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MEMORANDUM

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DATE: October 3, 2018

SUBJECT: Conway Park Playground – Environmental Summary and Risk Characterization

Introduction

On behalf of the City of Somerville, Weston & Sampson has prepared this memorandum to summarize the results of our environmental assessments and risk characterization of a portion of the playground area of Conway Park (the "Site") and obtain EPA and DEP approval to re-open the northwestern portion of the playground. The remainder of the playground will remain fenced, along with the ballfield area, pending further data evaluation and development of a remedial approach. As you are aware, the city has received numerous requests to open the playground and has kept it closed pending the sampling, risk characterization and your approval. A summary of the Site data and risk characterization for the northwest portion of the Playground only, is provided below.

Background and Release History

The Site is an approximately 2.79-acre city-owned park located at 550 Somerville Avenue, see Figure 1. The northern portion of the Site that abuts Somerville Avenue is developed as a playground and the remainder of the Site is developed as ballfields, see Figure 2. The playground includes a mulched area that has swings, hardscape that includes a concrete path and circular pad, a grassy area and a small concession stand that is located on the city property abutting the parking area for an ice rink that abuts the Site to the east.

A portion of the Site was initially assessed as part of planning for a retaining wall project in the southeastern corner of the ballfield. Following the detection of reportable concentrations of contaminants, Weston & Sampson conducted additional sampling at the Site. Once polychlorinated biphenyls (PCBs) were detected in the playground area, the city immediately fenced the playground and closed access to the whole Site. The city convened a public meeting on March 29, 2018 to present the findings and explain that the Site would be closed pending further assessment.

Weston & Sampson spoke with both MassDEP and EPA regarding the findings. In addition, the reportable concentration was formerly reported to Massachusetts Department of Environmental Protection (MassDEP) on March 29, 2018. The Site is now managed under the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000, and is tracked with Release Tracking Number (RTN) 3-34868. Weston & Sampson has collected groundwater samples from Conway Park. Contaminants were either not detected or below reportable concentrations; therefore, groundwater is not considered a media of concern.

The city met with representatives of EPA and MassDEP and Weston & Sampson to review Site conditions, access, and to discuss the planned approach to evaluate both the playground and ballfield. Currently, the entire Site remains enclosed with chain link fence, and the park is closed and locked restricting access to the public. The goal is to open

the northwestern portion of the playground, which includes the mulch area and concession stand. The grassy area and circular concrete pad as well as the ballfield will remain fenced and locked. The fence is shown on Figure 2.

Historic atlas maps indicate the Site was previously occupied by the Middlesex Bleachery and Dye Works in 1888 and the K.M. Gilmore and Co. Bleach, Dye and Print Works in 1900 and 1934. Numerous buildings were located on-Site during this period. Atlas maps from 1950 to 1991 depict the Site as vacant land. The current playground was redeveloped and opened in 2002.

Summary of Soil Data

In March 2018, Weston & Sampson collected five soil samples from the northwest portion of the playground; two soil samples were analyzed for metals, EPH fractions with target PAHs, three samples were analyzed for lead, and all five soil samples were analyzed for PCBs using soxhlet extraction, see Table 1. To evaluate the playground further, Weston & Sampson also analyzed the mulch which did not detect any contaminants. The mulch is underlain by a geotextile fabric.

in July 2018, twenty-eight (28) additional soil samples were collected from seven locations on the northwest portion of the playground. These soil samples were analyzed for both PCBs and lead. PCBs were detected in seven of thirty-three (33) soil samples analyzed at concentrations ranging from 0.1 to 0.27 mg/kg, an order of magnitude below the MCP Method 1 cleanup standard of 1 mg/kg, see Tables 1 and 2.

Lead was detected in surficial soil from 0 to 3 feet at concentrations ranging from 4.2 to 200 mg/kg with an average concentration of 68 mg/kg. However, the sample containing 200 mg/kg is at a location in the mulch area, below a geotextile fabric barrier and below approximately six inches to a foot of mulch. Therefore, including the value of 200 mg/kg is a very conservative assumption given that there is no direct contact with the underlying soil. The Massachusetts Contingency Plan (MCP) Method 1 cleanup standard for lead is 200 mg/kg.

The detected concentrations of PAHs and metals were generally equivalent to or less than background concentrations of PAHs and metals that may be found in natural soil, with a few exceptions. Detected concentrations were less than background concentrations typically found in soil containing coal or wood ash often observed in urban soil. The EPH fraction, C_{11} to C_{22} aromatics, was detected at a concentration of 41 mg/kg.

All constituent concentrations in soil from the northwest portion of the playground were less than Method 1 cleanup standards, with the exception of the highest detected concentration of lead which was detected at one location at the standard. Based on the data collected in the May 7 collection round (Table 1), coupled with additional sampling across the Site, the contaminants of concern include PCBs and lead.

Summary of Concrete Data

As requested by EPA at the site walk, Weston & Sampson collected three wipe samples from the surface of concrete path from the northwest portion of the playground. As discussed, the goal was to evaluate if the dirt containing PCBs was tracked from the abutting ballfield to the playground area. The concrete sample locations are also shown on Figure 2 and the data presented in Table 3. PCBs were not detected above detection limits.

Risk Characterization

As shown below, all concentrations (with the exception of 1 lead sample) were below the applicable Method 1 cleanup standards. A summary of the data from the northwestern portion of the playground is provided below: Tables 1 and 2 summarize the soil data used to evaluate risk. Weston & Sampson calculated Exposure Point concentrations using an average from all data, and an average from the surficial 0-0.5 feet, 0.5 to 1.5 feet depth and the original 0-3-foot sample below grade/mulch/grass interval only. EPCs are shown below.

Parameter	Units	Min Conc.	Max. Conc.	No. of samples	EPC-Average All data	No. of samples	EPC-Average Surficial	MCP Method 1 Standard
Total PCBs	mg/kg	ND (<0.081)	0.27	39	0.07	20	0.09	1
Lead	mg/kg	4.2	200	35	63.82	18	67.91	200

Summary

The findings show that none of the data for the northwest corner of the playground (i.e. the area to be reopened) exceed the Method 1 cleanup standards at any location. One lead sample, located below geotextile fabric and mulch, equals the standard, but the EPC based on averages is less than 68 mg/kg compared to the standard of 200 mg/kg. As discussed though the sample location was below mulch and below a geotextile fabric barrier, therefore there is no exposure at this location. For PCBs, the maximum concentration detected is 0.27 mg/kg compared to the MCP Method 1 and Toxic Substance Control Act (TSCA) cleanup standard of 1 mg/kg.

Based on these data, we recommend removing the fence to open-up the northwest portion of the playground and to allow the public to access that portion of the Site only. The city will also put down fresh mulch on top of existing mulch. We request that EPA and MassDEP approve the recommendation.

The remainder of the playground (southeastern area) and the abutting ballfield will remain fenced and closed (see Figure) until further assessment has been completed and a plan to remediate the remainder of Conway Park has been developed and approved by EPA and DEP.

FIGURE 1

CONWAY PARK
SOMERVILLE, MASSACHSUETTS

LOCUS MAP

0 2,000 4,000 **Feet**

Weston & Sampson

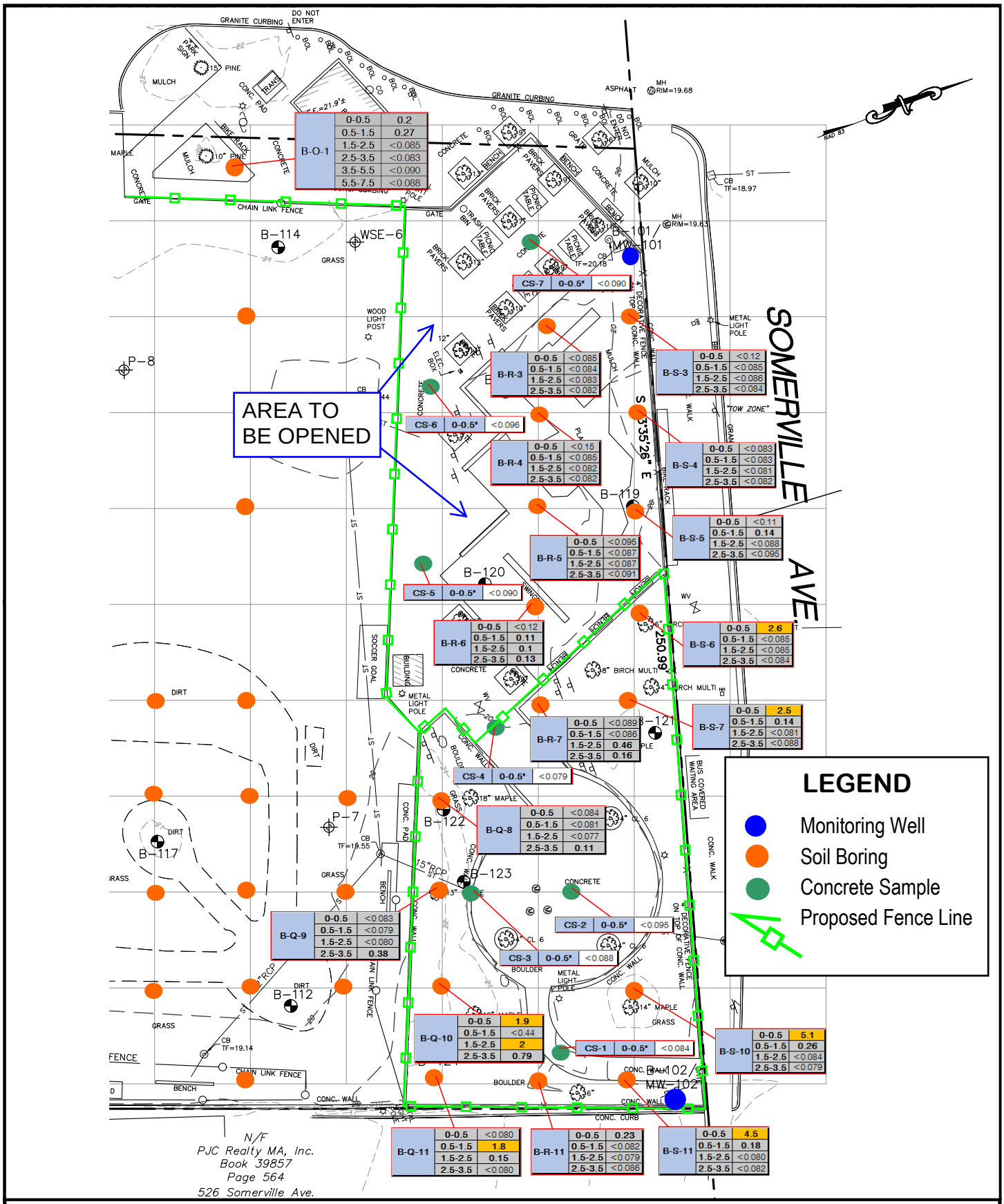

FIGURE 2

CONWAY PARK
SOMERVILLE, MASSACHUSETTS

PLAYGROUND AREA

Weston & Sampson

Table 1
Summary of Analytical Results- Playground (unfenced area)
TSCA Sampling
Conway Park
Somerville, Massachusetts

Parameter	Units	Reportable Concentrations	Method 1 Cleanup Standards		Sample Identification				
		RCS-1	S-1/GW-2	S-1/GW-3	B101 (0-3) 3/7/2018	B101 (6-9) 3/7/2018	B101* (0-1') 3/26/2018	B118 (0-1') 3/26/2018	B120* (0-1') 3/26/2018
Metals									
Antimony	mg/kg	20	20	20	<2.0	<2.0	NT	NT	NT
Arsenic	mg/kg	20	20	20	**2.8**	<2.0	NT	NT	NT
Barium	mg/kg	1000	1000	1000	**35**	**15**	NT	NT	NT
Beryllium	mg/kg	90	90	90	<0.20	<0.20	NT	NT	NT
Cadmium	mg/kg	70	70	70	**0.3**	<0.20	NT	NT	NT
Chromium	mg/kg	100	100	100	**13**	**10**	NT	NT	NT
Lead	mg/kg	200	200	200	**66**	**4.2**	NT	**160**	NT
Mercury	mg/kg	20	20	20	**0.13**	<0.028	NT	NT	NT
Nickel	mg/kg	600	600	600	**11**	**8.2**	NT	NT	NT
Vanadium	mg/kg	400	400	400	**19**	**16**	NT	NT	NT
Zinc	mg/kg	1000	1000	1000	**140**	**35**	NT	NT	NT
EPH Targets									
C9-C18 Aliphatics	mg/kg		1000	1000	<11	<12	NT	NT	NT
C19-C36 Aliphatics	mg/kg	3000	3000	3000	<11	<12	NT	NT	NT
C11-C22 Aromatics	mg/kg	1000	1000	1000	**49**	<12	NT	NT	NT
Acenaphthene	mg/kg	4	1000	1000	**0.19**	<0.12	NT	NT	NT
Acenaphthylene	mg/kg	1	600	10	<0.11	<0.12	NT	NT	NT
Anthracene	mg/kg	1000	1000	1000	**0.54**	<0.12	NT	NT	NT
Benzo(a)anthracene	mg/kg	1000	7	7	**1.7**	<0.12	NT	NT	NT
Benzo(a)pyrene	mg/kg	2	2	2	**1.8**	<0.12	NT	NT	NT
Benzo(b)fluoranthene	mg/kg	7	7	7	**2.2**	<0.12	NT	NT	NT
Benzo(g,h,i)perylene	mg/kg	1000	1000	1000	**1.3**	<0.12	NT	NT	NT
Benzo(k)fluoranthene	mg/kg	70	70	70	**0.74**	<0.12	NT	NT	NT
Chrysene	mg/kg	70	70	70	**2.1**	<0.12	NT	NT	NT
Dibenz(a,h)anthracene	mg/kg	0.7	0.7	0.7	**0.29**	<0.12	NT	NT	NT
Fluoranthene	mg/kg	1000	1000	1000	**4.2**	<0.12	NT	NT	NT
Fluorene	mg/kg	1000	1000	1000	**0.22**	<0.12	NT	NT	NT
Indeno(1,2,3-cd)pyrene	mg/kg	7	7	7	**1.2**	<0.12	NT	NT	NT
2-Methylnaphthalene	mg/kg	0.7	80	300	<0.11	<0.12	NT	NT	NT
Naphthalene	mg/kg	4	20	500	<0.11	<0.12	NT	NT	NT
Phenanthrene	mg/kg	10	500	500	**3.4**	<0.12	NT	NT	NT
Pyrene	mg/kg	1000	1000	1000	**4.6**	<0.12	NT	NT	NT
PCBs									
Aroclor-1254	mg/kg	1	1	1	**0.21**	<0.089	<0.33	<0.089	<0.14

Abbreviations:
mg/kg = milligram per killiogram
NT = Not Tested
* Mulch Sample

Notes:
< = indicates parameter not detected above laboratory method reporting limit, shown
BOLD Parameter detected above laboratory detection limit
BOLD Parameter exceeds the applicable RCS-1 threshold
Standards are from Massachusetts Contingency Plan (MCP), 310 CMR 40, April 2014.

Table 2
Summary of Analytical Results- Playground (unfenced area)
TSCA Sampling
Conway Park
Somerville, Massachusetts

Parameter	Units	Reportable Concentrations	Method 1 Cleanup Standards		Sample Identification															
					B-R-3				B-R-4				B-R-5				B-R-6			
		RCS-1	S-1/GW-2	S-1/GW-3	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5
					7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018
PCBs																				
Aroclor-1016	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1221	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1232	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1242	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1248	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1254	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	**0.11**	**0.1**	**0.13**
Aroclor-1260	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1262	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Aroclor-1268	mg/Kg	1	1	1	<0.085	<0.084	<0.083	<0.082	<0.15	<0.085	<0.082	<0.082	<0.095	<0.087	<0.087	<0.091	<0.12	<0.084	<0.084	<0.082
Total PCBs	mg/Kg	1	1	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.11**	**0.1**	**0.13**
Lead	mg/kg	200	200	200	**43**	**43**	**53**	**41**	**77**	**130**	**100**	**45**	**8.7**	**110**	**94**	**150**	**200**	**190**	**98**	**130**

Parameter	Units	Reportable Concentrations	Method 1 Cleanup Standards		Sample Identification											
					B-S-3				B-S-4				B-S-5			
		RCS-1	S-1/GW-2	S-1/GW-3	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5	0-0.5	0.5-1.5	1.5-2.5	2.5-3.5
					7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018	7/23/2018
PCBs																
Aroclor-1016	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	**0.14**	<0.088	<0.095
Aroclor-1221	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1232	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1242	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1248	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1254	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1260	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1262	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Aroclor-1268	mg/Kg	1	1	1	<0.12	<0.085	<0.086	<0.084	<0.083	<0.083	<0.081	<0.082	<0.11	<0.091	<0.088	<0.095
Total PCBs	mg/Kg	1	1	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.14**	ND	ND
Lead	mg/kg	200	200	200	**8.5**	**30**	**42**	**32**	**12**	**41**	**110**	**56**	**14**	**5.2**	**15**	**11**

Abbreviations:
mg/kg = milligram per killiogram
NT = Not Tested
ND = Not Detected

Notes:
< = indicates parameter not detected above laboratory method reporting limit, shown
BOLD Parameter detected above laboratory detection limit
BOLD Parameter exceeds the applicable RCS-1 threshold
Standards are from Massachusetts Contingency Plan (MCP), 310 CMR 40, April 2014.

Table 3
Summary of Concrete Analytical Results- Playground (unfenced area)
TSCA Sampling
Conway Park
Somerville, Massachusetts

Parameter	Units	Reportable Concentrations	Method 1 Cleanup Standards		Sample Identification		
		RCS-1	S-1/GW-2	S-1/GW-3	CS-5	CS-6	CS-7
					0-0.5	0-0.5	0-0.5
					7/31/2018	7/31/2018	7/31/2018
PCBs							
Aroclor-1016	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1221	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1232	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1242	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1248	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1254	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1260	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1262	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Aroclor-1268	mg/Kg	1	1	1	<0.090	<0.096	<0.090
Total PCBs	mg/Kg	1	1	1	<0.090	<0.096	<0.090

Abbreviations:
mg/kg = milligram per killiogram
NT = Not Tested

Notes:
< = indicates parameter not detected above laboratory method reporting limit, shown
BOLD Parameter detected above laboratory detection limit
BOLD Parameter exceeds the applicable RCS-1 threshold
Standards are from Massachusetts Contingency Plan (MCP), 310 CMR 40, April 2014.