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November 4, 2011

Mr. John Conte
Town Engineer
Weston Town Hall
56 Norfield Road
P.O. Box 1007
Weston, CT 06883

Subject: Stormwater Monitoring Results

Dear Mr. Conte:

CDM has prepared a summary of the results from the 2011 stormwater sampling required under the Town's Stormwater Management Plan (SMP) for the Municipal Separate Storm Sewer System (MS4) Permit. This letter presents the results from the two sampling events in 2011, identifies those parameters that consistently exceed acceptable ranges (over the four year sampling period, 2008 - 2011), and provides recommendations for further studies to determine the source of contamination at those locations.

Project Background

The Connecticut DEEP Permit for the MS4 requires that the Town of Weston perform annual stormwater monitoring at the following six outfall locations:

1. Saugatuck River Basin: Behind Post Office / Grocery Store - Route 57
2. Aspetuck River Basin: Codfish Lane near Old Redding Road [TA-14-2]
3. Saugatuck River Basin: Old orchard Dr. off Godfrey Rd. W [TW-14-8]
4. Saugatuck River Basin: Lords Highway at Old Hyde Road
5. Saugatuck River Basin: Middle School Outfall at the entrance on School Road
6. Saugatuck River Basin: High School Outfall at the NW corner of the parking lot

In accordance with the Town's MS4 permit requirements, samples were collected at the six locations and sent to Complete Environmental Testing, Inc. (CET) for analysis. These outfalls were visually inspected and sampled during two wet weather events on August 25 and October 19, 2011. The laboratory results from these two storm events are attached to this letter.

Sampling Results

The sampling results from CET were compared to the acceptable ranges for stormwater pollutants based on the specific constituent listed in Table 1 below. This table also provides a "reasoning" column explaining the resource or document that was used to determine the range and the "likely source" column indicating likely sources associated with each pollutant.

Table 1 - Analytical Parameters and Acceptable Ranges

Parameter	Acceptable Range	Reasoning	Likely Source
Escherichia Coli (E. Coli)	235/100 mL	EPA recommended criteria in a single sample (river)	E. coli is excreted from humans and animals and indicates recent sewage or animal waste contamination.
Ammonia as Nitrogen	No Standard Set	Indicates sewage contamination	Ammonia concentration is high in sewage. Typically compared to Potassium, Ammonia / Potassium ratio should be <1.
Nitrite as Nitrogen	10 mg/L	Indicates sewage contamination	Decaying vegetation, organic matter, treated waste water, fertilizers, animal waste.
Nitrate as Nitrogen	10 mg/L	Indicates sewage contamination	Decaying vegetation, organic matter, treated waste water, fertilizers, animal waste.
Total Phosphorus (TP)	0.5 mg/L (0.1 natural, 1.0 polluted)	Indicates sewage contamination	Decaying vegetation, organic matter, treated waste water, fertilizers, animal waste.
Total Kjeldahl Nitrogen (TKN)	<1.0 mg/L	Urban Stormwater BMP Performance Monitoring	Sewerage, decaying vegetation, organic matter, treated waste water, fertilizers, animal waste.
Hardness (as $CaCO_3$)	<100 mg/L	Water supply standard	Hardness is caused by the presence of calcium and magnesium.
Chemical Oxygen Demand (COD)	5 mg/L	DEEP Biotic Survey standard	Organic waste from treatment plants and septic systems.
Oil & Grease, Total	10 mg/L	NPDES	Vehicle and equipment areas, industrial areas, poor storage of oil drums, food preparation.
Specific Conductivity	< 750 umhos/cm	Standard for Class 2 Waters, Good[1]	High conductivity is an indicator of salinity. Approximates dissolved mineral content.
pH	6.0-9.0	Range to sustain aquatic life (fresh water)	Acids, acid-generating salts, and free carbon dioxide lower pH. Carbonates, bicarbonates, hydroxides, borates, phosphates, and silicates raise pH.
Total Suspended Solids (TSS)	20 mg/L	Urban Stormwater NPDES BMP	Erosion, runoff from roads, sang/gravel storage facilities and construction sites.
Turbidity	< 25 NTU	Range to sustain aquatic life (fresh water)	Turbidity is caused by suspended particle material.

Those samples that exceeded acceptable ranges for the two storm events in 2011, three storm events in 2010, one storm event in 2009, and two storm events in 2008 are summarized in Table 2 on the following page. Over the last four years, eight samples have been collected at

[1] Class 2, Good: Damage to sensitive plants will occur

the Post Office, Old Redding Road and Old Orchard Drive locations, with five samples collected at the Lords Highway, Middle School, and High School locations.

Table 2 – Number of Samples that Exceed Acceptable Ranges

Parameter	Post Office	Old Redding	Old Orchard	Lords Highway	Middle School	High School
E. Coli	6	5	5	2	3	2
Ammonia						
Nitrite						
Nitrate						
TP						
TKN	3	4		2	3	1
Hardness	1				1	3
COD	7	8	6	4	4	4
Oil & Grease	1					
Conductivity						2
pH	2				1	
TSS	6	4	1		1	2
Turbidity	3	3			1	

Highlighted cells in the table above indicate exceedance frequencies greater than 50% for either the eight or five samples taken. As shown both E. Coli and COD seem to be problematic at all six sampling locations. The results indicate potential contaminants sources that include human and animal waste contamination.

Recommendations

With high concentrations during more than 50% of the sampled rain events, additional studies are warranted to investigate the source of pollutants at all six locations. CDM recommends performing a preliminary study of the tributary area to each location to identify potential sources of contamination and then developing a plan for identifying, removing and reducing pollutant loadings.

CDM is pleased to have had the opportunity to summarize the sampling results for the Town of Weston. If you have any questions or need additional information, please do not hesitate to call me at (401) 457-0334.

Sincerely,

Cynthia A. Baumann, P.E., BCEE
Senior Project Manager
Camp Dresser & McKee Inc.

cc: File

Town of Weston - Wet Weather Sampling Results
2008 - 2011 Summary

Sample ID	Date Visited	Sampled?	Lab Report Received	Lab Data													
				Escherichia Coli (per 100 mL)	Ammonia as Nitrogen (mg/L)	Nitrite as Nitrogen (mg/L)	Nitrate as Nitrogen (mg/L)	Total Phosphorus (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Hardness (CaCO3) (mg/L)	Chemical Oxygen Demand (mg/L)	Oil & Grease, Total (mg/L)	Conductivity (umhos/cm)	pH	Total Suspended Solids (mg/L)	Turbidity (NTU)
Post Office	5/9/2008	Y	Y	>2419.6	0.58	<0.10	0.36	0.21	3.8	8.3	95.0	5.6	52.0	7.07	22	55.3
	9/26/2008	Y	Y	1986.3	0.67	<0.10	0.13	<0.10	<1.0	3.8	<5.0	<5.0	10.2	6.64	<5.0	6.6
	10/15/2009	Y	Y	1732.9	0.64	<0.10	0.38	<0.10	2.1	10.0	50.0	<5.0	32.0	7.02	22	28.0
	9/27/2010	Y	Y	2419.6	0.42	<0.10	0.57	0.13	2.1	22	240	<5.0	110	5.95	56	110
	10/15/2010	Y	Y	219.1	<0.10	<0.10	2.3	<0.10	1	74	16	<5.0	500	5.79	<5.0	0.61
	11/4/2010	Y	Y	> 2419.6	<0.10	<0.10	<0.10	<0.10	<1.0	5.3	17	<5.0	13	6.59	25	20
	8/25/2011	Y	Y	816.4	<0.10	<0.10	0.73	<0.10	<1.0	110	27	<5.0	600	6.27	32	6.7
	10/19/2011	Y	Y	-	<0.10	<0.10	<0.10	<0.10	<1.0	7.1	71	<5.0	32	7.01	23	19
Old Redding Road	5/9/2008	Y	Y	1986.3	0.41	<0.10	1.20	0.31	4.0	54.0	87.0	<5.0	150.0	6.45	27	24.3
	9/26/2008	Y	Y	1732.9	0.53	<0.10	<0.10	0.46	<1.0	28.0	73.0	<5.0	72.1	6.46	44	36.5
	10/15/2009	Y	Y	461.1	0.13	<0.10	<0.10	<0.10	2.3	73.0	330.0	<5.0	180.0	6.62	160	67.0
	9/27/2010	Y	Y	30.1	<0.10	<0.10	<0.10	<0.10	1	49	16	<5.0	150	7.15	<5.0	1.5
	10/15/2010	Y	Y	816.4	<0.10	<0.10	0.11	<0.10	1	44	12	<5.0	150	7.02	<5.0	1.8
	11/4/2010	Y	Y	488.4	<0.10	<0.10	<0.10	0.11	1.1	42	61	<5.0	110	6.83	19	9.1
	8/25/2011	Y	Y	30.1	<0.10	<0.10	<0.10	<0.10	<1.0	51	38	<5.0	170	6.96	11	1.8
	10/19/2011	Y	Y	-	<0.10	<0.10	0.27	0.33	1.1	39	49	<5.0	170	6.13	110	43
Old Orhard Drive	5/9/2008	Y	Y	461.1	0.24	<0.10	0.17	<0.10	<1.0	27.0	13.0	<5.0	76.0	7.20	<5.0	1.1
	9/26/2008	Y	Y	>2419.6	0.55	<0.10	0.60	0.20	<1.0	54.0	33.0	<5.0	97.7	7.29	250	23.0
	10/15/2009	Y	Y	10.9	<0.10	<0.10	<0.10	<0.10	<1.0	49.0	7.1	<5.0	110.0	7.32	<5.0	1.6
	9/27/2010	Y	Y	18.5	<0.10	<0.10	<0.10	<0.10	1	60	<5.0	<5.0	190	7.22	5	2.4
	10/15/2010	Y	Y	980.4	<0.10	<0.10	0.25	<0.10	<1.0	49	12	<5.0	160	6.99	<5.0	1.3
	11/4/2010	Y	Y	>2419.6	<0.10	<0.10	0.12	<0.10	1	53	21	<5.0	140	6.97	<5.0	3.6
	8/25/2011	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/19/2011	Y	Y	686.7	<0.10	<0.10	0.34	<0.10	<1.0	42	13	<5.0	140	6.69	16	11
High School	9/27/2010	Y	Y	>2419.6	<0.10	<0.10	0.97	<0.10	2	15	86	<5.0	83	6.43	16	21
	10/15/2010	Y	Y	298.7	<0.10	<0.10	0.23	<0.10	1	130	16	<5.0	410	6.48	120	1.8
	11/4/2010	Y	Y	127.4	<0.10	<0.10	0.1	<0.10	<1.0	16	<5.0	<5.0	42	7.2	<5.0	3.4
	8/25/2011	Y	Y	24.3	<0.10	<0.10	<0.10	<0.10	<1.0	350	23	<5.0	1000	7.08	79	5.6
	10/19/2011	Y	Y	-	<0.10	<0.10	0.4	<0.10	<1.0	280	30	<5.0	880	6.72	6	1.8
Middle School	9/27/2010	Y	Y	12	0.4	<0.10	0.55	<0.10	2.1	26	46	<5.0	110	5.16	<5.0	12
	10/15/2010	Y	Y	1732.9	<0.10	<0.10	0.26	<0.10	1.5	54	69	<5.0	280	6.73	<5.0	3.9
	11/4/2010	Y	Y	>2419.6	<0.10	<0.10	<0.10	<0.10	<1.0	7.8	<5.0	<5.0	38	6.59	6	6.2
	8/25/2011	Y	Y	1299.7	0.29	<0.10	0.85	<0.10	1.6	120	76	<5.0	370	7.04	22	43
	10/19/2011	Y	Y	-	<0.10	<0.10	<0.10	<0.10	<1.0	5.3	210	<5.0	43	7.02	<5.0	1.7
Lords Highway	9/27/2010	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/15/2010	Y	Y	172.5	<0.10	<0.10	<0.10	<0.10	1	17	28	<5.0	57	7.56	8	5.5
	11/4/2010	Y	Y	>2419.6	<0.10	<0.10	<0.10	0.31	1.2	18	96	<5.0	46	6.42	9	9.9
	8/25/2011	Y	Y	1986.3	0.23	<0.10	2.1	0.33	2.8	88	120	<5.0	380	6.96	13	17
	10/19/2011	Y	Y	-	<0.10	<0.10	0.35	<0.10	<1.0	26	130	<5.0	160	7.00	10	8.1

11/4/2011

Town of Weston
Wet Weather Sampling Results

Storm Event on October 19, 2011

Sample ID	Analysis	Result	MDL	Units
High School	Acid Digestion of Waters	Completed		
High School	E. Coli	-	1	MPN/100mls
High School	Ammonia as N	ND	0.1	mg/l
High School	Nitrite as N	ND	0.1	mg/l
High School	Nitrate as N	0.4	0.1	mg/l
High School	Phosphorus, Total	ND	0.1	mg/l
High School	Total Kjeldahl Nitrogen	ND	1	mg/l
High School	Hardness	280	5	mg/l
High School	Chemical Oxygen Demand	30	5	mg/l
High School	Oil & Grease, Total	ND	5	mg/l
High School	Specific Conductivity	880	1	umhos/cm
High School	pH analyzed in Lab	6.72		
High School	Total Suspended Solids	6	5	mg/l
High School	Turbidity	1.8		NTU
Lords Highway	Acid Digestion of Waters	Completed		
Lords Highway	E. Coli	-	1	MPN/100mls
Lords Highway	Ammonia as N	ND	0.1	mg/l
Lords Highway	Nitrite as N	ND	0.1	mg/l
Lords Highway	Nitrate as N	0.35	0.1	mg/l
Lords Highway	Phosphorus, Total	ND	0.1	mg/l
Lords Highway	Total Kjeldahl Nitrogen	ND	1	mg/l
Lords Highway	Hardness	26	5	mg/l
Lords Highway	Chemical Oxygen Demand	130	5	mg/l
Lords Highway	Oil & Grease, Total	ND	5	mg/l
Lords Highway	Specific Conductivity	160	1	umhos/cm
Lords Highway	pH analyzed in Lab	7.00		
Lords Highway	Total Suspended Solids	10	5	mg/l
Lords Highway	Turbidity	8.1		NTU
Middle School	Acid Digestion of Waters	Completed		
Middle School	E. Coli	-	1	MPN/100mls
Middle School	Ammonia as N	ND	0.1	mg/l
Middle School	Nitrite as N	ND	0.1	mg/l
Middle School	Nitrate as N	ND	0.1	mg/l
Middle School	Phosphorus, Total	ND	0.1	mg/l
Middle School	Total Kjeldahl Nitrogen	ND	1	mg/l
Middle School	Hardness	5.3	5	mg/l
Middle School	Chemical Oxygen Demand	210	5	mg/l
Middle School	Oil & Grease, Total	ND	5	mg/l
Middle School	Specific Conductivity	43	1	umhos/cm
Middle School	pH analyzed in Lab	7.02		
Middle School	Total Suspended Solids	ND	5	mg/l
Middle School	Turbidity	1.7		NTU

11/4/2011

Town of Weston
Wet Weather Sampling Results

Storm Event on October 19, 2011

Sample ID	Analysis	Result	MDL	Units
Old Orchard Rd	Acid Digestion of Waters	Completed		
Old Orchard Rd	E. Coli	686.7	1	MPN/100mls
Old Orchard Rd	Ammonia as N	ND	0.1	mg/l
Old Orchard Rd	Nitrite as N	ND	0.1	mg/l
Old Orchard Rd	Nitrate as N	0.34	0.1	mg/l
Old Orchard Rd	Phosphorus, Total	ND	0.1	mg/l
Old Orchard Rd	Total Kjeldahl Nitrogen	ND	1	mg/l
Old Orchard Rd	Hardness	42	5	mg/l
Old Orchard Rd	Chemical Oxygen Demand	13	5	mg/l
Old Orchard Rd	Oil & Grease, Total	ND	5	mg/l
Old Orchard Rd	Specific Conductivity	140	1	umhos/cm
Old Orchard Rd	pH analyzed in Lab	6.69		
Old Orchard Rd	Total Suspended Solids	16	5	mg/l
Old Orchard Rd	Turbidity	11		NTU
Post Office	Acid Digestion of Waters	Completed		
Post Office	E. Coli	-	1	MPN/100mls
Post Office	Ammonia as N Dup Result	ND	0.1	mg/l
Post Office	Nitrite as N Dup Result	ND	0.1	mg/l
Post Office	Nitrate as N Dup Res	ND	0.1	mg/l
Post Office	Chemical Oxygen Demand Dup	71	5	mg/l
Post Office	Ammonia as N	ND	0.1	mg/l
Post Office	Nitrite as N	ND	0.1	mg/l
Post Office	Nitrate as N	ND	0.1	mg/l
Post Office	Phosphorus, Total	ND	0.1	mg/l
Post Office	Total Kjeldahl Nitrogen	ND	1	mg/l
Post Office	Hardness	7.1	5	mg/l
Post Office	Chemical Oxygen Demand	71	5	mg/l
Post Office	Oil & Grease, Total	ND	5	mg/l
Post Office	Specific Conductivity	32	1	umhos/cm
Post Office	pH analyzed in Lab	7.01		
Post Office	Total Suspended Solids	23	5	mg/l
Post Office	Turbidity	19		NTU
Redding Rd	Acid Digestion of Waters	Completed		
Redding Rd	E. Coli	-	1	MPN/100mls
Redding Rd	Ammonia as N	ND	0.1	mg/l
Redding Rd	Nitrite as N	ND	0.1	mg/l
Redding Rd	Nitrate as N	0.27	0.1	mg/l
Redding Rd	Phosphorus, Total	0.33	0.1	mg/l
Redding Rd	Total Kjeldahl Nitrogen	1.1	1	mg/l
Redding Rd	Hardness	39	5	mg/l
Redding Rd	Chemical Oxygen Demand	49	5	mg/l
Redding Rd	Oil & Grease, Total	ND	5	mg/l
Redding Rd	Specific Conductivity	170	1	umhos/cm
Redding Rd	pH analyzed in Lab	6.13		
Redding Rd	Total Suspended Solids	110	5	mg/l
Redding Rd	Turbidity	43		NTU

Key: Exceeds Acceptable Ranges

11/4/2011

Town of Weston
Wet Weather Sampling Results

Storm Event on August 25, 2011

Sample ID	Analysis	Result	MDL	Units
High School	Acid Digestion of Waters	Completed		
High School	E. Coli	24.3	1	MPN/100mls
High School	Ammonia as N	ND	0.1	mg/l
High School	Nitrite as N	ND	0.1	mg/l
High School	Nitrate as N	ND	0.1	mg/l
High School	Phosphorus, Total	ND	0.1	mg/l
High School	Total Kjeldahl Nitrogen	ND	1	mg/l
High School	Hardness	350	5	mg/l
High School	Chemical Oxygen Demand	23	5	mg/l
High School	Oil & Grease, Total	ND	5	mg/l
High School	Specific Conductivity	1000	1	umhos/cm
High School	pH analyzed in Lab	7.08		
High School	Total Suspended Solids	79	5	mg/l
High School	Turbidity	5.6		NTU
Lords Highway	Acid Digestion of Waters	Completed		
Lords Highway	E. Coli	1986.3	1	MPN/100mls
Lords Highway	Ammonia as N	0.23	0.1	mg/l
Lords Highway	Nitrite as N	ND	0.1	mg/l
Lords Highway	Nitrate as N	2.1	0.1	mg/l
Lords Highway	Phosphorus, Total	0.33	0.1	mg/l
Lords Highway	Total Kjeldahl Nitrogen	2.8	1	mg/l
Lords Highway	Hardness	88	5	mg/l
Lords Highway	Chemical Oxygen Demand	120	5	mg/l
Lords Highway	Oil & Grease, Total	ND	5	mg/l
Lords Highway	Specific Conductivity	380	1	umhos/cm
Lords Highway	pH analyzed in Lab	6.96		
Lords Highway	Total Suspended Solids	13	5	mg/l
Lords Highway	Turbidity	17		NTU
Middle School	Acid Digestion of Waters	Completed		
Middle School	E. Coli	1299.7	1	MPN/100mls
Middle School	Ammonia as N	0.29	0.1	mg/l
Middle School	Nitrite as N	ND	0.1	mg/l
Middle School	Nitrate as N	0.85	0.1	mg/l
Middle School	Phosphorus, Total	ND	0.1	mg/l
Middle School	Total Kjeldahl Nitrogen	1.6	1	mg/l
Middle School	Hardness	120	5	mg/l
Middle School	Chemical Oxygen Demand	76	5	mg/l
Middle School	Oil & Grease, Total	ND	5	mg/l
Middle School	Specific Conductivity	370	1	umhos/cm
Middle School	pH analyzed in Lab	7.04		
Middle School	Total Suspended Solids	22	5	mg/l
Middle School	Turbidity	43		NTU

11/4/2011

Town of Weston
Wet Weather Sampling Results

Storm Event on August 25, 2011

Sample ID	Analysis	Result	MDL	Units
Old Orchard Rd	Acid Digestion of Waters	-		
Old Orchard Rd	E. Coli	-	1	MPN/100mls
Old Orchard Rd	Nitrite as N Dup Result	-	0.1	mg/l
Old Orchard Rd	Nitrate as N Dup Res	-	0.1	mg/l
Old Orchard Rd	Ammonia as N	-	0.1	mg/l
Old Orchard Rd	Nitrite as N	-	0.1	mg/l
Old Orchard Rd	Nitrate as N	-	0.1	mg/l
Old Orchard Rd	Phosphorus, Total	-	0.1	mg/l
Old Orchard Rd	Total Kjeldahl Nitrogen	-	1	mg/l
Old Orchard Rd	Hardness	-	5	mg/l
Old Orchard Rd	Chemical Oxygen Demand	-	5	mg/l
Old Orchard Rd	Oil & Grease, Total	-	5	mg/l
Old Orchard Rd	Specific Conductivity	-	1	umhos/cm
Old Orchard Rd	pH analyzed in Lab	-		
Old Orchard Rd	Total Suspended Solids	-	5	mg/l
Old Orchard Rd	Turbidity	-		NTU
Post Office	Acid Digestion of Waters	Completed		
Post Office	E. Coli	816.4	1	MPN/100mls
Post Office	Nitrite as N Dup Result	ND	0.1	mg/l
Post Office	Nitrate as N Dup Res	0.74	1	mg/l
Post Office	Ammonia as N	ND	0.1	mg/l
Post Office	Nitrite as N	ND	0.1	mg/l
Post Office	Nitrate as N	0.73	0.1	mg/l
Post Office	Phosphorus, Total	ND	0.1	mg/l
Post Office	Total Kjeldahl Nitrogen	ND	1	mg/l
Post Office	Hardness	110	5	mg/l
Post Office	Chemical Oxygen Demand	27	5	mg/l
Post Office	Oil & Grease, Total	ND	5	mg/l
Post Office	Specific Conductivity	600	1	umhos/cm
Post Office	pH analyzed in Lab	6.27		
Post Office	Total Suspended Solids	32	5	mg/l
Post Office	Turbidity	6.7		NTU
Redding Rd	Acid Digestion of Waters	Completed		
Redding Rd	E. Coli	30.1	1	MPN/100mls
Redding Rd	Ammonia as N	ND	0.1	mg/l
Redding Rd	Nitrite as N	ND	0.1	mg/l
Redding Rd	Nitrate as N	0.20	0.1	mg/l
Redding Rd	Phosphorus, Total	ND	0.1	mg/l
Redding Rd	Total Kjeldahl Nitrogen	ND	1	mg/l
Redding Rd	Hardness	51	5	mg/l
Redding Rd	Chemical Oxygen Demand	38	5	mg/l
Redding Rd	Oil & Grease, Total	ND	5	mg/l
Redding Rd	Specific Conductivity	170	1	umhos/cm
Redding Rd	pH analyzed in Lab	6.96		
Redding Rd	Total Suspended Solids	11	5	mg/l
Redding Rd	Turbidity	1.8		NTU

Key: Exceeds Acceptable Ranges