



# DRY WEATHER OUTFALL INSPECTION REPORT

1

**To:** Mr. Brent Baeslack, Conservation Agent  
**From:** Nick Cristofori, P.E., Comprehensive Environmental Inc.  
**Date:** June 30, 2021  
**Town:** Rowley, 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 Rowley 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. CEI performed field work related to dry weather screening over the course of four field days on May 7, 14, and 28, and June 22, 2021. The following relevant outfall conditions were observed:

**Table 1 – Dry Weather Flow Screening Results**

Parameter	Number
Known Outfalls within the Urbanized Area	93
Outfalls that were Attempted to Visit	85
Outfalls that Could Not be Located or Accessed	19
Structures Identified as an Outfall Found that were not an Outfall	6
Actual Outfalls Found	60
Outfalls Found	60
Outfalls Found Not Flowing	55
Outfalls Found with Evidence of Flow	5
Found with Illicit Discharge Potential	0
Total Not Yet Attempted to Visit	8

The five flowing outfalls were sampled for the following parameters as required by the permit: ammonia, chlorine, conductivity, salinity, e.coli, surfactants, and temperature. Results are as follows:



# DRY WEATHER OUTFALL INSPECTION REPORT

2

Table 2 – Dry Weather Flow Screening Results

Outfall ID	Ammonia (mg/L)	Chlorine (mg/L)	Surfactants (mg/L)	Conductivity (uS/cm)	Salinity (ppt)	Temperature (C)	pH	E. Coli (MPN/100 mL)
OF-59	0	0	<b>0.3</b>	606	0.3	18.3	6.72	8
OF-66	0	0	0.1	678	0.41	15.1	7.4	2
OF-76	0	<b>0.08</b>	<b>0.5</b>	1,004	0.58	17.6	7.34	0
OUT-91	0	0	0.2	1,309	0.86	13	6.41	5
OUT-100	0	<b>0.04</b>	0.13	903	0.52	17.7	6.86	0

Notes:

\* Numbers in bold 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  $\geq 0.5$  mg/L, surfactants  $\geq 0.25$  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  $\geq 0.5$  mg/L, surfactants  $\geq 0.25$  mg/L, and detectable levels of chlorine.

## Recommendations and Next Steps

The following items are recommended as follow-up actions:

- None of the sampling data collected from flowing outfalls met the Permit criteria as being highly likely to contain illicit discharges from sanitary sources. Additionally, none of the outfalls inspected exhibited a sewage smell that could be indicative of an illicit discharge. No additional illicit discharge screening is required at these outfalls.
- Outfall OUT-91 and OUT-100 exhibited some green discoloration; however, dry weather screening did not indicate the likelihood of an illicit discharge.
- Outfall OUT-60 exhibited some green discoloration; however, illicit discharges appear unlikely as no other evidence was observed in the area.
- Outfalls OF-3, OF-9, OF-11, OF-20, OF-23, OF-25, OF-26, OF-32, OF-48, OF-50, OF-53, OF-57, OF-69, OF-84, OF-91, OUT-103, OUT-28, OUT-33, OUT-56, and OUT-91 were observed to be at least half buried in sediment and should be cleaned out to preserve flow capacity.
- Outfalls OF-7, OF-10, OF-11, OF-20, OF-32, OF-57, OF-84, OUT-28, OUT-56, and OUT-91 were observed to be in poor condition and are showing evidence of deterioration. These outfalls should be monitored during future years and/or repaired as soon as practical.
- A total of 19 outfalls could not be located or accessed. These outfalls should be field-located so that dry weather inspections and screening can occur, or determined not to exist and removed from mapping. If possible, it is recommended that field work be undertaken during the non-growing season when vegetation is at a minimum but with no snow on the ground, as these conditions makes locating outfalls easier.



# DRY WEATHER OUTFALL INSPECTION REPORT

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3

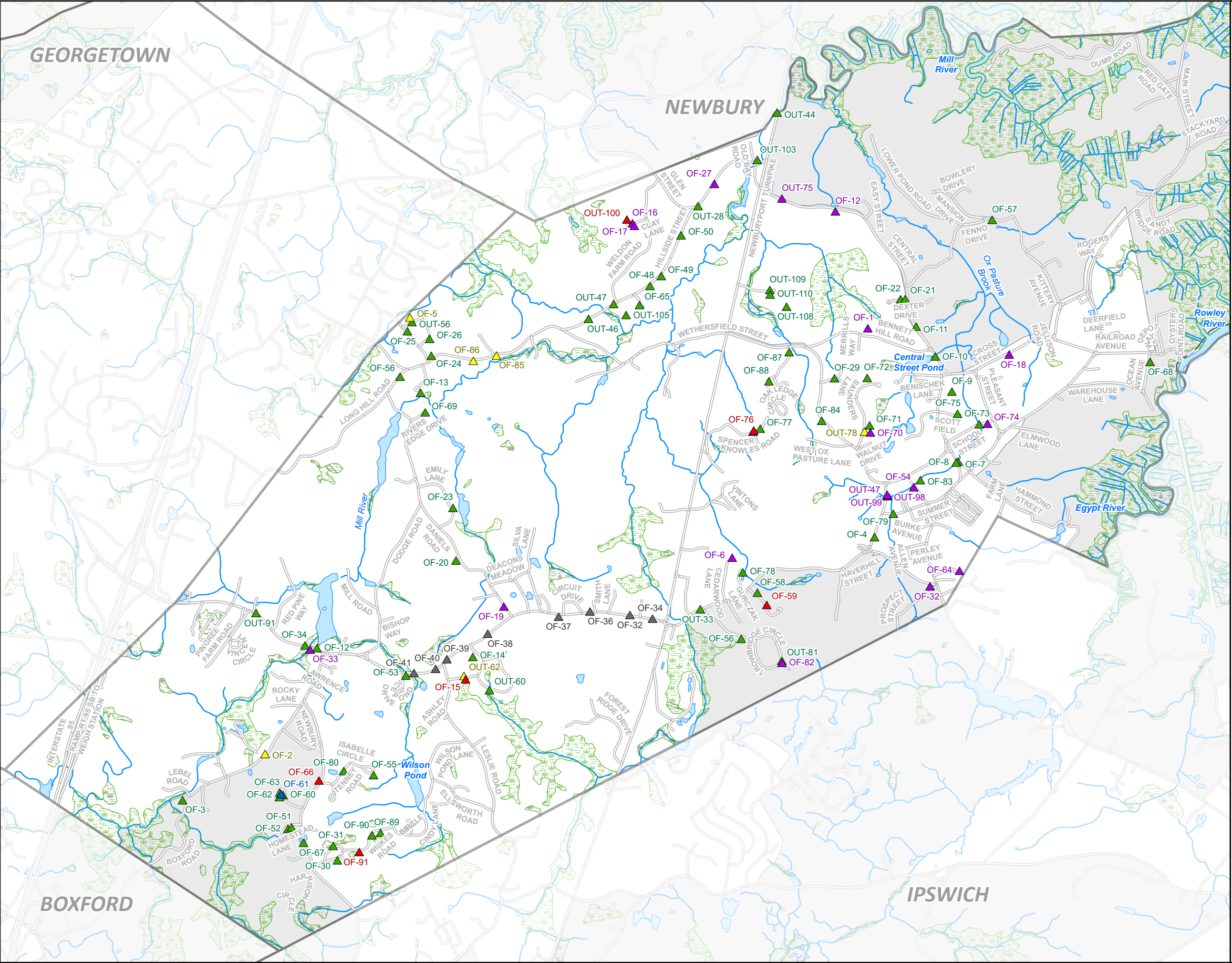
- A total of 8 outfalls have not yet been visited and should be inspected for dry weather flows as soon as possible. These outfalls were all located along Haverhill Street, a relatively narrow roadway with narrow or non-existent roadway shoulder and a 40 miles-per-hour speed limit, both of which limited field staff accessibility. Should future field efforts be unable to locate any of these outfalls, they will have to be sampled via an upgradient manhole located within the travel way of the roadway which will require a police detail. It is recommended that field work to locate and evaluate these outfalls be combined with investigating the other 19 outfalls above that could not be located or accessed.

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](mailto:ncristofori@ceiengineers.com). Thank you.

Nick Cristofori, P.E.  
Principal, Project Manager

#### Attachments:

- Dry Weather Outfall Sampling Results map
- Table of Results



Dry Weather Outfall  
Screening Map

Rowley, MA



Legend

Outfall Inspection Result:

- ▲ Flowing
- ▲ Not Flowing
- ▲ Not Found
- ▲ BMP Outlet
- ▲ Culvert
- ▲ Not Visited
- Roads
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area



Rowley Massachusetts Dry Weather Outfall Screening																
Structure ID	Location					Outfall Characteristics										
	Date / Time of Inspection	x	y	Street Name	Feature in MS4 region?	Status	Name of receiving waters	Type of Outfall	Shape of Outfall	Diameter	Outfall Material	Feature drains from:	ID of connected feature	Is feature submerged?	Primary land use	Notes
OF-1		249128.9891	941159.6126		Yes	Not found		Storm Sewer (closed pipe)				Catchbasin			Residential	Could not find outfall, mapped in garden area. Pipe exists in upgradient CB. No flow observed.
OF-2		250055.7698	941160.0999	Boxford Road	Yes	Found - not an outfall		Storm Sewer (closed pipe)			18 RCP				Residential	Culverted stream
OF-3	5/7/2021, 9:21 AM	248689.7831	939682.3548	Boxford Road	No	Found	Mill River (MA91-09) Rte 1 to Parker River	Storm Sewer (closed pipe)	Circular	12	CMP	Catchbasin		Not in Water	Residential	
OF-4	6/22/2021, 8:33 AM	245851.9965	937662.1154		Yes	Found		Storm Sewer (closed pipe)	Circular	6	PVC	Catchbasin	CB-2 (Bradford St.)	Not in Water	Residential	
OF-5		245516.0981	938256.9677		Yes	Found - not an outfall										
OF-6		250644.5059	941785.2841		Yes	Not found										Location most likely incorrect. Upgradient CB full of water, could not determine outlet pipe direction.
OF-7	6/22/2021, 10:00 AM	251011.0218	941221.0620	Central Street	Yes	Found	Ox Pasture Brook	Storm Sewer (closed pipe)	Circular	15	Steel	Catchbasin	CB-2	Partially in water	Residential	Pipe end found in CB that drops into brook. Pipe end half submerged. No flow in upgradient CB.
OF-8		248291.9312	939604.1765	Central Street	Yes	Found	Ox Pasture Brook	Open Drainage						Fully in Water	Commercial	CB located, drops into brook. Pipe was not found entering CB. Upgradient CB was stagnant and pipe was observed in the direction of outfall. May enter stream but not near CB. CB still acts as outfall for open drainage to stream.
OF-9	6/22/2021, 1:00 PM	246272.9624	942110.1544		Yes	Found		Storm Sewer (closed pipe)	Circular	6	HDPE	Catchbasin		Not in Water	Residential	Outfall had some sediments
OF-10	5/28/2021, 10:15 AM	250830.1736	941308.4231		Yes	Found	Ox Pasture Brook	Storm Sewer (closed pipe)	Circular	18	CMP	Catchbasin field		Not in Water	Residential	Outfall pipe located in CB. CB drops into stream that leads to Ox Pasture Brook. Pipe end is severely corroded.
OF-11	5/28/2021, 10:05 AM	245635.1747	937713.3520	Central Street	No	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin		Not in Water	Residential	Outfall pipe much lower in elevation compared to surrounding area. Erosion observed as water needs to leave pipe end.
OF-12	5/7/2021, 9:49 AM	250356.1834	942261.8423	Haverhill Street	Yes	Found	Mill River (MA91-08) Rowley Rd to Rte 1	Storm Sewer (closed pipe)				Catchbasin field		Fully in Water	Residential	Evidence of outfall found. Outfall submerged in drainage pool adjacent to flow path.
OF-12		246736.3695	939098.6989		Yes	Not found										Outfall not found. CB-44 does not exist. Road looks newly paved.
OF-13	5/7/2021, 11:16 AM	246361.9228	941484.0960	Christa Drive	Yes	Found		Storm Sewer (closed pipe)	Circular	24	Concrete	Catchbasin		Not in Water	Residential	Rip rap displaced (erosion)
OF-14	5/7/2021, 1:13 PM	248125.4085	942893.7342	Christopher Road	Yes	Found		Storm Sewer (closed pipe)	Circular	12	Concrete	Catchbasin		Not in Water	Residential	Heavy sediment deposits
OF-15	5/7/2021, 1:43 PM	250601.5264	939873.2944	Christopher Road	Yes	Found		Storm Sewer (closed pipe)	Circular	24	CMP	Catchbasin		Partially in water	Residential	Culvert under roadway, two catch basins drain to manhole that is connected to stream culvert. No flow from CBS
OF-16		248140.9148	942872.5409	Clay Lane	Yes	Not found										
OF-17		248955.1458	940111.5053	Clay Lane	Yes	Not found										
OF-18		250819.1743	940902.8723	Cross Street	Yes	Not found		Storm Sewer (closed pipe)	Circular	12	CMP	Catchbasin field		Not in Water	Residential	Could not locate outfall due to extreme vegetation, checked upgradient structure and was dry, picture of upgradient structure was taken
OF-19		250834.4863	940911.3663	Daniels Road	Yes	Not found										
OF-20	5/7/2021, 12:44 PM	249270.6736	942300.3414	Daniels Road	Yes	Found		Storm Sewer (closed pipe)	Circular	12	Concrete	Catchbasin		Not in Water	Residential	Neighbor #84 experiences flooding any rainstorm. Destroys property
OF-21	5/28/2021, 9:50 AM	245201.0377	938142.7771	Dexter Drive	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Not in Water	Residential	Sediment in pipe end (25%)
OF-22	5/28/2021, 9:55 AM	249428.8587	941821.5733	Dexter Drive	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field		Not in Water	Residential	Pipe in good condition, protruding from stone and mortar headwall 3". Headwall in fair condition. Mortar erosion and stone displacement.
OF-23	5/7/2021, 12:32 PM	244992.9514	939651.2031	Emily Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	24	RCP			Partially in water	Residential	
OF-24	5/7/2021, 11:58 AM	245388.5693	937739.7897	Farnam Road	Yes	Found		Storm Sewer (closed pipe)				Catchbasin		Fully in Water	Residential	Cannot inspect, fully submerged
OF-25	5/7/2021, 11:25 AM	252432.3671	941740.8075	Farnam Road	Yes	Found		Storm Sewer (closed pipe)	Circular		CMP	Catchbasin field		Not in Water	Residential	Outfall buried, tree cluster directly in front of outfall.
OF-26	5/7/2021, 11:51 AM	246239.7437	939129.8960	Forest Street	Yes	Found		Storm Sewer (closed pipe)	Circular	18	CMP	Catchbasin		Not in Water	Residential	Filled halfway with sediment
OF-27		246580.9291	939266.5995	Glen Street	Yes	Not found										Outfall from CB across street, appears to be buried.
OF-29	6/22/2021, 10:53 AM	250098.4868	941212.1723	Green Needle Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field	MH-1	Not in Water	Residential	Slight chipping on flared end
OF-30	5/14/2021, 9:11 AM	246796.8778	939285.3442	Harrison Circle	Yes	Found		Storm Sewer (closed pipe)	Circular	24	RCP	Catchbasin		Not in Water	Residential	Outfall found discharging into BMP adjacent to roadway. Location moved. No flow observed. Tree growing in FES.
OF-31		250846.6258	940002.3564	Harrison Circle	Yes	Found		Storm Sewer (closed pipe)	Circular	18	Concrete	Catchbasin		Not in Water	Residential	Flared end was chipped with exposed rebar.
OF-32	6/22/2021, 8:44 AM	246451.4742	941791.7551	Haverhill Street	Yes	Not found		Storm Sewer (closed pipe)						Partially in Water- Has Sediment	Residential	Pipe end not found, evidence of outfall observed. (Flow channel and stagnant water). Upgradient CB had stagnant water. Pipe end most like buried and clogged.
OF-32		249242.8241	939717.9938	Haverhill Street	Yes											
OF-33		250244.5630	940635.8496	Haverhill Street	Yes	Not found		Storm Sewer (closed pipe)				Catchbasin			Residential	
OF-34	5/7/2021, 9:34 AM	249407.3278	942199.7817	Haverhill Street	Yes	Found	Mill River (MA91-08) Rowley Rd to Rte 1	Storm Sewer (closed pipe)	Circular	18	Concrete	Catchbasin		Fully in Water	Open Space	Submerged but not flowing, high groundwater
OF-34		249188.5862	941184.8685	Haverhill Street	Yes											
OF-36		250242.4911	940625.0054	Haverhill Street	Yes											
OF-37		246487.4303	939186.2104	Haverhill Street	Yes											
OF-38		246401.1946	941320.4916	Haverhill Street	Yes											
OF-39		249164.4425	943421.0676	Haverhill Street	Yes											
OF-40		249268.3495	942338.5569	Haverhill Street	Yes											
OF-41		246192.0837	941617.1208	Haverhill Street	Yes											
OF-48	5/14/2021, 1:43 PM	245288.6380	937866.9682	Hillside Street	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP			Not in Water	Residential	Outfall found straight across road from catch basins, outlet area overgrown with thorn bushes
OF-49	5/14/2021, 1:49 PM	246723.2394	939126.9380	Hillside Street	Yes	Found		Storm Sewer (closed pipe)	Circular	24	RCP	Catchbasin field		Not in Water	Residential	Outfall found adjacent to roadway, culverted under road from CB. Outfall pipe is good condition, some sediment accumulation observed.
OF-50	5/14/2021, 2:03 PM	250520.7320	940756.2064	Hillside Street	Yes	Found		Storm Sewer (closed pipe)	Circular	18	RCP	Catchbasin		Not in Water	Residential	Outfall found, surrounded by overgrown and dead vegetation, some stagnant water downstream of pipe end but no flow present, pipe 75% full of sediment and debris
OF-51	5/14/2021, 9:27 AM	249164.9779	939820.1128	Homestead Lane	No	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin		Not in Water	Residential	Outfall found in roadside BMP. Minor amounts of sediment in concrete FES. Large rock also in FES (removed). No flow observed, outfall in good condition.
OF-52	5/14/2021, 9:37 AM	248072.1851	942130.5959	Homestead Lane	No	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Not in Water	Residential	Outfall found in roadside BMP. No sediment but leaves in FES. Outfall in good condition. No flow observed.
OF-53	5/14/2021, 11:29 AM	249031.0129	939435.7626	Ice Pond Drive	Yes	Found		Storm Sewer (closed pipe)	Circular	12	CMP	Catchbasin		Not in Water	Residential	Outfall found, big rocks in FES, moved rocks out
OF-54		245068.1020	938478.0299		Yes	Not found	Ox Pasture Brook	Storm Sewer (closed pipe)				Catchbasin field			Residential	Outfall not found due to heavily overgrown vegetation. Only 1 upgradient CB found of 2. Stagnant water present in sump.
OF-55	5/14/2021, 11:08 AM	249699.8091	941250.3358	Isabelle Circle	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Partially in water	Residential	Outfall pipe end located in small depression in residential front yard. Stagnant water present in pipe end. Upgradient structure also had stagnant water. No flow observed.
OF-56	5/28/2021, 12:41 PM	249806.7321	941604.8656	Longmeadow Drive	No	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field		Not in Water	Residential	Outfall found next to culvert outlet crossing under Longmeadow Dr.
OF-56		249368.7945	939253.2717	Long Hill Road	Yes	Found		Storm Sewer (closed pipe)	Circular	8	HDPE			Not in Water	Residential	Small HDPE pipe that flows into open drainage on the edge of roadway. Origin potential upgradient CB.
OF-57	6/22/2021, 1:36 PM	246028.6960	937821.6597	Mansion Drive	No	Found		Storm Sewer (closed pipe)	Circular	12	CMP	Catchbasin		Not in Water	Residential	Pipe end has stone and mortar headwall, pipe severely corroded and filled completely with sediment. Connected to CB across roadway.
OF-58	6/22/2021, 8:18 AM	246993.1371	941792.5515	Meadows Lane	No	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Partially in water	Residential	Sediment and organic debris present in FES
OF-59	6/22/2021, 10:20 AM	251118.4393	942922.5303	Meadows Lane	No	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin			Residential	Outfall has some sediment and is flowing
OF-60	5/14/2021, 9:51 AM	249328.6582	943815.2084		No	Found		Storm Sewer (closed pipe)	Circular	18	RCP	Catchbasin		Not in Water	Residential	Outfall found discharging to bmp, flared end, minor woody vegetation in front of FES
OF-61	5/14/2021, 10:00 AM	248271.6618	942372.1998	Mehaffey Lane	No	Found - not an outfall		Storm Sewer (closed pipe)	Circular		CMP			Not in Water	Residential	Outfall found not an outfall, is bmp outlet structure with oil water separator hood
OF-62		249369.1425	939236.4894	Mehaffey Lane	No	Found		Storm Sewer (closed pipe)	Circular	10	RCP	Detention pond		Not in Water	Residential	Two outfall pipes coming from BMP, one from bmp outlet one for bmp overflow
OF-63	5/14/2021, 10:06 AM	246801.4222	941749.4334		No	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin		Not in Water	Residential	Outfall found discharging to bmp, erosion at flared end

Rowley Massachusetts Dry Weather Outfall Screening

Structure ID	Location					Outfall Characteristics										
	Date / Time of Inspection	x	y	Street Name	Feature in MS4 region?	Status	Name of receiving waters	Type of Outfall	Shape of Outfall	Diameter	Outfall Material	Feature drains from:	ID of connected feature	Is feature submerged?	Primary land use	Notes
OF-64		245190.2226	938155.4687	Merrifields Street	Yes	Not found		Storm Sewer (closed pipe)				Catchbasin field			Residential	Outfall not found. Upgradient manhole inspected. No pipe runs in the mapped direction of the outfall. Outfall at mapped location may not exist.
OF-65	5/14/2021, 1:36 PM	246656.5822	940087.2060	Mill River Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Not in Water	Residential	Mapped outfall found. Outfall may be acting as inlet for surface runoff of grassed areas. Invert elevations not obvious.
OF-66	5/14/2021, 10:26 AM	245442.9226	939346.5238	Newbury Road	Yes	Found		Storm Sewer (closed pipe)	Circular	18	RCP	Catchbasin field		Partially in water	Residential	Outfall located in drainage swale near road. Stagnant water observed in outfall FES. Water flowing in upgradient manhole. Sampled.
OF-67	5/14/2021, 9:20 AM	249814.0609	942992.9429	Newbury Road	No	Found		Storm Sewer (closed pipe)	Circular	12	CMP	Catchbasin		Not in Water	Residential	Outfall found on side of road discharging into grassed field. No flow observed. Outfall in good condition.
OF-68	6/22/2021, 1:22 PM	247771.8860	939663.7925	Ocean Avenue	Yes	Found		Open Drainage	Circular	12	HDPE	Catchbasin field		Not in Water	Residential	Outfall found in drainage ditch on side of roadway. Water in ditch but no flow observed in pipe.
OF-69	5/7/2021, 11:00 AM	245218.5420	938135.7096	Rivers Edge Drive	Yes	Found		Storm Sewer (closed pipe)	Circular	18	Concrete	Catchbasin		Not in Water	Residential	
OF-70		249135.0843	941170.2547	Saunders Lane	Yes	Not found		Storm Sewer (closed pipe)	Circular			Catchbasin field			Residential	Outfall not found due to heavy vegetation on slope. Upgradient manhole inspected as proxy, dry no flow observed.
OF-71	6/22/2021, 11:18 AM	250296.2951	940476.7684	Saunders Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field	MH-3		Residential	Some sediment
OF-72	6/22/2021, 11:04 AM	250083.9118	942020.0810	Saunders Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field	MH-10	Not in Water	Residential	Outfall had some sediments
OF-73	6/22/2021, 12:31 PM	246290.8348	942071.6314	School Street	Yes	Found	Ox Pasture Brook	Storm Sewer (closed pipe)	Circular	12	HDPE	Catchbasin field		Not in Water	Residential	Outfall found in stream bank. Pipe end in good condition. No flow observed.
OF-74		251079.6041	941225.9658	School Street	Yes	Not found		Storm Sewer (closed pipe)								Outfall could not be located, checked upgradient cb which was dry
OF-75	6/22/2021, 12:42 PM	244381.6182	938092.9995	Scott Field	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin		Not in Water	Residential	
OF-76	5/28/2021, 11:12 AM	248104.3158	939634.2471	Spencer Knowles Road	Yes	Found		Storm Sewer (closed pipe)	Circular	36	RCP	Catchbasin field	MH-140	Partially in water	Residential	Outfall found, partially submerged in pool of stagnant water. Part of bottom of flared end section chipped off.
OF-77	5/28/2021, 10:52 AM	246632.3202	940525.7067	Spencer Knowles Road	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field		Partially in water	Residential	Concrete FES partially submerged. FES has major chips/cracks affecting its structural integrity.
OF-78	5/28/2021, 1:39 PM	246278.9052	942048.7549	Stoney Brook Drive	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field		Partially in water	Residential	RCP into BMP. Stagnant water present. Pipe end in good condition.
OF-79	6/22/2021, 9:09 AM	249260.7169	941578.4932	Summer Street	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin	CB-8 (Summer St.)	Not in Water	Residential	Some sediment build up, upgradient cb was dry
OF-80		246436.9397	941932.3226	Tenney Road	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Not in Water	Residential	Outfall located. Concrete FES present. Pipe full 50% with sediment. Minor erosion channel present.
OF-82		250394.5666	942263.1036	Vineyard Way	No	Not found		Storm Sewer (closed pipe)				Catchbasin field		Not in Water	Residential	Outfall not found, possibly buried under sediment and leaves. Upgradient manhole rusted shut. No evidence of flow observed in area. No flow in any of the upgradient catch basins.
OF-83	6/22/2021, 9:33 AM	248079.0236	942925.0370	Wethersfield Street	Yes	Found	Ox Pasture Brook	Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin	CB-9 (Wethersfield St.)	Partially in water	Residential	Outfall located, could not observed pipe end due to heavy vegetation and location near stream. Headwall was concrete and heavily deteriorated. No flow in upgradient CB.
OF-84	6/22/2021, 10:44 AM	248671.2866	943036.8954	Wethersfield Street	Yes	Found		Storm Sewer (closed pipe)	Circular	12	CMP			Not in Water	Residential	Pipe found, heavily corroded. Mostly buried. Connections unknown.
OF-85		248529.8171	942793.1110	Wethersfield Street	Yes	Found - not an outfall										Culvert under roadway. No drainage infrastructure present.
OF-86		245723.9406	938335.4304	Wethersfield Street	Yes	Found - not an outfall										Culvert under roadway. No drainage infrastructure present.
OF-87	5/28/2021, 10:34 AM	248365.4156	942454.8983	Wild Pasture Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	18	Other	Catchbasin	CB-458	Not in Water	Residential	Outfall found in conservation land. Cast iron pipe.
OF-88	5/28/2021, 10:43 AM	246253.0756	941995.6632	Wild Pasture Lane	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin field		Not in Water	Residential	Outfall found discharging in BMP. Concrete headwall present. Headwall and pipe end in good condition.
OF-89	5/7/2021, 1:54 PM	250139.7479	940282.3700	Wilkes Road	Yes	Found		Storm Sewer (closed pipe)	Elliptical	30	Concrete	Catchbasin		Not in Water	Residential	Also BMP
OF-90	5/7/2021, 2:14 PM	246920.7729	939478.6568	Wilkes Road	Yes	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin		Not in Water	Residential	Outfall found in drainage ditch adjacent to concrete retaining wall for roadway
OF-91	5/7/2021, 2:20 PM	247759.8807	942099.1060	Wilkes Road	Yes	Found		Storm Sewer (closed pipe)	Circular	12	Concrete	Catchbasin		Not in Water	Residential	At the base of the retaining wall
OUT-103	5/28/2021, 9:29 AM	245669.8412	937592.8696		Yes	Found		Storm Sewer (closed pipe)	Circular	15	CMP	Drainage ditch		Not in Water	Residential	Pipe end located adjacent to mill building, appears to drain from drainage ditch. Neighbor mentioned flooding issues. Drains overland to tail race.
OUT-105	6/22/2021, 2:09 PM	247968.4586	942221.9459		Yes	Found		Storm Sewer (closed pipe)	Circular	24	RCP			Not in Water	Residential	Concrete FES into BMP behind residential structure. Located in conservation land. Source of pipe unknown. Small amount of sediment and organic debris observed in FES. Damp, no flow observed.
OUT-108	5/28/2021, 8:52 AM	245958.6928	937800.9325		Yes	Found		Storm Sewer (closed pipe)	Circular	12	HDPE	Catchbasin		Not in Water	Residential	Outfall pipe connected to CB. Pipe end in good condition. No flow observed.
OUT-109	5/28/2021, 9:00 AM	247510.8253	939620.4891		Yes	Found		Storm Sewer (closed pipe)	Circular	12	HDPE	Detention pond		Not in Water	Residential	12" HDPE pipe with concrete headwall, discharging into BMP. Location moved.
OUT-110	5/14/2021, 2:30 PM	248807.6688	943221.4264		Yes	Found		Storm Sewer (closed pipe)	Circular	18	HDPE	Catchbasin		Not in Water	Residential	Outfall found coming out of rock pile, 2 HDPE pipes discharging to BMP from catch basin, no flow present
OUT-28	5/14/2021, 2:10 PM	249043.5460	939989.4391	Glen Street	Yes	Found		Storm Sewer (closed pipe)	Circular	12	RCP	Catchbasin		Not in Water	Residential	Outfall previously dug up. Buried under multiple feet of dirt. Filled over 50% with sediment.
OUT-33	5/28/2021, 1:10 PM	245187.3200	938119.8319	Haverhill Street	Yes	Found		Storm Sewer (closed pipe)	Circular	6	PVC	Catchbasin field	CB-157	Not in Water	Residential	Outfall found discharging below rock wall in yard of apartment complex. CB-157 buried under sediment pile. Pipe 1/2 buried under sediment.
OUT-44	5/28/2021, 9:14 AM	246934.7754	939009.0424		Yes	Found	Mill River (MA91-08) Rowley Rd to Rte 1	Storm Sewer (closed pipe)	Circular	8	PVC	Catchbasin		Not in Water	Open Space	PVC pipe from CB on bridge over Mill River, pipe extends from stone wall 3'. Flow plunges +10 feet to river bank.
OUT-46	5/14/2021, 11:54 AM	245399.7158	939381.4655	Hillside Street	Yes	Found		Storm Sewer (closed pipe)	Circular	12	CMP	Catchbasin		Not in Water	Residential	Outfall connected to singular CB across roadway. Discharges to wetland area. Minor plunge pool erosion.
OUT-47	5/14/2021, 1:18 PM	251260.1858	941801.7435	Hillside Street	Yes	Found		Open Drainage	Circular	12	CMP	Drainage ditch		Not in Water	Residential	Open drainage from edge of road into ditch, culverted under driveway before discharging to wetland. No flow observed.
OUT-47		245971.1847	938302.3670	Bradford Street	Yes	Not found		Storm Sewer (closed pipe)				Catchbasin	DP-3		Residential	Outfall not found, potentially buried in sediment at bottom of pond or hidden in rock wall.
OUT-56	5/7/2021, 11:39 AM	247054.5386	939704.4426	Brook Street	Yes	Found		Storm Sewer (closed pipe)				Catchbasin		Not in Water	Residential	Outfall completely buried. cannot identify material
OUT-60	5/7/2021, 1:30 PM	245500.2617	939358.8420	kathleen Circle	Yes	Found		Storm Sewer (closed pipe)	Circular	36	Concrete	Catchbasin		Partially in water	Residential	Picture is of upstream manhole, confirmed no flow from CB. Flow comes from wetland across st
OUT-62		248183.6275	942213.5619		Yes	Found - not an outfall										Inlet for stream.
OUT-75		250485.9596	942034.3989		Yes	Not found									Residential	Outfall not found. Possibly buried. Both manholes in Water Dept parking lot labeled sewer.
OUT-78		249369.0357	943099.6755	Saunders Lane	Yes	Found - not an outfall		Storm Sewer (closed pipe)				Catchbasin field			Residential	Found culvert, checked upgradient mh and it had no pipe, outfall may not exist
OUT-81	5/28/2021, 12:51 PM	250465.4927	940696.9261	Trowbridge Circle	No	Found		Storm Sewer (closed pipe)	Circular	15	RCP	Catchbasin field	MH-154	Not in Water	Residential	Outfall found in wooded area off of Trowbridge Circle. RCP with flared end.
OUT-91	5/7/2021, 10:02 AM	250078.5566	941606.5959	Haverhill Street	Yes	Found	Muddy Brook	Storm Sewer (closed pipe)				Catchbasin	MH-77	Fully in Water - Has Sediment	Residential	Outfall is completely submerged, cannot verify size or material. Sample taken from upstream manhole
OUT-98		246307.4073	939151.6634	Bradford Street	Yes	Not found		Storm Sewer (closed pipe)				Catchbasin				Outfall not found, potentially buried in sediment at bottom of pond or hidden in rock wall. Potential upgradient CB no longer exists.
OUT-99		250243.2230	940623.3467	Bradford Street	Yes	Not found		Open Drainage				Catchbasin			Residential	Outfall not found, potentially buried in sediment at bottom of pond or hidden in rock wall.
OUT-100	5/14/2021, 12:43 PM	250783.3430	941493.5550		Yes	Found		Storm Sewer (closed pipe)	Circular	36	RCP	Catchbasin field		Not in Water	Residential	New outfall found discharging to BMP

Notes

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



	Outfall Condition						Illicit Discharge Indicators			Flow Characteristics and Sampling Parameters													
Structure ID	Was Outfall Cleand Out?	Condition of Outfall	Outfall Damage	Is Sediment Present?	How Much of Pipe is Restricted by Sediment Plume?	Notes	Deposits or Stains	Pipe Algae or Growth	Do Indicators Suggest Illicit Discharge?	Is Flow Present?	Description of Flow	Flow Depth (inches)	Flow Width (ft/in)	Ammonia (mg/L)	Chlorine (mg/L)	Surfactants (mg/L)	Conductivity (uS/cm)	Salinity (ppt)	Temperature (C)	pH	E. Coli (MPN/100 mL)	Where was sample taken from?	
OF-64																							
OF-65	No	Good	None	No	0%	Mapped outfall found. Based on elevation of outfall invert and invert from inside manhole, may be acting as inlet.			No	No	None												
OF-66	No	Fair	Spalling, cracking, chipping	Yes	25%	Outfall located in roadside swale. Concrete FES present. Stagnant water in FES, flowing water in upgradient structure. Flow sampled from upgradient structure.			No	Yes	Trickle	0.25		0	0	0.1	678	0.41	15.1	7.4	2	Flow	
OF-67	No	Good	None	No		Outfall found on edge of road. Riprap present at outfall location before flow enters grassed field. No flow present at the time of inspection.				No	None												
OF-68	No	Good	None	Yes	25%	Pipe end found discharging into drainage ditch. Stagnant water present in drainage ditch, no flow observed in pipe. Pipe end protruding from slope, pipe end in good condition.			No	No	None												
OF-69	No	Good	None	Yes	50%					No	None												
OF-70																							
OF-71	Yes	Excellent	None	Yes	25%	Little sediment			No	No													
OF-72	No	Good	None	Yes	25%	Outfall has some debris and sediment, with grate			No	Damp	None												
OF-73	No	Good	None	No	0%	Outfall found in stream bank. Pipe end in good condition. No flow observed.			No	Damp	None												
OF-74																							
OF-75		Excellent	None	No					No	No													
OF-76	No	Good	Spalling, cracking, chipping	No	0%	Pipe partially submerged in stagnant water. Flow coming from Arthur Gordon Dr. Manhole incorrectly marked as sewer at end of Arthur Gordon Dr. Manhole on Spencer Knowles Rd rusted shut, cannot open.			No	Yes	Trickle			0	0.08	0.5	1004	0.58	17.6	7.34	0	Flow, upgradient manhole	
OF-77	No	Fair	Spalling, cracking, chipping	Yes	25%	Concrete FES chipped and cracked. Sediment present in FES. Partially submerged in stagnant water. No flow observed			No	No	None												
OF-78	No	Good	None	Yes	25%	Pipe end discharging into BMP. Pipe end in good condition. Stagnant water present, no flow observed. Upgradient manhole also stagnant water, no flow.			No	No	None												
OF-79	Yes	Good	None	Yes	25%	Some sediment in outfall outlet, upgradient cb dry			No	Damp	Damp												
OF-80																							
OF-82																							
OF-83	No	Fair				Outfall located, pipe end could not be inspected due to heavy vegetation and close proximity to stream. Headwall was concrete and heavily deteriorated. No flow observed.			No	No													
OF-84	No	Poor	Corrosion	Yes	100%	Pipe end very corroded and full of sediment. Upgradient connections unknown. Flow channel present.			No	No	None												
OF-85																							
OF-86																							
OF-87	No	Good	None	No	0%	18" cast iron pipe in good condition. Discharges to riprap.			No	No	None												
OF-88	No	Good	None	No	0%	Pipe end located in BMP. Concrete headwall present. Both in good condition.			No	No	None												
OF-89	No	Good	None	Yes	25%				No	No													
OF-90	No	Excellent	None	No		Outfall pipe end found in drainage ditch adjacent to concrete retaining wall for roadway.			No	No	None												
OF-91	No	Good	Spalling, cracking, chipping	Yes	50%				No	No													
OUT-103	No	Fair	Corrosion	Yes	50%	Sediment in pipe should be removed. Corrosion inside pipe observed.	Flow Line		No	No	None												
OUT-105	No	Good	None	Yes	25%	Concrete FES into BMP behind residential structure. Located in conservation land. Source of pipe unknown. Small amount of sediment and organic debris observed in FES. Damp, no flow observed.			No	Damp	None												
OUT-108	No	Good	None	No	0%	Pipe end in good condition. Minor erosion in riprap above pipe end, not an issue at this time.			No	No	None												
OUT-109	No	Good	None	No	0%	Pipe end elevated roughly 1' above BMP, small scour hole present.			No	No	None												
OUT-110	No	Good	None	No	0%	2 HDPE outfall pipes discharging to bmp, no sediment or debris in pipes, in good condition, no flow present			No	No	None												
OUT-28	No	Poor	None	Yes	75%	Outfall previously dug up. Pipe end was buried under multiple feet of dirt. Pipe end is still over 50% full of sediment. Could not inspect pipe due to it being mostly buried.			No	No	None												
OUT-33	No	Fair	None	Yes	50%	Pipe 1/2 blocked by sediment. Upgradient CB buried under sediment pile. No flow.			No	No	None												
OUT-44	No	Good	None	No	0%	Pipe extends from bridge 3'. Sediment in upgradient CB and blocking grate.			No	No	None												
OUT-46	No	Good	None	No	0%	Single outfall pipe from single CB across roadway. Minor plunge pool present. Good condition.			No	Damp	Damp												
OUT-47	No	Fair	None	No	0%	Open drainage from edge of road. Culverted under driveway before discharging to wetland area. No flow observed.			No	No	None												
OUT-47																							
OUT-56	No	Poor		Yes	100%	Total buried, looks like fill				No													
OUT-60	No	Excellent	Spalling, cracking, chipping			Flow from wetland across st. No flow in catch basins, confirmed in upstream manhole		Green	No	No	None												
OUT-62																							
OUT-75																							
OUT-78																							
OUT-81	No	Good	Spalling, cracking, chipping	Yes	25%	Some leaves and sediment on bottom of flared end. No flow.			No	No	None												
OUT-91	No	Poor		Yes	75%	Needs excavation		Green	No	Yes	Moderate	0.5	2	0	0	0.2	1309	0.86	13	6.41	5	Flow	
OUT-98																							
OUT-99																							
OUT-100	No	Fair	Spalling, cracking, chipping	No	0%	36 inch pipe with concrete FES found in BMP. Outfall not previously mapped. Upgradient infrastructure unknown. Appears to be main outlet as other outfall in the area were not found.	Flow Line	Green	No	Yes	Trickle			0	0.04	0.13	903	0.52	17.7	6.86	0	Flow	