Year 4 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2021-June 30, 2022

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2021 and June 30, 2022 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: Town of Merrimac

EPA NPDES Permit Number: MAR041209

Primary MS4 Program Manager Contact Information

Name: Robert Sinibaldi Title: Director of Public Works

Street Address Line 1: 4 School Street

Street Address Line 2: NA

City: Merrimac State: MA Zip Code: 01860

Email: dpwdir@townofmerrimac.com Phone Number: (978) 346-0612

Stormwater Management Program (SWMP) Information

SWMP Location (web address): http://www.merrimac01860.info/199/Stormwater

Date SWMP was Last Updated: September 2021

If the SWMP is not available on the web please provide the physical address:

Part II: Self-Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4. Make sure you are referring to the most recent EPA approved Section 303(d) Impaired Waters List which can be found here: https://www.epa.gov/tmdl/region-1-impaired-waters-and-303d-lists-state

Impairment(s)

☒ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☐ Phosphorus
☒ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

In State: ☐ Assabet River Phosphorus ☐ Bacteria and Pathogen ☐ Cape Cod Nitrogen
☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State: ☐ Bacteria/Pathogens ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. ***By checking each box you are certifying that you have completed that permit requirement fully.*** *If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.*

Year 4 Requirements

☒ Developed a report assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover, made it available as part of the SWMP, and:

- ○ No updates were recommended
- ○ Updates were recommended. The anticipated date or date of completion for updates is/was:

☒ Developed a report assessing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist, made it available as part of the SWMP, and:

- ○ No updates were recommended
- ○ Updates were recommended. The anticipated date or date of completion for updates is/was:

☒ Identified a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious cover

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide an update on previous incomplete milestones, or provide any additional details, please use the box below:

The Town completed a report assessing local regulations and street standards with the help of the Merrimac Valley Planning Commision (MVPC). A copy of that report is attached and available on the Town's stormwater web page. The Town intends to continue working with MVPC to implement the recommended

changes.

Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ○ This is not applicable because we do not have sanitary sewer
  - ◉ This is not applicable because we did not find any new SSOs
  - ○ The updated SSO inventory is attached to the email submission
  - ○ The updated SSO inventory can be found at the following website:

    There were no SSO's this year.
- ☒ Updated system map due in year 2 as necessary
- ☒ Provided training to employees involved in IDDE program within the reporting period
- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ All curbed roadways were swept at least once within the reporting period
- ☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- ☐ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- ☒ Updated inventory of all permittee owned facilities as necessary
- ☒ O&M programs for all permittee owned facilities have been completed and updated as necessary
- ☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs
- ☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- ☒ Inspected all permittee owned treatment structures (excluding catch basins)

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

The current version of the SWMP is always available on the Town's website. The SWMP is annually placed on a Board of Selectmen meeting agenda for discussion.

Mapping Requirements/Outfall Priority Ranking: All outfalls have been mapped. The Town is in the process of completing dry weather outfall inspections and intends to inspect all outfalls prior to winter (~November 30, 2022). An updated outfall inventory is attached and shows the current status of inspections and catchment composition evaluations.

SWPPPs and Inspections: Staffing limitations, funding, and covid restrictions impacted the Town's ability to prepare, complete and implement SWPPPs for all permittee owned or operated facilities . An extension for

this requirement is requested.

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

☒ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

☒ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time

☒ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

☒ Increased street sweeping frequency of all municipal owned streets and parking lots to a schedule that targets areas with potential for high pollutant loads

- ○ The street sweeping schedule is attached to the email submission
- ◉ The street sweeping schedule can be found at the following website:

http://www.merrimac01860.info/DocumentCenter/View/1580/Street-Sweeping-SOP

☒ Prioritized inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full; Cleaned catch basins more frequently if inspection and maintenance activities indicated excessive sediment or debris loadings

Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

- (●) Yes
- ( ) No

If yes, describe below, including any relevant impairments or TMDLs:

Since the Town submitted its NOI, the impairments for one of the Town's receiving waters changed.

Cobbler Brook: The added impairments identified in the 2018/2020 Reporting Cycle are benthic macroinvertebrates, dissolved oxygen, lack of coldwater assemblage, and temperature. The trash impairment was changed.

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed **during this reporting period**: 9

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP: School Program - Keeping Water Safe

Message Description and Distribution Method:

Program engages 5th grade students in several activities designed to raise their stormwater and water conservation awareness. Students learn about what a watershed is, what stormwater, groundwater and wastewater are, how they can negatively or positively impact these water systems, along with more details about each system and how it should be protected/maintained.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

2166 students, 370 teachers and parents, 30 schools

Message Date(s): September 2021 - June 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: - "Fowl Water Video" from Think Blue

Message Description and Distribution Method:

The Think Blue Massachusetts "Fowl Water" video defines stormwater and explains the impact that pollution like trash, oil, cigarettes and dog poop can have on stormwater and our waterways. Video available at https://www.thinkbluemassachusetts.org/ , www.greenscapes.org/resources-videos/ and spread as an advertisement on Facebook, Instagram, & YouTube

Targeted Audience: Residents +

Responsible Department/Parties: Think Blue MA, Greenscapes Coalition

Measurable Goal(s):

237,249 impressions on Facebook/Instagram
351,249 impressions on YouTube

Message Date(s): May 31, 2022 - June 17th, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Workshop - Planning Tools to Promote Natural Resource Stewardship

Message Description and Distribution Method:

Hosted by members of the PIE-Rivers Partnership, this free virtual workshop discussed the latest trends in promoting LID and other forms of Green Infrastructure in North Shore communities.

Targeted Audience: Residents+

Responsible Department/Parties: PIE-Rivers Partnership, Greenscapes Coalition

Measurable Goal(s):

82 Attendees

Message Date(s): November 9th, 2021

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Print Material/Rack Card - Storm Drain Info

Message Description and Distribution Method:

The Greenscapes storm drain rack card, originally printed in 2016 was modified for easy office printing and distribution. The original can be found here: https://greenscapes.org/wp-content/uploads/2017/01/Greenscapes-Rack-Card-2014-final.pdf

Targeted Audience: Residents+

Responsible Department/Parties: Greenscapes Coalition and Municipal Staff

Measurable Goal(s):

Message Date(s): Sent to Greenscapes network 1/24/22

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Public Lecture - Coastal Communities Talk Water

Message Description and Distribution Method:

This free community event at the Cabot Theater in Beverly MA, featured guest speakers from Salem Sound Coastwatch, the Ipswich River Watershed Association, Green Beverly, Sustainable Marblehead and the EPA, who covered various topics related to water quality, water quantity and general watershed stewardship.

Targeted Audience: Residents+

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

150 Attendees

Message Date(s): March 10th, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Print Material/Magazine - Greenscapes Guide

Message Description and Distribution Method:

The Greenscapes Guide, a 26 page magazine that covers sustainable landscaping tips, DIY stormwater management for homeowners and more, was distributed at every school program that Greenscapes conducted this school year.

Targeted Audience: Residents+

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

3,000 guides distributed throughout the North Shore

Message Date(s): Various dates between September 2021 - June 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: In-Person Exhibit - Culture House

Message Description and Distribution Method:

Salem Sound Coastwatch, a contributing partner to the Greenscapes Coalition, was a resident exhibitor at Salem Culture House, a pilot project that created a community space in Salem's Old Town Hall. At the exhibit, SSCW staff ran two hands on activities that taught visitors about their connection to their watershed. Greenscapes materials were on display and passed out.

Targeted Audience: Residents+

Responsible Department/Parties: Salem Sound Coastwatch (Greenscapes Coalition)

Measurable Goal(s):

924 Attendees

Message Date(s): April 20th, 2022 - April 23rd, 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Social Media

Message Description and Distribution Method:

Social media content related to stormwater management, wastewater and groundwater protection, water conservation, pet waste, septic system maintenance and sustainable lawn care are always available on the Greenscapes social media pages and on the Greenscapes website. https://greenscapes.org/resources-socialmedia/

Targeted Audience: Residents+

Responsible Department/Parties: Greenscapes Coalition and Municipal Staff

Measurable Goal(s):

Message Date(s):

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

BMP: Miscellaneous Tabling Events

Message Description and Distribution Method:

Events attended by Greenscapes personnel where printed materials were passed out: Middleton Earth Day, Tri-Town Spring Expo, Boxford Applefest, Topsfield Strawberry Fest, Ipswich STEAM Showcase, Beverly Earth Day, Salem Farmer's Market, Earth Week at the Peabody Essex Museum

Targeted Audience: Residents+

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

Message Date(s): Various dates between September 2021 - June 2022

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☐

Was this message different than what was proposed in your NOI? Yes ○ No ○

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) **during this reporting period**:

BMP 1: Public Participation in Stormwater Program Development
Household hazardous waste/used oil collection. The measurable goal shall be the pounds of waste collected.

The current version of the SWMP is available on the Town's wesbite. The SWMP is annually submitted to a Board of Selectmen meeting for discussion.

Was this opportunity different than what was proposed in your NOI? Yes ○ No ◉

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☐ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period**.*

Number of SSOs identified: 0

Number of SSOs removed: 0

MS4 System Mapping

Optional: Provide additional status information regarding your map:

See comments in the appropriate comment box in Part II.

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses. Please also include the updated inventory and ranking of outfalls/interconnections based on monitoring results.

○ No outfalls were inspected

○ The outfall screening data is attached to the email submission

◉ The outfall screening data can be found at the following website:

http://www.merrimac01860.info/199/Stormwater

*Below, report on the number of outfalls/interconnections screened **during this reporting period**.*

Number of outfalls screened: 54

*Below, report on the percent of outfalls/interconnections screened **to date**.*

Percent of outfalls screened: 44

Optional: Provide additional information regarding your outfall/interconnection screening:

The Town began dry weather inspections of outfalls and intends to inspect all outfalls prior to winter (~November 30, 2022). An updated outfall inventory is attached based on the inspections completed to date. Several factors have delayed the Town in completing dry weather inspections including covid restrictions, staffing and funding. An extension of this requirement is requested.

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- ○ No catchment investigations were conducted
- ○ The catchment investigation data is attached to the email submission
- ◉ The catchment investigation data can be found at the following website:

http://www.merrimac01860.info/199/Stormwater

*Below, report on the number of catchment investigations completed **during this reporting period**.*

Number of catchment investigations completed this reporting period: 0

*Below, report on the percent of catchments investigated **to date.***

Percent of total catchments investigated: 0

Optional: Provide any additional information for clarity regarding the catchment investigations below:

The Town began dry weather inspections of outfalls and intends to inspect all outfalls prior to winter (~November 30, 2022). As soon as that effort is complete, the Town intends to begin catchment investigations. The Town started to evaluate Catchment Compositions during this reporting period. Catchment compositions completed to date are provided on the attached Updated Outfall Inventory.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ◉ No illicit discharges were found
- ○ The illicit discharge removal report is attached to the email submission
- ○ The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed ***during this reporting period.***

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons/day

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed ***since the effective date of the permit (July 1, 2018)****.*

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

Employee Training

Describe the frequency and type of employee training conducted **during this reporting period**:

The Town employees involved in the Town's MS4 permitting including the IDDE Program periodically attend/participate in training courses and webinars. They also frequently attend MS4 focused meetings with the Merrimac Valley Planning Commission.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed ***during this reporting period****.*

Number of site plan reviews completed: 0

Number of inspections completed: 12

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance or Regulatory Mechanism

Date update was completed (due in year 3): 05/28/2012

As-built Drawings

*Below, report on the number of as-built drawings received **during this reporting period**.*

Number of as-built drawings received: 0

Optional: Enter any additional information relevant to the submission of as-built drawings:

Retrofit Properties Inventory

Below, list the permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas (at least 5):

The Town, with the assistance of the Merrimac Valley Planning Commission, identified 7 potential permittee owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas. Catchment areas for each of the properties have been mapped.

MCM6: Good Housekeeping

Catch Basin Cleaning

*Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins **during this reporting period**.*

Number of catch basins inspected: 714

Number of catch basins cleaned: 714

Total volume or mass of material removed from all catch basins: 66.8 tons

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins: 715

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Street Sweeping

*Report on street sweeping completed **during this reporting period** using one of the three metrics below.*

- ○ Number of miles cleaned: 13
- ◉ Volume of material removed: 15 cubic yards
- ○ Weight of material removed: [Select Units]

Stormwater Pollution Prevention Plan (SWPPP)

*Below, report on the number of site inspections for facilities that require a SWPPP completed **during this reporting period**.*

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

No inspections of facilities that require a SWPPP were completed during the reporting period. Staffing limitations, funding, and covid restrictions impacted the Town's ability to complete inspections. An extension for this requirement is requested.

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ◉ Not applicable
- ○ The results from additional reports or studies are attached to the email submission
- ○ The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

COVID-19 Impacts

Optional: If any of the above year 4 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

The impacts of Covid on the Town's ability to complete the year 4 requirements are noted above where applicable. Requirements that were impacted by Covid are noted above in the appropriate section.

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 5 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in

connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all curbed streets at least annually
- Continue investigations of catchments associated with Problem Outfalls
- Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- Review inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; update if necessary
- Review O&M programs for all permittee owned facilities; update if necessary
- Implement all maintenance procedures for permittee owned facilities in accordance with O&M programs
- Implement program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- Enclose all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- Review as-built drawings for new and redevelopment to ensure compliance with post construction bylaws, regulations, or regulatory mechanism consistent with permit requirements
- Inspect all permittee owned treatment structures (excluding catch basins)
- Identify additional permittee-owned properties that could potentially be modified or retrofitted with BMPs to reduce impervious areas so that the permittee maintains a minimum of 5 sites in their inventory, until such a time when the permittee has less than 5 sites remaining

Provide any additional details on activities planned for permit year 5 below:

Part V: Certification of Small MS4 Annual Report 2021

40 CFR 144.32(d) Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name:	Robert Sinibaldi	Title:	DPW Director
Signature:	Robert Sinibaldi Digitally signed by Robert Sinibaldi DN: C=US, OU=DPW, O=Town of Merrimac, CN=Robert Sinibaldi, E=dpwdir@townofmerrimac.com Reason: I am the author of this document Location: Date: 2022-09-28 12:28:54 Foxit PhantomPDF Version: 9.3.0	Date:	09/28/22

[Signatory may be a duly authorized representative]

ATTACHMENT 1

MERRIMAC BYLAW AND REGULATION REVIEW

SME
SEVEE & MAHER
ENGINEERS

Merrimac Bylaw and Regulation Review

Overview

To ensure Merrimac's compliance with year 4 MS4 permit requirements 2.3.6b: report assessing current street design and parking lot guidelines and other local requirements that affect creation of impervious surface and 2.3.6c: report assessing existing local regulations to determine the feasibility of making green roofs, infiltration practices, and water harvesting devices allowable, the following bylaws and regulations were reviewed:

- Zoning Bylaw (includes site plan review)
- Wetland Protection Bylaw
- Subdivision Rules and Regulations
- Stormwater Management Bylaw & IDDE Bylaw

Merrimac has made substantial progress towards ensuring impervious surface reduction and low impact development implementation within their bylaws and regulations. Flexible design standards as they relate to lot size, setbacks, and frontage extend beyond the OSRD by explicitly permitting reductions pending planning board approval. Further, the zoning bylaw, subdivision regulations, and wetland bylaw are all successful at providing design standards which manage soil for revegetation and limit clearing and grubbing while requiring revegetation. However, the subdivision regulations do require some design standards which increase imperviousness, and both the stormwater bylaw and subdivision regulations need more specificity regarding low impact development design requirements. Finally, the stormwater bylaw does not address necessary post construction volumes of Total Suspended Solids (TSS) and Total Phosphorus (TP).

Improvements could be made to these codes by revising some design standards within the subdivision regulations and developing design standards as they relate to low impact development within the subdivision regulations and stormwater bylaw. Requirements for TSS and TP removal could also be addressed within the stormwater bylaw to maintain MS4 compliance.

Recommendations

Goal 1: Protect Natural Resources and Open Space

- ***Zoning Bylaw, Subdivision Regulations, Wetland Bylaw:*** Merrimac's OSRD design standards successfully require the planting of native species during landscaping; however, this standard is not carried over to other development types, nor to other relevant bylaws and regulations. Greenscapes recommends placing a requirement for native species plantings within the zoning bylaw site development standards (19.9). Further, Greenscapes recommends editing the language within the Subdivision regulations from "street trees of nursery stock conforming to current standards…" to include language about a native species requirement. This language could also be

incorporated within the Wetland Bylaw 17.7 to ensure permitted activities within wetland areas require native species planting.

- ***Stormwater Bylaw:*** While the current stormwater bylaw's stormwater management & erosion and sediment control plan does hold some specificity in regulating disturbed areas and sedimentation, more specific design standards could be in place which already exist within the subdivision rules and regulations, such as prohibiting topsoil removal, requiring cut banking stabilization, and permanent vegetation stabilization structures. Greenscapes recommends implementing some of these more specific design standards within the stormwater bylaw to ensure consistency. Greenscapes also recommends requiring native plantings within the stormwater management & erosion and sediment control plan.

Goal 2: Promote Efficient, Compact Development Patterns and Infill

- ***Stormwater Bylaw and Subdivision Regulations:*** Currently, the stormwater bylaw and regulations require a stormwater management permit for any land disturbance of 20,000 feet. To encapsulate a wider breadth of projects which may alter natural stormwater processes, Greenscapes recommends developing new permit thresholds: a minor permit for developments between 3,000-20,000 square feet of land disturbance (typical single family home construction), which requires administrative review and approval from a conservation agent, and a major permit for land disturbances over 20,000 square feet (multi-dwelling or large commercial project), which requires a public hearing and approval by the planning board/conservation commission.

Goal 3: Smart Designs that Reduce Overall Imperviousness

- ***Zoning Bylaw:*** Merrimac's zoning bylaw has specific limits for impervious surface creation within the Water Resource District requiring a special permit for uses rendering 15% of impervious space respectively. Greenscapes recommends expanding limits on impervious space for lots to all districts, tailored appropriately to district type. Further, the zoning bylaw's OSRD specifically requires streets to be designed and located in a manner which maintains natural topography and minimizes cut and fill. Greenscapes recommends expanding that design requirement to all districts.
- ***Subdivision Regulations:*** Merrimac's subdivision regulations are successful at requiring street design standards which avoid important natural features, permitting flexible sidewalk placement, and requiring utilities underground. However, several design standards could be improved upon to better reduce overall imperviousness. Cul-de-sac islands are also not addressed within the subdivision regulations. Greenscapes recommends explicitly permitting cul-de-sac center islands with native landscaping, curb cuts, and LID like raingardens. Finally, sidewalks are required to be composed of impervious bituminous concrete in all instances, and curbing is required on all streets. Greenscapes recommends permitting permeable paving for sidewalks in low volume areas and permitting local or more rural roads to be developed without curbing to promote open drainage.

Goal 4: Adopt Green Infrastructure Stormwater Management Provisions

- ***Subdivision Regulations:*** While the subdivision regulations do provide extensive design standards for conventional stormwater management practices, there are none for low impact development management practices. Greenscapes recommends stating LID design standards within 4.4: Drainage of the subdivision regulations, including a requirement to include LID unless infeasible in site design, examples of LID, minimum compliance with Massachusetts Department of Environmental Protections' (MassDEP)most recent stormwater handbook, and standards such as groundwater recharge and flooding protection.
- ***Stormwater Bylaw:*** Merrimac's stormwater bylaw does encourage the use of LID and provide examples of LID actions, however like the subdivision regulations, no design standards for LID practices accompany this. Greenscapes recommends developing the same design standards to be addressed within the subdivision regulations or referencing the regulations in lieu. Further, the stormwater bylaw does not address the MassDEP required removal of Total Suspended Solids (TSS) and Total Phosphorus (TP) for new development and redevelopment sites. Greenscapes recommends requiring a 90% TSS and 60% TP generated on site for new developments pot-construction and an 80% TSS and 50% TP generated on site for redevelopments pot-construction

Goal 5: Encourage Efficient Parking

- ***Zoning Bylaw:*** The zoning bylaw currently requires a minimum number of parking spaces for residential and commercial uses and permits 20% of parking spaces for compact cars in lots over 50 spaces. Greenscapes recommends also developing maximum parking space requirements to limit excess impervious surface creation and permitting shared parking for uses with different peak demand times in applicable districts. Greenscapes also recommends explicitly requiring or encouraging LID within landscaped parking islands and requiring parking islands to have curb cuts for stormwater infiltration. This language could be expanded to the subdivision regulations drainage design requirements.

Timeline and Implementation Plan

Following a conversation with Merrimac's project liaison, the following endeavors were identified as priorities for implementation:

- Implementing language on TSS and TP standards within the stormwater bylaw
- Developing a major and minor permit category for stormwater permitting activities which accurately reflects the average lot sizes of Merrimac
- Clean up inconsistencies in design standards throughout codes
- Incorporate changes to Zoning Bylaw during its planned revision over the next year.

The town, come July 1st, will be onboarding new planning staff who will take on some of the revision activities. Revisions to the stormwater bylaw will be priority and revisions to the zoning bylaw will take place over the course of the year with hope to incorporate during next year's spring town meeting.

ATTACHMENT 2

INITIAL OUTFALL RANKING

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INITIAL OUTFALL INVENTORY AND PRIORITY RANKING

Outfall I.D.	General Street Location	Receiving Water (1)	Previous Screening Results Indicate Likely Sewer Input? (2)	Discharging to Area of Concern to Public Health? (3)	Frequency of Past Discharge Complaints (4)	Receiving Water Quality (5)	Density of Generating Sites (6)	Age of Development / Infrastructure (7)	Historic Combined Sewers or Septic? (8)	Aging Septic? (9)	Culverted Streams? (10)	Additional Characteristics	SCORE	PRIORITY RANKING (11)
Information Source:			Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria			Yes=3 (Problem Outfall) No=0	Yes=3 No=0	Fequent=3 Occasional=2 None=0	Poor=3 Fair=2 Good=0	High=3 Medium=2 Low=1	High=3 Medium=2 Low=1	Yes=3 No=0	Yes=3 No=1	Yes=3 No=2	TBD		
8249	Merrimac Road	Unknown Stream	N/A	0	0	0	1	2	0	1	2		6	Low
8254	Merrimac Road	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8255	Little Pond Road	Woods	0	0	0	0	1	2	0	1	2		6	Low
8272	Little Pond Road	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8273	Little Pond Road	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8275	Little Pond Road	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8295	Little Pond Road	Unknown Pond	0	0	0	0	1	2	0	1	2		6	Low
8299	Little Pond Road	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8307	Spring Hill Road	Uknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8309	Spring Hill Road	Uknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8310	River Road	Drop Basin	0	0	0	0	1	3	3	3	2		12	Low
8311	Little Pond Road	Unknown Stream	N/A	0	0	0	1	2	0	1	2		6	Low
8312	Spring Hill Road	Woods	0	0	0	0	1	2	0	1	2		6	Low
8313	Little Pond Road	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8314	Little Pond Road	Unknown Stream	N/A	0	0	0	1	2	0	1	2		6	Low
8316	River Road	Unknown Brook	N/A	0	0	0	1	3	3	3	2		12	Low
8317	River Road	Unknown Brook	0	0	0	0	1	3	3	3	2		12	Low
8321	Spring Hill Road	Woods	0	0	0	0	1	2	0	1	2		6	Low
8322	Little Pond Road	Unknown Pond	0	0	0	0	1	2	0	1	2		6	Low
8323	Spring Hill Road	Uknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8336	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	3	2		14	Low
8345	River Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8349	Little Pond Road	Woods	0	0	0	0	1	2	0	1	2		6	Low
8350	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	3	2		14	Low
8352	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	3	2		14	Low
8358	River Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	1	2		12	Low
8359	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	1	2		12	Low
8360	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	1	2		12	Low
8361	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	1	2		12	Low
8362	Chase Cresent	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8363	River Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8364	River Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	1	2		12	Low
8365	River Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	1	2		12	Low
8366	Locust Grove Road	Woods	N/A	0	0	0	1	2	3	3	2		11	Low
8367	Pleasant Valley Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	3	2		14	Low
8368	West Parish Lane	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8369	Stevens Terrace	Grass Area	N/A	0	0	0	1	2	0	1	2		6	Low
8370	Pleasant Valley Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	3	2		14	Low
8371	Locust Grove Road	Woods	0	0	0	0	1	2	3	3	2		11	Low
8372	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8373	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8374	Pleasant Valley Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	3	2		14	Low
8375	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	1	2		12	Low
8376	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8377	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8378	Pleasant Valley Road	Merrimack River (MA84A-05)	N/A	0	0	2	1	3	3	1	2		12	Low
8379	River Road	Cobblers Brook (MA84A-22)	0	0	0	2	1	3	3	1	2		12	Low
8380	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8381	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8382	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8383	Locust Grove Road	Woods	0	0	0	0	1	2	0	3	2		8	Low
8384	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	0	2	1	3	3	3	2		14	Low
8385	Stevens Terrace	Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8386	Locust Grove Road	Woods	N/A	0	0	0	1	2	0	1	2		6	Low
8387	Union Street	Woods	N/A	3	0	0	1	3	3	1	2		13	High
8388	Union Street	Woods	N/A	3	0	0	1	3	3	1	2		13	High
8389	Union Street	Woods	N/A	0	0	0	1	3	3	1	2		10	Low
8390	West Parish Lane	Detention Basin	0	0	0	0	1	2	0	1	2		6	Low
8391	Orchard Street	Woods	N/A	0	0	0	1	2	0	1	2		6	Low
8392	Middle Street	Woods	0	0	0	0	1	3	3	1	2		10	Low
8393	West Parish Lane	Unknown Stream	0	0	0	0	1	2	3	1	2		9	Low
8394	Heath Brook Lane	Unknown Stream	N/A	0	0	0	1	2	0	3	2		8	Low

Outfall I.D.	General Street Location	Receiving Water (1)	Previous Screening Results Indicate Likely Sewer Input? (2)	Discharging to Area of Concern to Public Health? (3)	Frequency of Past Discharge Complaints (4)	Receiving Water Quality (5)	Density of Generating Sites (6)	Age of Development / Infrastructure (7)	Historic Combined Sewers or Septic? (8)	Aging Septic? (9)	Culverted Streams? (10)	Additional Characteristics	SCORE	PRIORITY RANKING (11)
Information Source:			Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria			Yes=3 (Problem Outfall) No=0	Yes=3 No=0	Fequent=3 Occasional=2 None=0	Poor=3 Fair=2 Good=0	High=3 Medium=2 Low=1	High=3 Medium=2 Low=1	Yes=3 No=0	Yes=3 No=1	Yes=3 No=2	TBD		
8395	West Parish Road	Unknown Stream	0	0	0	0	1	2	3	1	2		9	Low
8396	Orchard Street	Woods	N/A	0	0	0	1	2	0	1	2		6	Low
8397	Orchard Street	Woods	0	0	0	0	1	2	0	1	2		6	Low
8398	Orchard Street	Woods	0	0	0	0	1	2	0	1	2		6	Low
8399	Orchard Street	Woods	0	0	0	0	1	2	0	1	2		6	Low
8400	Broad Street	Cobblers Brook (MA84A-22)	0	0	0	0	2	3	3	1	2		11	Low
8401	Broad Street	Cobblers Brook (MA84A-22)	0	0	0	0	2	3	3	1	2		11	Low
8402	Broad Street	Cobblers Brook (MA84A-22)	N/A	0	0	0	2	3	3	1	2		11	Low
8403	Broad Street	Cobblers Brook (MA84A-22)	0	0	0	0	2	3	3	1	2		11	Low
8404	Sunset Terrace	Woods	N/A	0	0	0	1	2	0	1	2		6	Low
8405	Champion Street	Woods	N/A	0	0	0	1	2	0	1	2		6	Low
8406	Champion Street	Woods	N/A	0	0	0	1	2	0	1	2		6	Low
8407	Broad Street	Cobblers Brook (MA84A-22)	N/A	0	0	0	1	3	3	1	2		10	Low
8408	Broad Street	Cobblers Brook (MA84A-22)	0	0	0	0	1	3	3	1	2		10	Low
8409	West Main Street	Cobblers Brook (MA84A-22)	N/A	0	0	0	3	3	3	1	2		12	Low
8410	Broad Street	Cobblers Brook (MA84A-22)	N/A	0	0	0	3	3	3	1	2		12	Low
8411	Broad Street	Cobblers Brook (MA84A-22)	N/A	0	0	0	3	3	3	1	2		12	Low
8412	Hadley Road	Woods	N/A	0	0	0	1	3	0	3	2		9	Low
8413	Broad Street	Cobblers Brook (MA84A-22)	N/A	0	0	0	3	3	3	1	2		12	Low
8414	Hadley Road	Woods	N/A	0	0	0	1	3	0	3	2		9	Low
8415	Burnside Lane	Swale/Unknown Stream	0	0	0	0	1	2	0	1	2		6	Low
8416	Liberty Street	Cobblers Brook (MA84A-22)	0	0	0	0	2	3	3	1	2		11	Low
8417	Hadley Road	Woods	0	0	0	0	1	3	0	3	2		9	Low
8418	Willowdale Drive	Cobblers Brook Tributary	0	0	0	0	1	2	0	1	2		6	Low
8419	Winter Street	Cobblers Brook Tributary	0	0	0	0	1	3	0	3	2		9	Low
8420	Willowdale Drive	Cobblers Brook Tributary	N/A	0	0	0	1	2	0	1	2		6	Low
8421	Chruch Street	Cobblers Brook Tributary	N/A	0	0	0	1	3	0	3	2		9	Low
8422	Attitash Avenue	Woods	0	0	0	0	1	3	3	1	2		10	Low
8423	Church Street	Cobblers Brook Tributary	N/A	0	0	0	1	3	0	3	2		9	Low
8424	Church Street	Cobblers Brook Tributary	0	0	0	0	1	3	0	3	2		9	Low
8425	Willowdale Drive	Cobblers Brook Tributary	N/A	0	0	0	1	2	0	1	2		6	Low
8426	Winter Street	Cobblers Brook Tributary	0	0	0	0	1	3	0	3	2		9	Low
8427	Winter Street	Cobblers Brook Tributary	0	0	0	0	1	3	0	3	2		9	Low
8428	Attitash Avenue	Wood/Wetland	0	0	0	0	1	3	3	1	2		10	Low
8429	Attitash Avenue	Wood/Wetland	N/A	0	0	0	1	3	3	1	2		10	Low
8430	Church Street	Woods/Cobblers Brook Tributary	N/A	0	0	0	1	3	3	1	2		10	Low
8431	Church Street	Wood/Wetland	0	0	0	0	1	3	3	1	2		10	Low
8432	Church Street	Cobblers Brook Tributary	0	0	0	0	1	3	3	1	2		10	Low
8433	Church Street	Cobblers Brook Tributary	0	0	0	0	1	3	3	1	2		10	Low
8434	Attitash Avenue	Lake Attitash (MA84002)	N/A	3	0	2	1	3	3	1	2		15	High
8435	Hansom Drive	Cobblers Brook (MA84A-22)	N/A	0	0	0	1	2	0	1	2		6	Low
8436	Meadow Avenue	Lake Attitash (MA84002)	N/A	3	0	2	1	3	3	1	2		15	High
8437	Bear Hill Road	Woods	0	0	0	0	1	3	0	3	2		9	Low
8438	Hansom Drive	Cobblers Brook (MA84A-22)	N/A	0	0	0	1	2	0	1	2		6	Low
8439	Highland Road	Woods	N/A	0	0	0	1	3	0	3	2		9	Low
8440	Hansom Drive	Cobblers Brook (MA84A-22)	N/A	0	0	0	1	2	0	1	2		6	Low
8441	West Shore Road	Woods (close to Lake Attitash)	N/A	0	0	0	1	1	0	1	2		5	Low
8442	Red Oak Acres	Cobblers Brook (MA84A-22)	0	0	0	0	1	2	0	1	2		6	Low
8443	West Shore Road	Lake Attitash (MA84002)	0	3	0	2	1	3	3	1	2		15	High
8444	Red Oak Acres	Cobblers Brook (MA84A-22)	0	0	0	0	1	2	0	3	2		8	Low
8445	Harriman Road	Cobblers Brook (MA84A-22)	0	0	0	0	1	3	0	3	2		9	Low
8446	Harriman Road	Cobblers Brook (MA84A-22)	0	0	0	0	1	3	0	3	2		9	Low
8447	Harriman Road	Cobblers Brook (MA84A-22)	0	0	0	0	1	3	0	1	2		7	Low
8448	Alnette Street	Lake Attitash (MA84002)	N/A	3	0	2	1	3	3	1	2		15	High
8449	Battis Road	Woods	N/A	0	0	0	1	3	0	3	2		9	Low
8450	Equestrian Way	Unknown Stream	N/A	0	0	0	1	2	0	3	2		8	Low
8451	Hadley Road	Unknown Stream	0	0	0	0	1	2	0	3	2		8	Low
8452	Equestrian Way	Unknown Stream	N/A	0	0	0	1	2	0	3	2		8	Low
8453	Ashley Lane	Grass Area	0	0	0	0	1	1	0	1	2		5	Low
8454	Brush Hill Road	Woods	N/A	0	0	0	1	2	0	3	2		8	Low
8455	Brush Hill Road	Unknown Stream	0	0	0	0	1	3	0	3	2		9	Low
8456	Brush Hill Road	Unknown Stream	N/A	0	0	0	1	3	0	3	2		9	Low
8457	Bear Hill Road	Woods	N/A	0	0	0	1	3	0	3	2		9	Low

Outfall I.D.	General Street Location	Receiving Water (1)	Previous Screening Results Indicate Likely Sewer Input? (2)	Discharging to Area of Concern to Public Health? (3)	Frequency of Past Discharge Complaints (4)	Receiving Water Quality (5)	Density of Generating Sites (6)	Age of Development / Infrastructure (7)	Historic Combined Sewers or Septic? (8)	Aging Septic? (9)	Culverted Streams? (10)	Additional Characteristics	SCORE	PRIORITY RANKING (11)
Information Source:			Outfall Inspections and Sample Results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria			Yes=3 (Problem Outfall) No=0	Yes=3 No=0	Fequent=3 Occasional=2 None=0	Poor=3 Fair=2 Good=0	High=3 Medium=2 Low=1	High=3 Medium=2 Low=1	Yes=3 No=0	Yes=3 No=1	Yes=3 No=2	TBD		

Scoring Criteria:

(2) Previous screening results indicate likely sewer input if any of the following are true:
- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

(3) Outfalls/interconnections that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

(5) Receiving water quality based on latest version of MassDEP Integrated List of Waters.
- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

(6) Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

(7) Age of development and infrastructure:
- High = Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

(8) Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers. It should be noted that Merrimac has no combined sewers.

(9) Aging septic systems are septic systems 30 years or older in residential areas.

(10) Any river or stream that is culverted for distance greater than a simple roadway crossing

SGC Assumptions:

(1) Highlighted responses were produced by SGC as either a new entry or revised from Merrimac's reporting records.

(2) "N/A" values were reports as "NO" to Dry Weather Testing within Merrimac's reporting records. All others were assumed "0" until Dry Weather Testing results can be reviewed.

(4) Assumed no previous discharge complaints.

(5) Cobblers Brook (MA84A-22) is categorized as a 4C water = 0, Lake Attitash (MA84002) is categorized as a 5 water = 2, Merrimack River (MA84A-05) is categorized as a 5 water = 2.

(6) Generating sites are institutional, municipal, commercial or industrial sites. For the purposes of this, we have assumed only municipal uses in Merrimac.

(7) Areas over 40 years old = 3, Areas of development 20-40 years old = 2, Areas of development less than 20 years old = 1.

(9) Areas where septic systems could potentially be older than 30 years.

(10) This category was difficult to determine from GIS mapping. Requires site inspeciton of additional information from Merrimac. We assumed there are no streams culverted longer than a standard road crossing.

(11) Further investigation is required to determine if some outfalls can be prioritized as "excluded".

ATTACHMENT 3

UPDATED OUTFALL RANKING

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Updated Outfall Inventory and Ranking, Merrimac, MA

Infrastructure and Investigation Information												Catchment Composition												Receiving Water								Ranking Output		
Town	Outfall ID	General Street Location	Receiving Water (Stream Segment)	Known or Suspected Problem?	Past Complaints?	Past Sewer Conversion or CSO in Catchment?	Culverts Longer Than Street Crossing In Catchment?	Date Outfall Screening Completed	Outfall Screening Results	Catchment Investigation Results	Infrastructure Score	Initial Catchment area (acres)	Number of Medium Loading Businesses	Number of High Loading Businesses	Density of Generating Sites (Businesses)	Number of Houses (20-40 years old)	Number of Houses (>40 years old)	Density of Generating Sites (Residential)	Length of Sewer Pipes in Catchment (Miles)	Density of Sewer Pipes in Catchment	Number of Septic Systems in Catchment	Density of Septic Systems	Catchment Score	Discharge to Public Beach	Discharge to Shellfish Bed	Discharge to Rec Area	Discharge in Drinking Water Supply Area	Dry Weather E.coli Score	Identified as NepRWA Hotspot?	Stormwater Related Impairments	Receiving Water Score	Outfall Ranking for Catchment Investigation	Stream Ranking for Outfall Screening	Priority Rank
				1 or 0 (if 1 automatically problem)	1 or 0 (if 1 automatically problem)	1 or 0	1 or 0		1 or 0 (if 1 automatically problem)	1 or 0	Equation	0	24	16	Equation	10	15	Equation	2.1	Equation	3	Equation		1 or 0 (if 1 automatically high)	1 or 0 (if 1 automatically high)	1 or 0 (if 1 automatically high)	1 or 0 (if 1 automatically high)	0, 1, or 2 (0= >235 average 1 = 235 - 500 2= >500 9 year average)	1 or 0 (if 1 automatically high)	0,1, 2, or 3 (0= no impairments, 1= 1-2 impairments, 2= 3-5 impairments, 3 = >5 impairments)	Equation	weighted average of the three scores	based on number of high priority outfalls	Problem, High, Medium, or Low
Merrimac	8249	Merrimac Road	Unknown Stream	0	0	0	0					1.3837	0	0	0	1	0	3.613	0	0.000	1	0.723		0	0	0	0			0	0.000			
Merrimac	8254	Merrimac Road	Unknown Stream	0	0	0	0					0.3889	0	0	0	0	2	51.432	0	0.000	2	5.143		0	0	0	0			0	0.000			
Merrimac	8255	Little Pond Road	Woods	0	0	0	0	8/17/22	0	0	0	0.1392	0	0	0	1	0	35.911	0	0.000	1	7.182		0	0	0	0			0	0.000			
Merrimac	8272	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	0.2777	0	0	0	2	0	36.012	190	684.226	0	0.000		0	0	0	0			0	0.000			
Merrimac	8273	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	0.6040	0	0	0	2	0	16.556	370	612.588	0	0.000		0	0	0	0			0	0.000			
Merrimac	8275	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	1.1229	0	0	0	4	0	17.810	465	414.094	0	0.000		0	0	0	0			0	0.000			
Merrimac	8295	Little Pond Road	Unknown Pond	0	0	0	0	8/17/22	0	0	0	0.3844	0	0	0	3	0	39.025	340	884.573	0	0.000		0	0	0	0			0	0.000			
Merrimac	8299	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	2.3825	0	0	0	11	0	23.085	1250	524.657	0	0.000		0	0	0	0			0	0.000			
Merrimac	8307	Spring Hill Road	Uknown Stream	0	0	0	0	8/17/22	0	0	0	0.2128	0	0	0	0	0	0.000	185	869.508	0	0.000		0	0	0	0			0	0.000			
Merrimac	8309	Spring Hill Road	Uknown Stream	0	0	0	0	8/17/22	0	0	0	0.5560	0	0	0	3	0	26.979	350	629.506	0	0.000		0	0	0	0			0	0.000			
Merrimac	8310	River Road	Drop Basin	0	0	1	0					1.7443	0	0	0	0	11	63.062	0	0.000	11	6.306		0	0	0	0			0	0.000			
Merrimac	8311	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	1.6185	0	0	0	4	0	12.357	470	290.400	0	0.000		0	0	0	0			0	0.000			
Merrimac	8312	Spring Hill Road	Woods	0	0	0	0	8/17/22	0	0	0	0.2128	0	0	0	1	0	23.500	175	822.508	0	0.000		0	0	0	0			0	0.000			
Merrimac	8313	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	0.0000	0	0	0	0	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!		0	0	0	0			0	0.000			
Merrimac	8314	Little Pond Road	Unknown Stream	0	0	0	0	8/17/22	0	0	0	0.3046	0	0	0	2	0	32.826	0	0.000	0	0.000		0	0	0	0			0	0.000			
Merrimac	8316	River Road	Unknown Brook	0	0	1	0					0.3963	0	0	0	0	4	100.944	0	0.000	4	10.094		0	0	0	0			0	0.000			
Merrimac	8317	River Road	Unknown Brook	0	0	1	0					0.3963	0	0	0	0	4	100.944	0	0.000	4	10.094		0	0	0	0			0	0.000			
Merrimac	8321	Spring Hill Road	Woods	0	0	0	0	8/17/22	0	0	0	0.8419	0	0	0	3	0	17.817	450	534.508	0	0.000		0	0	0	0			0	0.000			
Merrimac	8322	Little Pond Road	Unknown Pond	0	0	0	0	8/17/22	0	0	0	1.6304	0	0	0	8	0	24.533	600	367.999	0	0.000		0	0	0	0			0	0.000			
Merrimac	8323	Spring Hill Road	Uknown Stream	0	0	0	0	8/17/22	0	0	0	0.8361	0	0	0	5	0	29.901	495	592.043	0	0.000		0	0	0	0			0	0.000			
Merrimac	8336	River Road	Merrimack River (MA84A-05)	0	0	1	0					1.1010	0	0	0	0	2	18.165	0	0.000	2	1.817		0	0	0	0			2	0.333			
Merrimac	8345	River Road	Merrimack River (MA84A-05)	0	0	1	0					1.0048	0	0	0	0	2	19.904	0	0.000	2	1.990		0	0	0	0			2	0.333			
Merrimac	8349	Little Pond Road	Woods	0	0	0	0	8/17/22	0	0	0	0.9736	0	0	0	6	0	30.814	615	631.691	0	0.000		0	0	0	0			0	0.000			
Merrimac	8350	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8352	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8358	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8359	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8360	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8361	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8362	Chase Cresent	Unknown Stream	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8363	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8364	River Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8365	River Road	Merrimack River (MA84A-05)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			2	0.333			
Merrimac	8366	Locust Grove Road	Woods	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8367	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8368	West Parish Lane	Unknown Stream	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8369	Stevens Terrace	Grass Area	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8370	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8371	Locust Grove Road	Woods	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8372	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8373	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			2	0.333			
Merrimac	8374	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			2	0.333			
Merrimac	8375	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			2	0.333			
Merrimac	8376	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8377	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8378	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			2	0.333			
Merrimac	8379	River Road	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			2	0.333			
Merrimac	8380	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8381	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8382	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8383	Locust Grove Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8384	Pleasant Valley Road	Merrimack River (MA84A-05)	0	0	1	0																	0	0	0	0			2	0.333			
Merrimac	8385	Stevens Terrace	Unknown Stream	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8386	Locust Grove Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8387	Union Street	Woods	0	0	1	0	8/17/22	0		0.167													0	0	1	0			0	0.000			
Merrimac	8388	Union Street	Woods	0	0	1	0	8/17/22	0		0.167													0	0	1	0			0	0.000			
Merrimac	8389	Union Street	Woods	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8390	West Parish Lane	Detention Basin	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8391	Orchard Street	Woods	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8392	Middle Street	Woods	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8393	West Parish Lane	Unknown Stream	0	0	1	0	9/8/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8394	Heath Brook Lane	Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8395	West Parish Road	Unknown Stream	0	0	1	0	9/8/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8396	Orchard Street	Woods	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8397	Orchard Street	Woods	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8398	Orchard Street	Woods	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8399	Orchard Street	Woods	0	0	0	0	9/8/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8400	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8401	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			

Updated Outfall Inventory and Ranking, Merrimac, MA

Infrastructure and Investigation Information												Catchment Composition												Receiving Water								Ranking Output		
Town	Outfall ID	General Street Location	Receiving Water (Stream Segment)	Known or Suspected Problem?	Past Complaints?	Past Sewer Conversion or CSO in Catchment?	Culverts Longer Than Street Crossing In Catchment?	Date Outfall Screening Completed	Outfall Screening Results	Catchment Investigation Results	Infrastructure Score	Initial Catchment area (acres)	Number of Medium Loading Businesses	Number of High Loading Businesses	Density of Generating Sites (Businesses)	Number of Houses (20-40 years old)	Number of Houses (>40 years old)	Density of Generating Sites (Residential)	Length of Sewer Pipes in Catchment (Miles)	Density of Sewer Pipes in Catchment	Number of Septic Systems in Catchment	Density of Septic Systems	Catchment Score	Discharge to Public Beach	Discharge to Shellfish Bed	Discharge to Rec Area	Discharge in Drinking Water Supply Area	Dry Weather E.coli Score	Identified as NepRWA Hotspot?	Stormwater Related Impairments	Receiving Water Score	Outfall Ranking for Catchment Investigation	Stream Ranking for Outfall Screening	Priority Rank
				1 or 0 (if 1 automatically problem)	1 or 0 (if 1 automatically problem)	1 or 0	1 or 0		1 or 0 (if 1 automatically problem)	1 or 0	Equation	0	24	16	Equation	10	15	Equation	2.1	Equation	3	Equation		1 or 0 (if 1 automatically high)	1 or 0 (if 1 automatically high)	1 or 0 (if 1 automatically high)	1 or 0 (if 1 automatically high)	0, 1, or 2 (0= >235 average 1 = 235 - 500 2= >500 9 year average)	1 or 0 (if 1 automatically high)	0,1, 2, or 3 (0= no impairments, 1= 1-2 impairments, 2= 3-5 impairments, 3 = >5 impairments)	Equation	weighted average of the three scores	based on number of high priority outfalls	Problem, High, Medium, or Low
Merrimac	8402	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8403	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8404	Sunset Terrace	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8405	Champion Street	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8406	Champion Street	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8407	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8408	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8409	West Main Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8410	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8411	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8412	Hadley Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8413	Broad Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8414	Hadley Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8415	Burnside Lane	Swale/Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8416	Liberty Street	Cobblers Brook (MA84A-22)	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8417	Hadley Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8418	Willowdale Drive	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8419	Winter Street	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8420	Willowdale Drive	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8421	Chruch Street	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8422	Attitash Avenue	Woods	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8423	Church Street	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8424	Church Street	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8425	Willowdale Drive	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8426	Winter Street	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8427	Winter Street	Cobblers Brook Tributary	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8428	Attitash Avenue	Wood/Wetland	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8429	Attitash Avenue	Wood/Wetland	0	0	1	0	8/17/22	0		0.167													0	0	0	0			0	0.000			
Merrimac	8430	Church Street	Woods/Cobblers Brook Tributary	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8431	Church Street	Wood/Wetland	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8432	Church Street	Cobblers Brook Tributary	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8433	Church Street	Cobblers Brook Tributary	0	0	1	0																	0	0	0	0			0	0.000			
Merrimac	8434	Attitash Avenue	Lake Attitash (MA84002)	0	0	1	0	8/17/22	0		0.167													0	0	0	1			2	0.333			
Merrimac	8435	Hansom Drive	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8436	Meadow Avenue	Lake Attitash (MA84002)	0	0	1	0	8/17/22	0		0.167													0	0	0	1			2	0.333			
Merrimac	8437	Bear Hill Road	Woods	0	0	0	0	8/17/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8438	Hansom Drive	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8439	Highland Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8440	Hansom Drive	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8441	West Shore Road	Woods (close to Lake Attitash)	0	0	0	0	8/17/22	0		0.000													0	0	0	0			0	0.000			
Merrimac	8442	Red Oak Acres	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8443	West Shore Road	Lake Attitash (MA84002)	0	0	1	0	8/17/22	0		0.167													0	0	0	1			2	0.333			
Merrimac	8444	Red Oak Acres	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8445	Harriman Road	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8446	Harriman Road	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8447	Harriman Road	Cobblers Brook (MA84A-22)	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8448	Alnette Street	Lake Attitash (MA84002)	0	0	1	0	8/17/22	0		0.167													0	0	0	1			2	0.333			
Merrimac	8449	Battis Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8450	Equestrian Way	Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8451	Hadley Road	Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8452	Equestrian Way	Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8453	Ashley Lane	Grass Area	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8454	Brush Hill Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8455	Brush Hill Road	Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8456	Brush Hill Road	Unknown Stream	0	0	0	0																	0	0	0	0			0	0.000			
Merrimac	8457	Bear Hill Road	Woods	0	0	0	0																	0	0	0	0			0	0.000			

ATTACHMENT 4

DRY WEATHER OUTFALL INSPECTION FORMS

SME
SEVEE & MAHER
ENGINEERS

Outfall ID: 8255 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

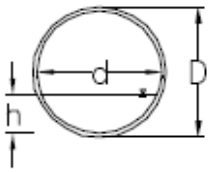
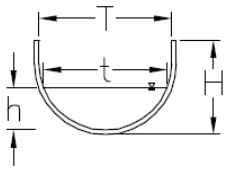
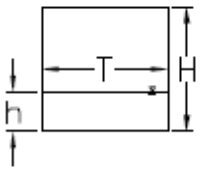
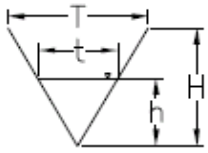
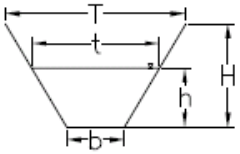
Street Name Little Pond Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Severely overgrown. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data.

Outfall ID: 8272 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

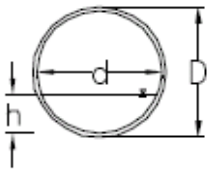
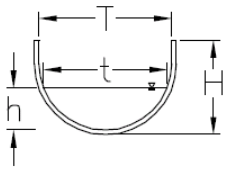
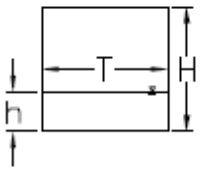
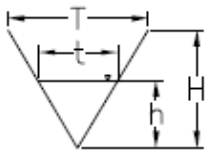
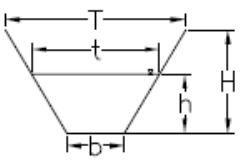
Street Name Little Pond Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☒	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Pipe outfall was found. Outfall included flared end section. Slightly overgrown. Outfall was dry.

Outfall ID: 8273 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

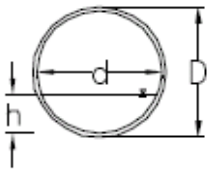
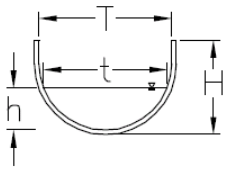
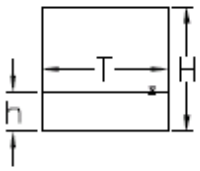
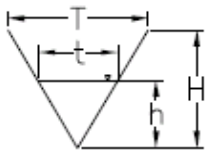
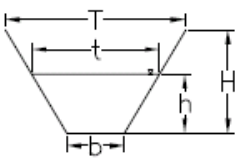
Street Name Little Pond Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☒	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 36	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

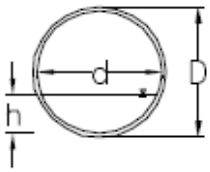
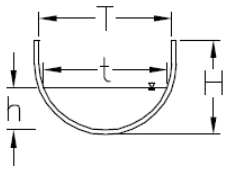
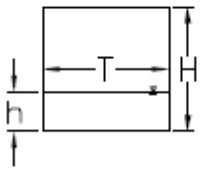
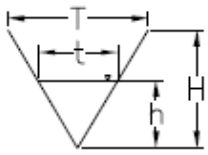
Comments: Pipe outfall was found. Outfall is cross street culvert outlet. Outfall included flared end section. Outfall was dry.

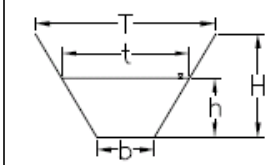
Outfall ID:	**8275**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Little Pond Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☒	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**

 ☒

Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Pipe outfall was found. Outfall is cross street culvert outlet. Outfall included flared end section. Sightly vegetated. Outfall was dry.

Outfall ID: 8295 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

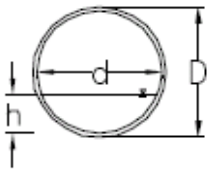
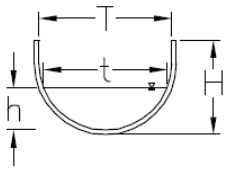
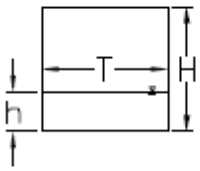
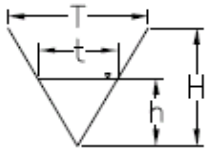
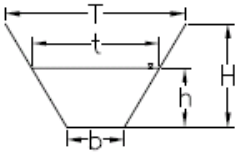
Street Name Little Pond Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Severely overgrown. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data.

Outfall ID: 8299 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

Street Name Little Pond Road

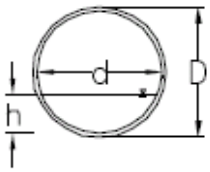
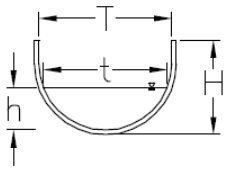
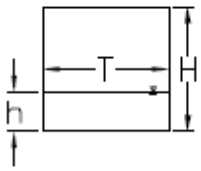
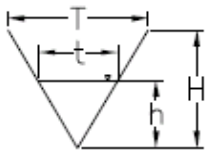
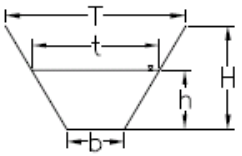
Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):	**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____	

Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☒	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

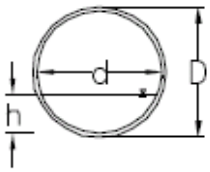
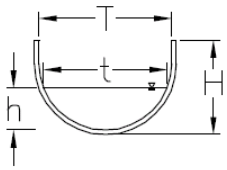
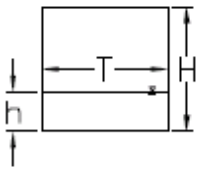
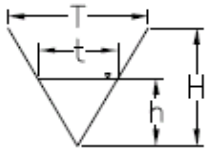
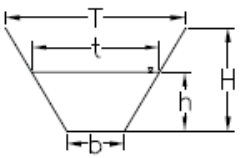
Comments: Pipe outfall was found. Outfall included flared end section. Heavily vegetated. Outfall was dry.

Outfall ID:	**8307**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Spring Hill Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☒	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 36	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Severely overgrown. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data. There was only one outfall found in

Outfall ID: 8309 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

Street Name Spring Hill Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

Rounded Pipe/Swale	Rectangular Pipe/Swale	Triangular Swale	Trapezoidal Swale
☐ ☒	☐	☐	☒

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☒ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☒ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap		Sheen: Bacterial	
Excessive sediment		Sheen: Petroleum	
Foam		Floatables	
Sanitary Waste		Algae	
Orange Staining		Excessive Vegetation	

Required Maintenance:
Tree Work
Ditch Work
Structural Corrosion
N/A
Remove Trash/Debris
Blocked Pipe
Erosion at Structure
Other

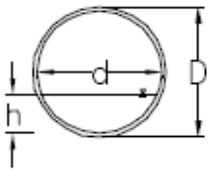
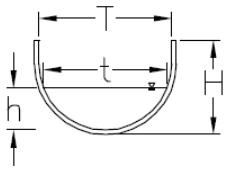
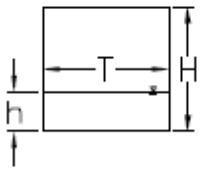
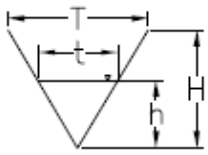
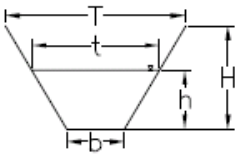
Comments: Pipe outfall was found. Slightly overgrown. Outfall was dry.

Outfall ID:	**8311**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Little Pond Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☒ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒	Rip rap	Sheen: Bacterial
Optical enhancers suspected?	Yes ☐	No ☒	Excessive sediment	Sheen: Petroleum
Has channelization occurred?	Yes ☐	No ☒	Foam	Floatables
Has scouring occurred below the outlet?	Yes ☐	No ☒	Sanitary Waste	Algae
			Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Severely overgrown, can not access. Headwall was slightly visible through vegetation. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above

is based on previous data.		

Outfall ID: 8312 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

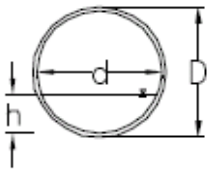
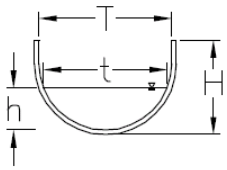
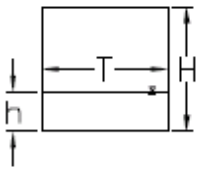
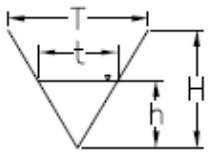
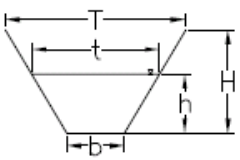
Street Name Spring Hill Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☒	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap		Sheen: Bacterial	
Excessive sediment		Sheen: Petroleum	
Foam		Floatables	
Sanitary Waste		Algae	
Orange Staining		Excessive Vegetation	

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

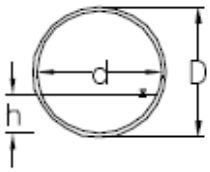
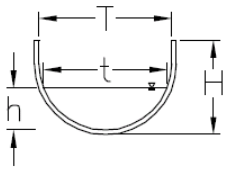
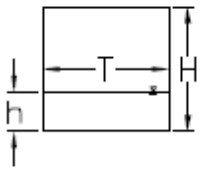
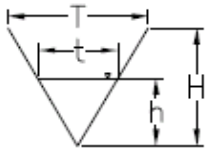
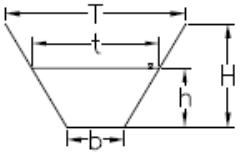
Comments: Pipe outfall was found. Outfall includes flared end section. Outfall was dry.

Outfall ID:	**8313**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Little Pond Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☒ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Severely overgrown, can not access. Headwall was slightly visible through vegetation. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above

is based on previous data.		

Outfall ID: 8314 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

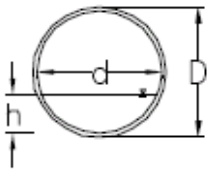
Street Name Little Pond Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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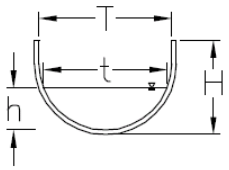

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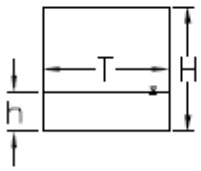
Rounded Pipe/Swale



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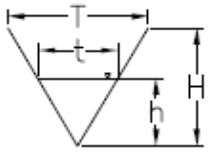
Rectangular Pipe/Swale



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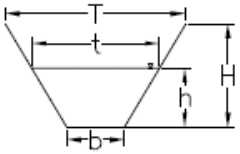
Triangular Swale



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Trapezoidal Swale

Pipe Measurements: Inner Dia. (in): d= 12 Outer Dia. (in): D= _____ Pipe Width (in): T= _____ Pipe Height (in): H= _____ Flow Width (in): h= _____*	**Swale Measurements:** Swale Width (in): T= _____ Flow Width (in): t = _____ Swale Height (in): H= _____ Flow Height (in): h= _____* Bottom Width (in): b=_____	**Is there a headwall?** Yes ☒ No ☐ **Condition:** Good ☐ Poor ☐ Fair ☐ Crumbling ☐ **Unknown. Headwall not accessible.**	**Location Sketch**

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Severely overgrown, can not access. Headwall was slightly visible through vegetation. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above

is based on previous data.		

Outfall ID: 8321 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

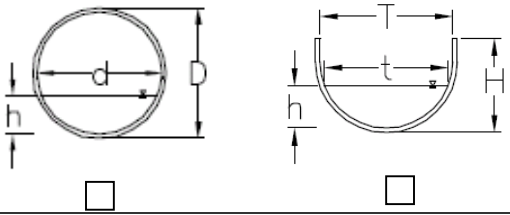
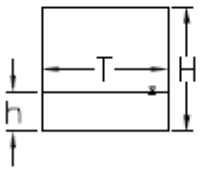
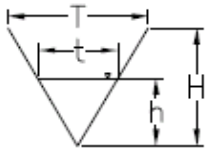
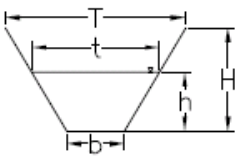
Street Name Spring Hill Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

			
☐ ☐	☐	☐	☒
Rounded Pipe/Swale	**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

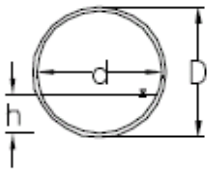
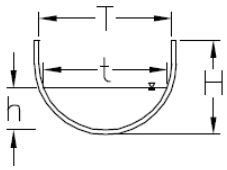
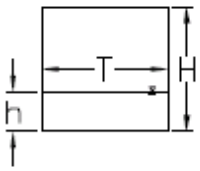
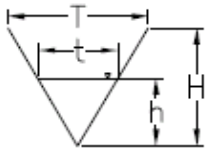
Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data.

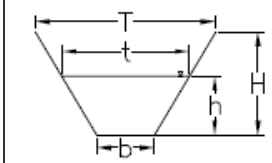
Outfall ID:	**8322**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Little Pond Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**

 ☒

Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒	Rip rap	Sheen: Bacterial
Optical enhancers suspected?	Yes ☐	No ☒	Excessive sediment	Sheen: Petroleum
Has channelization occurred?	Yes ☐	No ☒	Foam	Floatables
Has scouring occurred below the outlet?	Yes ☐	No ☒	Sanitary Waste	Algae
			Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

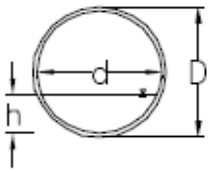
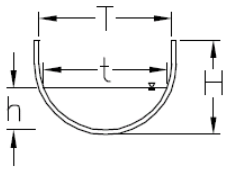
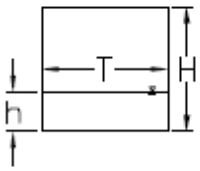
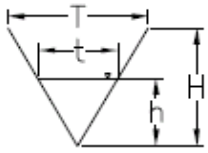
Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data.

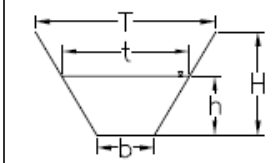
Outfall ID:	**8323**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Spring Hill Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**

 ☒

Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):	**Bold All Materials Present:**
Odor: Yes ☐ No ☒	Rip rap / Sheen: Bacterial
Optical enhancers suspected? Yes ☐ No ☒	Excessive sediment / Sheen: Petroleum
Has channelization occurred? Yes ☐ No ☒	Foam / Floatables
Has scouring occurred below the outlet? Yes ☐ No ☒	Sanitary Waste / Algae
Required Maintenance: **Tree Work**, Ditch Work, Structural Corrosion, N/A, Remove Trash/Debris, Blocked Pipe, Erosion at Structure, Other	Orange Staining / **Excessive Vegetation**

Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data.

Outfall ID: 8349 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

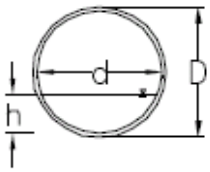
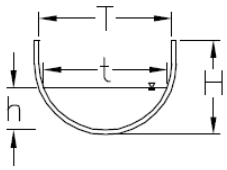
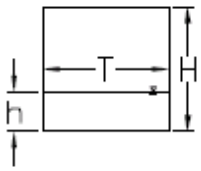
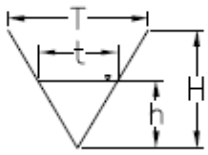
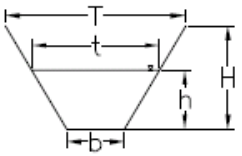
Street Name Little Pond Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: Unknown ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. The majority of the information above is based on previous data.

Outfall ID: 8365 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

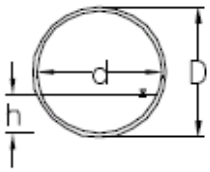
Street Name River Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☒	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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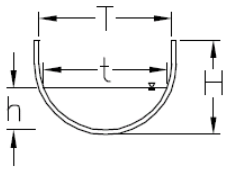

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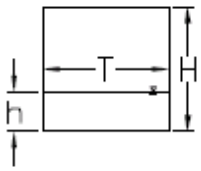
Rounded Pipe/Swale



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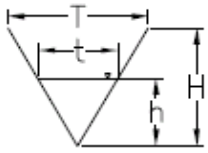
Rectangular Pipe/Swale



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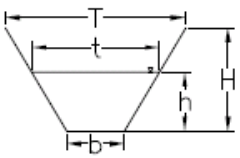
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*	**Unknown. Headwall not accessible.**	
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒	Rip rap	Sheen: Bacterial
Optical enhancers suspected?	Yes ☐	No ☒	Excessive sediment	Sheen: Petroleum
Has channelization occurred?	Yes ☐	No ☒	Foam	Floatables
Has scouring occurred below the outlet?	Yes ☐	No ☒	Sanitary Waste	Algae
			Orange Staining	**Excessive Vegetation**

Required Maintenance: Tree Work ☐ Remove Trash/Debris ☐ Ditch Work ☐ Blocked Pipe ☐ Structural Corrosion ☐ Erosion at Structure ☐ N/A ☐ Other ☐

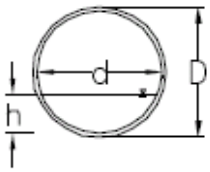
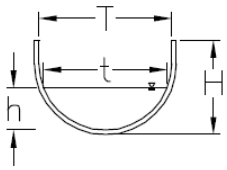
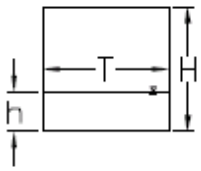
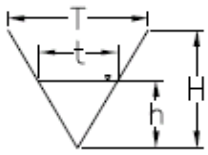
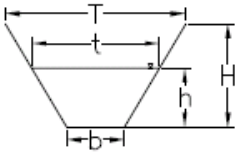
Comments: Outfall was not found between houses. However, no water flow was observed in area of outfall. The majority of the information above is based on previous data.

Outfall ID:	**8373**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Pleasant Valley Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. Outfall is possibly located within Merrimack River embankment. The

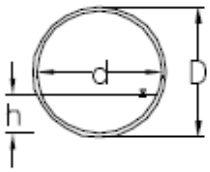
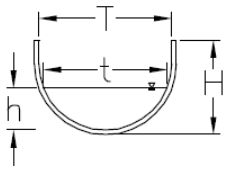
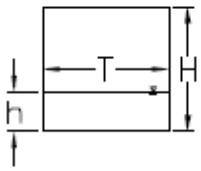
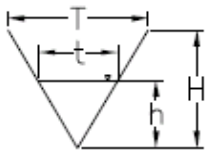
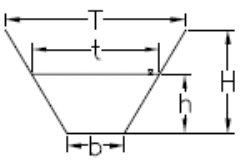
majority of the information above is based on previous data.		

Outfall ID:	**8374**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Pleasant Valley Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☒	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 8	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. Outfall is possibly located within Merrimack River embankment. The

majority of the information above is based on previous data.		

Outfall ID: 8375 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

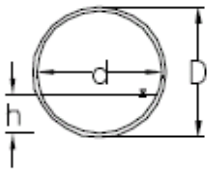
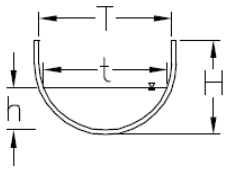
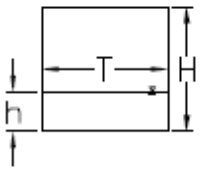
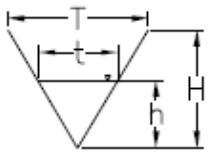
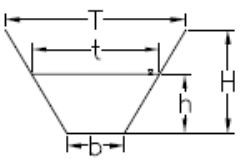
Street Name Pleasant Valley Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 10	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. Outfall is possibly located within Merrimack River embankment. The

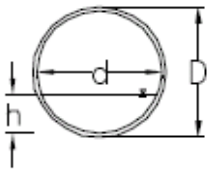
majority of the information above is based on previous data.		

Outfall ID:	**8378**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Pleasant Valley Road		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☒ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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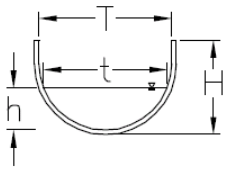

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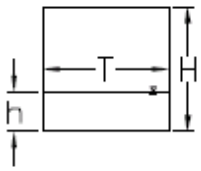
Rounded Pipe/Swale



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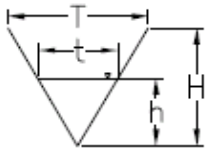
Rectangular Pipe/Swale



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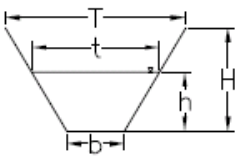
Triangular Swale



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Trapezoidal Swale

Pipe Measurements: Inner Dia. (in): d= 12 Outer Dia. (in): D= _____ Pipe Width (in): T= _____ Pipe Height (in): H= _____ Flow Width (in): h= _____*	**Swale Measurements:** Swale Width (in): T= _____ Flow Width (in): t = _____ Swale Height (in): H= _____ Flow Height (in): h= _____* Bottom Width (in): b=_____	**Is there a headwall?** Yes ☐ No ☒ **Condition:** Good ☐ Poor ☐ Fair ☐ Crumbling ☐	**Location Sketch**

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is severely overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall. Outfall is possibly located within Merrimack River embankment. The

majority of the information above is based on previous data.		

Outfall ID: 8379 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

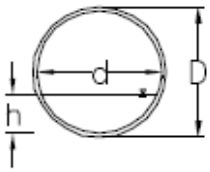
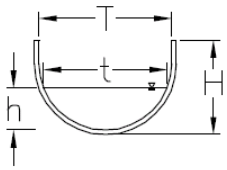
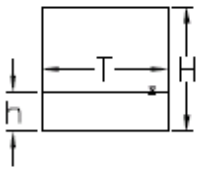
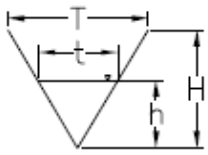
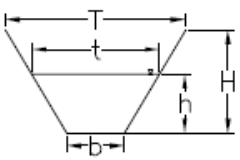
Street Name River Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☒ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. No outfalls were observed at the Cobbler Brook crossing. Outfalls may have been realigned during bridge rebuild. No water flow was observed in area of outfall or Cobbler Brook embankment. The

majority of the information above is based on previous data.		

Outfall ID: 8387 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

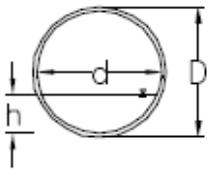
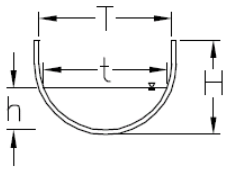
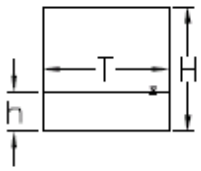
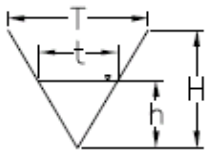
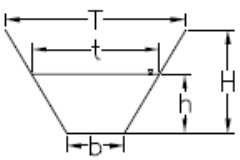
Street Name Union Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area between tennis courts and 495 is severely overgrown and can not access. However, upstream CBs were dry and no water flow was observed in area of outfall.. The majority of the information above is

based on previous data.		

Outfall ID: 8388 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

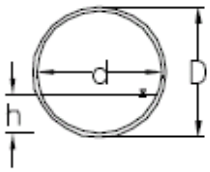
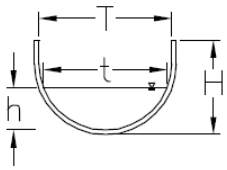
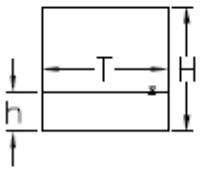
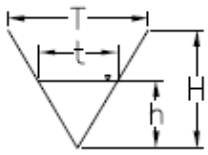
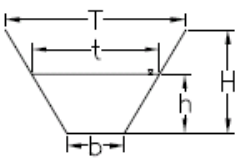
Street Name Union Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area between tennis courts and 495 is severely overgrown and can not access. However, upstream CBs were dry and no water flow was observed in area of outfall.. The majority of the information above is

based on previous data.		

Outfall ID: 8389 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

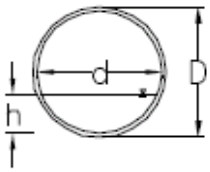
Street Name Union Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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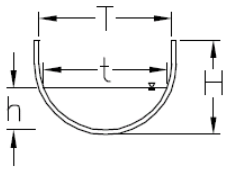

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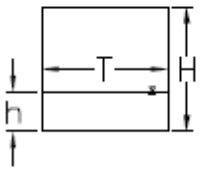
Rounded Pipe/Swale



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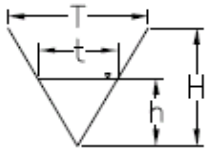
Rectangular Pipe/Swale



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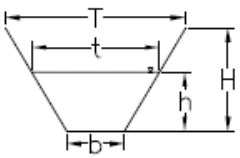
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 8	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area between houses is overgrown. However, upstream CBs were dry and no water flow was observed in area of outfall.. The majority of the information above is based on previous data.

Outfall ID: 8400 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

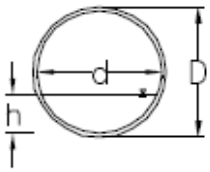
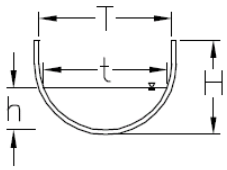
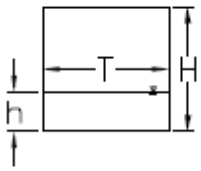
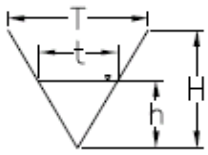
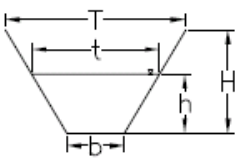
Street Name Broad Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall.. The majority of the information above is based on previous data.

Outfall ID: 8401 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

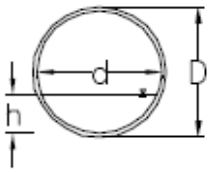
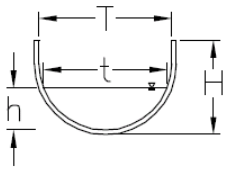
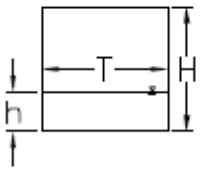
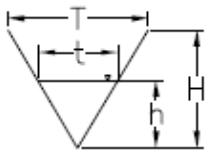
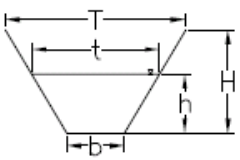
Street Name Broad Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area is overgrown and can not access. However, discharge CB was dry and no water flow was observed in area of outfall.. The majority of the information above is based on previous data.

Outfall ID: 8402 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

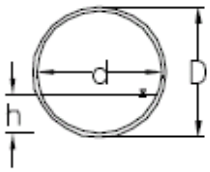
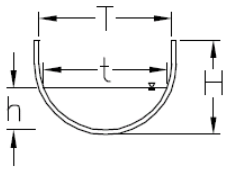
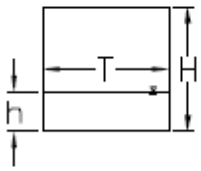
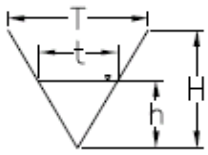
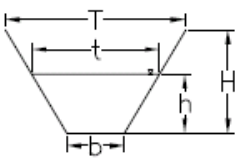
Street Name Broad Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap		Sheen: Bacterial	
Excessive sediment		Sheen: Petroleum	
Foam		Floatables	
Sanitary Waste		Algae	
Orange Staining		**Excessive Vegetation**	

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	**Erosion at Structure**
N/A	Other

Comments: Outfall was not found. Area near brook crossing is overgrown and can not be accessed because crossing has failed and is not accessible. No water flow was observed in area of outfall or Cobbler Brook embankment. Erosion was

observed at Brook crossing due to failure. The majority of the information above is based on previous data.		

Outfall ID: 8403 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

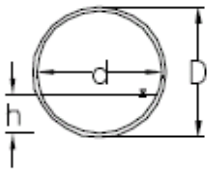
Street Name Broad Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☒	**Pipe Condition:**	Good ☐ Poor ☒ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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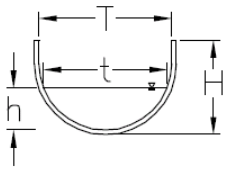

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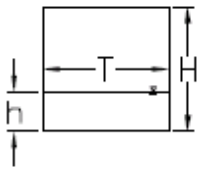
Rounded Pipe/Swale



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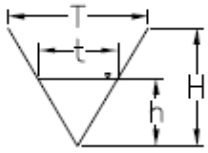
Rectangular Pipe/Swale



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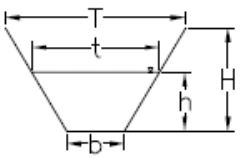
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 24	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	**Erosion at Structure**
N/A	Other

Comments: Outfall was not found. Area near brook crossing is overgrown and can not be accessed because crossing has failed and is not accessible. No water flow was observed in area of outfall or Cobbler Brook embankment. Erosion was

observed at Brook crossing due to failure. The majority of the information above is based on previous data.		

Outfall ID: 8407 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

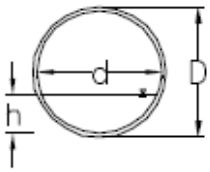
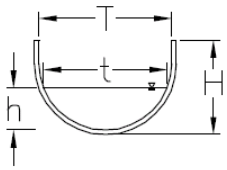
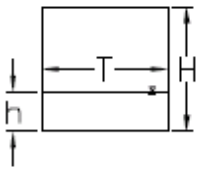
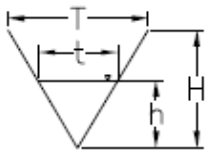
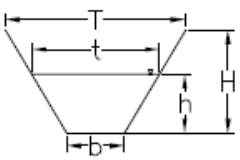
Street Name Broad Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☒ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	**Erosion at Structure**
N/A	Other

Comments: Outfall was not found. Area near stream crossing is overgrown. No water flow was observed in area of outfall or stream embankment. Upstream CB was dry. The majority of the information above is based on previous data.

Outfall ID: 8408 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

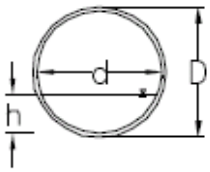
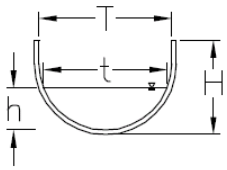
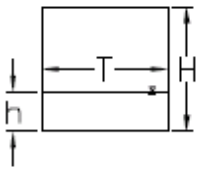
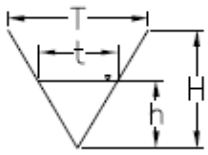
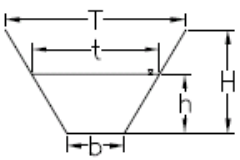
Street Name Broad Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	**Erosion at Structure**
N/A	Other

Comments: Outfall was not found. Area near stream crossing is overgrown. No water flow was observed in area of outfall or stream embankment. Upstream CB was dry. The majority of the information above is based on previous data.

Outfall ID: 8409 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

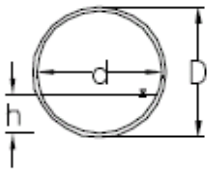
Street Name West Main Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☐ Poor ☒ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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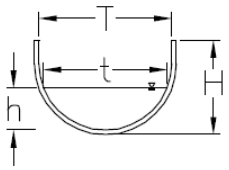

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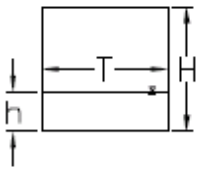
Rounded Pipe/Swale



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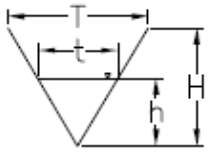
Rectangular Pipe/Swale



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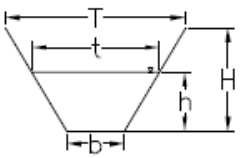
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area near Cobbler Brook crossing is slightly overgrown. Only one outfall was located at the inlet side of the crossing (8410). 8410 outfall was dry. No water flow was observed in area of outfall or brook

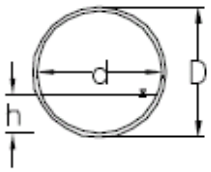
embankment. The majority of the information above is based on previous data.		

Outfall ID:	**8410**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	8/17/22
Street Name	Broad Street (based on outfall map, West Main Street)		
Last rainfall event	8/5/22 – NOAA (Lawrence, MA)		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☒ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☐ Poor ☒ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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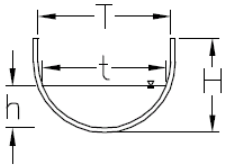

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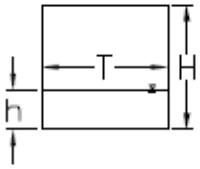
Rounded Pipe/Swale



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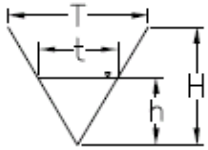
Rectangular Pipe/Swale



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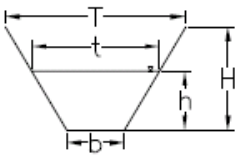
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was found. Area near Cobbler Brook crossing is slightly overgrown. Only 8410 outfall was located at the inlet side of the crossing. 8409

and 8411 were not found. Outfall was dry. Outfall is in poor condition. The majority of the information above is based on previous data.		

Outfall ID: 8411 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

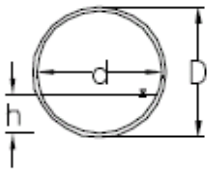
Street Name Broad Street (based on outfall map, West Main Street)

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☐ Poor ☒ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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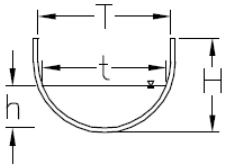

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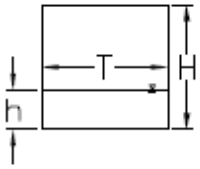
Rounded Pipe/Swale



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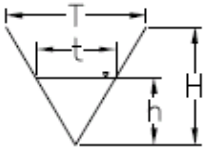
Rectangular Pipe/Swale



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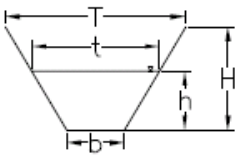
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area near Cobbler Brook crossing is slightly overgrown. Only one outfall was located at the inlet side of the crossing (8410).

8410 outfall was dry. No water flow was observed in area of outfall or brook embankment. The majority of the information above is based on previous data.		

Outfall ID: 8413 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

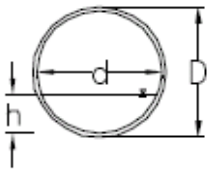
Street Name Broad Street (based on outfall map, West Main Street)

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: C. Steel_____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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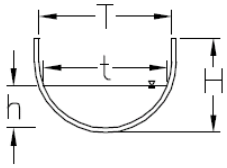

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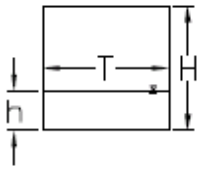
Rounded Pipe/Swale



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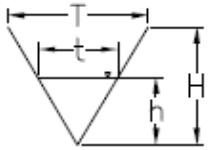
Rectangular Pipe/Swale



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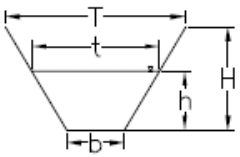
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Outfall potentially discharges in Cobbler Brook. Area of outfall is overgrown along brook embankment. No water flow was

observed in area of outfall or brook embankment. The majority of the information above is based on previous data.		

Outfall ID: 8416 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

Street Name Liberty Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☒	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

Rounded Pipe/Swale	Rectangular Pipe/Swale	Triangular Swale	Trapezoidal Swale
☐ ☐	☐	☐	☐

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 8	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found between houses. Outfall potentially discharges in Cobbler Brook. Area of outfall is overgrown along brook embankment. No water flow was observed in area of outfall or brook embankment. The majority

of the information above is based on previous data.		

Outfall ID: 8429 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

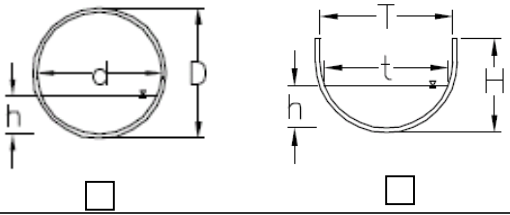
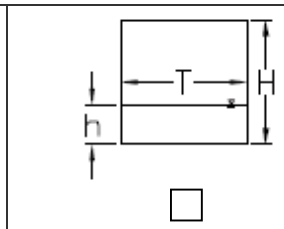
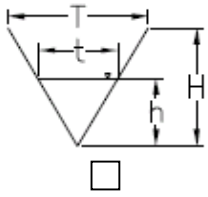
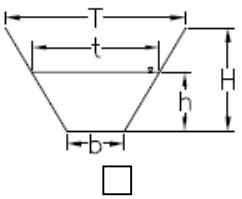
Street Name Attitash Avenue

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☒ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

			
☐ ☐	☐	☐	☐
Rounded Pipe/Swale	**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial	
Excessive sediment	Sheen: Petroleum	
Foam	Floatables	
Sanitary Waste	Algae	
Orange Staining	**Excessive Vegetation**	

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Area near fence and beyond fence is very overgrown. No water flow was observed in area of outfall. Upstream CB was dry. The majority of the information above is based on previous data.

Outfall ID: 8434 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

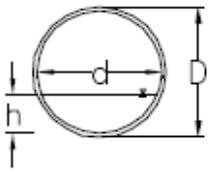
Street Name Attitash Avenue

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☒ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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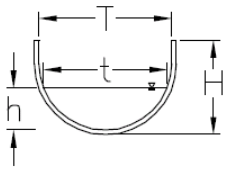

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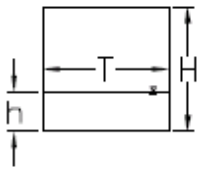
Rounded Pipe/Swale



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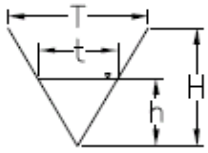
Rectangular Pipe/Swale



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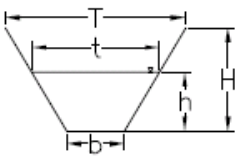
Triangular Swale



☐

Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Outfall likely discharges in Lake Attitash. No water flow was observed in area of outfall. Upstream CB and boat launch French drain were dry. The majority of the information above is based on previous data.

Outfall ID: 8436 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

Street Name Attitash Avenue

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

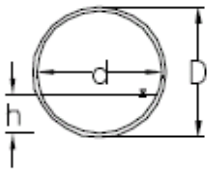
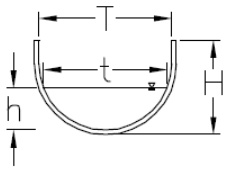
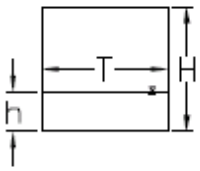
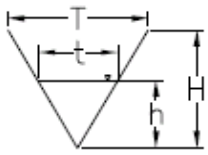
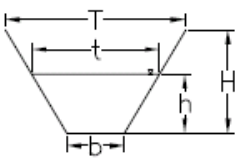
DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):	**Pipe Outfall** ☒	**Open Swale Outfall** ☐

Outfall Label:	**Stencil** ☒	**Ground Inset** ☐	**Sign** ☐	**None** ☐	**Other**_____

Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Outfall likely discharges in Lake Attitash. No water flow was observed in area of outfall. Upstream CB was dry. The majority of the information above is based on previous data.

Outfall ID: 8437 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

Street Name Bear Hill Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

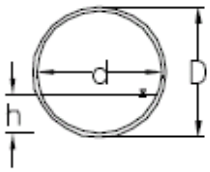
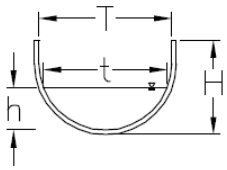
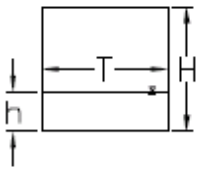
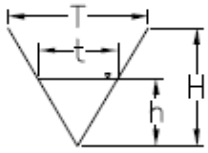
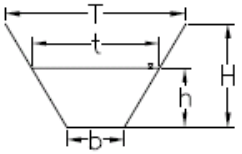
DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):	**Pipe Outfall** ☒	**Open Swale Outfall** ☐

Outfall Label:	**Stencil** ☒	**Ground Inset** ☐	**Sign** ☐	**None** ☐	**Other**_____

Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Based on review of historic maps, it appears that the roads have been realigned in this area. The approximate area of the outfall is overgrown. No water flow was observed in area of outfall. The majority

of the information above is based on previous data.		

Outfall ID: 8441 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

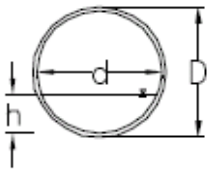
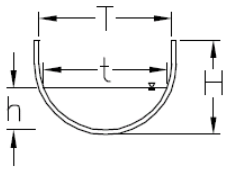
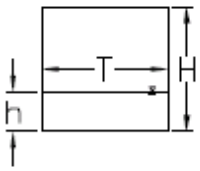
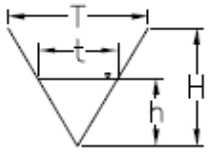
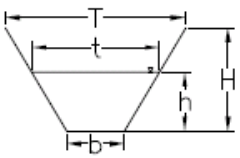
Street Name West Shore Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☒ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☒	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= ~10	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= 3	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=1-2		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial		
Excessive sediment	Sheen: Petroleum		
Foam	Floatables		
Sanitary Waste	Algae		
Orange Staining	Excessive Vegetation		

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was found. Outfall and riprap swale were in good condition and appears to be maintained well. Ourfall was dry.

Outfall ID: 8443 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

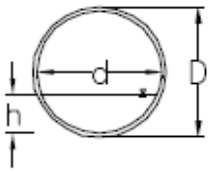
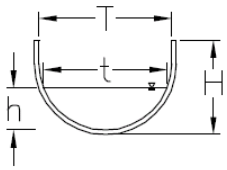
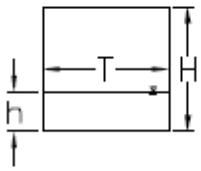
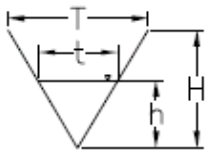
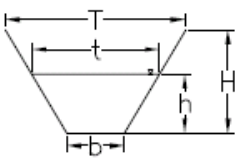
Street Name West Shore Road

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☒ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☐
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒	Rip rap	Sheen: Bacterial
Optical enhancers suspected?	Yes ☐	No ☒	Excessive sediment	Sheen: Petroleum
Has channelization occurred?	Yes ☐	No ☒	Foam	Floatables
Has scouring occurred below the outlet?	Yes ☐	No ☒	Sanitary Waste	Algae
			Orange Staining	**Excessive Vegetation**

Required Maintenance: Tree Work ☐ Remove Trash/Debris ☐ Ditch Work ☐ Blocked Pipe ☐ Structural Corrosion ☐ Erosion at Structure ☐ N/A ☐ Other ☐

Comments: Outfall was not found. Based on review of historic maps, it appears that the outfall is located between houses. It may be located within Lake Attitash. The approximate area of the outfall is overgrown. No water flow was observed in

area of outfall. The majority of the information above is based on previous data.		

Outfall ID: 8448 **Town:** Merrimac

Inspector: MRR **Date:** 8/17/22

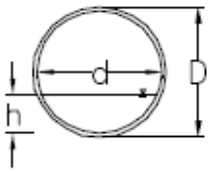
Street Name Alnette Street

Last rainfall event 8/5/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☐ Clay Tile ☐ Plastic ☒ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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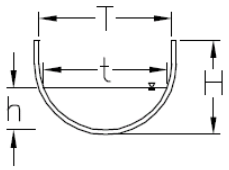

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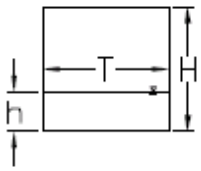
Rounded Pipe/Swale



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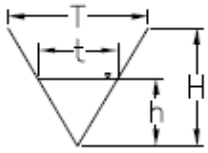
Rectangular Pipe/Swale



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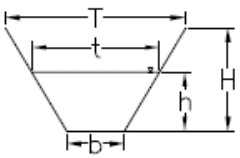
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Based on review of historic maps, it appears that the outfall is located between houses. The approximate area of the outfall is overgrown. No water flow was observed in area of outfall. The majority of the

information above is based on previous data.		

Outfall ID: 8362 **Town:** Merrimac

Inspector: MRR **Date:** 9/8/22

Street Name Chase Cresent

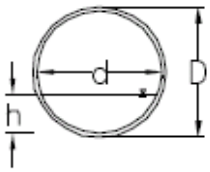
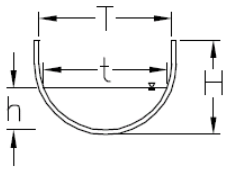
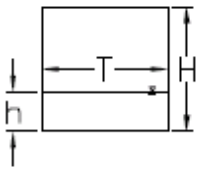
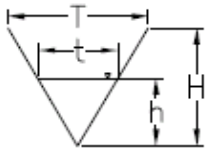
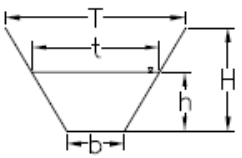
Last rainfall event 8/6/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):	**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____	

Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☒	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 36	Swale Width (in): T= _____	Yes ☒ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☒ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

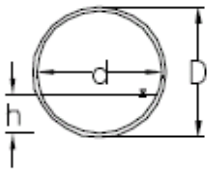
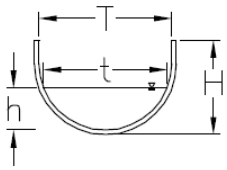
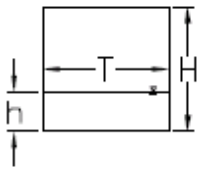
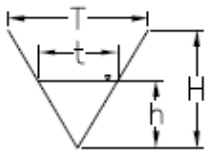
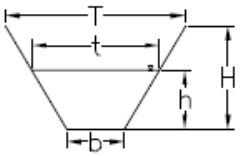
Comments: 36" concrete cross culvert was found. Headwall is overgrown. Can we remove as an outfall? Pipe is a cross-culvert for drainage swale. A CB is located in the general area of the outfall. CB was dry. Could not find CB discharge pipe.

Outfall ID:	**8368**	**Town:**	**Merrimac**
Inspector:	**MRR**	**Date:**	9/8/22
Street Name	West Parish Lane		
Last rainfall event	8/6/22 – NOAA (Lawrence, MA)		

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found. Outfall is mapped near a large corrugated metal cross culvert. Cross-culvert was in good condition. Inlet and outlet is constructed with stone headwalls. Cross-culvert ditch was ditch was dry. The majority of the

information above is based on previous data.		

Outfall ID: 8369 **Town:** Merrimac

Inspector: MRR **Date:** 9/8/22

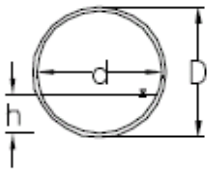
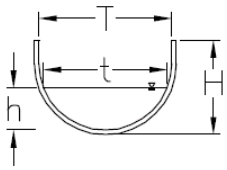
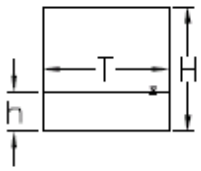
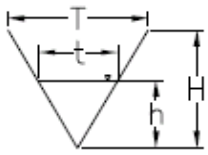
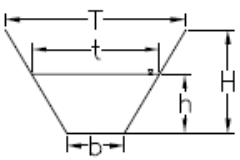
Street Name Stevens Terrace

Last rainfall event 8/6/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 18	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Pipe was found. Slight vegetation coverage around inlet. Pipe and swale were dry.

Outfall ID: 8385 **Town:** Merrimac

Inspector: MRR **Date:** 9/8/22

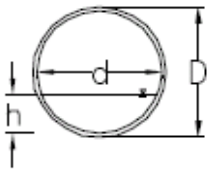
Street Name Stevens Terrace

Last rainfall event 8/6/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☐ Corrugated metal ☒ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐

Shape of Pipe/Swale (check one)



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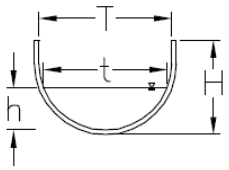

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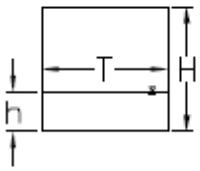
Rounded Pipe/Swale



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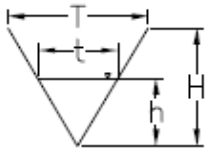
Rectangular Pipe/Swale



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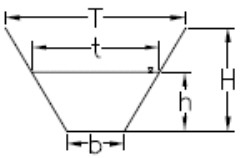
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☐ No ☒	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☐ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	Excessive Vegetation

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was found. Slight vegetation. Pipe was partially blocked. Outfall was dry.

Outfall ID: 8393 **Town:** Merrimac

Inspector: MRR **Date:** 9/8/22

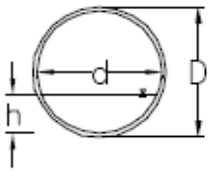
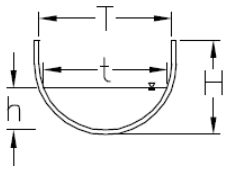
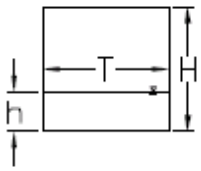
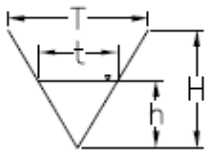
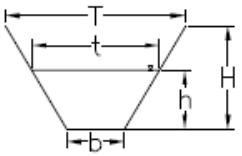
Street Name West Parish Lane

Last rainfall event 8/6/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)

 ☐	 ☐	 ☐	 ☐	 ☒
Rounded Pipe/Swale		**Rectangular Pipe/Swale**	**Triangular Swale**	**Trapezoidal Swale**

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 48	Swale Width (in): T= _____	Yes ☒ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☒ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Required Maintenance:

Tree Work	Remove Trash/Debris
Ditch Work	Blocked Pipe
Structural Corrosion	Erosion at Structure
N/A	Other

Comments: Outfall was not found within headwall. Severely overgrown. However, discharge CB was dry and no water flow was observed in area of outfall. The pipe information provided above is based on previous data.

Outfall ID: 8395 **Town:** Merrimac

Inspector: MRR **Date:** 9/8/22

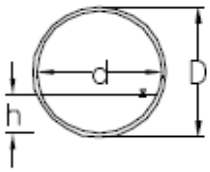
Street Name West Parish Lane

Last rainfall event 8/6/22 – NOAA (Lawrence, MA)

DRY WEATHER OUTFALL INSPECTION SURVEY

Type of Outfall (check one):		**Pipe Outfall** ☒	**Open Swale Outfall** ☐
Outfall Label:	**Stencil** ☒ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Pipe Material:	Concrete ☒ Corrugated metal ☐ Clay Tile ☐ Plastic ☐ Other: _____ ☐	**Pipe Condition:**	Good ☒ Poor ☐ Fair ☐ Crumbling ☐
Swale Material:	Paved (asphalt) ☐ Concrete ☐ Earthen ☒ Stone ☐ Other: _____ ☐	**Swale Condition:**	Good ☐ Poor ☐ Fair ☒ Crumbling ☐

Shape of Pipe/Swale (check one)



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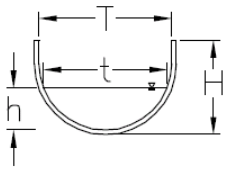

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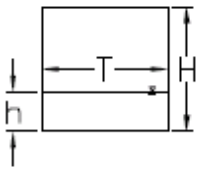
Rounded Pipe/Swale



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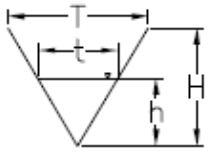
Rectangular Pipe/Swale



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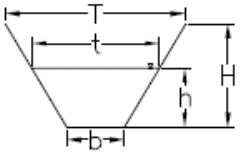
Triangular Swale



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Trapezoidal Swale

Pipe Measurements:	**Swale Measurements:**	**Is there a headwall?**	**Location Sketch**
Inner Dia. (in): d= 12	Swale Width (in): T= _____	Yes ☒ No ☐	
Outer Dia. (in): D= _____	Flow Width (in): t = _____	**Condition:**	
Pipe Width (in): T= _____	Swale Height (in): H= _____	Good ☐ Poor ☐ Fair ☒ Crumbling ☐	
Pipe Height (in): H= _____	Flow Height (in): h= _____*		
Flow Width (in): h= _____*	Bottom Width (in): b=_____		

Description of Flow: Heavy ☐ Moderate ☐ Trickling ☐ Dry ☒

If the outlet is submerged check yes and indicate approximate height of water above the outlet invert. h above invert (in):

Bold All Materials Present:

Odor:	Yes ☐	No ☒
Optical enhancers suspected?	Yes ☐	No ☒
Has channelization occurred?	Yes ☐	No ☒
Has scouring occurred below the outlet?	Yes ☐	No ☒

Required Maintenance:
Tree Work
Ditch Work
Structural Corrosion
N/A
Remove Trash/Debris
Blocked Pipe
Erosion at Structure
Other

Rip rap	Sheen: Bacterial
Excessive sediment	Sheen: Petroleum
Foam	Floatables
Sanitary Waste	Algae
Orange Staining	**Excessive Vegetation**

Comments: Outfall was not found within headwall. Severely overgrown. However, discharge CB was dry and no water flow was observed in approximate area of outfall. The pipe information provided above is based on previous data.