. In the case of MP580 and MP1390, direct wastewater connections were eliminated before samples could be collected.

## 5. Conclusions

The Montpelier IDDE project extended and improved upon a previous assessment by FWR and Stone in 2008. A total of 228 stormwater drainage systems were assessed or reassessed. Using DEC's detailed stormwater infrastructure mapping, Stone and FWR collaborated with the City of Montpelier Department of Public Works to conduct a more comprehensive and intensive illicit discharge detection and elimination project, applying our collective knowledge of Montpelier's stormwater infrastructure and our detective skills to identify and eliminate illicit discharges within city limits. Several direct wastewater cross connections (to MP370, MP580, MP590) were eliminated as a result of this project. Other benefits included identifying two areas with leaking water lines (in MP590 and MP1310), which the City repaired. However, further investigation is needed to resolve several suspected problems that could not be addressed within the scope and timeframe of this study and to confirm that certain completed repairs eliminated the source of contamination in these stormwater drainage systems.

## 6. References

American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21st edition, Washington D.C., 2005.

Friends of the Winooski River. 2009. Detection and Elimination of Non-Stormwater Discharges to the North Branch, Dog River, and the Stevens Branch in Montpelier, Berlin, and Northfield. Montpelier, VT.

Hach Company. Hach Method #8167. Loveland, CO.

Stone Environmental, Inc., SEI SOP 5.23.3: Maintenance and Calibration of the pH/Con 10 Meter. February 24, 2003.

Stone Environmental, Inc., SEI SOP 6.38.0: Optical Brightener Testing, September 11, 2008.



## Appendix A. Assessment Data Form



## **Montpelier IDDE Project**

| Date:                    |         | 111              | me: _    |               |          |                         | Insp     | ector:            |       |                   |           |          |          |
|--------------------------|---------|------------------|----------|---------------|----------|-------------------------|----------|-------------------|-------|-------------------|-----------|----------|----------|
| Structure type:          |         |                  |          |               |          |                         | Inne     | r diameter (c     | outfa | all only):        |           |          | (in.)    |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
| Material (outfall only): |         | corrugat<br>meta | ted<br>I | concrete      | e k      | corrugate<br>black plas | d<br>tic | smooth<br>plastic |       | vitrified<br>clay | other (de | scribe): |          |
|                          |         |                  |          | wet           |          | •                       |          |                   |       | Flowing           |           | ,        |          |
| Flow depth (outfall only | /):     | dry              |          | (no flow)     | )        | dripping                |          | trickling         |       |                   | Depth:    |          | (in.)    |
| Outfall position:        |         | free flo         | w        | submerge      | ed s     | submerge                | d        | If partially s    | ubn   | nerged, surcha    | arged?    | YES      | NO       |
| Erosion at outfall:      |         | none             |          | If present,   | descr    | ibe:                    |          |                   |       |                   |           |          |          |
| Discharge characteristi  | ice (ot |                  |          | color turbic  | ditu or  | ad odor of              | flow     | <i>.</i>          |       |                   |           |          |          |
| Discharge characteristi  | US (UL  | JSEIValioi       | 15 011   |               | uity, ai |                         | now      | /).               |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
| Floatables:              | n       | one              | 5        | sheen         | se       | ewage                   | _        | suds              | ot    | ner               |           |          |          |
| Deposits or staining:    | n       | one              | se       | diment        |          | oily                    | irc      | on staining       | ot    | ner               |           |          |          |
|                          |         |                  | cra      | acking,       |          |                         |          |                   |       |                   |           |          |          |
| Structural damage:       | n       | one              | S        | palling       | COI      | rrosion                 | ful      | crushed           | ot    | ner               |           |          |          |
| Obstructions:            | n       | one              |          | obstructed    | 1        | 0                       | bstru    | ucted             | ot    | ner               |           |          |          |
| Ammonia                  |         | mg/L             |          |               | Date     | OB pad s                | set: _   |                   |       |                   |           | NA       |          |
| Chlorine                 |         | ma/l             | Free     | or Total      | Date     | OB pad r                | etrie    | ved.              |       |                   |           | NA       |          |
|                          |         |                  | 1100     | or rotal      | Duto     | OD paul                 | ouno     |                   |       |                   |           |          | <u>.</u> |
| MBAS                     |         | _ mg/L           |          |               |          |                         |          |                   |       |                   |           |          |          |
| Specific conductance     |         |                  |          | _µS/cm        |          |                         | 1        |                   |       |                   |           |          |          |
| Sample collected for E   | E. coli | analysis:        | ١        | ES N          | 10       | NA                      | Da       | te:               |       | 1                 | -ime:     |          |          |
| Sample collected for T   | 'N ana  | alysis:          | Y        | ES N          | 10       | NA                      | Da       | te:               |       | Т                 | ime:      |          |          |
| Flow measurement (if     | E. co   | li and/or n      | utrier   | nts sample of | collect  | ed):                    |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
| Comments:                |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |
|                          |         |                  |          |               |          |                         |          |                   |       |                   |           |          |          |

## Appendix B. Stone Environmental SOPs



## STANDARD OPERATING PROCEDURE

## SEI-5.23.3

## MAINTENANCE AND CALIBRATION OF THE pH/CON 10 METER

SOP Number: SEI-5.23.3 Revision Number: 3 Date Issued: 05/14/99 Date of Revision: 02/24/03

#### 1.0 OBJECTIVE

This standard operating procedure (SOP) explains the calibration and maintenance of the Oakton pH/Con 10 meter and the Cole-Parmer pH/Con 10 meter. The meters are identical except for the distributor's names. The meter is manufactured by Cole-Parmer and distributed by Cole-Parmer and Oakton. The operator's manual should be referred to for the applicable procedures described below. The pH/Con 10 meter is used for measuring the pH, conductivity, and temperature of water. The pH/conductivity meters generate and measure data, and thus must meet the requirements of 40 CFR part 160 subpart D.

#### 2.0 POLICIES

- 1. According to 40 CFR Part 160, Subpart D, Section 160.61, Equipment used in the generation, measurement, or assessment of data and equipment used for facility environmental control shall be of appropriate design and adequate capacity to function according to the protocol and shall be suitable located for operation, inspection, cleaning, and maintenance.
- 2. Personnel will legibly record data and observations in the field to enable others to reconstruct project events and provide sufficient evidence of activities conducted.

#### 3.0 SAFETY ISSUES

- 1. If necessary and appropriate, a site-specific health and safety plan shall be created for each study site. A template for creating a proper health and safety plan is provided on the SEI network.
- 2. If necessary and appropriate, all chemicals are required to be received with Material Safety Data Sheets (MSDS) or appropriate application label. These labels or MSDS shall be made available to all personnel involved in the sampling and testing.

#### 4.0 PROCEDURES

#### 4.1 Equipment and Materials

1. The pH/Con 10 meter, pH/conductivity/ temperature probe. The probe cable has a notched 6-pin connector to attach to probe meter.

- 2. If necessary and appropriate, standard solutions (e.g., standard pH 4.0 and 7.0, conductivity standards)
- 3. Clean beakers or other appropriate containers
- 4. Log or other appropriate medium to record calibration.

## 4.2 Meter Set-up and Conditioning

- 1. The pH/Con 10 meter uses a combination pH/conductivity/temperature probe. The probe cable has a notched 6-pin connector to attach the probe meter. Keep connector dry and clean.
- 2. To connect the probe, line up the notches and 6-pins on the probe connector with the holes in the connector located on the top of the meter. Push down and the probe connector will lock into place.
- 3. To remove probe, slide up the metal sleeve on the probe connector. While holding onto metal sleeve, pull probe away from the meter. Do not pull on the probe cord or the probe wires might disconnect.
- 4. Be sure to decontaminate the probe prior to use. The probe shall be tripled rinsed with distilled or deionized water. Further decontamination and cleaning procedures may be called for in special situations or outlined in approved protocols or work plans. This will be documented in field notes or in an appropriate logbook.
- 5. Be sure to remove the protective rubber cap of the probe before conditioning, calibration, or measurement. If the probe is clean, free of corrosion, and the pH bulb has not become dehydrated, simply soak the probe in tap water for ten minutes before calibrating or taking readings to saturate the pH electrode surface to minimize drift. Wash the probe as necessary in a mild detergent solution. If corrosion appears on the steel pins in the conductivity cell, use a swab soaked in isopropyl alcohol to clean the pins. Do not wipe the probe; this causes a build-up of electrostatic charge on the glass surface. If the pH electrode has dehydrated, soak it for 30 minutes in a 2M-4M KCI boot solution prior to soaking in tap water.
- 6. Wash the probe in deionized water after use and store in pH 4.0 standard solution or an approved boot solution (per the manufacturer's instruction).

## 4.3 pH Calibration

- 1. The meter is capable of up to 3-point pH calibration to ensure accuracy across the entire pH range of the meter. At the beginning of each day of use, perform a 2 or 3-point calibration with standard pH buffers 4.00, 7.00, and 10.00. Calibration standards that bracket the expected sample range should be used. Never reuse buffer solutions; contaminants in the solution can affect the calibration.
- 2. Press the MODE key to select pH mode. The pH indicator appears in the upper right corner of the display.

- 3. Dip the probe into the calibration buffer. The end of the probe must be completely immersed into the buffer. Stir the probe gently to create a homogeneous buffer solution. Tap probe to remove any air bubbles.
- 4. Press CAL/MEAS to enter pH calibration mode. The primary display will show the measured reading while the smaller secondary display will indicate the pH standard buffer solution.
- 5. Press □ or □ keys to scroll up or down until the secondary display value is the same as the pH buffer value (pH 4.00, 7.00 or 10.00).
- 6. Wait for the measured pH value to stabilize. The READY indicator will display when the reading stabilizes. After the READY indicator turns on, press ENTER to confirm calibration. A confirming indicator (CON) flashes and disappears. The meter is now calibrated at the buffer indicated in the secondary display.
- 7. Repeat steps 3, 5, and 6 using a second or third pH standard
- 8. Press CAL/MEAS to return to pH measurement mode.

## 4.4 Conductivity Calibration

- 1. Select a conductivity standard with a value near the sample value expected. The meter should be calibrated by the user(s) at the beginning of each day of use.
- 2. Pour out two separate portions of your calibration standard and one of deionized water into separate clean containers.
- 3. Press MODE key to select Conductivity. The  $\Phi$ S or mS indicator will appear on the right side of the display.
- 4. Rinse the probe with deionized water, and then rinse the probe in one of the portions of calibration standard Record the calibration standard on the per-use maintenance form or other appropriate medium.
- 5. Immerse the probe into the second portion of calibration standard. The meter's autoranging function selects the appropriate conductivity range (four ranges are possible). Be sure to tap the probe to remove air bubbles. Air bubbles will cause errors in calibration.
- 6. Wait for the reading to stabilize. The READY indicator lights when the reading is stable. Press the CAL/MEAS key. The CAL indicator appears above the primary display. The primary display shows the measured reading and the secondary display shows the temperature. Record the initial calibration standard on the per-use maintenance form or other appropriate medium.
- Press the □ or □ keys to scroll to the value of your conductivity standard Press and hold the
  □ or □ keys to scroll faster. The meter automatically compensates for temperature differences using a factor of 2.00% per BC.

8. Press ENTER key to confirm calibration. Upon confirmation, the CON indicator appears briefly. The meter automatically switches back into Measurement mode. The display now shows the calibrated, temperature compensated conductivity value. However, if the calibration value input into the meter is different from the initial value displayed by more than 20%, the ERR annunciator appears in the lower left corner of the display

## 4.5 Temperature Calibration/Verification

1. The built-in temperature sensor is factory calibrated. Therefore, no additional calibration is necessary. However, the temperature may be verified against another working thermometer. However, if errors in temperature readings are suspected or if a replacement probe is used. Refer to the operating instructions if temperature calibration is necessary.

## 4.6 General and Annual Maintenance

Individual users are responsible for the calibration, cleaning, repair, and maintenance of the instrument.

Routine inspection and maintenance schedules vary from each piece of equipment. Typically there are minor maintenance needs each piece of equipment will need to undergo prior to use in the field (such as cleaning or conditioning). Always consult the manufacturer=s instructions for general maintenance.

Specific per use maintenance needs for the pH/Con 10 meter include but are not limited to:

- 1. Inspect probe for physical damage and debris
- 2. Inspect meter for physical damage and debris
- 3. Clean probe w/ mild detergent
- 4. Rinse probe in distilled water
- 5. Clean conductivity pins with isopropyl alcohol (if necessary)
- 6. Condition probe
- 7. Calibrated to pH 7.0
- 8. Calibrated to pH 4.0
- 9. Calibrated to pH 10.0

The pH/con 10 meter shall be stored in a clean dry place, usually the padded box that it came in. Care should be given to keep the instrument from dust and contamination.

Wash the probe in distilled water after use, and store in pH 4 solution.

All maintenance, repairs, and calibrations are to be documented on an equipment maintenance log or other appropriate medium. Follow the checklist provided on the equipment maintenance log for regular use maintenance needs. Any maintenance must include documentation of whether the maintenance was routine and followed the SOP or not.

Equipment logs shall be brought to the field for documenting use and calibration. The logs will be returned to the office after each field use and filed in the equipment records filing cabinet.

In the event of failure due to breakage or loss of parts, an attempt will be made to repair or replace the necessary parts by the field personnel who discover the malfunction. All repairs will be documented in field notes and/or on a non-routine maintenance log. If the instrument is rendered "out of service" or "broken", it should be tagged as such. If further repair is necessary, return the instrument to the manufacturer following proper shipping procedures.

Non-routine repairs must include documentation of the nature of the defect, how and when the defect was discovered, and any remedial action taken in response to the defect.

## 5.0 **RESPONSIBILITIES**

- 1. All personnel will legibly record data and observations (including phone conversations) in accordance with this SOP to enable others to reconstruct project events and provide sufficient evidence of activities conducted.
- 2. Prior to use and after use, all equipment will be appropriately cleaned, decontaminated, calibrated (if necessary) and stored in accordance with the manufacturer's instructions and this SOP.

## 6.0 **DEFINITIONS**

- 1. *Decontamination* Procedures followed to ensure cross contamination does not occur between sampling points or that potential contamination of equipment does not pose a hazard to sampling personnel.
- 2. *EPA* the U.S. Environmental Protection Agency.
- 3. FIFRA the Federal Insecticide, Fungicide, and Rodenticide Act as amended.
- 4. *Maintenance* Actions performed on equipment to standardize and/or correct the accuracy and precision of a piece of equipment to ensure that the equipment is operating within the manufacturer's specifications and standard values.
- 5. Study means any experiment at one or more test sites, in which a test substance is studied in a test system under laboratory conditions or in the environment to determine or help predict its effects, metabolism, product performance (pesticide efficacy studies only as required by 40 CFR 158.640) environmental and chemical fate, persistence, or residue, or other characteristics in humans, other living organisms, or media. The term "study" does not include basic exploratory studies carried out to determine whether a test substance or a test method has any potential utility.

#### 7.0 REFERENCES

40 CFR Part 160 Good Laboratory Practice Standards, August, 1989.

#### 8.0 TABLES, DIAGRAMS, FLOWCHARTS, AND VALIDATION DATA

None



## 9.0 AUTHORIZATION

Revised by: \_\_\_\_\_

| Date: |
|-------|
|-------|

Michael Nuss, Staff Scientist

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Christopher T. Stone, President



### **10.0 REVISION HISTORY**

Revision number 1:

- 1. Changed title and references to Oakton in Sections 1.0 and 2.0 to enable this standard operating procedure to apply to both the Oakton pH/Con 10 meter and the Cole-Parmer pH/Con 10 meter, as these are identical meters.
- 2. Added instructions about cleaning and re-hydrating the probe to Section 3.1.
- 3. Added Section 9.0.
- 4. Reformatted.
- 5. Minor word editing.

Revision number 2:

- 1. Changed the title.
- 2. Removed sections 7.0 (Measurement) and 8.0 (Maintenance/Repairs).
- 3. Added section called (General and Annual Maintenance).
- 4. Minor editing.
- 5. Reformatted.

Revision number 3:

- 1. Minor wording edits in Section 1.0, Objective.
- 2. Updated style to match SEI Style Guide font and text. Reformatted using MS Word
- Added standardized section headers: 2.0 Policies, 3.0 Safety, 5.0 Responsibilities, 6.0 Definitions, 7.0 References, 8.0 Tables, Diagrams, Flowcharts and Validation data. Authorization moved to Section 9.0, and Section 10.0 Revision History.
- 4. Deleted section on logs being given to the QAU.
- 5. Other minor wording edits.



## STANDARD OPERATING PROCEDURE

## SEI-6.38.1

## **OPTICAL BRIGHTENER TESTING**

SOP Number: SEI-6.38.1

Revision Number: 1

Date Issued: 09/11/08 Date of Revision: 03/18/13

### 1.0 OBJECTIVE

Optical brighteners are a class of fluorescent dyes used in almost all laundry detergents. Many paper products also contain optical brighteners. When optical brightener is applied to cotton fabrics, they will absorb ultraviolet (UV) rays in sunlight and release them as blue rays. These blue rays interact with the natural yellowish color of cottons to give the garment the appearance of being "whiter than white". Optical brightener dyes are generally found in domestic wastewaters that have a laundry effluent component. Because optical brighteners absorb UV light and fluoresce in the blue region of the visible spectrum, they can be detected using a long wave UV light (a "black" light).

Optical brightener monitoring can be used to indicate the presence of wastewater in stormwater drainage systems, streams, and other water bodies. Since optical brighteners are removed by adsorption onto soil and organic materials as effluent passes through soil and aquifer media, optical brightener monitoring may also be used to identify incompletely renovated wastewater effluent in groundwater at wastewater dispersal sites.

To test for optical brightener, a cotton pad is placed in a flow stream for a period of 4-10 days, after which the pad is rinsed, air dried, and viewed under a long-range UV light. Florescence indicates the presence of optical brightener. Optical brighteners may be monitored in a wide range of structures and flow streams. For example, monitoring pads may be placed in stormwater outfall pipes, within catchbasins and manholes, or in any other man-made or natural water conveyance. Optical brightener pads may be placed in dry pipes or other dry structures to monitor possible intermittent flow streams. However, the more common application is to monitor discharge points that are flowing under dry weather conditions.

#### 2.0 POLICIES

- 1. According to Stone's Corporate Quality Management Plan, Stone shall have standard operating procedures in writing setting forth study methods that management is satisfied are adequate to ensure the quality and integrity of the data generated in the course of a study.
- 2. Personnel will legibly record data and observations in the field to enable others to reconstruct project events and provide sufficient evidence of activities conducted.

## 3.0 SAFETY ISSUES

- 1. If necessary and appropriate, a site-specific health and safety plan shall be created for each study site. A template for creating a proper health and safety plan is provided on the SEI network.
- 2. Care must always be taken when approaching a sampling location. Do not, under any circumstances, place yourself in danger to collect a sample.
- 3. If necessary and appropriate, all chemicals are required to be received with Material Safety Data Sheets (MSDS) or appropriate application labels. These labels or MSDS shall be made available to all personnel involved in the sampling and testing.

## 4.0 PROCEDURES

### 4.1 Equipment and Materials

- 1. Untreated cotton pad measuring approximately 10 cm by 10 cm (e.g., VWR cat no. 21902-985 or equivalent).
- 2. Fiberglass or nylon screen to enclose the cotton pad (sewn or stapled).
- 3. Monofilament fishing line (approximately 20 to 50 lb. test).
- 4. Binder clips of various sizes.
- 5. Field notebook, sample collection form, or other acceptable medium for recording field data.
- 6. Protective gloves if contamination is suspected in the water to be sampled, or if cold weather may be hazardous with wet hands.

## 4.2 Sampling Procedure and Sample Handling

## 4.2.1 Optical Brightener Pad Assembly

To assemble an optical brightener monitoring pad, place an untreated cotton pad measuring approximately 10 cm by 10 cm (e.g., VWR cat no. 21902-985) in an envelope made of a screen material. A light fiberglass screen is preferred. The pad may be folded in half to double its thickness. Sew, staple, or otherwise secure all open sides of the screen envelope to enclose the pad.

## 4.2.2 Optical Brightener Pad Placement

 Secure the pad at the monitoring point using high test nylon fishing line (20 - 50 lb. test), a binder clip, or both. The pad may be attached to any convenient anchor, provided the pad is as well exposed to the flow stream as possible and the anchor point appears stable enough to resist the force of high flow events. When sampling culverts or stormwater outfall pipes, the pad may be clipped directly to the inner rim of the outfall. The pad should lie flat against the bottom surface of the pipe. The pad may also be hung from a catchbasin grate or manhole rung.

- 2. If a suitable anchor is not present, a heavy object may be placed in the flow stream or channel to anchor the pad. For example, a pad may be anchored in a stream by tying it to a concrete block.
- 3. Two or more optical brightener monitoring pads may be placed at monitoring points if appropriate. If more than a single pad is used, the pads should be anchored so that they do not become entangled.
- 4. Record the date each pad is deployed and any other relevant information in a field logbook or on a specified sample collection form.

## 4.2.3 Optical Brightener Pad Retrieval and Handling

- 1. After a 4-10-day period of exposure, optical brightener pads should be collected. The collection of each pad should be recorded in a field logbook or on a specified sample collection form.
- 2. Any object inserted in a pipe or other structure to anchor the pad should be removed.
- 3. Pads should be placed in individually labeled, re-sealable plastic bags. The sample label should indicate the monitoring point identification.
- 4. The pad should be removed from the screen envelope using scissors to cut open the envelope. The pad should be gently rinsed using cold tap water. Lightly squeeze out excess water with a clean hand. Do not wring out the pad. When processing the pads be aware that you may spread dye from one pad to another with your hands. Wear disposable gloves.
- 5. The pad should then be returned immediately to the labeled bag.
- 6. Pads should be air dried. The pad may be hung on a line to dry within the labeled bag. If a resealable plastic bag is used, cut the bottom corners of the bag to allow airflow to the pad.

## 4.3 Optical Brightener Analysis

- 1. When the pad is dry, expose the pad under a high-quality long-range UV light in a room that is completely dark. A non-exposed and an exposed pad are used as controls and compared to each test pad as it is exposed to the UV light.
- 2. There are three qualitative results: Positive, Negative, and Indeterminate. A pad will very definitely glow (fluoresce) if it is positive. If it is negative it will be noticeably drab and similar to the control pad. All other tests are indeterminate. Pads may be sorted into the basic categories: positive test, negative test, and indeterminate. Further, for positive tests, the pads may be sorted into categories by the relative strength of the fluorescence. A pad that is fluoresces brightly over most or all of its surface may be considered a strongly positive test, whereas a pad on which fluorescence appears patchy or faint may be considered a weakly positive test. Indeterminate results generally dictate that the test be repeated.
- 3. In some instances, only a portion of the pad or simply the outer edge will fluoresce after being exposed to optical brightener. This can be caused by many factors but is usually the result of an uneven exposure to the dye in the flow stream due to sedimentation or the way the pad was

positioned in the water. Regardless, as long as a portion of the pad fluoresces, it should be considered positive.

- 4. Since paper and cotton dust is so pervasive, it is common to see fluorescent fibers or specks on the test or control pads. These should be ignored and not used to indicate a positive result.
- 5. With the lights back on, record the identification number and the test result for each pad.
- 6. It is advisable to have a second reader perform the pad observations independently. The results are then compared. Any conflicting interpretations may be resolved though repeated observation of the pad in question, or a by a third observer.

## 5.0 **RESPONSIBILITIES**

1. All personnel will legibly record data and observations (including phone conversations) in accordance with this SOP to enable others to reconstruct project events and provide sufficient evidence of activities conducted.

### 6.0 **DEFINITIONS**

1. Study means any experiment at one or more test sites, in which a test substance is studied in a test system under laboratory conditions or in the environment to determine or help predict its effects, metabolism, product performance (pesticide efficacy studies only as required by 40 CFR 158.640) environmental and chemical fate, persistence, or residue, or other characteristics in humans, other living organisms, or media. The term "study" does not include basic exploratory studies carried out to determine whether a test substance or a test method has any potential utility.

## 7.0 REFERENCES

40 CFR Part 160 Good Laboratory Practice Standards, August 1989.

MASS Bay Program. 1998. An Optical Brightener Handbook. http://www.thecompass.org/8TB/pages/SamplingContents.html

## 8.0 TABLES, DIAGRAMS, FLOWCHARTS, AND VALIDATION DATA

None

STONE ENVIRONMENTAL

#### 9.0 AUTHORIZATION

Revised by: \_\_\_\_\_ Date: \_\_\_\_\_

Dave Braun, Project Scientist/Water Quality Specialist

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Christopher T. Stone, President

#### **10.0 REVISION HISTORY**

Revision number 1:

- 1. Minor clarifications and rewording throughout.
- 2. Changed 4-8 day pad exposure period to 4-10 day exposure period.
- 3. Changed description of indeterminate results.
- 4. Added use of binder clips to secure pads.
- 5. Updated procedure for processing exposed pads.



## Appendix C. Assessment Data Table



| System ID      | Structure ID   | Data accessed          | Inspector  | Inspector | Structure  | Pipe diam. | Dine material                      | Dry,<br>Wet (no flow),<br>Dripping, or<br>Flowing? | Flow depth   | Dine position    | Frasion     | Erosion     | Discharge                        | Elastables   | Deposits/             | Damage         | Obstructions                 | OR Posult                 | Ammonia     | Chlorine     | MBAS detergents-<br>Corrected | Sp.<br>conductance | Comments                      |
|----------------|----------------|------------------------|------------|-----------|------------|------------|------------------------------------|----------------------------------------------------|--------------|------------------|-------------|-------------|----------------------------------|--------------|-----------------------|----------------|------------------------------|---------------------------|-------------|--------------|-------------------------------|--------------------|-------------------------------|
| MP010          | MP010          | 5/17/2016              | HHA        | DCB       | outfall    | 12         | asbestos cement                    | trickling                                          | n/a          | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | positive (strong)         | 0.20        | 0.02         | 0.1                           | 981                | Significant suds and sheer    |
| MP010          | CB1            | 6/23/2016              | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a<br>p/a  | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010<br>MP010 | CB2<br>CB3     | 6/23/2016              | нна<br>ННА |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | indeterminate             | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB4            | 6/23/2016              | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB5            | 6/23/2016              | ННА        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a<br>n/a   | n/a<br>n/a       | n/a<br>n/a  | n/a<br>n/a  | clear, no odor                   | none         | none                  | none           | none                         | indeterminate             | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010<br>MP010 | CB0<br>CB7     | 6/23/2016              | ННА        |           | catchbasin | n/a        | n/a                                | wet (no flow)<br>wet (no flow)                     | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB8            | 6/23/2016              | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | MP010          | 7/26/2016              | ННА        |           | outfall    | 12<br>n/a  | asbestos cement                    | dry<br>wot (po flow)                               | n/a<br>n/a   | free flow        | none<br>n/a | n/a<br>n/a  | n/a                              | suds         | none                  | none           | none                         | n/a                       | n/a         | n/a<br>n/a   | n/a                           | n/a                |                               |
| MP010<br>MP010 | CB1<br>CB2     | 8/4/2016               | ННА        |           | catchbasin | n/a        | n/a                                | wet (no flow)<br>wet (no flow)                     | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB3            | 8/4/2016               | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB4            | 8/4/2016               | ННА        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a<br>n/a   | n/a<br>n/a       | n/a<br>n/a  | n/a<br>p/a  | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010<br>MP010 | CB5<br>CB6     | 8/4/2016<br>8/4/2016   | ННА        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | indeterminate             | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB7            | 8/4/2016               | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB8            | 8/4/2016               | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a<br>n/a   | n/a              | n/a         | n/a<br>n/a  | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010<br>MP010 | CB4<br>CB5     | 10/4/2016              | нна<br>ННА |           | catchbasin | n/a<br>n/a | n/a<br>n/a                         | wet (no flow)<br>wet (no flow)                     | n/a<br>n/a   | n/a<br>n/a       | n/a<br>n/a  | n/a<br>n/a  | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a<br>n/a  | n/a<br>n/a   | n/a<br>n/a                    | n/a<br>n/a         |                               |
| MP010          | CB6            | 10/4/2016              | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | CB7            | 10/4/2016              | HHA        |           | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010<br>MP010 | CB8<br>MP010   | 10/4/2016<br>10/4/2016 | ΗΗΑ<br>ΗΗΔ |           | catchbasin | n/a<br>12  | N/a<br>ashestos cement             | wet (no flow)<br>dry                               | n/a<br>n/a   | n/a<br>free flow | n/a<br>none | n/a<br>n/a  | clear, no odor<br>n/a            | none         | none                  | none           | none                         | negative                  | n/a<br>n/a  | n/a<br>n/a   | n/a<br>n/a                    | n/a<br>n/a         |                               |
| MP010          | MP010          | 8/17/2017              | BAM        |           | outfall    | 12         | asbestos cement                    | flowing                                            | Π/a          | free flow        | none        | n/a         | clear, no odor                   | suds         | none                  | none           | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                |                               |
| MP010          | MP010          | 8/25/2017              | BAM        |           | outfall    | 12         | asbestos cement                    | flowing                                            |              | free flow        | none        | n/a         | clear, no odor                   | suds         | none                  | none           | none                         | positive (strong)         | n/a         | n/a          | n/a                           | n/a                |                               |
| MP020          | MP020          | 5/17/2016              | ННА        | DCB       | outfall    | 17.5       | corrugated black plast             | tic flowing                                        | 1<br>n/2     | free flow        | none<br>n/a | n/a<br>p/a  | clear, no odor                   | none         | none                  | none           | none                         | positive                  | 0.00        | 0.02         | 0.1                           | 512<br>1429        | Downstream from MP010.        |
| MP030<br>MP030 | MP030          | 5/17/2016              | нна<br>ННА | DCB       | outfall    | n/a<br>24  | concrete                           | flowing                                            | 1/a<br>1     | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.03         | 0.1<br>0.1                    | 248                | 2nd CB up from main storr     |
| MP040          | MP040          | 5/17/2016              | HHA        | DCB       | outfall    | 12         | corrugated metal                   | flowing                                            | 0.5          | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.08         | 0.1                           | 767                |                               |
| MP040          | MP040          | 7/26/2016              | HHA        |           | outfall    | 12         | corrugated metal                   | dry                                                | n/a          | free flow        | none        | n/a         | n/a                              | none         | none                  | none           | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                |                               |
| MP050<br>MP060 | MP050<br>MP060 | 5/17/2016<br>5/17/2016 | ННА<br>ННА | DCB       | outfall    | 4<br>12    | smooth plastic                     | tiowing<br>wet (no flow)                           | 0.25<br>n/a  | free flow        | none        | n/a<br>n/a  | clear, no odor<br>clear, no odor | none         | none                  | none           | none<br>partially obstructed | negative<br>indeterminate | 0.00<br>n/a | 0.00<br>n/a  | 0.0<br>n/a                    | 247<br>n/a         |                               |
| MP060          | MP060          | 10/4/2016              | HHA        | DCB       | outfall    | 12         | smooth plastic                     | wet (no flow)                                      | n/a          | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | partially obstructed         | negative                  | n/a         | n/a          | n/a                           | n/a                | Only sampled OB for rease     |
| MP070          | MP070          | 5/17/2016              | HHA        | DCB       | outfall    | 36         | corrugated black plast             | ticflowing                                         | 1            | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.00         | 0.1                           | 450                |                               |
| MP080          | MP080          | 5/17/2016              | HHA        | DCB       | outfall    | n/a        | n/a                                | wet (no flow)                                      | n/a          | obstructed       | none        | n/a         | n/a                              | n/a          | n/a                   | n/a            | fully obstructed             | n/a                       | n/a         | n/a          | n/a                           | n/a                | Outfall appears buried in ro  |
| MP090<br>MP100 | MP090<br>MP100 | 5/1//2016<br>5/17/2016 | ННА<br>ННА | DCB       | outfall    | 36<br>8    | corrugated metal                   | tiowing<br>trickling                               | 0.5<br>n/a   | free flow        | none        | no<br>n/a   | clear, no odor<br>clear, no odor | n/a<br>none  | n/a<br>none           | Corrosion      | none                         | negative                  | 0.00        | 0.02         | 0.2                           | 456<br>4580        |                               |
| MP110          | MP110          | 5/17/2016              | HHA        | DCB       | outfall    | 24         | corrugated metal                   | flowing                                            | 0.25         | free flow        | none        | n/a         | clear, no odor                   | suds (minor) | none                  | rusted through | none                         | negative                  | 0.00        | 0.02         | 0.1                           | 356                |                               |
| MP110          | MP110          | 7/26/2016              | HHA        |           | outfall    | 24         | corrugated metal                   | flowing                                            | 0.25         | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | corrosion      | none                         | negative                  | 0.10        | 0.04         | 0.1                           | 267                |                               |
| MP110<br>MP110 | MP110<br>MP110 | 10/4/2016<br>8/17/2017 | HHA<br>Ram |           | outfall    | 24<br>24   | corrugated metal                   | flowing                                            | 0.25         | free flow        | none        | n/a<br>n/a  | clear, no odor<br>clear, no odor | none         | none                  | corrosion      | none                         | n/a<br>n/a                | n/a<br>n/a  | n/a<br>n/a   | n/a<br>n/a                    | n/a<br>n/a         | Checked for suds, none pr     |
| MP120          | MP120          | 5/17/2016              | HHA        | DCB       | outfall    | 18         | corrugated metal                   | dry                                                | n/a          | n/a              | none        | n/a         | no flow                          | none         | none                  | corrosion      | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                | checked for suds, none pr     |
| MP120          | MP120          | 8/4/2016               | HHA        |           | outfall    | 18         | corrugated metal                   | dry                                                | n/a          | n/a              | none        | n/a         | no flow                          | none         | none                  | corrosion      | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP130          | MP130          | 5/17/2016              | ННА<br>ННА | DCB       | outfall    | 4          | smooth plastic                     | flowing                                            | 0.5          | free flow        | none        | n/a<br>n/a  | clear, no odor                   | none         | none<br>iron staining | none           | none                         | positive (strong)         | 0.00        | 0.00         | 0.1                           | 103                |                               |
| MP130<br>MP140 | MP130<br>MP140 | 5/20/2016              | ННА        | DCB       | outfall    | 4<br>12    | concrete                           | flowing                                            | 0.25         | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | cracking       | none                         | negative                  | 0.00        | 0.01         | 0.1                           | 468                | Part of pipe is broken off a  |
| MP150          | MP150          | 5/20/2016              | HHA        | DCB       | outfall    | 12         | corrugated metal                   | trickling                                          | n/a          | free flow        | none        | n/a         | iron stained, iron floc, no odor | none         | iron staining         | corrosion      | none                         | negative                  | 0.30        | 0.06         | 0.1                           | 402                |                               |
| MP150          | MP150          | 7/26/2016              | HHA        |           | outfall    | 12<br>n/a  | corrugated metal                   | trickling                                          | n/a<br>n/a   | free flow        | none        | n/a<br>n/a  | iron stained, iron floc, no odor | none         | iron staining         | corrosion      | none                         | negative                  | 2.00        | 0.02         | 2.0                           | 213                |                               |
| MP160<br>MP160 | MH1-Pipe A     | 5/20/2016              | нна<br>ННА | DCB       | catchbasin | n/a        | n/a                                | flowing                                            | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.01         | 0.0                           | 195<br>191         |                               |
| MP160          | MP160          | 5/20/2016              | HHA        | DCB       | outfall    | 36         | corrugated metal                   | flowing                                            | 1            | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.02         | 0.1                           | 174                | Opened MH1 and sampled        |
| MP170          | MP170          | 5/20/2016              | HHA        | DCB       | outfall    | 18<br>24   | corrugated black plast             | tic dry                                            | n/a<br>1     | free flow        | none        | n/a<br>n/a  | n/a                              | none         | none                  | none           | partially obstructed         | n/a                       | n/a         | n/a          | n/a                           | n/a                | No flow at outfall or junctio |
| MP180<br>MP190 | MP180<br>MP190 | 5/20/2016              | нна<br>ННА | DCB       | outfall    | 24<br>24   | concrete                           | flowing                                            | 0.75         | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.00         | 0.0                           | 790<br>750         | Upstream of MP180             |
| MP200          | MP200          | 5/26/2016              | HHA        |           | outfall    | 12         | corrugated metal                   | dry                                                | n/a          | free flow        | none        | n/a         | no flow                          | none         | none                  | none           | partially obstructed         | n/a                       | n/a         | n/a          | n/a                           | n/a                | Outfall near bridge on Elm    |
| MP210          | MP210          | 5/26/2016              | HHA        |           | outfall    | 6<br>10    | smooth plastic                     | dry<br>dry                                         | n/a<br>n/a   | free flow        | none        | n/a<br>n/a  | no flow                          | none         | none                  | none           | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                | No flow; located downstrea    |
| MP230          | CB1            | 5/26/2016<br>5/26/2016 | ппа<br>ННА |           | catchbasin | n/a        | n/a                                | ury<br>trickling                                   | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | partially obstructed         | negative                  | 0.30        | 0.05         | 0.2                           | 1/a<br>1460        | Could not locate outfall. as  |
| MP230          | CB1            | 7/26/2016              | HHA        |           | catchbasin | n/a        | n/a                                | trickling                                          | n/a          | n/a              | n/a         | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.10        | 0.02         | 0.1                           | 1734               | Could not locate outfall, as  |
| MP230          | CB1            | 8/7/2017               | BAM        |           | catchbasin | n/a        | n/a                                | trickling                                          | n/a<br>n/a   | n/a              | n/a         | n/a<br>n/a  | n/a                              | none         | none                  | none           | none                         | n/a                       | 0.20        | n/a          | n/a                           | n/a                | Could not locate outfall, as  |
| MP250          | MP250          | 5/26/2016              | ппа<br>ННА |           | outfall    | 30<br>24   | concrete                           | ury<br>tricklina                                   | n/a          | free flow        | none        | n/a         | clear, some suds                 | suds         | none                  | none           | partially obstructed         | negative                  | 0.10        | 0.03         | 0.0                           | 790                | Large concrete outrall Cove   |
| MP250          | MP250          | 7/26/2016              | HHA        |           | outfall    | 24         | concrete                           | flowing                                            | 0.5          | free flow        | none        | n/a         | clear, some suds                 | suds         | none                  | none           | none                         | indeterminate             | 0.25        | 0.02         | 0.1                           | 1924               |                               |
| MP250          | MP250          | 10/4/2016              | HHA        |           | outfall    | 24         | concrete                           | trickling                                          | n/a          | free flow        | none        | n/a         |                                  | none         | none                  | none           | none                         | negative                  | n/a         | n/a          | n/a                           | n/a                |                               |
| MP250<br>MP260 | MP250<br>MP260 | 8/1//2017<br>5/26/2016 | HHA        |           | outfall    | 24<br>12   | concrete<br>corrugated black plast | ticdry                                             | n/a<br>n/a   | free flow        | none        | n/a<br>n/a  | no flow no odor                  | suas         | none                  | none           | none                         | negative<br>n/a           | n/a<br>n/a  | n/a<br>n/a   | n/a<br>n/a                    | n/a<br>n/a         | Difficult to find covered by  |
| MP270          | MP270          | 5/26/2016              | HHA        |           | outfall    | 12         | corrugated metal                   | wet (no flow)                                      | n/a          | submerged        | none        | n/a         | iron staining                    | none         | iron staining         | corrosion      | partially obstructed         | n/a                       | n/a         | n/a          | n/a                           | n/a                | Completely submerged; bl      |
| MP280          | MP280          | 5/26/2016              | HHA        |           | outfall    | 12<br>10   | corrugated metal                   | dry<br>ticflowing                                  | n/a          | free flow        | none        | n/a<br>n/a  | no flow, no odor                 | none         | none                  | none           | partially obstructed         | n/a                       | n/a         | n/a          | n/a                           | n/a                | No flow; drains to wetland    |
| MP290<br>MP290 | MP290<br>MP290 | 5/26/2016              | нна<br>ННА |           | outiall    | 18<br>18   | corrugated black plast             | ticflowing                                         | 0.25<br>0.25 | free flow        | none        | n/a         | clear, suds                      | suds         | none                  | none           | none                         | negative                  | 0.00        | 0.05         | 0.1                           | 305<br>533         |                               |
| MP290          | MP290          | 10/4/2016              | HHA        |           | outfall    | 18         | corrugated black plast             | ticflowing                                         | 0.25         | free flow        | none        | n/a         | clear, no suds or odor           | none         | none                  | none           | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                | Reassessed to check for s     |
| MP300          | MP300          | 5/26/2016              | HHA        |           | outfall    | 36         | corrugated metal                   | trickling                                          | n/a          | free flow        | none        | n/a<br>n/a  | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.03         | 0.1                           | 120                | Directly to the right of MP3  |
| wp310<br>MP320 | WP310<br>MP320 | 5/26/2016<br>5/26/2016 | нна<br>ННА |           | outfall    | 24<br>36   | concrete<br>corrugated black plast | uickling<br>ticflowing                             | n/a<br>0.5   | free flow        | none        | n/a         | clear, no odor<br>clear, no odor | none         | none                  | none           | none                         | negative                  | 0.00        | 0.04<br>0.02 | U. I<br>() 1                  | 322<br>426         |                               |
| MP330          | MP330          | 5/26/2016              | HHA        |           | outfall    | 6          | smooth plastic                     | wet (no flow)                                      | n/a          | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | cracking       | none                         | negative                  | 0.00        | 0.01         | 0.1                           | 352                |                               |
| MP340          | MP340          | 5/27/2016              | HHA        |           | outfall    | 18         | corrugated metal                   | dry                                                | n/a          | free flow        | none        | n/a         | no flow, no odor                 | none         | none                  | rusted out     | none                         | n/a                       | n/a         | n/a          | n/a                           | n/a                |                               |
| MP340<br>MP350 | СВ1<br>МР350   | 5/27/2016<br>5/27/2014 | ННА<br>ННА |           | catchbasin | n/a<br>12  | N/a                                | tlowing<br>flowing                                 | n/a<br>0.25  | n/a<br>free flow | n/a<br>none | n/a<br>none | clear, no odor<br>clear, no odor | n/a<br>none  | n/a<br>none           | n/a<br>crushed | n/a<br>none                  | negative                  | n/a<br>0.10 | n/a<br>0 1 2 | n/a<br>0 1                    | n/a<br>101 g       |                               |
| MP350          | MP350          | 7/26/2016              | HHA        |           | outfall    | 12         | corrugated metal                   | flowing                                            | 0.25         | free flow        | none        | none        | clear, no odor                   | none         | none                  | crushed        | none                         | negative                  | 0.10        | 0.12         | 0.1                           | 94.8               |                               |
| MP360          | MP360          | 5/27/2016              | HHA        | DCB       | outfall    | 6          | corrugated black plast             | tictrickling                                       | n/a          | free flow        | none        | n/a         | clear, no odor                   | none         | none                  | none           | none                         | negative                  | 0.00        | 0.01         | 0.1                           | 349                |                               |
| MP370          | MP370          | 5/27/2016              |            | DCB       | outfall    | 24         | corrugated black plast             | ticflowing                                         | 0.5<br>n/a   | free flow        | none<br>n/a | n/a<br>n/a  | clear, WW odor                   | none<br>n/a  | none<br>n/a           | none<br>n/a    | none                         | positive                  | 0.75        | 0.00         | 0.1                           | 2820               | Name of landowner is Lew      |
| MP370          | CB1<br>CB2     | 5/27/2016              | ппа<br>ННА | DCB       | catchbasin | n/a        | n/a                                | wet (no flow)<br>wet (no flow)                     | n/a          | n/a              | n/a         | n/a         | n/a                              | n/a          | n/a                   | n/a            | n/a                          | positive                  | n/a         | n/a          | n/a                           | n/a                | Placed pad at CB2, did not    |
| MP370          | CB3-Pipe B     | 5/27/2016              | HHA        | DCB       | catchbasin | n/a        | n/a                                | flowing                                            | n/a          | n/a              | n/a         | n/a         | WW odor                          | none         | none                  | none           | none                         | positive                  | 2.00        | 0.00         | 0.7                           | 3320               | sample                        |
| MP370          | CB4            | 5/27/2016              | HHA        | DCB       | catchbasin | n/a        | n/a                                | wet (no flow)                                      | n/a          | n/a              | n/a         | n/a         | n/a                              | n/a          | n/a                   | n/a            | n/a                          | negative                  | n/a         | n/a          | n/a                           | n/a                | Placed pad at CB4 but did     |

## en present when OB pad collected

0. Assumed positive OB resulted from contamination of MP010 ormwater line

## ssessment

rock lined ditch; pool near outfall location is clear, no odor; only CB is wet, not flowing.

oresent oresent

at discharge point

ed Pipe A (minor flow) and Pipe B (up-pipe flow). Pipe C was wet/no flow ion CB3

Im St. is dry, partially obstructed; does not appear to be in regular use ream of MP200, plastic pipe coming out of side embankment has perforated end cap with wooden fence post laying over it; garbage at end of pipe assessed at first upstream CB (sampled sump). Pipe B was trickling, pipes A and C not flowing. assessed at first upstream CB. assessed at first upstream CB. overed by vegetation

by vegetation along river blue/aqua material in river at outlet appears to be flakes of pool paint d area

suds 310

ewis lace pad lot sample

id not sample

|                    |                       |                         | Inspector  | Inspector  |                          | Pipe diam.  |                                                    | Dry,<br>Wet (no flow),<br>Dripping, or | Flow depth   |                        | E                | Frosion                            | Discharge                                                              |                | Deposits/                      |                           |                              |                             | Ammonia       | Chlorine      | MBAS detergents<br>Corrected | Sp.<br>conductance |                                                             |
|--------------------|-----------------------|-------------------------|------------|------------|--------------------------|-------------|----------------------------------------------------|----------------------------------------|--------------|------------------------|------------------|------------------------------------|------------------------------------------------------------------------|----------------|--------------------------------|---------------------------|------------------------------|-----------------------------|---------------|---------------|------------------------------|--------------------|-------------------------------------------------------------|
| System ID<br>MP370 | Structure ID<br>MP370 | Date assessed 10/4/2016 | 1<br>HHA   | 2          | Structure<br>Outfall     | (in.)<br>24 | Pipe material<br>corrugated black plasti           | Flowing?<br>ic flowing                 | (in.)<br>0.5 | Pipe position Er       | osion d<br>one r | lescription<br>η/a                 | characteristics<br>clear, no odor                                      | Floatables     | Stains<br>NONE                 | Damage<br>NONE            | Obstructions<br>NONE         | OB Result<br>DOSITIVE       | (mg/L)<br>n/a | (mg/L)<br>n/a | (mg/L)<br>n/a                | (µs/cm)<br>n/a     | Comments<br>Just placed OB pad for rea                      |
| MP370              | CB3                   | 10/4/2016               | HHA        |            | catchbasin               | n/a         | n/a                                                | wet (no flow)                          | n/a          | n/a n/                 | la r             | n/a                                | n/a                                                                    | n/a            | n/a                            | n/a                       | n/a                          | positive                    | n/a           | n/a           | n/a                          | n/a                | Just placed OB pad for rea                                  |
| MP370<br>MP380     | CB6<br>MP380          | 10/4/2016<br>5/27/2016  | ННА<br>ННА | DCB        | catchbasin<br>outfall    | n/a<br>32   | n/a<br>concrete                                    | wet (no flow)<br>flowing               | n/a<br>0.5   | n/a n/<br>free flow no | /a r<br>one r    | n/a<br>n/a                         | n/a<br>clear no odor                                                   | n/a<br>none    | n/a<br>none                    | n/a<br>none               | n/a<br>none                  | positive<br>negative        | n/a<br>0.00   | n/a<br>0.00   | n/a<br>0 1                   | n/a<br>725         | Just placed OB pad for rea                                  |
| MP380              | CB4-Pipe A            | 5/27/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | n/a            | n/a                            | n/a                       | n/a                          | negative                    | 0.00          | 0.02          | 0.0                          | 651                |                                                             |
| MP380              | CB4-Pipe B            | 5/27/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | n/a            | n/a<br>n/a                     | n/a                       | n/a                          | negative                    | 0.00          | 0.00          | 0.2                          | 1026               |                                                             |
| MP380<br>MP380     | СВ5<br>MP380          | 5/2//2016<br>7/26/2016  | HHA        | DCB        | outfall                  | 32          | concrete                                           | flowing                                | 0.5          | free flow no           | one r            | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | indeterminate               | 0.00          | 0.01          | 0.0                          | 1233               |                                                             |
| MP380              | CB4-Pipe A            | 7/26/2016               | HHA        |            | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | /a r             | n/a                                | clear, no odor                                                         | n/a            | n/a                            | n/a                       | n/a                          | negative                    | 0.25          | 0.04          | 0.0                          | 1045               |                                                             |
| MP380<br>MP380     | MP380<br>CB4-Pipe A   | 10/4/2016<br>10/4/2016  | нна<br>ННА |            | outrail<br>catchbasin    | 32<br>n/a   | concrete<br>n/a                                    | flowing<br>flowing                     | 0.5<br>n/a   | n/a n/                 | one r<br>/a r    | n/a<br>n/a                         | clear, no odor<br>clear, no odor                                       | none<br>n/a    | none<br>n/a                    | none<br>n/a               | none<br>n/a                  | n/a<br>n/a                  | n/a<br>n/a    | n/a<br>n/a    | 0.1<br>0.1                   | n/a<br>n/a         | Only sampled MBAS for re<br>Only sampled MBAS for re        |
| MP400              | MP400                 | 6/2/2016                | HHA        |            | outfall                  | 12          | corrugated metal                                   | dry                                    | n/a          | free flow no           | one r            | n/a                                | no flow, no odor                                                       | none           | none                           | none                      | partially obstructed         | l n/a                       | n/a           | n/a           | n/a                          | n/a                | 75% obstructed by leaves                                    |
| MP410<br>MP420     | MP410<br>CB1          | 6/2/2016<br>6/23/2016   | ННА<br>ННА |            | outfall<br>catchbasin    | 18<br>n/a   | corrugated metal                                   | dry<br>wet (no flow)                   | n/a<br>n/a   | free flow no           | one r<br>/a r    | n/a<br>n/a                         | no flow, no odor                                                       | none<br>n/a    | none<br>n/a                    | none<br>n/a               | partially obstructed         | l n/a<br>n/a                | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         | 60-70% obstructed by veg                                    |
| MP430              | MP430                 | 6/1/2016                | HHA        |            | outfall                  | 18          | corrugated black plasti                            | icdry                                  | n/a          | free flow no           | one r            | n/a                                | dry, no odor                                                           | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                |                                                             |
| MP440              | MP440                 | 6/1/2016                | HHA        |            | outfall                  | 24          | concrete                                           | wet (no flow)                          | n/a          | partially sut no       | one r            | n/a                                | clear, no odor, stagnant pool                                          | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | CB by outfall also stagnant                                 |
| MP450<br>MP450     | MP450<br>MP450        | 6/1/2016<br>7/26/2016   | нна<br>ННА |            | outfall                  | 24<br>24    | corrugated metal                                   | flowing<br>flowing                     | 0.5<br>0.25  | free flow no           | one r<br>one r   | n/a<br>n/a                         | very iron stained, no odor, clear<br>very iron stained, no odor, clear | none           | iron staining<br>iron staining | corrosion                 | none                         | negative                    | 0.30<br>1.0   | 0.00<br>0.04  | 0.1<br>0.0                   | 336<br>1042        |                                                             |
| MP450              | MP450                 | 10/5/2016               | HHA        |            | outfall                  | 24          | corrugated metal                                   | flowing                                |              | free flow no           | one r            | n/a                                | iron stained                                                           | none           | iron staining                  | corrosion                 | none                         | n/a                         | 1.0           | n/a           | n/a                          | n/a                | Only tested ammonia for re                                  |
| MP460              | MP460                 | 6/1/2016                | HHA        |            | outfall                  | 12<br>12    | corrugated metal                                   | flowing<br>dry                         | 0.25<br>p/2  | free flow no           | one r            | n/a<br>Na                          | suds in discharge, clear, no odor                                      | suds           | none                           | none                      | none                         | negative                    | 0.00          | 0.02          | 0.1                          | 551<br>p/a         |                                                             |
| MP400<br>MP470     | CB1                   | 6/1/2016                | HHA        |            | catchbasin               | n/a         | n/a                                                | dry                                    | n/a          | n/a n/                 | la r             | n/a                                | n/a                                                                    | n/a            | n/a                            | n/a                       | n/a                          | n/a                         | n/a           | n/a           | n/a                          | n/a                | Could not locate; first upsti                               |
| MP480              | MP480                 | 6/1/2016                | HHA        |            | outfall                  | 9           | smooth plastic                                     | dry                                    | n/a          | free flow no           | one r            | n/a                                | no flow, no odor                                                       | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | No flow; additional 9" pipe                                 |
| MP490<br>MP500     | MP490<br>MP500        | 6/1/2016<br>6/1/2016    | HHA<br>HHA |            | outfall                  | 24<br>18    | corrugated metal                                   | flowing<br>flowing                     | 0.5<br>0.25  | free flow no           | one r            | 1/a<br>1/a                         | clear, no odor<br>clear, no odor                                       | none           | none                           | corrosion                 | none                         | negative<br>negative        | 0.00          | 0.00          | 0.1<br>0.1                   | 107<br>1714        |                                                             |
| MP510              | MP510                 | 6/1/2016                | HHA        |            | outfall                  | n/a         | n/a                                                | n/a                                    | n/a          | n/a n/                 | la r             | n/a                                | n/a                                                                    | n/a            | n/a                            | n/a                       | n/a                          | n/a                         | n/a           | n/a           | n/a                          | n/a                | Could not locate outfall or                                 |
| MP520              | MP520                 | 6/1/2016                | HHA        |            | outfall                  | 12          | corrugated black plasti                            | ic dry                                 | n/a          | free flow no           | one r            | n/a                                | no odor                                                                | none           | none                           | none                      | none                         | n/a<br>n/a                  | n/a           | n/a           | n/a                          | n/a                | First unstream CD not flow                                  |
| MP530<br>MP540     | MP530<br>MP540        | 6/1/2016<br>6/1/2016    | HHA        |            | outfall                  | о<br>8      | smooth plastic                                     | dry                                    | n/a<br>n/a   | free flow no           | one r            | i/a<br>n/a                         | no odor                                                                | none           | none                           | none                      | none                         | n/a<br>n/a                  | n/a           | n/a           | n/a<br>n/a                   | n/a<br>n/a         | A 4-inch plastic pipe conne                                 |
| MP550              | MP550                 | 6/1/2016                | HHA        |            | outfall                  | 24          | corrugated black plasti                            | icwet (no flow)                        | n/a          | free flow no           | one r            | n/a                                | no flow, no odor                                                       | none           | none                           | crushed                   | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | Stagnant water in pool                                      |
| MP560<br>MP570     | MP560<br>MP570        | 6/1/2016<br>6/1/2016    | ННА<br>ННА |            | outfall                  | n/a<br>24   | n/a                                                | n/a<br>wet (no flow)                   | n/a<br>n/a   | n/a n/<br>free flow no | /a r<br>one r    | n/a<br>n/a                         | n/a<br>stagnant water, no odor                                         | n/a<br>none    | n/a<br>none                    | n/a<br>crushed            | n/a<br>nartially obstructed  | n/a<br>1 n/a                | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         | Could not locate outfall or a<br>First upstream CB not flow |
| MP580              | MP580                 | 6/1/2016                | HHA        |            | outfall                  | 24          | corrugated metal                                   | flowing                                | 0.25         | free flow no           | one r            | n/a                                | clear, no odor                                                         | none           | none                           | cracking, corrosion       | none                         | positive                    | 2.0           | 0.00          | 0.7                          | 1059               |                                                             |
| MP580              | CB3                   | 6/15/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | slight flow                            | n/a          | n/a n/                 | la r             | n/a                                | toilet paper, feces, WW odor                                           | feces          | none                           | n/a                       | n/a                          | n/a                         | 0.40          | n/a           | n/a                          | n/a                | WW appears to enter from                                    |
| MP580<br>MP580     | CB3                   | 10/4/2016               | нна<br>ННА |            | catchbasin               | z4<br>n/a   | n/a                                                | ary<br>intermittent                    | n/a<br>n/a   | n/a n/                 | la r             | n/a                                | WW odor, toilet paper, feces                                           | feces          | none                           | n/a                       | n/a                          | n/a<br>n/a                  | 1/a<br>2.0    | n/a           | n/a                          | n/a<br>n/a         | Observed slight flow with f                                 |
| MP580              | CB4                   | 10/4/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | wet (no flow)                          | n/a          | n/a n/                 | la r             | n/a                                | WW odor, brownish color                                                | none           | none                           | n/a                       | n/a                          | n/a                         | 0.50          | n/a           | n/a                          | n/a                |                                                             |
| MP580<br>MP580     | CB6<br>MP580          | 10/4/2016<br>9/11/2017  | hha<br>BAM | DCR        | outfall                  | n/a         | n/a                                                | wet (no flow)<br>wet (no flow)         | n/a<br>n/a   | n/a n/<br>free flow no | va r<br>one r    | n/a<br>n/a                         | vvv odor<br>clear, no odor                                             | reces?<br>none | none                           | none                      | none                         | n/a<br>negative             | 0.25<br>n/a   | n/a<br>n/a    | 1.5<br>n/a                   | n/a<br>n/a         | Observed cover or weir d                                    |
| MP580              | CB3                   | 9/11/2017               | BAM        |            | catchbasin               | n/a         | n/a                                                | wet (no flow)                          | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | positive                    | n/a           | n/a           | n/a                          | n/a                | Strong WW odor when pac                                     |
| MP580<br>MP580     | CB3<br>CB3 pipe C     | 9/29/2017<br>9/29/2017  | BAM        |            | catchbasin               | n/a<br>n/a  | n/a<br>n/a                                         | wet (no flow)<br>wet (no flow)         | n/a<br>n/a   | n/a n/<br>n/a n/       | la r             | n/a<br>n/a                         | clear, no odor<br>clear, no odor                                       | none           | none                           | none                      | none                         | positive (weak)<br>positive | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         |                                                             |
| MP590              | MP590                 | 6/1/2016                | HHA        |            | outfall                  | 30          | corrugated metal                                   | flowing                                | 0.5          | free flow no           | one r            | n/a                                | WW odor, clear                                                         | none           | none                           | corrosion                 | none                         | negative                    | 0.10          | 0.01          | 0.2                          | 1028               | Complete Development                                        |
| MP590<br>MP590     | CB8                   | 6/15/2016<br>6/15/2016  | HHA<br>HHA | DCB        | catchbasin               | 30<br>n/a   | n/a                                                | dry                                    | 0.5<br>n/a   | n/a n/                 | one r<br>/a r    | n/a<br>n/a                         | n/a                                                                    | n/a            | none<br>n/a                    | n/a                       | n/a                          | negative                    | 0.10<br>n/a   | 0.02<br>n/a   | 0.0<br>n/a                   | n/a                | Sampled Zhd time; sound (                                   |
| MP590              | CB13                  | 6/15/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | /a r             | n/a                                | clear, no odor                                                         | n/a            | minor iron staining            | n/a                       | n/a                          | n/a                         | 0.10          | 0.19          | 0.0                          | 1407               |                                                             |
| MP590<br>MP590     | CB14<br>CB15          | 6/15/2016<br>6/15/2016  | ННА<br>ННА | DCB<br>DCB | catchbasin<br>catchbasin | n/a<br>n/a  | n/a<br>n/a                                         | wet (no flow)<br>dry                   | n/a<br>n/a   | n/a n/<br>n/a n/       | la r<br>Ia r     | n/a<br>n/a                         | n/a<br>n/a                                                             | n/a<br>n/a     | n/a<br>n/a                     | n/a<br>n/a                | n/a<br>n/a                   | n/a<br>n/a                  | n/a<br>n/a    | 0.00<br>n/a   | n/a<br>n/a                   | n/a<br>n/a         | Dry so high chlorine must                                   |
| MP590              | CB23 pipe A           | 6/15/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | none           | none                           | n/a                       | n/a                          | n/a                         | 0.20          | 0.07          | 0.1                          | 1766               | Dry, so high chlorine must                                  |
| MP590              | CB23 pipe B           | 6/15/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | none           | none                           | n/a                       | n/a                          | negative                    | 0.00          | 0.04          | 0.1                          | 221                | to MU Doiloy or CD02                                        |
| MP590<br>MP590     | CB24<br>CB25          | 6/15/2016<br>6/15/2016  | HHA        | DCB        | catchbasin               | n/a<br>n/a  | n/a                                                | trickling                              | n/a<br>n/a   | n/a n/<br>n/a n/       | a r<br>/a r      | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | n/a                         | 2.0<br>n/a    | 0.00          | 0.4<br>n/a                   | 322<br>n/a         | Sump pump discharges to                                     |
| MP590              | CB26                  | 6/15/2016               | HHA        | DCB        | catchbasin               | n/a         | n/a                                                | trickling                              | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | n/a                         | n/a           | 0.01          | n/a                          | n/a                |                                                             |
| MP590<br>MP590     | MH4<br>MP590          | 6/15/2016<br>9/11/2017  | HHA<br>BAM | DCB        | manhole<br>outfall       | n/a<br>30   | n/a<br>corrugated metal                            | flowing<br>flowing                     | n/a          | n/a n/                 | /a r             | n/a                                | clear, no odor<br>clear, no odor                                       | none           | none                           | none                      | none                         | n/a<br>negative             | n/a<br>n/a    | 0.24<br>n/a   | n/a<br>n/a                   | n/a<br>n/a         |                                                             |
| MP590              | CB6                   | 9/11/2017               | BAM        |            | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | /a r             | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | indeterminate               | n/a           | n/a           | n/a                          | n/a                |                                                             |
| MP590              | CB14                  | 9/11/2017               | BAM        |            | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | n/a<br>n/a                  | n/a           | 0.04          | n/a                          | n/a                |                                                             |
| MP590<br>MP590     | CB14-X<br>CB15        | 9/11/2017<br>9/11/2017  | BAM        |            | catchbasin               | n/a         | n/a                                                | dry                                    | n/a          | n/a n/                 | a r<br>/a r      | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | n/a                         | n/a           | 0.08<br>n/a   | n/a                          | n/a                |                                                             |
| MP590              | CB6                   | 9/21/2017               | BAM        |            | catchbasin               | n/a         | n/a                                                | flowing                                | n/a          | n/a n/                 | la r             | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | negative                    | n/a           | n/a           | n/a                          | n/a                |                                                             |
| WP600<br>MP600     | WP600<br>MP600        | o/2/2016<br>7/26/2016   | нна<br>ННА |            | outfall                  | 24<br>24    | corrugated black plasti<br>corrugated black plasti | iculokiing<br>icdry                    | n/a<br>n/a   | n/a no                 | one r            | iva<br>n/a                         | ciear, no odor<br>n/a                                                  | none           | none                           | none                      | none                         | negative<br>n/a             | 0.10<br>n/a   | u.11<br>n/a   | 0.0<br>n/a                   | 1194<br>n/a        |                                                             |
| MP610              | MP610                 | 6/2/2016                | HHA        |            | outfall                  | 24          | corrugated black plasti                            | ic trickling                           | n/a          | free flow no           | one r            | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | negative                    | 0.10          | 0.02          | 0.1                          | 747                |                                                             |
| MP620<br>MP630     | MP620<br>CB1          | 6/2/2016<br>6/2/2016    | ННА<br>ННА |            | outfall                  | 12<br>n/a   | concrete<br>n/a                                    | dry<br>n/a                             | n/a<br>n/a   | free flow no           | one r<br>/a r    | า/a<br>า/a                         | no flow, no odor<br>n/a                                                | none<br>n/a    | none<br>n/a                    | cracking, spalling<br>n/a | none<br>n/a                  | nenative                    | n/a<br>n/a    | n/a<br>n/a    | n/a                          | n/a<br>n/a         | First upstream CB not flow                                  |
| MP640              | MP640                 | 6/2/2016                | HHA        |            | outfall                  | 12          | corrugated metal                                   | dry                                    | n/a          | free flow ye           | es e             | eroded channel                     | dry; could not assess odor                                             | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | Outfall is 15-20 ft above gr                                |
| MP650              | MP650                 | 6/2/2016                | HHA        |            | outfall                  | 24          | concrete                                           | dry                                    | n/a          | free flow no           | one r            | n/a                                | no flow, no odor                                                       | none           | none                           | none                      | partially obstructed         | l n/a                       | n/a           | n/a           | n/a                          | n/a                | First upstream CB not flow                                  |
| MP660<br>MP670     | MP660<br>MP670        | 6/2/2016<br>6/2/2016    | нна<br>ННА |            | outfall                  | 8<br>36     | corrugated black plasti                            | flowina                                | n/a<br>0.5   | partially sub no       | one r<br>one r   | n/a<br>n/a                         | no flow, no odor<br>no odor, some suds                                 | none<br>suds   | none                           | none                      | none<br>partially obstructed | n/a<br>1 negative           | n/a<br>0.10   | n/a<br>0.00   | n/a<br>0.0                   | n/a<br>1508        | 60% obstructed by sand                                      |
| MP670              | MP670                 | 7/26/2016               | HHA        |            | outfall                  | 36          | concrete                                           | dry                                    | n/a          | partially sut no       | one r            | n/a                                | n/a                                                                    | none           | none                           | none                      | partially obstructed         | l n/a                       | n/a           | n/a           | n/a                          | n/a                |                                                             |
| MP680              | CB1                   | 6/2/2016<br>6/2/2014    | ННА<br>ННА |            | catchbasin               | n/a<br>n/a  | n/a<br>n/a                                         | ary<br>dry                             | n/a<br>n/a   | n/a n/                 | ra r             | 1/a<br>channel eroded from base of | iva<br>n/a                                                             | n/a<br>n/a     | n/a<br>n/a                     | n/a<br>n/a                | n/a<br>n/a                   | n/a<br>n/a                  | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         | Could not locate outfall; Fi                                |
| MP700              | MP700                 | 6/2/2016                | HHA        |            | outfall                  | 24          | corrugated black plast                             | ic dry                                 | n/a          | free flow no           | one r            | n/a                                | dry, no odor                                                           | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | Joana not iocate outidii, Fli                               |
| MP710              | MP710                 | 6/2/2016                | HHA        |            | outfall                  | 36          | concrete                                           | dry<br>dry                             | n/a          | free flow no           | one r            | n/a                                | dry, no odor                                                           | none           | none                           | none                      | partially obstructed         | l n/a                       | n/a           | n/a           | n/a                          | n/a                | 70-80% obstructed by sed                                    |
| WP720              | WP720<br>MP730        | o/2/2016<br>6/2/2016    | нна<br>ННА |            | outfall                  | 12<br>n/a   | corrugated metal                                   | ury<br>n/a                             | n/a<br>n/a   | n/a n/                 | une r<br>/a r    | iva<br>n/a                         | ury, no odor<br>n/a                                                    | none<br>n/a    | none<br>n/a                    | corrosion<br>n/a          | none<br>n/a                  | n/a                         | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         | Outfall not located, manne                                  |
| MP740              | MP740                 | 6/2/2016                | HHA        |            | outfall                  | 24          | corrugated black plast                             | ic dry                                 | n/a          | free flow no           | one r            | n/a                                | dry, no odor                                                           | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | .,                                                          |
| MP750<br>MP760     | MP750<br>MP760        | 6/2/2016<br>6/2/2016    | ННА<br>ННА |            | outfall                  | 12<br>פ     | corrugated metal                                   | dry<br>icdry                           | n/a<br>n/a   | free flow ye           | es b             | bypass around outfall              | dry, no odor<br>dry, no odor                                           | none           | none                           | corrosion                 | none                         | n/a<br>n/a                  | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         | Heavily corroded                                            |
| MP770              | MP770                 | 6/2/2016                | HHA        |            | outfall                  | 12          | corrugated black plasti                            | ic dry                                 | n/a          | free flow no           | one r            | n/a                                | dry, no odor                                                           | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | Mapped incorrectlylocate                                    |
| MP780              | MP780                 | 6/2/2016                | HHA        |            | outfall                  | 12          | corrugated metal                                   | dry                                    | n/a          | free flow no           | one r            | n/a                                | dry, no odor                                                           | none           | none                           | crushed                   | partially obstructed         | l n/a                       | n/a           | n/a           | n/a                          | n/a                |                                                             |
| MP800              | MP800                 | 6/2/2016                | нна<br>ННА |            | outfall                  | 18          | corrugated metal                                   | dry                                    | n/a          | free flow no           | one r            | "a<br>1/a                          | dry, no odor                                                           | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                | First upstream CB not flow                                  |
| MP810              | MP810                 | 6/2/2016                | HHA        |            | outfall                  | 32          | corrugated black plasti                            | ic flowing                             | 0.25         | free flow no           | one r            | n/a                                | clear, no odor                                                         | none           | none                           | none                      | none                         | negative                    | 0.00          | 0.00          | 0.1                          | 1400               |                                                             |
| MP810<br>MP820     | MH4<br>MP820          | 6/14/2016<br>6/14/2016  | HHA<br>HHA |            | manhole<br>outfall       | n/a<br>12   | n/a<br>corrugated black plasti                     | dry<br>icdrv                           | n/a<br>n/a   | n/a n/<br>free flow ve | ra r<br>es e     | n/a<br>eroded channel helow OF     | n/a<br>n/a                                                             | n/a<br>none    | n/a<br>none                    | n/a<br>none               | n/a<br>none                  | n/a<br>n/a                  | n/a<br>n/a    | n/a<br>n/a    | n/a<br>n/a                   | n/a<br>n/a         | Junction manhole (MH4) for<br>Eroded channel below out      |
| MP830              | MP830                 | 6/14/2016               | HHA        |            | outfall                  | 6           | concrete                                           | dry                                    | n/a          | free flow no           | one r            | n/a                                | n/a                                                                    | none           | none                           | none                      | none                         | n/a                         | n/a           | n/a           | n/a                          | n/a                |                                                             |

assessment assessment assessment

reassessment reassessment s and dirt getation and soil ed first upstream CB

reassessment

stream CB (CB1) not flowing e present across from this outfall

r any inlet to system

wing nected to CB discharges near the MP540 outfall

or any inlet to system

wing

m hole below and to the right of white pvc pipe in corner

feces coming in from hole in corner; called Kurt and determined source is not pump station near river

r over outgoing pipe that flows toward culvert down line. Strong WW odor

d retrieved

checked to CB at corner of State and Bailey; drains Bailey Ave. system

st arise between CB15 and CB13

to CB25 via 4" PVC pipe

owing stream CB flowing ground, causing eroded channel; first upstream CB not flowing owing owing

First upstream CB (CB1) was dry. First upstream CB (CB1) was dry.

diment

ped as outfall for MHS roof drains

ted at bottom of hill

wing

for National Life parking lot drainage system. No flow from any pipes into MH4 utfall

| r         |              | 1           |           |           |                    | 1                   |                       | 1              | 1          |               |              |            |                                      |                        |                     | 1                  |                      | <u>г г</u>        |             |           | 1               | 1                   |                                              |
|-----------|--------------|-------------|-----------|-----------|--------------------|---------------------|-----------------------|----------------|------------|---------------|--------------|------------|--------------------------------------|------------------------|---------------------|--------------------|----------------------|-------------------|-------------|-----------|-----------------|---------------------|----------------------------------------------|
|           |              |             |           |           |                    |                     |                       |                |            |               |              |            |                                      |                        |                     |                    |                      |                   |             |           |                 |                     |                                              |
|           |              |             |           |           |                    |                     |                       | Dry,           |            |               |              |            |                                      |                        |                     |                    |                      |                   |             |           |                 |                     |                                              |
|           |              |             | Increator | Increater |                    | Din e diem          |                       | Wet (no flow), | Flow doubh |               |              | Freedom    | Discharge                            |                        | Denesite/           |                    |                      |                   | Ammonio     | Chloring  | MBAS detergents | s- Sp.              |                                              |
| Sustan ID | Structure ID | Data accord | Inspector | Inspector | Ctructure          | Pipe diam           | n.<br>Dina matarial   | Dripping, or   | Flow depth | Dino position | Fracian      | Leosion    | Discharge                            | Floatablac             | Deposits/           | Domogo             | Obstructions         | OR Deput          | Ammonia     | Chlorine  | Corrected       | conductant          | .e<br>Commonto                               |
| System ID |              |             |           | 2         | Structure          | (in.)               |                       | Flowing?       | (in.)      | Pipe position | Erosion      |            |                                      | Floatables             | Stains              | Damage             | Obstructions         |                   | (mg/L)      | (mg/L)    | (mg/L)          | (µs/cm)             | Comments                                     |
| MP840     | MP840        | 6/14/2016   | HHA       |           | outfall            | 6                   | concrete              | dry            | n/a        | free flow     | none         | n/a        | n/a                                  | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP850     | MP850        | 6/14/2016   | HHA       |           | outfall            | 24                  | corrugated metal      | dripping       | n/a        | free flow     | none         | n/a        | clear, no odor                       | none                   |                     | none               | none                 | n/a               | 0.20        | 0.00      | 0.1             | n/a                 | Discharges into pool with yellow-green s     |
| MP860     | MP860        | 6/14/2016   | HHA       |           | outfall            | 12                  | corrugated metal      | drv            | n/a        | free flow     | none         | n/a        | n/a                                  | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
|           | MD070        | 6/11/2016   |           |           | outfall            | 10                  | corrugated black plac | stiday         | n/a        | froo flow     | nono         | nla        | nla                                  | nono                   | nono                | crushod            | nono                 | nlo               | n/o         | n/a       | n/a             | n/o                 |                                              |
|           |              | 0/14/2010   | ППА       |           | outiali            | 12                  | confugated black plas | Sucury         | 11/d       | liee liow     | none         | 11/d       | 11/d                                 | HUHE                   | TIONE               | CIUSHEU            | none                 | 11/a              | 11/a        | 11/4      | n/a             | 11/a                |                                              |
| MP880     | MP880        | 6/14/2016   | HHA       |           | outfall            | 12                  | corrugated metal      | wet (no flow)  | n/a        | free flow     | none         | n/a        | n/a                                  | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP890     | MP890        | 6/14/2016   | HHA       |           | outfall            | 32                  | corrugated metal      | flowing        | 0.5        | free flow     | none         | n/a        | clear, laundry odor                  | suds                   | none                | none               | none                 | negative          | 0.10        | 0.00      | 0.1             | 300                 | Significant suds present                     |
| MP890     | CB9          | 6/15/2016   | ННА       |           | catchbasin         | n/a                 | n/a                   | drv            | n/a        | n/a           | n/a          | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | <u> </u>                                     |
|           |              | 0/10/2010   |           |           | outfall            | 17.0                | a arrugated motal     | flowing        | 1 5        | free flow     | nono         |            | alaar na adar                        | nono                   | nono                | nono               | nana                 | nla               | 0.05        | 0.00      | 0.1             | 240                 |                                              |
| IVIP890   | IVIP890      | //20/2010   | ННА       |           | outiali            | 32                  | corrugated metal      | nowing         | I.3        | free now      | none         | 11/a       |                                      | none                   | none                | none               | none                 | 11/a              | 0.25        | 0.00      | 0.1             | 349                 |                                              |
| MP890     | MP890        | 10/5/2016   | HHA       |           | outfall            | 32                  | corrugated metal      | flowing        | 0.5        | free flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.10        | 0.00      | 0.1             | 223                 |                                              |
| MP890     | CB1          | 10/5/2016   | HHA       |           | catchbasin         | n/a                 | n/a                   | flowing        | 0.25       | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | n/a               | 0.10        | 0.00      | 0.1             | 227                 |                                              |
|           | MD900        | 0/11/2017   | RVM       |           | outfall            | 20                  |                       | flowing        |            | froo flow     | nono         | n/a        | cloar faint laundry odor             | sude                   | n/a                 | nla                | n/a                  | norativo          | 0.10        | 0.02      | 0.1             | 1/0                 |                                              |
|           |              | 7/11/2017   | DAIVI     |           | outian             | 52                  |                       | nowing         | 0.5        |               | IIUIIC       | ,<br>,     |                                      | 3003                   | TI/d                | n/a                | n/a                  | negative          | 0.10        | 0.02      | 0.1             | 140                 |                                              |
| MP900     | MP900        | 6/14/2016   | HHA       |           | outrall            | 24                  | corrugated metal      | tiowing        | 0.5        | free flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.03      | 0.1             | 398                 |                                              |
| MP900     | CB3          | 6/15/2016   | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | wet (no flow)  | n/a        | n/a           | n/a          | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | negative          | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP910     | MP910        | 6/14/2016   | HHA       |           | outfall            | 32                  | corrugated metal      | drv            | n/a        | free flow     | none         | n/a        | n/a                                  | none                   | none                | corrosion          | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 | Elevated in the air                          |
| MD010     | CD2          | 6/15/2016   |           |           | catchhasin         | n/a                 | nlo                   | dry            | n/a        | nla           | nla          | nla        | nla                                  | nla                    | n/o                 | nla                | nla                  | nlo               | n/o         | n/a       | n/a             | n/o                 |                                              |
| IVIF 910  | CDZ          | 0/15/2010   | ппа       | DCD       | Calcinnasiii       | 11/a                | 11/a                  | ury            | 11/a       | 11/a          | 11/d         | 11/a       | 11/d                                 | il/a                   | 11/a                | 11/a               | 11/d                 | ıı/a              | n/a         | 1#a       | n/a             | 11/a                |                                              |
| MP910     | MH1          | 6/15/2016   | HHA       | DCB       | manhole            | n/a                 | n/a                   | dry            | n/a        | n/a           | n/a          | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Manhole has no inflow pipe                   |
| MP920     | MP920        | 6/23/2016   | HHA       |           | outfall            | 8                   | smooth plastic        | dry            | n/a        | free flow     | none         | n/a        | dry, no odor                         | n/a                    | n/a                 | n/a                | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP930     | CB1          | 6/14/2016   | ННΔ       |           | catchhasin         | n/a                 | n/a                   | drv            | n/a        | n/a           | n/a          | n/a        | dry                                  | none                   | none                | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Could not locate outfall. Assessed at firs   |
|           |              | (11/2010    |           |           |                    | 1/4                 |                       | di y           | n/a        | fina - flasse | n/u          | - /-       |                                      | none                   | none                | 11/0               | n/u                  |                   | 11/a        | n/a       | 11/u            | n/a                 |                                              |
| IVIP940   | IVIP940      | 6/14/2016   | HHA       |           | outiali            | 0                   | smooth plastic        | ary            | n/a        | lifee llow    | none         | n/a        | ary, no odor                         | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP950     | MP950        | 6/14/2016   | HHA       |           | outfall            | 6                   | smooth plastic        | dry            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP960     | MP960        | 6/14/2016   | HHA       |           | outfall            | 6                   | smooth plastic        | drv            | n/a        | free flow     | none         | n/a        | drv, no odor                         | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
|           |              | 6/11/2016   | ΗΠν       |           | outfall            | 10                  | smooth plastic        | drv            | n/a        | free flow     | n∩n≏         | n/a        | dry no odor                          | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/2                 | Located in chicken coop                      |
|           |              |             |           |           |                    | 12                  |                       | ury<br>der     |            |               |              | nia        |                                      | none                   | nonc                | none               |                      | nia               | 11/a        | 11/a      | 11/d            | 11/d                | Locator in chicken coop                      |
| IVIP980   | WF780        | 0/14/2016   | HHA       |           | outfall            | 6                   | smooth plastic        | ary            | n/a        | ILEE IOM      | none         | 11/8       | ערץ, חס סמסר                         | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP990     | CB1          | 6/14/2016   | HHA       |           | catchbasin         | n/a                 | n/a                   | dry            | n/a        | n/a           | n/a          | n/a        | dry                                  | none                   | none                | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Could not locate outfall. Assessed at first  |
| MP1000    | MP1000       | 6/14/2016   | НΗΔ       |           | outfall            | 18                  | corrunated metal      | drv            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | cracking corrosion | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MD1010    |              | 6/11/2010   |           |           | outfall            | 10                  | cmooth place!-        | da.            | nla        | fraction      | nonc         | n/o        | dru no odor                          | nono                   | nono                | nono               | nono                 | nlo               | nla         | n/a       | ni a            | - /-                |                                              |
|           | IVIP IUIU    | 0/14/2016   | HHA       |           | outiall            | 12                  | SHOULD PLASTIC        | ury            | 11/d       | nee now       | none         | ing .      |                                      | none                   | none                | попе               | TIOLIE               | 11/d              | n/a         | 11/3      | n/a             | n/a                 |                                              |
| MP1020    | MP1020       | 6/14/2016   | HHA       |           | outfall            | 18                  | smooth plastic        | wet (no flow)  | n/a        | tree flow     | none         | n/a        | iron stained, sheen present, no odor | sheen                  | oily, iron staining | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1030    | MP1030       | 6/14/2016   | HHA       |           | outfall            | 24                  | corrugated metal      | flowina        | 0.5        | free flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | positive          | 0.00        | 0.02      | 0.1             | 460                 |                                              |
| MD1020    |              | 8/1/2014    | ЦЦЛ       |           | Outfall            | <br>ว/              | corrunated motal      | flowing        | 05         | free flow     | none         | n/a        | clear no odor                        | none                   | none                | none               | none                 | negative          | 0.10        | 0.00      | 0.1             | <u></u> <b>Б</b> 01 |                                              |
|           |              |             | HITA<br>  |           | outidii            | 24                  | contugated metal      | nowing<br>a    | 0.0        |               |              | - /-       |                                      |                        |                     |                    |                      | negative          | 0.10        | 0.00      | U. I            | 001                 | Only Proprie                                 |
| MP1030    | MP1030       | 10/4/2016   | HHA       |           | outfall            | 24                  | corrugated metal      | flowing        | 0.5        | free flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | n/a         | n/a       | n/a             | n/a                 | Only sampling OB for reassessment            |
| MP1030    | CB3          | 10/4/2016   | HHA       |           | catchbasin         | n/a                 | n/a                   | flowing        | 0.5        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | n/a         | n/a       | n/a             | n/a                 | Only sampling OB for reassessment            |
| MP1040    | MP1040       | 6/15/2016   | ННА       | DCB       | outfall            | 24                  | corrugated metal      | drv            | n/a        | free flow     | none         | n/a        | n/a                                  | n/a                    | n/a                 | corrosion          | none                 | negative          | n/a         | n/a       | n/a             | n/a                 | Mapped as CSO but appears to be sepa         |
|           | MD1050       | 6/16/2016   |           |           | outfall            | 24                  | corrugated motal      | dny            | nla        | froo flow     | nono         | nla        | nla                                  | nla                    | nla                 | corrocion          | nono                 | nogativo          | n/a         | n/a       | n/a             | n/a                 | Outfall poor MDE00: cound checked to C       |
| IVIP 1050 | IVIP 1050    | 0/15/2010   | ННА       | DCB       | ouliali            | 24                  | confugated metal      | ury            | N/a        | free now      | none         | 11/a       | 1//2                                 | N/a                    | 1/a                 | CONOSION           | none                 | negative          | n/a         | n/a       | n/a             | n/a                 | Outial near MP540; Sound Checked to C        |
| MP1060    | MP1060       | 6/15/2016   | HHA       | DCB       | CSO outfall        | 18                  | concrete              | dry            | n/a        | free flow     | none         | n/a        | n/a                                  | toilet paper and feces | paper waste         |                    | partially obstructed | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1070    | MP1070       | 6/15/2016   | HHA       | DCB       | outfall            | 12                  | corrugated metal      | dry            | n/a        | free flow     | none         | n/a        | n/a                                  | n/a                    | n/a                 | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 | Outfall not mapped; observed near CSO        |
| MP1080    | MP1080       | 6/15/2016   | ННА       | DCB       | CSO outfall        | 18                  | corrugated metal      | drv            | n/a        | free flow     | none         | n/a        | n/a                                  | n/a                    | n/a                 | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
|           | MD1000       | (/15/2010   |           |           | outfall            | 24                  | confugated metal      | dry            | nla        | free flow     | nono         |            | nia                                  | nla                    | nla                 | none               | none                 | nla               | n/a         | n/a       | n/a             | n/a                 |                                              |
| IVIP 1090 | IVIP 1090    | 0/15/2010   | ННА       | DCR       | outiali            | 24                  | corrugated metal      | ary            | n/a        | free now      | none         | 11/a       | 1//2                                 | 11/a                   | 11/a                | none               | none                 | 11/a              | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1100    | MP1100       | 6/15/2016   | HHA       | DCB       | outfall            | 12                  | smooth plastic        | dry            | n/a        | free flow     | none         | n/a        | n/a                                  | n/a                    | n/a                 | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1110    | MP1110       | 6/15/2016   | HHA       | DCB       | outlet with n      | n n/a               | n/a                   | drv            | n/a        | n/a           | none         | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Large square outlet with no pipe             |
| MD1120    | MD1120       | 6/15/2016   | ннл       |           | outfall            | 2/                  | concrete              | dry            | n/a        | froo flow     | nono         | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
|           |              | 0/13/2010   | TITIA     | DCD       | outiali            | 24                  |                       | ury            | 11/a       | ITEE IIUW     |              | 11/d       |                                      | II/a                   | 11/d                | 11/d               | 11/a                 | 11/a              | n/a         | 11/a      | n/a             | 11/a                |                                              |
| MP1130    | MP1130       | 6/23/2016   | HHA       |           | outfall            | 12                  | corrugated plastic    | dry            | n/a        | n/a           | none         | n/a        | dry, no odor                         | none                   | none                | none               | partially obstructed | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1140    | MP1140       | 6/23/2016   | HHA       |           | outfall            | 6                   | corrugated metal      | flowing        | 0.25       | free flow     | none         | n/a        | suds, no odor                        | suds                   | none                | none               | none                 | n/a               | 0.30        | 0.07      | 0.0             | 1050                | Owner of Compost Co. requests we cont        |
| MP1150    | MP1150       | 6/23/2016   | ННΔ       |           | unknown            | n/a                 | n/a                   | n/a            | n/a        | n/a           | n/a          | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Could not locate outfall. Assessed at firs   |
|           |              | (122/2010   |           |           |                    | 1//4                | nia<br>               | fly a          | 0.5        | 11/u          | n/a          |            |                                      | 178                    | 11/a                | 11/4               | 11/0                 |                   | 0.00        | 1//4      | 0.1             | 11/4                |                                              |
| MPT160    | MPT160       | 6/23/2016   | HHA       |           | outfall            | 36                  | corrugated metal      | flowing        | 0.5        | tree flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.02      | 0.1             | 604                 |                                              |
| MP1170    | MP1170       | 6/23/2016   | HHA       |           | outfall            | 12                  | corrugated metal      | dry            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1180    | MP1180       | 6/23/2016   | ННА       |           | outfall            | 12                  | corrugated plastic    | drv            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MD1100    | MD1100       | 6/28/2016   | ЦЦА       |           | outfall            | 24                  | corrugated motal      | dry            | n/a        | froo flow     | nono         | n/a        | dry no odor                          | nono                   | nono                | corrosion          | nono                 | n/a               | n/a         | n/a       | n/a             | n/a                 | Pine centerline rusted out                   |
| IVIE 1190 |              | 0/20/2010   | ппа       |           | outiali            | 24                  | confugated metal      | ury            | 11/a       | ilee ilow     | nune         | 1Wa        | ury, no ouor                         | none                   | none                | CUTUSIUI           | none                 | ıı/a              | n/a         | 11/a      | n/a             | 11/a                |                                              |
| MP1200    | MP1200       | 6/28/2016   | HHA       |           | unknown            | n/a                 | n/a                   | n/a            | n/a        | n/a           | n/a          | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Could not locate outfall or any inlet to sys |
| MP1210    | MP1210       | 6/28/2016   | HHA       |           | outfall            | 24                  | corrugated metal      | dry            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | corrosion          | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 | Pipe centerline rusted out                   |
| MP1220    | MP1220       | 6/28/2016   | ННА       |           | outfall            | 24                  | corrugated metal      | drv            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | corrosion          | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 | Pipe centerline rusted out                   |
|           | MD1240       | 7/20/2010   |           |           | outfall            | 10                  | eonorata              | flowing        | 0.05       | free flow     | nono         | nla        | alger no oder                        | nono                   | none                | nono               | none                 | nla               | 0.10        | 0.01      | 0.1             | (20                 |                                              |
| IVIP1240  | IVIP1240     | //20/2010   | ппа       |           | outiali            | 10                  | concrete              | nowing         | 0.20       | liee liow     | none         | 11/d       |                                      | попе                   | TIONE               | TIONE              | none                 | II/d              | 0.10        | 0.01      | 0.1             | 028                 |                                              |
| MP1250    | MP1250       | 6/28/2016   | HHA       |           | outfall            | 12                  | concrete              | dry            | n/a        | free flow     | none         | n/a        | dry, no odor                         | none                   | none                | none               | none                 | negative          | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1260    | MP1260       | 6/28/2016   | HHA       |           | outfall            | 32                  | corrugated plastic    | flowing        | 0.5        | free flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.10        | 0.02      | 0.1             | 1441                |                                              |
| MD1260    | MD1260       | 7/20/2016   | ннλ       |           | outfall            | 30                  | corrugated plastic    | flowing        | 05         | froe flow     | nono         | n/a        | clear, no odor                       | none                   | nono                | nono               | nono                 | n/a               | 0.10        | 0.03      | 0.0             | 1011                |                                              |
|           | CD1          | 7/20/2010   |           |           | ootobbool          | 52                  | n/o                   | flowing        | <br>n/-    | nlo           | n/n          | n/a        | cloar no odor                        | n/o                    | n/o                 | n/o                | n/a                  | nogativo          | 0.10        | 0.00      | 0.0             | 1011                |                                              |
| IVIP1200  | CBI          | //20/2016   | ННА       |           | calcinoasin        | n/a                 | 11/a                  | nowing         | n/a        | n/a           | II/d         | 11/a       |                                      | 11/a                   | 11/a                | n/a                | 11/a                 | negative          | 0.20        | 0.03      | 0.0             | 1259                |                                              |
| MP1260    | CB2          | 7/20/2016   | HHA       |           | catchbasin         | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | WW odor, clear                       | none                   | none                | none               | none                 | negative          | 0.25        | 0.03      | 0.0             | 1622                |                                              |
| MP1260    | CB3          | 7/20/2016   | HHA       |           | catchbasin         | n/a                 | n/a                   | flowina        | n/a        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.25        | 0.02      | 0.0             | 1716                |                                              |
| MP1270    | MP1270       | 6/28/2016   | ΗΗΛ       |           | outfall            | 24                  | concrete              | drv            | n/a        | free flow     | none         | n/a        | dry no odor                          | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/2                 |                                              |
| MD1000    |              | 6/20/2010   | 1 11 1 4  |           | م. بلا <u>ج</u> ال | 40                  | compared at all all   |                | nla        | frace         |              | nlo        | dru                                  |                        |                     | nono               | nono                 | nlo               | ni d        | -/-       |                 |                     | Difficult to popped because the second       |
| IVIP1280  | IVIP 1280    | 0/28/2016   | ННА       |           | outiall            | 12                  | corrugated plastic    | ury            | 11/2       | nee now       | none         | 11/d       | uly                                  | none                   | none                | попе               | none                 | 11/d              | n/a         | n/a       | n/a             | n/a                 | Dimult to access because of tall retaining   |
| MP1290    | MP1290       | 6/28/2016   | HHA       |           | CSO outfall        | 18                  | corrugated metal      | dry            | n/a        | free flow     | none         | n/a        | dry, WW odor                         | none                   | none                | corrosion          | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1300    | MP1300       | 7/1/2016    | HHA       | DCB       | outfall            | n/a                 | n/a                   | n/a            | n/a        | free flow     | n/a          | n/a        | n/a                                  | n/a                    | n/a                 | n/a                | n/a                  | n/a               | n/a         | n/a       | n/a             | n/a                 | Could not locate, nearest CB (drv) is actu   |
| MP1310    | MP1310       | 7/1/2016    | ΗΗΛ       |           | outfall            | 24                  | concrete              | flowing        | በ 5        | free flow     | none         | n/a        | clear no odor                        | none                   | none                | none               | none                 | negative          | 0.10        | 0 02      | 0.0             | 1200                |                                              |
|           |              |             |           |           |                    | ∠4<br>,             |                       | nowing<br>a    | U.J        |               |              | a          |                                      |                        |                     |                    |                      | negative          | 0.10        | 0.0Z      | 0.0             | 4200<br>,           |                                              |
| WP1310    | CR5          | //1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | ary            | n/a        | n/a           | n/a          | 11/8       | 11/a                                 | n/a                    | n/a                 | n/a                | n/a                  | negative          | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1310    | CB3          | 7/1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | wet (no flow)  | n/a        | n/a           | n/a          | n/a        | WW odor                              | none                   | none                | none               | none                 | indeterminate     | 0.50        | n/a       | n/a             | n/a                 |                                              |
| MP1310    | CB5-Pine B   | 7/1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | n/a         | n/a       | n/a             | 5400                |                                              |
| MD1210    | (RQ          | 7/1/2014    | ЦЦ Л      |           | catchhaoin         | nlo                 | n/a                   | flowing        | n/s        | n/a           | n/a          | n/a        | clear no odor                        | nono                   | nono                | nono               | none                 | negativo          | n/o         | n/o       | nla             | E100                |                                              |
|           |              |             |           |           |                    | 11/d                | 11/a<br>m/-           | nowing<br>a    | /          | n/a<br>/-     | ninu<br>mala | nua<br>n/a |                                      |                        |                     |                    |                      | negative          | 11/0        | ıı/a      | 11/d            | J17U                |                                              |
| WP1310    | світ-Ріре А  | //1/2016    | HHA       | DCR       | catendasin         | n/a                 | U//a                  | nowing         | n/a        | 11/a          | n//a         | II/d       |                                      | none                   | none                | none               | none                 | negative          | 0.50        | n/a       | n/a             | n/a                 |                                              |
| MP1310    | CB13         | 7/1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | trickling      | n/a        | n/a           | n/a          | n/a        | clear, WW odor                       | none                   | none                | none               | none                 | negative          | 2.0         | n/a       | n/a             | n/a                 |                                              |
| MP1310    | MP1310       | 9/11/2017   | BAM       |           | outfall            | 24                  | concrete              | trickling      | n/a        | free flow     | none         | n/a        | n/a                                  | none                   | none                | none               | none                 | n/a               | n/a         | n/a       | n/a             | n/a                 |                                              |
| MD1010    | CB3          | 0/01/0017   | DVV       |           | catchhaola         | n/c                 | nla                   | flowing        | nla        | n/2           | n/2          | n/a        | cloudy MM odor                       | nono                   | nono                | nono               | nono                 | n/a               | 0.75        | n/o       | nla             | nla                 |                                              |
| IVIT 1310 |              | 712112011   | DAIVI     |           | Calcinnasin        | 11/a                | ıva                   | nowing         | 11/d       | 11/d          | 11/d         | ina ,      |                                      | none                   | HUHE                | HUHE               | IUIR                 | ıı/d              | U./D        | ۵/۱۱<br>۲ | 6/11            | 11/a                |                                              |
| MP1310    | CB10         | 9/21/2017   | BAM       |           | catchbasin         | n/a                 | n/a                   | wet (no flow)  | n/a        | n/a           | n/a          | n/a        | clear, WW/ammonia odor, suds         | suds                   | none                | none               | none                 | n/a               | 1.0         | n/a       | n/a             | n/a                 | Suds appearing to originate from Pipe C      |
| MP1310    | CB11         | 9/21/2017   | BAM       |           | catchbasin         | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | n/a               | 0.15        | n/a       | n/a             | n/a                 | Flow into CB11 from Pipe B                   |
| MD1300    | MD1300       | 7/1/2014    | ΗΠν       | ΠΓΡ       | outfall            | 24                  | concrete              | flowing        | በ ንፍ       | free flow     | n/a          | n/a        | clear no odor                        | none                   | none                | none               | none                 | negative          | 0.00        | 0 03      | 0.0             | 1100                | r * =                                        |
|           |              |             | 1111A     |           |                    | ۲ <del>4</del><br>, | n/a                   | telalit        | U.ZJ       |               | niu          | nia        |                                      | nono                   | none                | none               | none                 | nogulivo          | 0.00        | 0.00      | 0.0             | 1107                |                                              |
| MP1320    | СВА          | //1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | trickling      | n/a        | n/a           | n/a          | п/а        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.02      | 0.0             | 1120                | СВА-bibe A trickling, СВА-bibe B dribbing    |
| MP1320    | MH1          | 7/1/2016    | HHA       | DCB       | manhole            | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.01      | 0.0             | 1100                |                                              |
| MP1330    | MP1330       | 7/1/2016    | ННА       | DCB       | outfall            | 24                  | concrete              | trickling      | 0.1        | free flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.02      | 0.2             | 171                 | Map inaccurate, only CB and outfall in th    |
| MD1000    | CB3          | 7/1/2014    | ШЦА       |           | catchhaola         | n/c                 | nla                   | dry            | nla        | n/2           | n/2          | n/a        | dry no odor                          | nono                   | nono                | nono               | nono                 | n/a               | nlo         | nlo       | nla             | nla                 | l argo motal gato in structure               |
| 10171330  |              | 111/2010    | пнА       | DCR       | Calcinnasin        | n/a                 | II/d                  | ury            | 11/d       | 11/d          | ıı/d         | ıwa        | ury, no ouor                         | none                   | HUHE                | HUHE               | IUIR                 | 11/d              | ıı/d        | b/ii      | 6/11            | 11/2                | Larye metaryate in structure                 |
| MP1340    | MP1340       | //1/2016    | HHA       | DCB       | outfall            | 24                  | corrugated metal      | flowing        | 0.5        | tree flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.01      | 0.0             | 1294                |                                              |
| MP1340    | CB6          | 7/1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.00      | 0.0             | 670                 |                                              |
| MP1340    | CB8          | 7/1/2016    | НΗΔ       | DCB       | catchhasin         | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | clear, no odor                       | none                   | none                | none               | none                 | negative          | 0.00        | 0.02      | 0 1             | n/a                 |                                              |
|           | 000          | 7/1/2010    |           |           |                    | - /-                | nlo                   | flowing        | nla        | nla           | nla          | nlo        | cloar no odor                        | nono                   | nono                | nono               | nono                 | nogativo          | 0.00<br>plc | 0.02      | 0.1<br>m/s      | п/а<br>г 40         | Flow coming from up lighten 1                |
| IVIP 1350 |              | //1/2016    | HHA       | DCR       | calchoasin         | n/a                 | ıı/a                  | nowing         | 11/d       | 11/d          | 11/d         | ing .      |                                      | none                   | none                | попе               | IIUIIE               | negative          | 6/II        | 0.26      | n/a             | 540                 | Flow conting from up Highland AVe.           |
| MP1350    | CB23         | 7/1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | no flow        | n/a        | n/a           | n/a          | n/a        | n/a                                  | none                   | none                | none               | none                 | n/a               | n/a         | 0.19      | n/a             | n/a                 | No flow from upper block on Wilson Stre      |
| MP1350    | CB24         | 7/1/2016    | HHA       | DCB       | catchbasin         | n/a                 | n/a                   | flowing        | n/a        | n/a           | n/a          | n/a        | WW odor, brownish color              | none                   | none                | none               | none                 | negative          | 1.0         | 0.00      | n/a             | n/a                 |                                              |
| MP1350    | CB26         | 7/1/2016    | НΗΔ       |           | catchhasin         | n/a                 | n/a                   | wet (no flow)  | n/a        | n/a           | n/a          | n/a        | WW odor toilet naner seware          | Sewade                 | none                | none               | none                 | positive (strong) | 2.0         | n/a       | n/a             | n/a                 |                                              |
| MD12E0    | CD21         | 7/1/2010    |           |           | catchhaoin         | n/a                 | n/2                   | wot (no flow)  | nlo        | n/o           | n/a          | n/a        | cloar no odor                        | nono                   | nono                | nono               | nono                 | pogativo          | nlo         | nlo       | n/o             | nla                 |                                              |
| IVIP 1350 | CB31         | //1/2016    | HHA       | DCR       | calcindasin        | n/a                 | Б/Л                   | wei (no now)   | 11/2       | 11/d          | ıı/d         | ıı/d       |                                      | попе                   | none                | попе               | none                 | negative          | n/a         | n/a       | n/a             | n/a                 |                                              |
| MP1350    | MP1350       | //12/2016   | HHA       | BAM       | outtall            | 48                  | corrugated metal      | flowing        | 0.5        | tree flow     | none         | n/a        | clear, no odor                       | none                   | none                | none               | none                 | positive          | 0.10        | 0.00      | 0.1             | 645                 |                                              |
|           |              |             |           |           |                    |                     |                       |                |            |               |              |            |                                      |                        |                     |                    |                      |                   |             |           |                 |                     |                                              |

yellow-green sludgy material; could not set OB pad because pool was deep

Assessed at first upstream CB

Assessed at first upstream CB

ssessment issessment bears to be separate storm, CB1 through CB3 connected and checked to CBs near Bailey Ave. intersection

rved near CSO outfall

equests we contact before visiting (very unfriendly) Assessed at first upstream CB

r any inlet to system

se of tall retaining wall, viewed with binoculars from railroad bridge

t CB (dry) is actually culvert inlet

ate from Pipe C; pipe crossing within CB В

-pipe B dripping

and outfall in the vicinity ure

hland Ave. on Wilson Street

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                  |                        |                |                |                          |                     |                               | Dry,<br>Wet (no flow),   |                     |                             |                    |                              |                                             |                                   |                        |                             |                              |                 |                   |                    | MBAS detergents     | Sp.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | System ID        | Structure ID     | Date assessed          | Inspector<br>1 | Inspector<br>2 | Structure                | Pipe diam.<br>(in.) | Pipe material                 | Dripping, or<br>Flowing? | Flow depth<br>(in.) | Pipe position Ero           | e<br>E<br>Dision d | Erosion<br>lescription       | Discharge<br>characteristics                | Floatables                        | Deposits/<br>Stains    | Damage                      | Obstructions                 | OB Result       | Ammonia<br>(mg/L) | Chlorine<br>(mg/L) | Corrected<br>(mg/L) | conductance<br>(µs/cm) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MP1350           | CB13             | 7/12/2016              |                | BAM            | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a<br>Na                    | clear, no odor                              | none                              | none                   | none                        | none                         | negative        | 0.25              | 0.05               | 0.0                 | 790<br>667             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No.         No. <td>MP1350<br/>MP1350</td> <td>CB20<br/>CB22</td> <td>8/25/2017</td> <td>BAM</td> <td>DAIVI</td> <td>catchbasin</td> <td>n/a</td> <td>n/a</td> <td>flowing</td> <td>n/a</td> <td>n/a n/a</td> <td>a i<br/>a r</td> <td>n/a</td> <td>clear, no odor</td> <td>none</td> <td>none</td> <td>none</td> <td>none</td> <td>n/a</td> <td>n/a</td> <td>0.01</td> <td>0.0<br/>n/a</td> <td>n/a</td> <td></td>                                                                                                                                                                                                                               | MP1350<br>MP1350 | CB20<br>CB22     | 8/25/2017              | BAM            | DAIVI          | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a i<br>a r         | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | n/a             | n/a               | 0.01               | 0.0<br>n/a          | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| M M M M M M M M M M M M M M M M M M M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MP1360           | MP1360           | 7/12/2016              | HHA            | BAM            | outfall                  | 36                  | corrugated metal              | trickling                | n/a                 | free flow no                | one r              | n/a                          | clear, no odor                              | none                              | none                   | heavily corroded            | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    | Could not sample; pipe rus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Math                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MP1360<br>MP1360 | CB1-Pipe A       | 7/12/2016<br>7/12/2016 | ΗΗΑ<br>ΗΗΔ     | BAM<br>Bam     | catchbasin<br>catchbasin | n/a<br>n/a          | n/a<br>n/a                    | flowing                  | n/a<br>n/a          | n/a n/a<br>n/a n/a          | ar<br>ar           | 1/a<br>1/a                   | clear, no odor<br>clear, no odor            | none                              | none                   | none                        | none                         | negative<br>n/a | 0.25<br>0.25      | 0.03               | 0.0<br>0.1          | 3720<br>1425           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No.         No. <td>MP1360</td> <td>MH1</td> <td>7/12/2016</td> <td>HHA</td> <td>BAM</td> <td>manhole</td> <td>n/a</td> <td>n/a</td> <td>flowing</td> <td>n/a</td> <td>n/a n/a</td> <td>a r</td> <td>n/a</td> <td>clear, no odor</td> <td>none</td> <td>none</td> <td>none</td> <td>none</td> <td>n/a</td> <td>0.23</td> <td>0.04</td> <td>0.0</td> <td>1728</td> <td>Sampled mostly from sum</td>                                                                                                                                                                                                                                                | MP1360           | MH1              | 7/12/2016              | HHA            | BAM            | manhole                  | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | n/a             | 0.23              | 0.04               | 0.0                 | 1728                   | Sampled mostly from sum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Math                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MP1360           | MP1360           | 10/4/2016              | HHA            |                | outfall                  | 36                  | corrugated metal              | trickling                | n/a                 | free flow no                | one r              | n/a                          | clear, no odor                              | none                              | none                   | heavily corroded            | none                         | n/a             | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MP1360           | CB1              | 10/6/2017<br>10/6/2017 | BAM            |                | catchbasin               | n/a                 | n/a                           | unknown                  | n/a<br>n/a          | n/a n/a                     | a r                | n/a                          | unknown                                     | unknown                           | unknown                | unknown                     | unknown                      | negative<br>n/a | n/a<br>0.05       | n/a                | n/a                 | n/a<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N N N N N N N N N N N N N N N N N N N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MP1360<br>MP1360 | CB2<br>CB3       | 10/6/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | unknown                  | n/a                 | n/a n/a                     | a r<br>a r         | n/a                          | unknown                                     | unknown                           | unknown                | unknown                     | unknown                      | n/a             | 0.05              | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D       D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MP1370           | MP1370           | 7/12/2016              | HHA            | BAM            | outfall                  | 24                  | corrugated black plast        | ticflowing               | 0.25                | free flow no                | one r              | n/a                          | clear, no odor                              | none                              | none                   | cracked                     | none                         | n/a             | 0.20              | 0.07               | 0.3                 | 3070                   | Stone tunnel leading back                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MP1370           | CB11             | 7/12/2016              | HHA            | BAM            | catchbasin               | n/a                 | n/a                           | flowing (very s          | lcn/a               | n/a n/a                     | a r                | n/a                          | sheen present, no odor                      | sheen                             | none                   | none                        | none                         | indeterminate   | 0.25              | 0.08               | 0.1                 | 1808                   | Sampled mostly from sump                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| C 10         C 10 <thc 10<="" th="">        C 10         C 10         C</thc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MP1370<br>MP1370 | CB12<br>CB13     | 10/5/2016              | нна<br>ННА     | DAIVI          | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a i<br>a r         | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | indeterminate   | 0.50              | 0.08               | 0.1                 | 293<br>3125            | Suus, sampieu irom sump                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Cont         Cont        Cont        Cont        Co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MP1370           | CB1              | 7/7/2017               | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | clear, faint laundry odor                   | none                              | none                   | none                        | none                         | positive (weak) | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Cond         Cond        Cond        Cond         C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MP1370           | CB11             | 7/7/2017               | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | indeterminate   | 0.20              | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Mode         Mode        Mode        Mode        M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | MP1370<br>MP1370 | CB12<br>CB13     | ////2017<br>7/7/2017   | BAM            |                | catchbasin               | n/a<br>n/a          | n/a<br>n/a                    | Wet (no flow)<br>flowing | n/a<br>n/a          | n/a n/a<br>n/a n/a          | ar<br>ar           | 1/a<br>1/a                   | cloudy, no odor<br>clear, no odor           | none                              | none                   | none                        | none                         | negative        | 0.20              | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No. <td>MP1370</td> <td>MH1</td> <td>7/7/2017</td> <td>BAM</td> <td></td> <td>catchbasin</td> <td>n/a</td> <td>n/a</td> <td>flowing</td> <td>n/a</td> <td>n/a n/a</td> <td>a r</td> <td>n/a</td> <td>clear, faint laundry odor</td> <td>none</td> <td>none</td> <td>none</td> <td>none</td> <td>positive (weak)</td> <td>0.20</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MP1370           | MH1              | 7/7/2017               | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | clear, faint laundry odor                   | none                              | none                   | none                        | none                         | positive (weak) | 0.20              | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PM         PM        PM        PM        PM        PM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MP1370           | MH3              | 7/7/2017               | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | clear, faint laundry odor                   | none                              | none                   | none                        | none                         | n/a             | 0.20              | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PFD         O         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D         D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MP1370           | CB11             | 8/25/2017<br>9/25/2017 | BAM            |                | catchbasin               | n/a                 | n/a<br>n/a                    | flowing                  | n/a<br>n/a          | n/a n/a                     | a r                | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 111 <td>MP1370<br/>MP1370</td> <td>CB12<br/>CB13</td> <td>8/25/2017</td> <td>BAM</td> <td></td> <td>catchbasin</td> <td>n/a</td> <td>n/a</td> <td>flowing</td> <td>n/a</td> <td>n/a n/a</td> <td>a i<br/>a r</td> <td>n/a</td> <td>clear, no odor</td> <td>none</td> <td>none</td> <td>none</td> <td>none</td> <td>negative</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MP1370<br>MP1370 | CB12<br>CB13     | 8/25/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a i<br>a r         | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MP1370           | CB14             | 8/25/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | cloudy, sheen, suds, no odor                | sheen, suds                       | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Phile         Phile <th< td=""><td>MP1370</td><td>CB15</td><td>8/25/2017</td><td>BAM</td><td></td><td>catchbasin</td><td>n/a</td><td>n/a</td><td>wet (no flow)</td><td>n/a</td><td>n/a n/a</td><td>a r</td><td>n/a</td><td>cloudy, faint ammonia odor</td><td>cloudy</td><td>none</td><td>none</td><td>none</td><td>negative</td><td>0.80</td><td>0.00</td><td>0.1</td><td>531</td><td>Homeowner on Wilder mei</td></th<>                                                                                                                                                         | MP1370           | CB15             | 8/25/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | wet (no flow)            | n/a                 | n/a n/a                     | a r                | n/a                          | cloudy, faint ammonia odor                  | cloudy                            | none                   | none                        | none                         | negative        | 0.80              | 0.00               | 0.1                 | 531                    | Homeowner on Wilder mei                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MP1370<br>MP1370 | CB16<br>CB17     | 8/25/2017<br>8/25/2017 | BAM            |                | catchbasin               | n/a<br>n/a          | n/a<br>n/a                    | tiowing<br>wet (no flow) | n/a<br>n/a          | n/a n/a<br>n/a n/a          | ar<br>ar           | n/a<br>n/a                   | clear, no odor<br>cloudy faint ammonia odor | ciouay                            | none                   | none                        | none                         | negative        | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ADD MAD <td>MP1370</td> <td>CB18</td> <td>8/25/2017</td> <td>BAM</td> <td></td> <td>catchbasin</td> <td>n/a</td> <td>n/a</td> <td>wet (no flow)</td> <td>n/a</td> <td>n/a n/a</td> <td>a r</td> <td>n/a</td> <td>cloudy, faint WW odor, looks like greywater</td> <td>cloudy</td> <td>none</td> <td>none</td> <td>none</td> <td>negative</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MP1370           | CB18             | 8/25/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | wet (no flow)            | n/a                 | n/a n/a                     | a r                | n/a                          | cloudy, faint WW odor, looks like greywater | cloudy                            | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Dist         Dist <th< td=""><td>MP1370</td><td>CB19</td><td>8/25/2017</td><td>BAM</td><td></td><td>catchbasin</td><td>n/a</td><td>n/a</td><td>dry</td><td>n/a</td><td>n/a n/a</td><td>a r</td><td>n/a</td><td>clear, faint WW odor</td><td>cloudy</td><td>none</td><td>none</td><td>none</td><td>negative</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></th<>                                                                                                                                                                                                                                      | MP1370           | CB19             | 8/25/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | dry                      | n/a                 | n/a n/a                     | a r                | n/a                          | clear, faint WW odor                        | cloudy                            | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No.Po         No.Po <t< td=""><td>MP1370</td><td>MH1<br/>MH2</td><td>8/25/2017<br/>9/25/2017</td><td>BAM</td><td></td><td>catchbasin</td><td>n/a</td><td>n/a</td><td>flowing</td><td>n/a<br/>n/a</td><td>n/a n/a</td><td>a r</td><td>n/a</td><td>clear, no odor</td><td>none</td><td>none</td><td>none</td><td>none</td><td>positive (weak)</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a<br/>n/a</td><td>Only flowing pipe is Dipe A</td></t<>                                                                                                                                 | MP1370           | MH1<br>MH2       | 8/25/2017<br>9/25/2017 | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a<br>n/a          | n/a n/a                     | a r                | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | positive (weak) | n/a               | n/a                | n/a                 | n/a<br>n/a             | Only flowing pipe is Dipe A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MP1370<br>MP1370 | CB11             | 9/21/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a i<br>a r         | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    | Only nowing pipe is Fipe A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| NIDE         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O         O        O         O         O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MP1370           | CB12             | 9/21/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | wet (no flow)            | n/a                 | n/a n/a                     | a r                | n/a                          | cloudy, no odor                             | sheen                             | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| District                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MP1370           | MH3              | 9/21/2017              | BAM            |                | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | clear, no odor                              | none                              | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Initial         Allow         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MP1380<br>MP1390 | MP1380<br>MP1390 | 7/12/2016              | нна<br>ННА     | BAIM           | outfall                  | 24<br>36            | concrete                      | flowing                  | n/a<br>0.5          | free flow no                | one r              | n/a<br>n/a                   | NO ODOR<br>WW odor (CSO outfall) clear      | none                              | none                   | none                        | none                         | n/a<br>positive | n/a<br>0.10       | n/a<br>0.02        | n/a<br>0.0          | n/a<br>968             | Posted as CSO outfall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Martial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MP1390           | MP1390           | 8/4/2016               | HHA            |                | outfall                  | 36                  | concrete                      | flowing                  | 0.5                 | free flow no                | one r              | n/a                          | WW odor (CSO outfall), clear                | none                              | none                   | none                        | none                         | positive        | n/a               | n/a                | n/a                 | n/a                    | Posted as CSO outfall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Name         Name        Name        Name         N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MPF010           | CB1              | 7/22/16                | SW             | GP             | catchbasin               | n/a                 | n/a                           | dry                      | n/a                 | n/a n/a                     | a r                | n/a                          | n/a                                         | n/a                               | n/a                    | n/a                         | n/a                          | n/a             | n/a               | n/a                | n/a                 | n/a                    | Could not find outfall amor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| NIME         NIME        NIME        NIME        NI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MPF020           | MPF020           | 7/22/16                | SW             | GP<br>GP       | outfall                  | 13                  | corrugated metal              | wet (no flow)<br>dry     | n/a<br>n/a          | froo flow                   | one r              | 1/a<br>2/2                   | clear, no odor                              | none<br>n/a                       | fine sediment          | none                        | partially obstructed         | negative        | n/a               | n/a                | n/a                 | n/a<br>n/a             | 1/3 full of sediment, standi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MEME MEV Visite Visite<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MPF040           | MPF040           | 7/22/16                | SW             | GP             | outfall                  | n/a                 | n/a                           | n/a                      | n/a                 | n/a n/a                     | a r                | n/a                          | n/a                                         | n/a                               | n/a                    | n/a                         | n/a                          | n/a             | n/a               | n/a                | n/a                 | n/a                    | Could not find outfall amor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 01750         01750         021         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5         0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MPF050           | MPF050           | 7/22/16                | SW             | GP             | outfall                  | 12                  | smooth plastic                | dry                      | n/a                 | free flow ye                | es i               | ncision forming              | n/a                                         | none                              | none                   | none                        | none                         | n/a             | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Priory         Priory<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MPF060           | MPF060           | 7/22/16                | SW             | GP             | outfall                  | unknowr             | n smooth plastic              | wet (no flow)            | n/a                 | free flow no                | one r              | n/a                          | no odor                                     | none                              | sediment               | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    | Area around outfall is inco                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1919         Market         No         No        No       No         No </td <td>MPF070<br/>MPF080</td> <td>MPF070<br/>MPF080</td> <td>7/22/16</td> <td>SW</td> <td>GP<br/>GP</td> <td>outfall</td> <td>n/a<br/>23</td> <td>n/a<br/>corrugated black plast</td> <td>ticwet (no flow)</td> <td>n/a<br/>n/a</td> <td>n/a n/a<br/>partially sut no</td> <td>a r<br/>one r</td> <td>n/a<br/>n/a</td> <td>n/a<br/>no odor</td> <td>n/a<br/>none</td> <td>n/a<br/>sediment</td> <td>n/a<br/>none</td> <td>n/a<br/>partially obstructed</td> <td>n/a<br/>negative</td> <td>n/a<br/>n/a</td> <td>n/a<br/>n/a</td> <td>n/a<br/>n/a</td> <td>n/a<br/>n/a</td> <td>Area around outial is inact</td>                                                         | MPF070<br>MPF080 | MPF070<br>MPF080 | 7/22/16                | SW             | GP<br>GP       | outfall                  | n/a<br>23           | n/a<br>corrugated black plast | ticwet (no flow)         | n/a<br>n/a          | n/a n/a<br>partially sut no | a r<br>one r       | n/a<br>n/a                   | n/a<br>no odor                              | n/a<br>none                       | n/a<br>sediment        | n/a<br>none                 | n/a<br>partially obstructed  | n/a<br>negative | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             | Area around outial is inact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VATIM         VATIM        VATIM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MPF090           | MPF090           | 7/22/16                | SW             | GP             | outfall                  | n/a                 | n/a                           | n/a                      | n/a                 | n/a n/a                     | a r                | n/a                          | n/a                                         | n/a                               | n/a                    | n/a                         | n/a                          | n/a             | n/a               | n/a                | n/a                 | n/a                    | Could not access outfall, h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Alt 10         Oli 10<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MPF100           | MPF100           | 7/22/16                | SW             | GP             | outfall                  | 17                  | corrugated black plas         | ticflowing               | 0.25                | partially sut no            | one r              | n/a                          | n/a                                         | oily sheen                        | algae                  | none                        | none                         | negative        | 0.3               | 0.00               | 0.0                 | 266                    | Oily sheen observed again                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Initial         Marka         Marka        <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MPF100<br>MPF110 | MPF100<br>MPF110 | 10/5/16<br>7/22/16     | HHA<br>SW/     | GP             | outfall                  | 17<br>8             | corrugated black plast        | tictiowing<br>ticdry     | n/a                 | free flow no                | one r              | 1/a<br>1/a                   | clear, no odor<br>n/a                       | none                              | none<br>sediment       | none                        | none<br>partially obstructed | n/a<br>n/a      | 0.0<br>n/a        | 0.00<br>n/a        | 0.1<br>n/a          | 234<br>n/a             | Did not observe oily sheen<br>25% filled with sediment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MPT2 MPT3 <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MPF120           | MPF120           | 7/22/16                | SW             | GP             | outfall                  | 17                  | corrugated black plast        | ticwet (no flow)         | n/a                 | free flow no                | one r              | n/a                          | n/a                                         | none                              | sediment               | none                        | partially obstructed         | n/a             | n/a               | n/a                | n/a                 | n/a                    | Next to another outfall map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| hit Pic         Mit Pic         Cond         Cond        Cond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MPF130           | MPF130           | 7/22/16                | SW             | GP             | outfall                  | 18                  | corrugated black plast        | ticwet (no flow)         | n/a                 | free flow ye                | es r               | minor                        | n/a                                         | none                              | none                   | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Name         Name <th< td=""><td>MPF140<br/>MPF150</td><td>MPF140<br/>MPF150</td><td>7/22/16<br/>7/22/16</td><td>SW</td><td>GP<br/>GP</td><td>outfall</td><td>6<br/>15</td><td>vitrified clay</td><td>dry<br/>ticwet (no flow)</td><td>n/a<br/>n/a</td><td>free flow ye</td><td>es s</td><td>small incision</td><td>n/a<br/>po odor</td><td>none<br/>oily spots in pool on 7/2</td><td>none<br/>Sediment</td><td>none</td><td>none<br/>partially obstructed</td><td>n/a<br/>negative</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>Top of outfall is bent such</td></th<> | MPF140<br>MPF150 | MPF140<br>MPF150 | 7/22/16<br>7/22/16     | SW             | GP<br>GP       | outfall                  | 6<br>15             | vitrified clay                | dry<br>ticwet (no flow)  | n/a<br>n/a          | free flow ye                | es s               | small incision               | n/a<br>po odor                              | none<br>oily spots in pool on 7/2 | none<br>Sediment       | none                        | none<br>partially obstructed | n/a<br>negative | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             | Top of outfall is bent such                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| MFP16 <td>MPF150</td> <td>MPF150</td> <td>10/5/16</td> <td>HHA</td> <td>01</td> <td>outfall</td> <td>15</td> <td>corrugated black plast</td> <td>ticwet (no flow)</td> <td>n/a</td> <td>free flow no</td> <td>one r</td> <td>n/a</td> <td>n/a</td> <td>none</td> <td>none</td> <td>crushed</td> <td>partially obstructed</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>Did not observe oily sheen</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MPF150           | MPF150           | 10/5/16                | HHA            | 01             | outfall                  | 15                  | corrugated black plast        | ticwet (no flow)         | n/a                 | free flow no                | one r              | n/a                          | n/a                                         | none                              | none                   | crushed                     | partially obstructed         | n/a             | n/a               | n/a                | n/a                 | n/a                    | Did not observe oily sheen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Marce       DS1       DS1 <th< td=""><td>MPF160</td><td>MPF160</td><td>7/22/16</td><td>SW</td><td>GP</td><td>outfall</td><td>12</td><td>corrugated black plast</td><td>tic dry</td><td>n/a</td><td>free flow no</td><td>one r</td><td>n/a</td><td>n/a</td><td>none</td><td>none</td><td>none</td><td>none</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></th<>                                                                                                                                                                                                                                                                                                                                                                       | MPF160           | MPF160           | 7/22/16                | SW             | GP             | outfall                  | 12                  | corrugated black plast        | tic dry                  | n/a                 | free flow no                | one r              | n/a                          | n/a                                         | none                              | none                   | none                        | none                         | n/a             | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MP110         MP110 <th< td=""><td>MPF170</td><td>CB1</td><td>7/22/16<br/>7/27/16</td><td>SW</td><td>GP<br/>GP</td><td>catchbasin</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>flowing</td><td>steady<br/>fast</td><td>n/a n/a</td><td>a r<br/>a r</td><td>1/a<br/>2/a</td><td>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>negative</td><td>0.3<br/>n/a</td><td>0.04<br/>n/a</td><td>0.7<br/>n/a</td><td>775<br/>n/a</td><td>Could not find outfall. Sam</td></th<>                                                            | MPF170           | CB1              | 7/22/16<br>7/27/16     | SW             | GP<br>GP       | catchbasin               | n/a<br>n/a          | n/a<br>n/a                    | flowing                  | steady<br>fast      | n/a n/a                     | a r<br>a r         | 1/a<br>2/a                   | n/a                                         | n/a<br>n/a                        | n/a<br>n/a             | n/a<br>n/a                  | n/a<br>n/a                   | negative        | 0.3<br>n/a        | 0.04<br>n/a        | 0.7<br>n/a          | 775<br>n/a             | Could not find outfall. Sam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| MP108         SP1         SP1         SP1         SP1         SP1         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N        N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N         N        N        N        N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MPF180           | MPF180           | 7/27/16                | SW             | GP             | outfall                  | 30                  | corrugated black plas         | ticdripping              | n/a                 | free flow no                | ne e               | eroded, but rip rapped below | no odor                                     | none                              | sediment               | none                        | partially obstructed         | negative        | n/a               | n/a                | n/a                 | n/a                    | flow is circumventing end of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MeH M MeH M Me M Me<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | MPF180           | CB1              | 7/27/16                | SW             | GP             | catchbasin               | n/a                 | n/a                           | flowing                  | n/a                 | n/a n/a                     | a r                | n/a                          | no odor                                     | n/a                               | n/a                    | n/a                         | n/a                          | negative        | 0.1               | 0.00               | 0.0                 | 382                    | , the second sec |
| marks         marks         mark         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MPF190           | MPF190           | 7/27/16                | SW             | GP             | outfall                  | n/a                 | n/a                           | n/a<br>n/a               | n/a                 | n/a n/a                     | a r                | n/a                          | n/a                                         | n/a                               | n/a                    | n/a                         | n/a                          | n/a             | n/a               | n/a                | n/a                 | n/a                    | Could not find outfall, prob                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MPF20         MT*20         VT/16         SW         CP         outility         No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MPF210           | MPF210           | 7/27/16                | SW             | GP             | outfall                  | 15                  | corrugated grey plasti        | ic wet (no flow)         | n/a                 | partially sut no            | one r              | "a<br>n/a                    | n/a                                         | particulate bits - algae?         | ? sediment             | none                        | partially obstructed         | negative        | n/a               | n/a                | n/a                 | n/a                    | 1/2 filled with sediment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MFP23         MFP32         MFP32 <th< td=""><td>MPF220</td><td>MPF220</td><td>7/27/16</td><td>SW</td><td>GP</td><td>outfall</td><td>8</td><td>smooth plastic</td><td>wet (no flow)</td><td>n/a</td><td>partially sut no</td><td>one r</td><td>n/a</td><td>n/a</td><td>none</td><td>sediment</td><td>none</td><td>partially obstructed</td><td>negative</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>1/2 filled with sediment</td></th<>                                                                                                                                             | MPF220           | MPF220           | 7/27/16                | SW             | GP             | outfall                  | 8                   | smooth plastic                | wet (no flow)            | n/a                 | partially sut no            | one r              | n/a                          | n/a                                         | none                              | sediment               | none                        | partially obstructed         | negative        | n/a               | n/a                | n/a                 | n/a                    | 1/2 filled with sediment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MPF240         MP720         MP20         MP20        MP20        MP20 <t< td=""><td>MPF230</td><td>MPF230</td><td>7/27/16</td><td>SW</td><td>GP</td><td>outfall</td><td>14</td><td>corrugated metal</td><td>dry</td><td>n/a</td><td>free flow no</td><td>one e</td><td>eroded, rip rapped below</td><td>n/a</td><td>none</td><td>none</td><td>corrosion</td><td>none</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td></td></t<>                                                                                                                                                                                                                    | MPF230           | MPF230           | 7/27/16                | SW             | GP             | outfall                  | 14                  | corrugated metal              | dry                      | n/a                 | free flow no                | one e              | eroded, rip rapped below     | n/a                                         | none                              | none                   | corrosion                   | none                         | n/a             | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MPF20       MP720       M72716       SW       GP       outfail       12       consigled metal       dry       na       free flow       no       na       na <th< td=""><td>MPF240<br/>MPF250</td><td>MPF240<br/>MPF250</td><td>7/27/16</td><td>SW<br/>SW</td><td>GP<br/>GP</td><td>outfall</td><td>unknowr</td><td>corrugated metal</td><td>ary<br/>wet (no flow)</td><td>n/a<br/>n/a</td><td>free flow no</td><td>one r<br/>one r</td><td>na<br/>n/a</td><td>n/a</td><td>none</td><td>iron staining or rus</td><td>st crushed (on top)</td><td>none</td><td>n/a<br/>negative</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td>n/a<br/>n/a</td><td></td></th<>                                                                                                                                                                                                                                                     | MPF240<br>MPF250 | MPF240<br>MPF250 | 7/27/16                | SW<br>SW       | GP<br>GP       | outfall                  | unknowr             | corrugated metal              | ary<br>wet (no flow)     | n/a<br>n/a          | free flow no                | one r<br>one r     | na<br>n/a                    | n/a                                         | none                              | iron staining or rus   | st crushed (on top)         | none                         | n/a<br>negative | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MPF270       77.71/6       SW       GP       outfal       12       orragate main                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | MPF260           | MPF260           | 7/27/16                | SW             | GP             | outfall                  | 12                  | corrugated metal              | dry                      | n/a                 | free flow no                | one r              | n/a                          | n/a                                         | none                              | none                   | none                        | none                         | n/a             | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MPP-280         V/2/16         SW         GP         utilit         15         corrugated metal         driping         n/a         n/a<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MPF270           | MPF270           | 7/27/16                | SW             | GP             | outfall                  | 12                  | corrugated metal              | dry                      | n/a                 | free flow no                | one r              | n/a                          | n/a                                         | none                              | sediment and leav      | ∕€none                      | none                         | n/a             | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| M1 F290         MF290         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MPF280           | MPF280<br>MPF290 | 7/27/16<br>7/27/16     | SW             | GP<br>GP       | outfall                  | 15<br>15            | corrugated metal              | dry<br>drinning          | n/a<br>n/a          | free flow no                | one r              | 1/a<br>proded but rin ranned | n/a                                         | none                              | sediment               | none<br>ia crushed (on ton) | none                         | n/a<br>negative | n/a<br>03         | n/a<br>0.46        | n/a<br>0.1          | n/a<br>462             | Swimming pool above                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| MPF290CB19/29/17BAMcatchbasinn/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MPF290           | MPF290           | 9/29/17                | BAM            |                | outfall                  | 15                  | corrugated metal              | dripping                 | n/a                 | free flow no                | one r              | 1/a                          | clear, no odor                              | none                              | none                   | crushed                     | none                         | n/a             | 0.0               | 0.90               | n/a                 | n/a                    | Summing hoor apore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MPF290       C82       9/29/7       BAM       catchbasin       n/a       n/a <td>MPF290</td> <td>CB1</td> <td>9/29/17</td> <td>BAM</td> <td></td> <td>catchbasin</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a n/a</td> <td>a r</td> <td>n/a</td> <td>ammonia odor in sample, not CB</td> <td>n/a</td> <td>none</td> <td>none</td> <td>none</td> <td>n/a</td> <td>0.3</td> <td>0.01</td> <td>n/a</td> <td>n/a</td> <td>Odor may just be grass de</td>                                                                                                                                                                                                                                                                                                                                | MPF290           | CB1              | 9/29/17                | BAM            |                | catchbasin               | n/a                 | n/a                           | n/a                      | n/a                 | n/a n/a                     | a r                | n/a                          | ammonia odor in sample, not CB              | n/a                               | none                   | none                        | none                         | n/a             | 0.3               | 0.01               | n/a                 | n/a                    | Odor may just be grass de                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Mirit Sol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MPF290           | CB2              | 9/29/17                | BAM            |                | catchbasin               | n/a                 | n/a                           | n/a<br>drinning          | n/a                 | n/a n/a                     | a r                | n/a<br>Na                    | ammonia odor in sample, not CB              | n/a                               | none                   | none                        | none                         | n/a             | 0.4               | 0.09               | n/a                 | n/a                    | Odor may just be grass de                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| MPF310MPF3108/4/16SWGPoutfall15corrugated metalvetn/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MPF300           | MPF300           | 10/5/16                | SVV<br>HHA     | GP             | outfall                  | 15<br>15            | smooth plastic                | dry                      | n/a                 | free flow no                | nne r<br>Dne r     | n/a                          | no odor                                     | n/a                               | n/a                    | n/a                         | n/a                          | negative<br>n/a | 0.5<br>n/a        | 0.04<br>n/a        | n/a                 | 209<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MP320       8/4/6       SW       GP       outfall       15       corrugate mate       wet (no flow)       n/a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MPF310           | MPF310           | 8/4/16                 | SW             | GP             | outfall                  | 15                  | corrugated metal              | dry                      | n/a                 | n/a no                      | one r              | n/a                          | n/a                                         | none                              | sediment               | none                        | fully obstructed             | negative        | n/a               | n/a                | n/a                 | n/a                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MPF 320 6B1 8/4 / 16 SW 6P catchoasin n/a   MPF 30 8/4 / 16 SW 6P outfall 10 smooth plastic wet (no flow) n/a   MPF 30 8/4 / 16 SW 6P outfall 10 smooth plastic wet (no flow) n/a   MPF 30 8/4 / 16 SW 6P outfall 15 corrugated black plastif lowing 0.25 fee flow none n/a n/a n/a n/a n/a n/a n/a n/a   MPF 30 8/4 / 16 SW 6P outfall 16 corrugated black plastif lowing 0.25 fee flow none n/a   MPF 30 8/4 / 16 SW 6P outfall n/a   MPF 30 8/4 / 16 SW 6P outfall 16 orrugated black plastif lowing n/a </td <td>MPF320</td> <td>MPF320</td> <td>8/4/16</td> <td>SW</td> <td>GP</td> <td>outfall</td> <td>15</td> <td>corrugated metal</td> <td>wet (no flow)</td> <td>n/a</td> <td>partially sut no</td> <td>one r</td> <td>n/a</td> <td>clear, no odor</td> <td>none</td> <td>sediment</td> <td>corrosion</td> <td>partially obstructed</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>Map is incorrect. Culvert of</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MPF320           | MPF320           | 8/4/16                 | SW             | GP             | outfall                  | 15                  | corrugated metal              | wet (no flow)            | n/a                 | partially sut no            | one r              | n/a                          | clear, no odor                              | none                              | sediment               | corrosion                   | partially obstructed         | n/a             | n/a               | n/a                | n/a                 | n/a                    | Map is incorrect. Culvert of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCORNARCO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MPF320<br>MPF330 | CB1<br>MDE330    | 8/4/16<br>8/4/16       | SW             | GP<br>GP       | catchbasin               | n/a<br>10           | N/a<br>smooth plastic         | NO TIOW<br>Wet (no flow) | n/a<br>n/a          | n/a n/a<br>free flow no     | a r<br>one r       | า/a<br>า/a                   | n/a<br>n/a                                  | n/a<br>none                       | n/a<br>grass leaves mu | n/a<br>d none               | n/a<br>none                  | negative        | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MPF350MPF3508/4/16SWGPoutfalln/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MPF340           | MPF340           | 8/4/16                 | SW             | GP             | outfall                  | 15                  | corrugated black plast        | ticflowing               | 0.25                | free flow no                | one r              | n/a                          | faint odor                                  | none                              | algae                  | none                        | none                         | negative        | 0.15              | 0.05               | 0.1                 | 920                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MPF 3608/4/16SWGPoutfall15corrugated black plastic drippingn/afree flow <none< th="">n/ano odorbrown particlesnonenonenonenegative0.150.230.11020MPF 360MPF 36010/5/16HHAoutfall15corrugated black plastic wet (no flow)n/afree flow<none< td="">n/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/an/a</none<></none<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MPF350           | MPF350           | 8/4/16                 | SW             | GP             | outfall                  | n/a                 | n/a                           | n/a                      | n/a                 | submerged n/a               | a r                | n/a                          | n/a                                         | n/a                               | n/a                    | n/a                         | n/a                          | n/a             | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall; en                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MPF370 8/4/16 SW GP outfall 18 corrugated black plastic wet (no flow) n/a partially sub none n/a n/a m/a n/a n/a n/a n/a n/a n/a n/a n/a n/a still wet on 8/10/16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MPF360<br>MPF360 | MPF360<br>MPF360 | 8/4/16<br>10/5/16      | SW<br>HHA      | GP             | outfall                  | 15<br>15            | corrugated black plast        | tic wet (no flow)        | n/a<br>n/a          | free flow no                | one r              | า/a<br>า/a                   | no odor                                     | brown particles                   | none                   | none                        | none                         | negative<br>n/a | 0.15<br>n/a       | 0.23<br>n/a        | 0.1<br>n/a          | 1020<br>n/a            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MPF370           | MPF370           | 8/4/16                 | SW             | GP             | outfall                  | 18                  | corrugated black plast        | ticwet (no flow)         | n/a                 | partially sut no            | one r              | n/a                          | no odor                                     | none                              | sediment               | none                        | none                         | negative        | n/a               | n/a                | n/a                 | n/a                    | Still wet on 8/10/16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

usted through and water trickling out 4-5 ft inside pipe

Imp; very slow flow to MH1 flow from pipe A

ck 20 ft to pipe; pipe is cracked and discharging a couple feet back into pipe ump; slow flow from incoming pipe

entioned an old clay sewer that was repaired three times; believes this has been replaced.

ong the tall grasses and weeds. CB1 was dry. ding water at outfall; 7/27/16: noticed some iron staining

ong debris and vegetation behind barber shop

ccessible, behind a tall fence on one side and the interstate on the other

high on steep hill along interstate in on 7/27/16

t; CB above completely clogged with leaves and sediment napped as previously assessed with no problems. Assessed the outfall on the left.

h that half of the opening is obstructed

mpled next upstream catchbasin (CB1).

d of pipe. Pipe end dripping, but flow below pipe is strong. Sampled CB1

bbably buried; inlet above was dry e WWTF

decomposing in basin decomposing in basin below than from pool area

outlet connects at CB, which outlets in ditch. Bottom of outfall pipe rusted through

empties into pond with fountain behind Westview Meadows, probably submerged

|                  |                  |                    |                |                |            |                    |                         | Dry,<br>Wet (no flow),       |                     |                  |                 |                                  |                                                |                      |                     |                            |                      |                        |                   | Λ                  | /BAS detergents     | Sp.                    |                                |
|------------------|------------------|--------------------|----------------|----------------|------------|--------------------|-------------------------|------------------------------|---------------------|------------------|-----------------|----------------------------------|------------------------------------------------|----------------------|---------------------|----------------------------|----------------------|------------------------|-------------------|--------------------|---------------------|------------------------|--------------------------------|
| System ID        | Structure ID     | Date assessed      | Inspector<br>1 | Inspector<br>2 | Structure  | Pipe diar<br>(in.) | n.<br>Pipe material     | Dripping, or<br>Flowing?     | Flow depth<br>(in.) | Pipe position    | Erosion         | Erosion<br>description           | Discharge<br>characteristics                   | Floatables           | Deposits/<br>Stains | Damage                     | Obstructions         | OB Result              | Ammonia<br>(mg/L) | Chlorine<br>(mg/L) | Corrected<br>(mg/L) | conductance<br>(µs/cm) | Comments                       |
| MPF380           | MPF380           | 8/4/16             | SW             | GP             | outfall    | 18                 | corrugated metal        | flowing                      | 0.125               | partially su     | ut none         | n/a                              | strong musty odor                              | none                 | sediment            | corrosion                  | none                 | negative               | n/a               | n/a                | n/a                 | n/a                    | Could not collect sample (to   |
| MPF390           | MPF390           | 8/4/16<br>9/4/16   | SW             | GP             | outfall    | 18                 | corrugated metal        | flowing                      | 3<br>unknown        | partially su     | ik none         | n/a                              | clear, no odor                                 | grass bits           | rust                | crushed                    | partially obstructed | negative               | 0.3<br>p/p        | 0.01               | 0.0<br>p/p          | 906<br>p/a             | Collected sample from outf     |
| MPF400<br>MPF410 | MPF400<br>MPF410 | 8/4/16<br>8/4/16   | SW             | GP             | outfall    | 0<br>12            | corrugated metal        | wet (no flow)                | n/a                 | free flow        | none            | n/a                              | n/a                                            | none                 | sediment            | corrosion                  | partially obstructed | negative               | n/a               | n/a                | n/a                 | n/a                    | Vegetation partly obstructin   |
| MPF420           | MPF420           | 8/4/16             | SW             | GP             | outfall    | 15                 | corrugated metal        | wet (no flow)                | n/a                 | free flow        | none            | n/a                              | musty basement odor                            | none                 | sediment            | corrosion                  | partially obstructed | negative               | n/a               | n/a                | n/a                 | n/a                    | Partially obstructed by muc    |
| MPF430           | MPF430           | 8/4/16             | SW             | GP             | outfall    | 15                 | corrugated metal        | flowing                      | 0.125               | free flow        | none            | n/a                              | clear, no odor                                 | sheen in pool below  | none                | corrosion                  | none                 | indeterminate          | 0.13              | 0.00               | 0.1                 | 873                    | 8/10/16                        |
| MPF430           | MPF430           | 10/6/16            | HHA            | 0.5            | outfall    | 15                 | corrugated metal        | flowing                      | 0.25                | free flow        | none            | n/a                              | clear, no odor                                 | none                 | none                | corrosion                  | none                 | negative               | n/a               | n/a                | n/a                 | n/a                    |                                |
| MPF440<br>MPF450 | MPF440<br>MPF450 | 8/4/16<br>8/5/16   | SW             | GP<br>GP       | outfall    | 13<br>12           | corrugated metal        | dry<br>asticdry              | n/a<br>n/a          | free flow        | none            | n/a<br>n/a                       | n/a<br>n/a                                     | none                 | sediment            | none                       | partially obstructed | n/a<br>n/a             | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             | Unmapped outfall               |
| MPF460           | MPF460           | 8/5/16             | LM             | GP             | outfall    | 24                 | corrugated metal        | flowing                      | 0.75                | free flow        | none            | n/a                              | clear, no odor                                 | none                 | none                | none                       | none                 | negative               | 0.3               | 0.04               | 0.1                 | 241                    | Springs on hill above road t   |
| MPF470           | MPF470           | 8/5/16             | LM             | GP             | outfall    | 8                  | smooth plastic          | wet (no flow)                | n/a                 | free flow        | none            | n/a                              | musty odor                                     | none                 | iron staining       | none                       | none                 | negative               | n/a               | n/a                | n/a                 | n/a                    | Pool below pipe has rusty/r    |
| MPF480           | MPF480           | 8/5/16             | LM             | GP             | outfall    | 15                 | smooth plastic          | wet (no flow)                | n/a                 | partially su     | ut none         | n/a                              | no odor                                        | leaves, debris       | sediment            | none                       | partially obstructed | negative               | 0.35              | 0.05               | 0.1                 | 252                    | through pipe.                  |
| MPF490           | MPF490           | 8/5/16             | LM             | GP             | outfall    | 9<br>10            | smooth plastic          | wet (no flow)                | n/a                 | partially su     | ut none         | n/a                              | no odor                                        | sheen                | sediment & debris   | s cracking                 | none                 | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Half-full of water, possibly s |
| MPF500           | MPF500           | 8/5/16<br>10/6/16  | LIVI<br>HHA    | GP             | outfall    | 18<br>18           | smooth plastic          | trickling                    | 0.125<br>n/a        | free flow        | none            | n/a<br>n/a                       | clear, faint chiorine odor (might be the pipe) | none                 | sediment (thick m   | none                       | none                 | negative<br>n/a        | 0.3               | 0.07<br>n/a        | 0.3                 | 436<br>352             | Could not retest Cl because    |
| MPF510           | MPF510           | 8/5/16             | LM             | GP             | outfall    | 16                 | corrugated metal        | drv                          | n/a                 | free flow        | ves             | aully                            | no odor                                        | none                 | none                | corrosion                  | none                 | n/a                    | 0.0<br>n/a        | n/a                | n/a                 | 552<br>n/a             | Verv corroded. Extensive e     |
| MPF520           | MPF520           | 8/5/16             | LM             | GP             | outfall    | 16                 | corrugated metal        | dry                          | n/a                 | free flow        | yes             | around pipe                      | no odor                                        | none                 | iron staining       | none                       | none                 | n/a                    | n/a               | n/a                | n/a                 | n/a                    |                                |
| MPF530           | MPF530           | 8/5/16             | LM             | GP             | outfall    | 11                 | corrugated metal        | dry                          | n/a                 | partially su     | ut none         | n/a                              | no odor                                        | none                 | sediment            | crushed                    | partially obstructed | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Almost fully obstructed. East  |
| MPF540           | MPF540           | 8/5/16             | LM             | GP             | outfall    | 14                 | corrugated black pla    | asticwet (no flow)           | n/a                 | partially su     | ık yes          | minor, around pipe               | no odor                                        | sheen                | sediment            | crushed                    | partially obstructed | negative               | n/a               | n/a                | n/a                 | n/a                    | Sherwood. Pad lost & reset     |
| MPF550           | CB1              | 8/5/16<br>8/25/16  | LIVI<br>SW/    | GP<br>GP       | catchbasin | i n/a              | n/a<br>n/a              | n/a<br>n/a                   | n/a<br>n/a          | n/a<br>n/a       | n/a<br>n/a      | n/a<br>n/a                       | n/a<br>n/a                                     | n/a<br>n/a           | n/a<br>n/a          | n/a<br>n/a                 | n/a<br>n/a           | n/a                    | n/a               | n/a                | n/a<br>0.1          | n/a<br>127             | Too steep and overgrown t      |
| MPF550           | CB4<br>CB6       | 8/25/16            | SW             | GP             | catchbasin | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | negative               | 0.2               | 0.00               | 0.1                 | 212                    |                                |
| MPF560           | MPF560           | 8/5/16             | LM             | GP             | outfall    | 18                 | smooth plastic          | dry                          | n/a                 | partially su     | ut none         | n/a                              | no odor                                        | n/a                  | sediment, iron sta  | ir none                    | partially obstructed | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Partially obstructed with mu   |
| MPF570           | MPF570           | 8/5/16             | LM             | GP             | outfall    | 24                 | corrugated metal        | flowing                      | 0.5                 | free flow        | none            | n/a                              | no odor                                        | suds                 | none                | corrosion (slight)         | none                 | negative               | 0.5               | 0.07               | 0.1                 | 576                    | Bubbles in pool below          |
| MPF570           | MPF570           | 10/6/16            | HHA            |                | outfall    | 24                 | corrugated metal        | flowing                      | 0.5                 | free flow        | none            | n/a                              | clear, no odor                                 | none                 | none                | corrosion (slight)         | none                 | negative               | 0.2               | n/a                | 0.3                 | 550                    | Sample did not foam when       |
| MPF570           | MPF570           | 9/29/17            | BAM            |                | outtall    | 24                 | corrugated metal        | flowing                      | 0.25<br>n/2         | free flow        | yes<br>n/a      | channel incising                 | clear, no odor                                 | suds                 | none                | corrosion (slight)         | none                 | negative               | 0.0               | 0.06               | n/a<br>n/a          | n/a                    | Suds in pool, no foam when     |
| MPF570<br>MPF580 | MPF580           | 8/5/16             | I M            | GP             | outfall    | 11/1/a<br>7        | smooth plastic          | drv                          | n/a                 | free flow        | none            | n/a                              | n/a                                            | none                 | none                | none                       | none                 | n/a                    | 0.0<br>n/a        | 0.02<br>n/a        | n/a                 | n/a                    | Sampleu Irom Pipe A, no n      |
| MPF590           | MPF590           | 8/5/16             | LM             | GP             | outfall    | 24                 | corrugated metal        | dry                          | n/a                 | free flow        | yes             | some underneath pipe             | n/a                                            | none                 | iron staining or ru | st none                    | none                 | n/a                    | n/a               | n/a                | n/a                 | n/a                    |                                |
| MPF600           | MPF600           | 8/5/16             | LM             | GP             | outfall    | 15                 | corrugated black pla    | asticwet (no flow)           | n/a                 | partially su     | uk none         | n/a                              | n/a                                            | none                 | none                | none                       | partially obstructed | negative               | n/a               | n/a                | n/a                 | n/a                    | Partially obstructed with roo  |
| MPF610           | MPF610           | 8/17/16            | SW             | LM             | outfall    | 18                 | corrugated metal        | dry                          | n/a                 | free flow        | yes             | extensive around/below OF        | n/a                                            | none                 | none                | cracking, corrosion        | none                 | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Hillside is slumping badly.    |
| MPF610           | CB1              | 8/17/16            | SW             | LM             | catchbasin | n/a                | n/a                     | trickling                    | n/a                 | n/a              | n/a<br>n/a      | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | negative               | 0.3               | 0.09               | 0.1                 | 306                    | Sampled from sump; trickle     |
| MPF610<br>MPF610 | CB2<br>MPF610    | 8/1//16<br>10/6/16 | SW<br>HΔ       | LIVI           |            | i n/a<br>18        | n/a<br>corrugated metal | dry                          | n/a<br>n/a          | n/a<br>free flow | n/a<br>ves      | N/a<br>extensive around/below OF | n/a                                            | n/a<br>n/a           | n/a<br>none         | n/a<br>cracking corrosion  | n/a<br>none          | negative<br>n/a        | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a<br>n/a             | Flow from along Sherwood       |
| MPF610           | CB1              | 10/6/16            | HA             |                | catchbasin | n/a                | n/a                     | dry                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Dry                            |
| MPF620           | MPF620           | 8/17/16            | SW             | LM             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall. Pro  |
| MPF630           | MPF630           | 8/17/16            | SW             | LM             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | surcharge        | d n/a           | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not access outfall. O    |
| MPF640           | MPF640           | 9/2/17             | LM             | GP             | outfall    | 48                 | corrugated black pla    | astic flowing                | 0.5                 | free flow        | yes             | severe above/around OF           | no odor                                        | none                 | none                | none                       | none                 | negative               | 0.0<br>n/o        | 0.04               | 0.2                 | 700                    | Observed suds and iron sta     |
| MPF650<br>MPF660 | MPF650           | 8/1//16<br>8/17/16 | SW             | LIVI           | outfall    | 10<br>12           | corrugated black pla    | astictrickling               | n/a<br>n/a          | free flow        | none            | n/a<br>n/a                       | pond/algae odor                                | none                 | sediment            | n/a<br>none                | none                 | n/a<br>n/a             | n/a<br>4 0        | n/a<br>0.19        | n/a<br>0.1          | n/a<br>618             | Security cameras. No park      |
| MPF670           | MPF670           | 8/17/16            | SW             | LM             | outfall    | 17                 | corrugated black pla    | asticwet (no flow)           | n/a                 | free flow        | none            | n/a                              | n/a                                            | none                 | none                | none                       | none                 | n/a                    | n/a               | n/a                | n/a                 | n/a                    | security cameras. No pad s     |
| MPF680           | MPF680           | 8/17/16            | SW             | LM             | outfall    | 15                 | corrugated metal        | wet (no flow)                | n/a                 | partially su     | ık yes          | incision below OF                | plaster odor                                   | none                 | sediment            | none                       | none                 | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Light grey deposits on vege    |
| MPF680           | MPF680           | 10/6/16            | HA             |                | n/a        | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Tons of trash in gulley behi   |
| MPF680           | MPF680           | 9/21/17            | BAM            | 1.5.4          | n/a        | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a<br>d n/a    | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall       |
| MPF090           | MPF090           | 8/17/16            | SW             | LIVI           | outfall    | n/a                | n/a                     | n/a                          | n/a                 | submerge         | u 11/a<br>d n/a | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Outfall could not be access    |
| MPF710           | MPF710           | 8/17/16            | SW             | LM             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall, un   |
| MPF720           | MPF720           | 8/17/16            | SW             | LM             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall, un   |
| MPF730           | MPF730           | 8/17/16            | SW             | LM             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall, ma   |
| WPF740<br>MDF750 | MPF750           | 8/1//16<br>8/17/14 | SW<br>SW       |                | OUTTAIL    | 16<br>14           | corrugated metal        | dry<br>wet (no flow)         | n/a<br>n/a          | partially su     | IC YES          | some although armored            | no odor<br>n/a                                 |                      | none                | none<br>cracking corrector | partially obstructed | n/a<br>n/a             | n/a<br>n/a        | n/a<br>n/a         | n/a<br>n/a          | n/a                    | Partially obstructed by rock   |
| MPF760           | MPF760           | 8/25/16            | SW             | GP             | outfall    | 18                 | corrugated metal        | drippina                     | n/a                 | free flow        | yes             | some although armored            | rusty odor                                     | none                 | none                | crushed on front           | partially obstructed | negative               | n/a               | n/a                | n/a                 | n/a                    | Flow too slow to sample. E     |
| MPF770           | MPF770           | 8/25/16            | SW             | GP             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall       |
| MPF780           | MPF780           | 8/25/16            | SW             | GP             | outfall    | 24                 | corrugated black pla    | asticflowing                 | 0.125               | free flow        | none            | riprapped                        | clear, no odor                                 | none                 | sediment            | none                       | none                 | negative               | 0.3               | 0.00               | 0.0                 | 865                    | 9/2/16: pad had become di      |
| MPF780           | CB1              | 8/25/16            | SW             | GP             | catchbasin | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a<br>p/a                 | n/a                  | n/a<br>n/a             | 0.3               | 0.00               | 0.0                 | 904                    |                                |
| MPF800           | MPF800           | 0/20/10<br>8/25/16 | SW<br>SW       | GP<br>GP       | outfall    | 14<br>⊿            | smooth plastic          | flowing                      | n/a<br>0.125        | free flow        | none            | iva<br>stone lined swale         | no odor                                        | none                 | sediment            | none                       |                      | n/a                    | 0.2               | n/a<br>0.00        | n/a<br>0.0          | 11/a<br>378            | Outfall is lower down swale    |
| MPF810           | MPF810           | 8/25/16            | SW             | GP             | outfall    | 14                 | concrete                | flowing                      | minimal             | partially su     | ut none         | n/a                              | no odor                                        | sheen (small amount) | sediment            | none                       | partially obstructed | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Very slow flow observed in     |
| MPF810           | CB1              | 8/25/16            | SW             | GP             | catchbasin | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | negative               | 0.3               | 0.00               | 0.0                 | 1666                   | Sampled Pipe A                 |
| MPF820           | MPF820           | 8/25/16            | SW             | GP             | outfall    | 12                 | concrete                | flowing                      | 0.25                | free flow        | yes             | along edge of embankment         | no odor                                        | small amount of suds | none                | none                       | none                 | negative               | 0.2               | 0.03               | 0.0                 | 436                    |                                |
| MPF830           | MPF830           | 8/25/16            | SW             | GP             | outfall    | 15                 | smooth plastic          | flowing                      | 2/2                 | free flow        | yes             | minor                            | musty odor                                     | none                 | iron staining or ru | stnone                     | none                 | negative               | 0.3               | 0.05               | 0.0                 | 448                    | Vary corrected most of the     |
| ₩₽₽840<br>MPF840 | MPF840           | 0/20/10<br>9/21/17 | SVV<br>RAM     | GP             | outfall    |                    | corrugated metal        | drinning                     | n/a<br>n/a          | free flow        | none            | n/a                              | clear, no odor                                 | none                 | oily deposits       | corrosion                  | none                 | positive (weak)<br>n/a | 0.0<br>n/a        | 0.07<br>1 14       | 0.1<br>n/a          | 997<br>n/a             | very conoded, most of the      |
| MPF850           | MPF850           | 8/25/16            | SW             | GP             | outfall    | n/a                | n/a                     | n/a                          | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    | Could not locate outfall, but  |
| MPF860           | MPF860           | 8/25/16            | SW             | GP             | outfall    | 6                  | smooth metal            | flowing                      | 0.125               | free flow        | none            | n/a                              | petroleum/chemical odor                        | none                 | heavy iron stainin  | g none                     | none                 | n/a                    | 0.3               | 0.03               | 0.0                 | 902                    | Outfall at the contaminated    |
| MPF870           | MPF870           | 8/25/16            | SW             | GP             | seep       | n/a                | n/a                     | flowing                      | 1                   | free flow        | yes             | minor                            | strong petroleum/chemical odor                 | none                 | heavy iron stainin  | g n/a                      | none                 | n/a                    | 0.4               | 0.00               | 0.0                 | 1695                   | 0090)                          |
| MPF880           | MPF880           | 9/2/16             | LM             | GP             | outfall    | 11                 | smooth plastic          | dry                          | n/a                 | free flow        | none            | n/a                              | n/a                                            | none                 | sediment            | none                       | partially obstructed | n/a<br>n/a             | n/a               | n/a                | n/a                 | n/a                    | No obvious damage, but tw      |
| IVIPE000         | IVIPE000         | 9/2/16<br>9/2/16   | LIVI<br>L M    | GP<br>CD       | outfall    | 7.5<br>19          | SITIONIN PISSIC         | wet (NO NOW)<br>asticflowing | n/a<br>0.25         | free flow        | none            | n/a                              | n/a<br>no odor                                 | none                 | Sealment            |                            | none                 | nositive (week)        | n/a<br>0.1        | n/a<br>0.04        | n/a<br>0 1          | n/a<br>1820            | Ripran around nine (formo      |
| MPF900           | CB1              | 9/2/16             | LM             | GP             | catchbasin | n/a                | n/a                     | trickling                    | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | negative               | 0.1               | 0.00               | 0.1                 | 1880                   | Flow appears to come from      |
| MPF900           | CB2              | 9/2/16             | LM             | GP             | catchbasin | n/a                | n/a                     | no flow                      | n/a                 | n/a              | n/a             | n/a                              | n/a                                            | n/a                  | n/a                 | n/a                        | n/a                  | negative               | n/a               | n/a                | n/a                 | n/a                    | No flow, but set pad anywa     |
| MPF900           | MPF900           | 9/29/17            | BAM            |                | outfall    | 18                 | corrugated black pla    | asticflowing                 | unknown             | free flow        | none            | n/a                              | clear, no odor                                 | n/a                  | n/a                 | n/a                        | n/a                  | n/a                    | n/a               | n/a                | n/a                 | n/a                    |                                |
| MPF910           | MPF910           | 9/2/16             | LM             | GP             | outfall    | 11.5               | vitrified clay          | flowing                      | unknown             | tree flow        | yes             | incision                         | strong petroleum odor                          | orange floc          | iron staining       | none                       | tully obstructed     | positive               | 0.4               | 0.95               | n/a                 | 2090                   | Sample too turbid to do MB     |

(too shallow) utfall pool. Outfall partially obstructed with vegetation. Two inlets flowing to CB1. imple since outfall almost completely buried. ting outfall. Adjacent, unmapped white plastic pipe was dry. Outfall dry on 8/10/16 ud and grass. Outfall dry on 8/10/16

d flowing to CB, according to Tim Piercer, who lives in brown house y/rainbow sheen, algae. Outfall dry on 8/10/16

y surcharged. No flow, no sample taken

erosion, poison ivy

Easiest access near #414 Sherwood. Set 8/17/16 In to find/access outfall. CB1 above was dry.

nud, gravel, debris

en shaken; could not test CI because meter malfunctioning en sample shaken flow from Pipe B

ocks, vegetation

le from inlet d Drive; set pad in flow as best we could.

Probably under sediment deposit. Outfall surcharged (culvert below plugged with sediment.) staining below outfall on 9/8/16. arking lot drain. Probably just wet from rain on 8/16/16 d set. d set. getation below outfall. whind mobile home retail store; looked for 15 mins and could not locate outfall

ssed, submerged in stormwater pond at Cabot distribution center ssed, submerged in stormwater pond at Cabot distribution center inder overgrown trash dump inder overgrown trash dump may be under turf or small ponds at the top of the swale cks inside outfall pipe m parking lot over the top of the bank here. End of pipe is folded over

dislodged, but still able to retrieve it.

le than indicated on map. No pad set. n pool below. Outfall 1/3 blocked with sediment.

e flow does not reach end of pipe.

out saw gully here with strong flow ed Grossman's site. (formerly WR-0100)

two sticks had been put inside to support it.

nerly WR-0170) om CB3, but CB3 is dry. CB4, CB5, and CB6 also dry. 9/8/16: petroleum odor at CB1 and CB3. vay

IBAS test. Iron staining extends from outfall to river. (formerly WR-0180)

## Appendix D. Maps

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|                                   |    |







• Budling Address

## Stormwater Lines

- →→ Storm line
- – Sanitary line
- →→ Swale
- ----- Under drain
- – Roof drain
- ----- Stream

## Stormwater Points

- Catchbasin
- Yard drain
- Sanitary Manhole
- Culvert inlet
- Culvert outlet
- Outfall

Source: Esri World Imagery, VTDEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP010 Exported: 1/13/2020 by wrich

## Map 1: MP010

16-002 Montpelier IDDE







## Stormwater Lines

→ Storm line

— Stream

## **Stormwater Points**

- Catchbasin
- Culvert inlet
- Culvert outlet

Outfall

Source: Esri World Imagery, VTDEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP130 Exported: 1/13/2020 2:50 PM by wrich

## Map 2: MP130

16-002 Montpelier IDDE

Prepared For VT DEC



STONE ENVIRONMENTAL







## Stormwater Lines

- Storm line
   Sanitary line
   Swale
- ---- Under drain
- – Roof drain
- Stream

## Stormwater Points

- Catchbasin
- Sanitary Manhole
- Culvert inlet
- ළ Outfall

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP250 Exported: 1/13/2020 2:51 PM by wrich

## Map 4: MP250

16-002 Montpelier IDDE







• Building Addresses

## Stormwater Points

- Catchbasin
- Drop Inlet
- Yard drain
- Stormwater Manhole
- Combined sewer MH
- 😵 Sanitary Manhole
- Culvert inlet
- Oulvert outlet
- 🕘 Outfall
- Information Point

#### Stormwater Lines

- Storm line
   Storm line (old sanitary line)
   Combined sewer
   Sanitary line
   Swale
   Footing drain
   Under drain
   Roof drain
   Trench drain
   French drain
   Infiltration pipe
   Tunnel (storm)
   Emergency spillway
- Stream

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP370\_380 Exported: 1/13/2020 3:13 PM by wrich

## Map 5: MP370 & MP380

16-002 Montpelier IDDE







## Stormwater Points

- Catchbasin
- Drop Inlet
- Stormwater Manhole
- Combined sewer MH
- Sanitary Manhole
- Culvert inlet
- Oulvert outlet
- Outfall
- Contraction CSO outfalls

## Stormwater Lines

- → Storm line
- Storm line (old sanitary line)
- >>>> Combined sewer
- – Sanitary line
- Roof drain

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP580 Exported: 12/27/2019 4:40 PM by wrich

## Map 6: MP580

16-002 Montpelier IDDE







Source: Esri World Imagery, VT DEC

**lier** 

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP590 Exported: 1/14/2020 11:12 AM by wrich

## Map 7: MP590

16-002 Montpelier IDDE









#### Stormwater Points

- Catchbasin
- 😑 Dry Well
- Drop Inlet
- 😧 Yard drain
- CB tied to sanitary sewer
- Stormwater Manhole
- 😵 Sanitary Manhole
- Culvert inlet
- Oulvert outlet
- Outfall
- 1 Information Point

#### Stormwater Lines

- →→ Storm line
- >>> Combined sewer
- – Sanitary line
- → Swale
- --- Under drain
- Roof drain
- ---- Trench drain
- ---- Stream

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP890 Exported: 1/13/2020 3:21 PM by wrich

## Map 8: MP890

16-002 Montpelier IDDE







## **Stormwater Points**

- Catchbasin
- Junction Box
- Stormwater Manhole
- Sanitary Manhole
- Culvert inlet
- Oulvert outlet
- Outfall

## Stormwater Lines

- →→ Storm line
- Sanitary line
- ► Swale
- ----- Footing drain
- Roof drain
- Stream

Source: Esri World Imagery, VT DEC

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## Map 9: MP1030

16-002 Montpelier IDDE

Prepared For VT DEC



STONE ENVIRONMENTAL





## Stormwater Points

- E Catchbasin
- Drop Inlet
- Yard drain
- Junction Box
- Stormwater Manhole
- Combined sewer MH
- Sanitary Manhole
- Culvert inlet
- O Culvert outlet
- Outfall
- C Known CSO outfalls
- 1 Information Point

#### Stormwater Lines

- Storm line
- Storm line (old sanitary line)
- >>> Combined sewer
- – Sanitary line
- Footing drain
- ---- Under drain
- Roof drain
- Trench drain
- ---- Stream

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP1310 Exported: 12/29/2019 1:14 PM by wrich

## Map 10: MP1310

16-002 Montpelier IDDE







## Stormwater Points

- Catchbasin
- Yard drain
- Junction Box
- Stormwater Manhole
- Sanitary Manhole
- Culvert inlet
- Oulvert outlet
- Outfall

## Stormwater Lines

- → Storm line
- – Sanitary line
- >>> Swale
- ----- Footing drain
- --- Under drain
- Roof drain
- Stream

Source: Esri World Imagery. VT DEC

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## Map 11: MP1350

16-002 Montpelier IDDE








| Dry Well                  | – – Sanitary line                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drop Inlet                | 🗰 Swale                                                                                                                                                                                                                                                                                                                      |
| Grate/Curb Inlet          | Footing drain                                                                                                                                                                                                                                                                                                                |
| Yard drain                | Under drain                                                                                                                                                                                                                                                                                                                  |
| Junction Box              | Roof drain                                                                                                                                                                                                                                                                                                                   |
| CB tied to sanitary sewer | Stream                                                                                                                                                                                                                                                                                                                       |
| Stormwater Manhole        |                                                                                                                                                                                                                                                                                                                              |
| Combined sewer MH         |                                                                                                                                                                                                                                                                                                                              |
| Sanitary Manhole          |                                                                                                                                                                                                                                                                                                                              |
| Culvert inlet             |                                                                                                                                                                                                                                                                                                                              |
| Culvert outlet            |                                                                                                                                                                                                                                                                                                                              |
| Outfall                   |                                                                                                                                                                                                                                                                                                                              |
| Known CSO outfalls        |                                                                                                                                                                                                                                                                                                                              |
| Pond outlet structure     |                                                                                                                                                                                                                                                                                                                              |
| Treatment feature         |                                                                                                                                                                                                                                                                                                                              |
| Information Point         |                                                                                                                                                                                                                                                                                                                              |
| Unknown Point             |                                                                                                                                                                                                                                                                                                                              |
|                           | Dry Well<br>Drop Inlet<br>Grate/Curb Inlet<br>Yard drain<br>Junction Box<br>CB tied to sanitary sewer<br>Stormwater Manhole<br>Combined sewer MH<br>Sanitary Manhole<br>Culvert inlet<br>Culvert outlet<br>Outfall<br>Known CSO outfalls<br>Pond outlet structure<br>Treatment feature<br>Information Point<br>Unknown Point |

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP1360 Exported: 1/13/2020 3:25 PM by wrich

## Map 12: MP1360

16-002 Montpelier IDDE







| Sto       | ormwater Points      | Stormwater Lines               |
|-----------|----------------------|--------------------------------|
|           | Catchbasin           | 🗯 Storm line                   |
|           | Drop Inlet           | Storm line (old                |
| $\square$ | Grate/Curb Inlet     | Sumary me                      |
| $\otimes$ | Yard drain           |                                |
|           | CB tied to sanitary  | Sanitary line                  |
|           | sewer                | 🁐 Swale                        |
| O         | Stormwater           | Footing drain                  |
| -         | Maimole              | Under drain                    |
| <b>🔅</b>  | Combined sewer<br>MH | <ul> <li>Roof drain</li> </ul> |
| $ \odot $ | Sanitary Manhole     | Trench drain                   |
| 0         | Culvert inlet        | French drain                   |
| 0         | Culvert outlet       | Infiltration pipe              |
| Ð         | Outfall              | — Tunnel (storm)               |
| 0         | Information Point    | Strain Emergency spillway      |
| ?         | Unknown Point        | - Stream                       |

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP1370 Exported: 1/13/2020 3:30 PM by wrich

# Map 13: MP1370

16-002 Montpelier IDDE







| Sto                   | ormwater Points                                                                                            | Stormwater Lines               |
|-----------------------|------------------------------------------------------------------------------------------------------------|--------------------------------|
| ⊟                     | Catchbasin                                                                                                 | 🗯 Storm line                   |
|                       | Drop Inlet                                                                                                 | Storm line (old                |
| ۲                     | Yard drain                                                                                                 | Combined sewer                 |
| Stormwater<br>Manhole | – – Sanitary line                                                                                          |                                |
| <b>()</b>             | Combined sewer                                                                                             | 🁐 Swale                        |
| 8                     | MH<br>Sapitany Manholo                                                                                     | Footing drain                  |
| •                     |                                                                                                            | Under drain                    |
| •                     | <ul> <li>Culvert outlet</li> <li>Outfall</li> <li>Known CSO outfalls</li> <li>Information Point</li> </ul> | <ul> <li>Roof drain</li> </ul> |
| 6                     |                                                                                                            | Trench drain                   |
| <b>2</b>              |                                                                                                            | French drain                   |
| U                     |                                                                                                            | Infiltration pipe              |
|                       |                                                                                                            | 💻 Tunnel (storm)               |
|                       |                                                                                                            | Sec. Emergency spillwa         |
|                       |                                                                                                            | - Stream                       |

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MP1390 Exported: 1/13/2020 3:31 PM by wrich

# Map 14: MP1390

16-002 Montpelier IDDE







#### Stormwater Points

- Catchbasin
- Drop Inlet
- Yard drain
- Culvert inlet
- Culvert outlet
- Outfall
- **1** Information Point

#### Stormwater Lines

- → Storm line
- \mapsto Swale
- ----- Footing drain
- Stream

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MPF170 Exported: 1/1/2020 2:50 PM by wrich

## Map 15: MPF170

16-002 Montpelier IDDE







## Stormwater Points

- Catchbasin
- Stormwater Manhole
- Outfall

#### Stormwater Lines

- → Storm line
- \mapsto Swale
- ----- Footing drain
- Roof drain

Source: Esri World Imagery, VT EC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MPF290 Exported: 1/13/2020 3:34 PM by wrich

## Map 16: MPF290

16-002 Montpelier IDDE











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## Stormwater Points

- Catchbasin
- Sanitary Manhole
- Outfall

### Stormwater Lines

- → Storm line
- Sanitary line
- ➡ Swale
- ---- Under drain
- Stream

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MPF840 Exported: 1/2/2020 10:10 AM by wrich

## Map 18: MPF840

16-002 Montpelier IDDE







| Sto                | ormwater Points  | Stormwater Lines               |
|--------------------|------------------|--------------------------------|
|                    | Catchbasin       | \mapsto Storm line             |
|                    | Drop Inlet       | Storm line (old                |
| 8                  | Yard drain       | Sanitary line)                 |
| Stormwa<br>Manhole | Stormwater       | – – Sanitary line              |
|                    | Manhole          | 🇯 Swale                        |
| <b>()</b>          | Sanitary Manhole | Footing drain                  |
| 0                  | Culvert inlet    | Under drain                    |
| 0                  | Culvert outlet   | <ul> <li>Roof drain</li> </ul> |
| Ð                  | Outfall          | - Stream                       |
|                    |                  |                                |

Source: Esri World Imagery, VT DEC

Path: O:\PROJ-16\WRM\16-002 Montpelier IDDE\GIS\MapDocuments\PresentationsAndReports\Montp IDDE Maps 2019\Montpelier IDDE Maps 2019.aprx MPF900\_910 Exported: 1/13/2020 3:42 PM by wrich

## Map 19: MPF900/MPF910

16-002 Montpelier IDDE

