



- Ecology
- Soil & Wetland Studies
- Water Quality Monitoring • GPS
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- Aquatic, Wildlife and Listed Species Surveys
- Application Reviews • Permitting & Compliance

April 4, 2016

Town of Mansfield  
Inland Wetlands Agency  
14 Park Place  
Mansfield, CT 06226-2217

**Re: WETLANDS ASSESSMENT-SUPPLEMENTAL: WATER QUALITY INVESTIGATION**  
***Lodges at Storrs***, Hunting Lodge Road, Mansfield, CT

*REMA Job No.: 15-1860-MNS18*

Dear Agency Members:

REMA ECOLOGICAL SERVICES, LLC (REMA), is providing herein the results to date of an investigation of water quality in the southern portion of the eastern semi-perennial<sup>1</sup> watercourse (WC4), and the southern seasonally flooded wetland (WA), the only area in which breeding activity of vernal pool species was observed in 2016. Sampling station locations are shown in Figure A (attached), and were also flagged in the field.

Samples were collected in polypropylene bottles in mid-afternoon of March 24<sup>th</sup>, 2016, and delivered to Phoenix Laboratories, of Manchester, in late afternoon; preservation was as specified by the laboratory, e.g. H<sub>2</sub>SO<sub>4</sub>. Additional parameters will be tested later in the season using hand-held meters, at the time of the final search for additional evidence of amphibian breeding, e.g. spotted salamanders and late-arriving wood frogs (see separate letter/report on vernal pool investigation).

Results indicated moderately good water quality in the eastern stream. At 211  $\mu$ S/cm, specific conductivity was relatively low for a semi-perennial stream. Nutrient parameters were close to the draft USEPA criteria for non-impaired watercourses, based on a large data set of pristine watercourses. Nitrate-nitrogen level in the sample from the stream was 0.45 mg/l, exceeding the criterion (0.31 mg/l). Total Kjeldahl nitrogen (TKN) concentration was



0.35 mg/l, well below the drafter criterion of 1.26 mg/l. Total phosphorus was again close to double the USEPA criteria, but well below the majority of streams in the urbanizing Connecticut landscape. Initial exploratory rock turning, revealed a few moderately pollution intolerant taxa: water penny beetles and stream salamanders.

Results for the vernal pool must be considered in the context of the season, and site topography. Conductivity was relatively low (98.1 mg/l) and nutrient parameters were somewhat elevated (160 µg/l TP and 2.48 mg/l TN). However, the nutrient loading from partially treated septic leachate or infiltrated fertilizer is unlikely, considering the 200-foot width of the naturally vegetated buffer and the fact that the nearest residential lots drain predominantly southerly. Elevated nutrient levels would be expected for any pool in early spring, as the winter's decomposition of leaf litter always releases nutrients, in both dissolved and fine particulate form. In early spring little nutrient attenuation has taken place, via plant uptake, denitrification, and filter-feeding invertebrates. The initial pH reading (pending the more accurate in-situ reading) was substantially lower than that for the stream, as expected for a still pool without throughflow.

Respectfully submitted,

**REMA ECOLOGICAL SERVICES, LLC**

Handwritten signature of Sigrun N. Gadwa in black ink.

Sigrun N. Gadwa, MS, PWS  
Professional Wetland Scientist  
Registered Soil Scientist

Handwritten signature of George T. Logan in black ink.

George T. Logan, MS, PWS, CE  
Professional Wetland Scientist  
Registered Soil Scientist, Certified Senior Ecologist

**VIA E-MAIL & HAND-DELIVERY**

Attachments: Figure A; Table 1: Water Quality Summary Table; Laboratory Analytical Results

<sup>i</sup> A semi-perennial watercourse does not flow year round, but the substrate retains sufficient saturation, at least locally, for a variety of aquatic organisms, to remain hydrated until flow resumes. These include most case caddisflies and lungless stream salamanders.

**Table 1. Surface water analytical results in Vernal Pool (Wetland A), and an unnamed Intermittent Stream (Wetland C4) at Proposed Lodges at Storrs, Hunting Lodge Road, Mansfield, CT, on 3-24-16.**

<b>Sampling Station</b>	<i>Unnamed Stream</i>	<i>Vernal Pool</i>	<i>CT Standards</i>
<b>Sampling Date:</b>	3/24/2016	3/24/2016	
<b>Conductivity (<math>\mu</math> S/cm)</b>	211.0	98.1	NE
<b>pH<sup>3</sup></b>	7.06	6.01	as naturally occurs <sup>1</sup>
<b>Total Phosphorus as P (<math>\mu</math>g/l)</b>	40.00	160.00	only of natural origin <sup>1</sup> , 23.75 <sup>2</sup>
<b>Ortho Phosphorus as P (<math>\mu</math>g/l)</b>	<0.01	0.01	NE
<b>Nitrate-N (mg/l)</b>	0.45	1.39	0.31 <sup>2</sup> (includes Nitrite-N)
<b>Nitrite-N (mg/l)</b>	<0.01	<0.01	NE
<b>Total Keldahl Nitrogen (mg/l)</b>	0.35	2.48	5 <sup>1</sup> ; 1.26 <sup>2</sup>

**NOTES:**

N/A = Not applicable

NE = No standard established

mg/L = milligrams per Liter;  $\mu$ g/L = micrograms per Liter

<sup>1</sup> The State of Connecticut Water Quality Standards for Class A Waters.

<sup>2</sup> USEPA Nutrient Criteria (draft) for EcoRegion 1V, Level 11 Ecoregion 59 (coastal New England).

Note that Brook (Wetland C4) was sampled downgradient of the old causeway crossing. The vernal pool (Wetland A) was sampled in east-central portion. Sampling stations are shown on Figure A, attached.

<sup>3</sup> If tested in the laboratory, pH should be tested within a few hours of sample collection. Readings for this parameter could be too high, because testing took place ~ 19 hours after sampling.



*Wetland C & Intermittent Stream*

S-1

VP-1

*Wetland A & Vernal Pool Habitat*

FIGURE A: Surface Water Quality Sampling Stations at the Proposed "**Storrs Lodges**" residential community, Mansfield, CT (as seen on a April 2013 aerial photo; Google Earth)



Wednesday, March 30, 2016

Attn:  
Rema Ecological Services  
164 East Center Street  
Suite 8  
Manchester CT 06040

Project ID: LODGES AT STORRS  
Sample ID#s: BK88942 - BK88943

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

A handwritten signature in black ink that reads "Phyllis Shiller". The signature is written in a cursive style.

Phyllis Shiller  
Laboratory Director

NELAC - #NY11301  
CT Lab Registration #PH-0618  
MA Lab Registration #MA-CT-007  
ME Lab Registration #CT-007  
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003  
NY Lab Registration #11301  
PA Lab Registration #68-03530  
RI Lab Registration #63  
VT Lab Registration #VT11301



Environmental Laboratories, Inc.  
 587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045  
 Tel. (860) 645-1102 Fax (860) 645-0823

# Analysis Report

March 30, 2016

FOR: Attn:  
 Rema Ecological Services  
 164 East Center Street  
 Suite 8  
 Manchester CT 06040

Sample Information

Matrix: SURFACE WATER  
 Location Code: REMA  
 Rush Request: Standard  
 P.O.#:

Custody Information

Collected by:  
 Received by: SW  
 Analyzed by: see "By" below

Date Time

03/24/16 15:21  
 03/24/16 16:44

## Laboratory Data

SDG ID: GBK88942  
 Phoenix ID: BK88942

Project ID: LODGES AT STORRS  
 Client ID: VP-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Conductivity	98	5.00	umhos/cm	1	03/25/16	RR/EG	SM2510B-97
Ammonia as Nitrogen	0.30	0.10	mg/L	2	03/29/16	WHM	E350.1
Nitrite-N	< 0.01	0.01	mg/L	1	03/24/16 20:42	CAL	E353.2
Nitrate-N	1.39	0.02	mg/L	1	03/24/16 20:42	CAL	E353.2
Ortho-Phosphate-P	0.04	0.01	mg/L	1	03/25/16 18:37	CAL	SM4500PF-99
pH	6.01	0.10	pH Units	1	03/25/16 07:03	RR/EG	SM4500-H B-00
Nitrogen Tot Kjeldahl	2.48	0.20	mg/L	2	03/29/16	WHM	E351.1
Total Nitrogen	3.87	0.10	mg/L	1	03/29/16	WHM	SM4500NH3/E300.0
Phosphorus, as P	0.16	0.02	mg/L	2	03/25/16	JR	SM4500PE-99

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

**Comments:**

Ortho-Phosphate was not field filtered within 15 minutes of collection.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200. This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director

March 30, 2016

Reviewed and Released by: Deb Lawrie, Project Manager



Environmental Laboratories, Inc.  
 587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045  
 Tel. (860) 645-1102 Fax (860) 645-0823

# Analysis Report

March 30, 2016

FOR: Attn:  
 Rema Ecological Services  
 164 East Center Street  
 Suite 8  
 Manchester CT 06040

Sample Information

Matrix: SURFACE WATER  
 Location Code: REMA  
 Rush Request: Standard  
 P.O.#:

Custody Information

Collected by:  
 Received by: SW  
 Analyzed by: see "By" below

Date Time

03/24/16 16:07  
 03/24/16 16:44

## Laboratory Data

SDG ID: GBK88942  
 Phoenix ID: BK88943

Project ID: LODGES AT STORRS  
 Client ID: STREAM-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Conductivity	211	5.00	umhos/cm	1	03/25/16	RR/EG	SM2510B-97
Ammonia as Nitrogen	< 0.05	0.05	mg/L	1	03/29/16	WHM	E350.1
Nitrite-N	< 0.01	0.01	mg/L	1	03/24/16 20:43	CAL	E353.2
Nitrate-N	0.45	0.02	mg/L	1	03/24/16 20:43	CAL	E353.2
Ortho-Phosphate-P	< 0.01	0.01	mg/L	1	03/25/16 18:38	CAL	SM4500PF-99
pH	7.06	0.10	pH Units	1	03/25/16 07:06	RR/EG	SM4500-H B-00
Nitrogen Tot Kjeldahl	0.35	0.10	mg/L	1	03/29/16	WHM	E351.1
Total Nitrogen	0.80	0.10	mg/L	1	03/29/16	WHM	SM4500NH3/E300.0
Phosphorus, as P	0.04	0.01	mg/L	1	03/25/16	JR	SM4500PE-99

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

**Comments:**

Ortho-Phosphate was not field filtered within 15 minutes of collection.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200. This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director

March 30, 2016

Reviewed and Released by: Deb Lawrie, Project Manager



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 587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06045  
 Tel. (860) 645-1102 Fax (860) 645-0823

# QA/QC Report

March 30, 2016

## QA/QC Data

SDG I.D.: GBK88942

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 339352 (mg/L), QC Sample No: BK87168 (BK88942, BK88943)													
Nitrate-N	BRL	0.02	<0.02	<0.02	NC	102			95.8			85 - 115	20
Nitrite-N	BRL	0.01	0.01	0.02	NC	106			96.4			85 - 115	20
QA/QC Batch 339406 (mg/L), QC Sample No: BK87874 (BK88942, BK88943)													
Phosphorus, as P	BRL	0.01	0.05	0.03	NC	107			96.0			85 - 115	20
QA/QC Batch 339731 (mg/L), QC Sample No: BK88719 (BK88942, BK88943)													
Ammonia as Nitrogen	BRL	0.05	<0.05	<0.05	NC	101			100				
Nitrogen Tot Kjeldahl	BRL	0.10	0.37	0.33	NC	90.3			102				
QA/QC Batch 339432 (umhos/cm), QC Sample No: BK88845 (BK88942, BK88943)													
Conductivity	BRL	5.00	1820	1820	0	106						85 - 115	20
QA/QC Batch 339420 (pH), QC Sample No: BK88845 (BK88942, BK88943)													
pH			7.81	7.79	0.30	99.6						85 - 115	20
QA/QC Batch 339518 (mg/L), QC Sample No: BK88856 (BK88942, BK88943)													
Ortho-Phosphate as Phosphorus	BRL	0.01	0.25	0.25	0	106			104			85 - 115	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

- RPD - Relative Percent Difference
- LCS - Laboratory Control Sample
- LCSD - Laboratory Control Sample Duplicate
- MS - Matrix Spike
- MS Dup - Matrix Spike Duplicate
- NC - No Criteria
- Intf - Interference

  
 Phyllis Shiller, Laboratory Director  
 March 30, 2016

# Sample Criteria Exceedences Report

Criteria: None

**GBK88942 - REMA**

State: CT

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
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\*\*\* No Data to Display \*\*\*

Phoenix Laboratories does not assume responsibility for the data contained in this report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.



