



DRY WEATHER OUTFALL INSPECTION REPORT

To: Mr. Sam Jensen, P.E., Assistant Town Engineer
From: Nick Cristofori, P.E., Comprehensive Environmental Inc.
Date: June 3, 2021
Town: Sandwich, MA
Subject: Dry Weather Outfall Inspection and Screening

Under the Environmental Protection Agency’s (EPA’s) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Sandwich are required to inspect all known outfalls and interconnections for the presence of dry weather flow (no more than 0.1-inches of rainfall has occurred during the previous 24-hour period and no significant snow melt is occurring) within three years of the permit effective date, or by June 30, 2021.

Members of the town performed field work related to dry weather screening on October 9 and 19, 2020, January 8, 2021, and March 8, 2021 during which a total of seven outfalls were observed to be flowing. Remaining outfalls were either directly observed to be dry or inspected via an upgradient structure where no flow was observed. Members from Comprehensive Environmental Inc. (CEI) then visited the seven flowing outfalls on April 5 and 19, 2021, during which six of the seven outfalls were observed to be flowing (outfall OU38-500-691 was not flowing on April 19, 2021). The following relevant outfall conditions were documented by the Town and CEI:

Table 1 – Dry Weather Flow Screening Results

Parameter	Number
Known Outfalls	82
Outfalls that were Attempted to Visit	82
Outfalls that Could Not be Accessed	1
Outfalls that Were Abandoned	1
Outfalls or Upgradient Structures Observed	80
Outfalls Found Not Flowing	74
Outfalls Found with Evidence of Flow	6
Found with Illicit Discharge Potential	2
Total Not Yet Attempted to Visit	0

CEI observed evidence of flowing outfalls at six location and collected samples for analysis of the following parameters: ammonia, chlorine, conductivity, salinity, surfactants, pH, dissolved oxygen, temperature, and e.coli or enterococcus. Additionally, five outfalls had pollutants of concern associated with fecal coliform and one additionalg outfall had a pollutant of concern associated with total phosphorus which were also collected and analyzed. Results are as follows:



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Table 2 – Dry Weather Flow Screening Results

Outfall ID	Ammonia Result (mg/L)	Chlorine Result (mg/L)	Surfactants Result (mg/L)	Conductivity Result (uS/cm)	Salinity Result (ppt)	Temperature Result (C)	pH Result	Dissolved Oxygen Result (mg/L)	Total Phosphorus (mg/L)	Enterococcus Result (MPN/100 mL)	E. Coli Result (MPN/100 mL)
OU73-187-001	0	0	0.09	235.5	0.11	12.7	7.83	7.88		0	
OU89-344-96-B	0.25	0	0.96*	2121	1.09	11.4	6.91	6.39		45	
OU82-54-32-A	0	0.04*	0.15	397	0.19	11.2	6.58	4.8		5	
OU82-258-8	1*	0	0.61*	7094	3.92	10.6	6.2	4.71		15	
OUT-73-187-002	0	0	0.15	544.9	0.27	12.1	6.87	6.06		0	
OU38-500-692	0	0	0.27*	147.9	0.07	11.4		11	0.03		1.1

*Exceeds illicit discharge or water quality benchmarks

Per the 2016 MS4 Permit, the following criteria indicate likely sewer input and should be considered highly likely to contain illicit discharges from sanitary sources:

1. Olfactory or visual evidence of sewage;
2. Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water (235 colonies per 100 mL); and/or
3. Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

Recommendations and Next Steps

The following items are recommended as follow-up actions:

- None of the flowing outfalls met the Permit criteria as being highly likely to contain illicit discharges from sanitary sources and do not require additional follow-up.
- Although two flowing outfalls exhibited minor evidence of illicit discharges associated with benthic growth, stormwater discharges from both outfalls did not indicate that illicit discharges are likely and additional follow-up is likely not required.
- One outfall, outfall OU73-300-1 appears not to have been assessed directly or at an upgradient structure for the presence of flow. It is recommended that this location be investigated during a future date if required. Outfalls that have not yet been located should be inspected for dry weather flows by the end of Year 3 (June 30, 2021).
- The Town may wish to complete expanded outfall screening to assess outfalls for parameters not required under the Permit. This may include inspecting outfalls for structural condition, sedimentation accumulation, evidence of downstream erosion or



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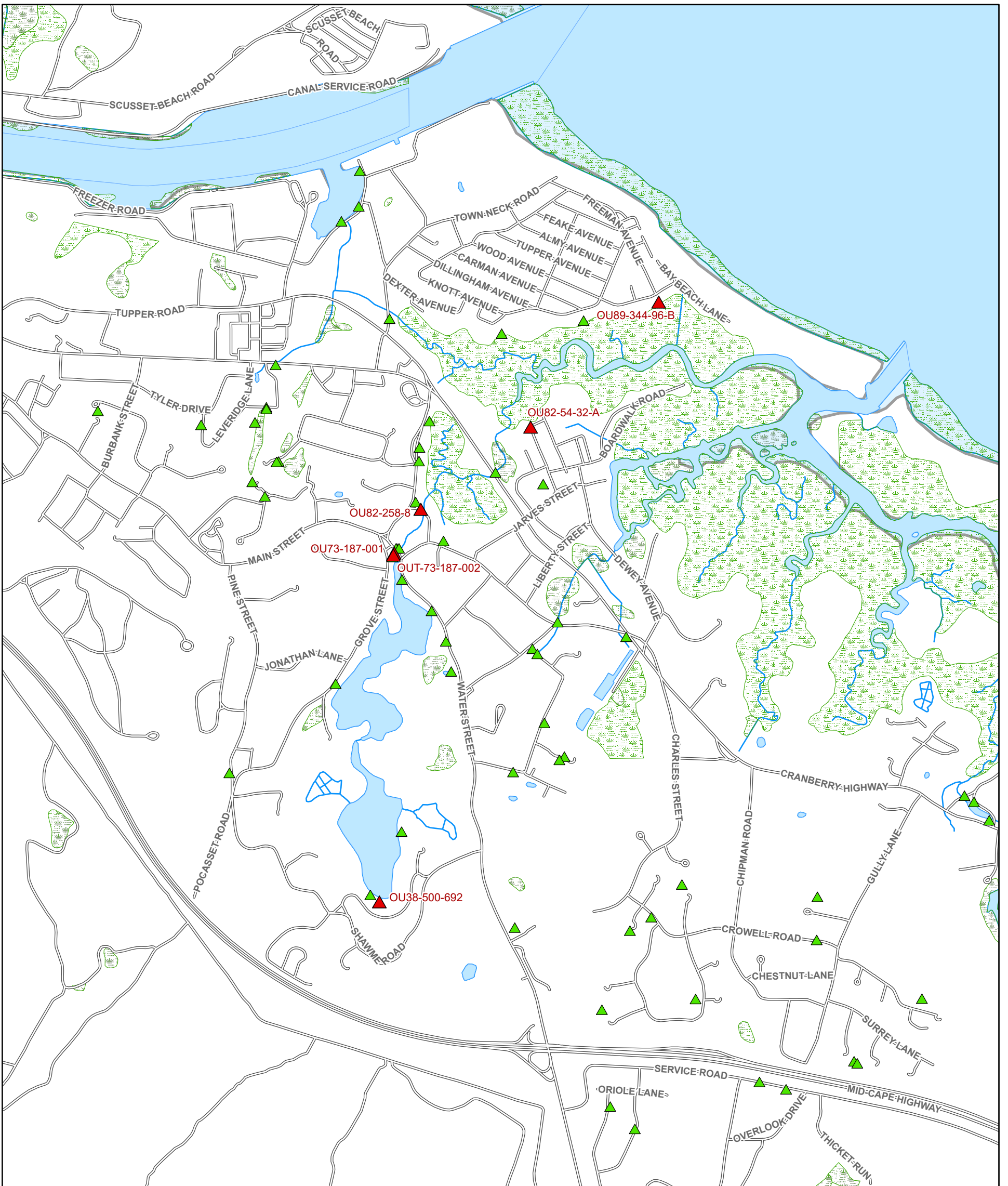
vegetation distress, etc. Note that this is not required as part of the illicit discharge investigations completed to date.

If you have any further questions or would like additional information, please feel free to contact me at 800.725.2550 x303 or ncristofori@ceiengineers.com. Thank you.







Nick Cristofori, P.E.
Principal, Project Manager

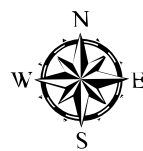
Attachments:

- Dry Weather Outfall Sampling Map of Flowing Outfalls
- Dry Weather Outfall Screening Results of Flowing Outfalls



Legend

-  Flowing Outfall
-  Not Flowing Outfall
-  Road
-  Lake, Pond, Reservoir
-  Wetland, Marsh, Swamp
-  Stream, Brook



**Dry Weather Outfall
Screening Results Map**

Sandwich, MA



**Comprehensive
Environmental
Incorporated**

Data Sources: MassGIS, Town of Sandwich, CEI

Sandwich Massachusetts Dry Weather Outfall Screening

Outfall Characteristics													Headwall and Downstream Condition								Illicit Discharge Potenti		
Outfall ID	Lat.	Lon.	Date / Time of Inspection	Outfall Located?	Receiving Waterbody (if any)	Number of Outfall Pipes	Outfall Type	Outfall Shape	Outfall Diameter (inches)	Outfall Material	Outfall Damage	Outfall Condition Comment	Pipe End Treatment	Pipe End Treatment Condition	Headwall Material	Headwall Condition	Headwall Condition Comment	Downstream Erosion	Vegetation Distress	Downstream Erosion Comment	Sedimentation Level	Any Illicit Discharge Indicators?	Illicit Discharge Indicators
OU73-187-001	41.75810	-70.50039	4/5/2021 15:37	Found	Mill Creek	1	Outfall	Round	12	DI	None		Flush with headwall	Good	Stone	Good	Resting wall	None	None		None	No	Green benthic growth
OU89-344-96-B	41.76743	-70.48688	4/5/2021 16:33	Found	Mill Creek	1	Outfall	Round	36	RCP	Spalling	Minor invert spalling	Flush with headwall	Good	Reinforced Concrete	Good		None	None	Channelization	None	Yes	
OU82-54-32-A	41.76279	-70.49353	4/5/2021 17:16	Found	Mill Creek	1	Outfall	Round	12	RCP	Spalling	Generalized spalling and chipping at outlet	Flush with headwall	Fair	Stone	Good		None	None		Moderate, 25%-50	No	Orange benthic growth
OU82-258-8	41.75960	-70.49904	4/5/2021 17:52	Found	Mill Creek	1	Outfall	Round	12	RCP	Spalling, Cracking	Spalling and disjointed	Projecting	Poor	Stone	Good	Stone retaining wall for roadway	None	None		None	Yes	
OUT-73-187-002	41.75804	-70.50026	4/5/2021 18:30	Found	Mill Creek	1	Outfall	Round	10	VC	None	Outfall plugged	Projecting	Good	Stone	Good		None	None		None	No	
OU38-500-692	41.74493	-70.50146	4/19/2021 13:14	Found	Shawne Pond	1	Outfall	Round	12	CMP	None	Top of pipe is minorly crushed	Projecting	Good	Stone	Good		None	None		None	No	
OU38-500-691	41.74752	-70.50025	4/19/2021 14:09	Found	Shame Pond	1	Outfall	Round	22	CMP	None	End section of pipe removed	Projecting	Good	N/A	N/A		None	None	Outfall perched and undermined by severe plunge pool	None	No	

Notes

1. Outfall Material: RCP = Reinforced Concrete Pipe; CMP = Corrugated Metal Pipe; HDPE = High Density Polyethylene; CI = Cast Iron; PVC = Polyvinyl Chloride; VC = Vitrified Clay; DI = Ductile Iron

al		Sampling Parameters																	Overall Comments	
Outfall ID	Illicit Discharge Potential	Is Dry Weather Flow Present?	Flow Description	Flow Depth (inches)	Revisit Required?	Is a Sample Required?	Is Outfall Submerged?	Pollutant(s) of Concern	Ammonia Result (mg/L)	Chlorine Result (mg/L)	Surfactants Result (mg/L)	Conductivity Result (uS/cm)	Salinity Result (ppt)	Temperature Result (C)	pH	Dissolved Oxygen (mg/L)	Total Phosphorus (mg/L)	Enterococcus Result - Lab (MPN/100 mL)	E. Coli Result - Lab (MPN/100 mL)	Overall Comments
OU73-187-001	Unlikely	Yes	Trickle	0.5	No	Yes	Yes	Fecal coliform	0	0	0.09	235.5	0.11	12.7	7.83	7.88		0		Outfall partially submerged, sample collected from upgradient catch basin. Source of flow seems to be originating from artisan drain fountain
OU89-344-96-B		Yes	Trickle	0.1	No	Yes	No	Fecal coliform	0.25	0	0.96	2121	1.09	11.4	6.91	6.39		45		
OU82-54-32-A	Unlikely	Yes	Trickle	0.25	No	Yes	No	Fecal coliform	0	0.04	0.15	397	0.19	11.2	6.58	4.8		5		Source of flow appears to be a sump pump discharging above the sole catch basin in drainage network
OU82-258-8		Yes	Trickle	0.1	No	Yes	No	Fecal coliform	1	0	0.61	7094	3.92	10.6	6.2	4.71		15		
OUT-73-187-002		Yes	Trickle	0.1	No	Yes	No	Fecal coliform	0	0	0.15	544.9	0.27	12.1	6.87	6.06		0		Originates from town hall. Outfall plugged but trickle of flow escaping
OU38-500-692		Yes	Trickle	1	No	Yes	No	Total phosphorus	0	0	0.27	147.9	0.07	11.4		11	0.03		1.1	Outfall flowing but no flow in upgradient catch basin.
OU38-500-691		No			No	No	No													Outfall was noted as flowing during towns inspection but was not flowing during this inspection. Invert and conveyance are both wet however