

February 14, 2014

Mr. Louis M. Taverna, P.E.  
City Engineer  
City of Newton  
1000 Commonwealth Avenue  
Newton Centre, MA 02459

RE: **Annual Stormwater Monitoring Report for CY2013**  
Newton South High School Football Field  
140 Brandeis Road  
Newton, MA  
SAK Project Number 09.39.00

Dear Mr. Taverna:

### 1. Introduction

SAK Environmental, LLC (SAK) was retained by the City of Newton (CITY) to perform stormwater monitoring at the turf football field (FIELD) located at the Newton South High School. See **Figure 1** for the project location. The FIELD was constructed of synthetic turf with crumb rubber infill. A Massachusetts Department of Environmental Protection (MADEP) Superseding Order of Conditions dated June 5, 2009 (DEP File#239-0590) and related letter from the CITY's civil engineer, Gale Associates dated April 22, 2009, required the CITY to perform triennial (Spring, Summer and Fall) stormwater monitoring for a period of five (5) years beginning in 2009. This report summarizes results for Calendar Year 2013.

### 2. Work Performed

SAK conducted stormwater monitoring on April 24, June 27, and November 14 2013. SAK collected a single stormwater grab sample from drain manholes DMH-1, -2, and -5. **Figure 2** shows sampling locations. A 250 mL plastic sampling container was lowered into the manhole to retrieve the sample. The sample was passed through a coffee filter when pouring it into the laboratory container (a plastic 250 mL container preserved with nitric acid) to remove debris (i.e. leaves, sticks, crumb rubber). A new plastic collection container and coffee filter were used at each sampling location. Stormwater samples were submitted to an independent state certified laboratory (Con-Test Analytical Laboratory of East Longmeadow) and analyzed for the following total metals - Zinc, Cadmium, Chromium and Lead by EPA Method 6010.

### 3. Results

Laboratory results are summarized in **Table 1**. Results were compared to Massachusetts Drinking Water Quality Standards (310 CMR 22.00) in accordance with the approved Stormwater Monitoring Plan. During Calendar Year 2013, Cadmium, Chromium and Lead were





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140 Brandeis Road, Newton, MA  
SAK Project Number 09.39.00

Dear Mr. Taverna:

### **1. Introduction**

SAK Environmental, LLC (SAK) was retained by the City of Newton (CITY) to perform environmental monitoring of the turf football field (FIELD) at the Newton South High School. See **Figure 1** for the project location. The FIELD was constructed of synthetic turf with crumb rubber and sand infill. Public involvement by CITY residents raised concern about potential exposure to Lead and other compounds that may be present in the FIELD's materials. These concerns resulted in a Settlement Agreement dated October 20, 2009 between the CITY and two resident groups (identified as "10 Resident Group" and "Resident Abutters") that required monitoring for the migration of crumb rubber and/or associated compounds into the stormwater drainage system, groundwater, wetland, and FIELD surface be performed.

Under the Settlement Agreement, the CITY is to inspect for crumb rubber granules in selected trench drain and in-line catch basins that collect stormwater from the FIELD, and along a 6 foot high chain link fence and vinyl screen that parallels bordering vegetated wetlands at 6-month intervals for a period of 18-months. "If a significant accumulation of crumb rubber particles are found within the trench drain or at the base of the vinyl screen, or in both locations, Newton shall continue to inspect along the wetland (a.k.a. fence line) at 6-month intervals for an additional 18-months. If a significant amount of crumb rubber granules are detected during the additional inspections, Newton shall take steps to further prevent the crumb rubber granules from reaching the wetland". Monitoring was completed for both 18-month periods and as a precautionary measure monitoring was performed once in 2013, and no further monitoring is planned or required.

In addition, annual monitoring of water quality at the High School's nearby irrigation well and the measurement for Lead dust on the FIELD's turf was performed.

This report summarizes results for calendar year 2013. A separate report is being issued to report annual storm water monitoring results as required by the Massachusetts Department of Environmental Protection (MADEP).

## 2. Work Performed

### 2.1. Crumb Rubber Monitoring

Crumb rubber monitoring was performed on June 28, 2013. Sampling only occurred once during 2013.

#### 2.1.1. Chain Link Fence-Bordering Wetland

The presence of crumb rubber deposits on the ground surface was visually inspected along bordering vegetative wetland to determine if crumb rubber migrated by overland storm water flow. A visual inspection was performed along the entire fence line, and three (3) designated locations, FL-1, -2, and -3, were visually inspected in greater detail. These inspection points were located adjacent to (on the FIELD side) a 6 foot high chain link fence that runs parallel to wetland resource. Refer to **Figure 2** for inspection locations.

#### 2.1.2. Trench Drain

A visual inspection and sample collection of crumb rubber in the perimeter trench drains along the FIELD was conducted on June 28, 2013. Crumb rubber that had accumulated in trench drain to the FIELD's stormwater collection system was collected from two (2) locations (TD-2, and -4) during the inspection. See **Figure 2** for sampling locations. The grate covers at inspection locations were removed by the CITY to allow access. Deposits were collected from a three (3) foot length of trench drain at each monitoring location. The contents of the drain (crumb rubber, soil, debris) were removed and put in a clean zip lock bag, labeled and dated, and stored for subsequent measurement at SAK offices.

#### 2.1.3. In-Line Catch Basins

Visual inspection and sample collection of crumb rubber in the in-line catch basins was conducted on June 28, 2013. Crumb rubber that had accumulated in the in-line catch basins to the FIELD's stormwater collection system was collected at four (4) in-line locations (CB-1, -3, -6, and 9) during inspection. See **Figure 2** for sampling locations. The grate covers at inspection locations were removed by the CITY to allow access. Each catch basin contained a strainer basket which was removed and emptied into a clean zip lock bag, labeled and dated, and stored for subsequent measurement at SAK offices.

#### 2.1.4. Sample Analysis & Measurement

Crumb rubber samples retrieved from the site were analyzed at SAK offices as follows:

- a. The entire content of the sample container was emptied onto paper towels to aid in the drying process;
- b. Large debris (i.e. leaves, sticks, litter, rocks, etc) were removed by hand;
- c. The sample was allowed to air dry overnight;
- d. The sample was then filtered using a sieve-set with progressively smaller mesh to remove non-rubber particles;
- e. The crumb rubber was added to a graduated cylinder containing a tare weight and volume. The weight and volume of the crumb rubber sample was determined after its addition to the

graduated cylinder.

## 2.2. Well Monitoring

On June 19, 2013, SAK collected one groundwater sample from irrigation Well #1. The well is located southeast of the football FIELD (see **Figure 2**). The irrigation well is approximately 300 feet deep. The well provides irrigation water to natural grass baseball fields located to the east. The CITY provided access and operated the well during sampling. Prior to sampling, well water was purged for approximately 30 minutes at about 25 gallons per minute, totaling approximately 750 gallons. A groundwater sample was collected from a sampling port. The sample was submitted to an independent state certified laboratory (Con-Test Analytical Laboratory of East Longmeadow) and analyzed for the following total metals - Zinc, Manganese, Barium, Lead, Chromium, Copper, Iron and Cadmium by EPA Method 6010.

## 2.3. Lead Dust Monitoring

On September 6, 2013, SAK collected four (4) wipe samples to determine if Lead dust had accumulated on the FIELD's synthetic turf. One sample was collected from each quadrant of the football FIELD (NE, SE, NW and SW). See **Figure 2** for sampling locations. Samples were collected in accordance with ASTM E 1728-03 "Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination", where a moistened wipe was used to clean a pre-determined surface area using a 12 inch square template (144 in<sup>2</sup>). Samples were submitted to an independent accredited laboratory (ProScience Analytical Services, Inc. of Woburn) and analyzed using EPA method SW846-7420/3015.

## 2.4. Wetland Soil Sampling

Wetland soil sampling was not required based on Conclusions of the February 15, 2012 report, and was therefore excluded from the 2013 sampling.

# 3. Results

## 3.1. Crumb Rubber Monitoring

### 3.1.1. Chain Link Fence-Bordering Wetland

Visual Inspection along the vinyl fence/screen adjacent to the bordering vegetated wetland showed no evidence of crumb rubber deposits during the monitoring event. The vinyl screen on the fence was observed to be in good condition.

### 3.1.2. Trench Drain

Crumb rubber results from the two measured sections of trench drain are listed in **Table 1**. The weight of crumb rubber in the two drains ranged from 1.8 grams to 2.1 grams for 2013. At TD-2, the amount was less than the amount determined in 2012 by a difference of 22.6 grams. At TD-4, a small amount of crumb rubber (2.1 grams) was detected which was larger than 2012. Average values were calculated for both TD-2 and TD-4 for the entire four years of monitoring, at 28.1 grams and 4.8 grams, respectively. The significance of this data is unclear at this time. It appears that the crumb rubber collection system is sufficiently intercepting the crumb rubber granules keeping them from affecting storm water and the nearby wetland.

### 3.1.3. In-Line Catch Basins

Crumb rubber results in the in-line catch basins are listed in **Table 1**. The weight of crumb rubber in the four basins for 2013 ranged from 136 grams to 903 grams (2012 range was 4.0 gram to 189.9 grams). Average values were calculated for all in-line catch basins for the entire three years of monitoring, and are listed below:

- CB-1 at 126.8 grams
- CB-3 at 254.6 grams
- CB-6 at 86.9 grams
- CB-9 at 89.7 grams

As shown in the Weight of Crumb Rubber vs. Time in In-Line Catch Basins graph attached in **Appendix A** the weight of crumb rubber collected in the in-line catch basins has continued to increase over time after an initial decrease after the first monitoring event.

Newton's Engineering Division informed us that no visual inspection or maintenance of the trench drains or in-line catch basins was completed in 2013. According to the City, This oversight will be rectified through a more organized schedule for maintenance practices for the future. Newton's Engineering Division also indicated that in the summer of 2012, screens were installed on the 6" diameter outlet pipes (situated within the ACO trench drain system) adjacent to each in-line catch basin basket, which will trap more of the crumb rubber at this location preventing it from reaching any downstream structures. This is the reason for an increase in crumb rubber collected from the in-line catch basins. Future annual maintenance will include cleaning out the in-line catch basin baskets and the trench drains.

### 3.2. Well Monitoring

Laboratory results are summarized in **Table 2** and compared to Massachusetts Drinking Water Quality Standards. In 2013, Barium, Cadmium, Chromium, Copper, and Lead were below laboratory detection limits. Zinc and Iron were detected, but below Massachusetts Drinking Water Quality Standards. Manganese was detected above Massachusetts Drinking Water Quality Standards by 120 ug/L. See **Appendix B** for laboratory reports. This is the first time during this monitoring program that Manganese was exceeded. Synthetic fields are not known to be a potential source of Manganese. Conversely, Manganese is known to be a prevalent element in New England groundwater quality. There is no evidence that the FIELD has impacted groundwater quality in this area.

### 3.3. Lead Dust Monitoring

All Lead wipe samples collected were below laboratory detection limits. The detection limit as stated by the laboratory is 60.0 micrograms per square foot. Laboratory reports are included in **Appendix B**. There are no exposure limits directly applicable to non-residential building surfaces. *The US Department of Housing and Urban Development (HUD)* promulgated the most suitable analogous standard for Lead resulting from Lead dust and where taken from limits established for the abatement of residential dwellings. These limits are 40 ug/square foot on

flooring; 250 ug/square foot on interior window sills; and 400 ug/square foot on exterior window sills and window wells. None of these standards were exceeded. Even though the detection limit was above 40 ug/square foot, there has been no indication from previous sampling that lead dust is present on the FIELD.

#### 4. Conclusions

Based on the information presented herein and the terms of the Settlement Agreement, the following conclusions are made:

Section 1.c. of the Settlement Agreement states that (after 18-months of monitoring) "*if a significant accumulation of crumb rubber granules are found within the trench drain or at the base of the vinyl screen, or in both locations, Newton shall continue to inspect along the wetland line at 6-month periods for an additional period of 18 months to detect crumb rubber*". An additional 18-months of monitoring was determined to be required under the Settlement Agreement as stated in the February 15, 2012 report. Crumb rubber monitoring was completed in 2013 to satisfy the additional 18-months of sampling and no further monitoring is planned or required.

- ✓ Annual lead wipe testing will continue to be performed in September of 2014 to complete the requirements of the 5 year testing after initial testing, per Section 1.e. of the Settlement Agreement.
- ✓ Annual water well testing will continue to be performed in 2014 to complete the requirements of the 5 year testing after initial testing, per Section 1.i. of the Settlement Agreement.

Do not hesitate to call with any questions at (978) 688-7804.

Sincerely,  
**SAK Environmental, LLC**  
Prepared By:



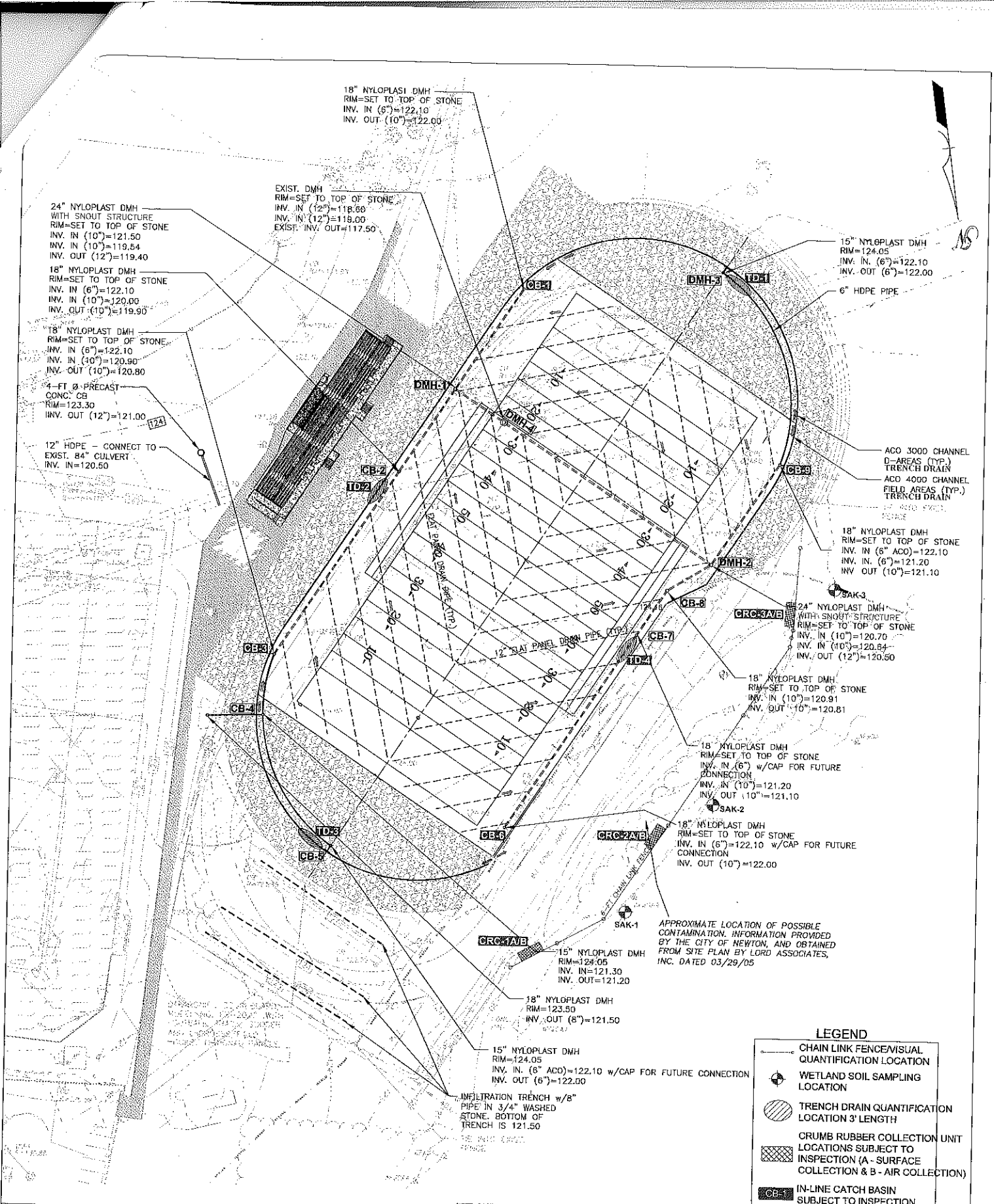
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**FIGURE 2 - SITE LAYOUT**  
NEWTON SOUTH FOOTBALL FIELD  
140 BRANDEIS ROAD  
NEWTON, MA

**PROJECT NO. 09.39.00**  
CLIENT:  
CITY OF NEWTON  
SCALE:  
NOT TO SCALE

**DATE: JUNE 4, 2010**  
DRAWN BY:  
ZMT/MPG  
CHECKED BY:  
MS