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Memorandum

To:	Scott Alfonse and Cheryl Henlin, City of New Bedford
From:	David M. Sullivan, LSP, TRC Environmental Corporation
CC:	G. Hunt, D. Silverman, D. Peterson, J. Saunders, TRC Environmental Corporation
Subject:	Proposed Acquired Residential Properties Dioxin Sampling - Technical Approach 101, 102 and 111 Greenwood Street & 98, 108 and 118 Ruggles Street
Date:	April 15, 2011

TRC Environmental Corporation (TRC) has prepared the following memorandum to outline the proposed technical approach for conducting an environmental investigation for polychlorinated dibenzo-p-dioxins (dioxins), polychlorinated dibenzofurans (furans), and dioxin-like polychlorinated biphenyl (PCB) congeners, collectively referred to as dioxin compounds, in soil at the six above referenced Acquired Residential Properties in New Bedford, Massachusetts. The approach proposed herein is designed to capture worst-case conditions and provide representative spatial coverage, as well as to evaluate risk under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000) at the Acquired Residential Properties portion of the Parker Street Waste Site (PSWS).

Background

TRC previously conducted soil sampling for dioxin compounds in April 2010 at New Bedford High School (NBHS). TRC conducted that sampling consistent with the March 3, 2010 memorandum (TRC 2010) outlining the dioxin compound investigative approach.

To develop the soil-sampling program for dioxin compounds at the NBHS campus, TRC reviewed all soil data collected from the PSWS. As discussed in Attachment A (Recommended Technical Approach for Dioxin Evaluation) to TRC's above-referenced March 3, 2010 memorandum (TRC 2010), TRC's evaluation focused principally on data for metals, polynuclear aromatic hydrocarbons (PAHs), PCBs (homologs or Aroclors), and other semi-volatile organic compounds (SVOCs) as part of the process for sample selection. Based on an evaluation of all analytical results, TRC selected soil sample locations with concentrations greater than regulatory limits for PCBs, PAHs, SVOCs, and/or metals for review. TRC also evaluated locations based on the visual presence of ash, metals enrichment, and PAHs; PCB concentrations greater than regulatory limits; and the need to provide representative geographic coverage. TRC also reviewed soils data for the presence of other organochlorine compounds, the manufacture of which can result in the artifactual formation of dioxins (e.g., chlorinated benzenes and chlorinated phenols) and determined that PCBs are the only class of such compounds present. The available analytical data from NBHS and elsewhere provide no indication of the presence of any other chlorinated organic compounds in significant concentrations based on analysis for volatile organic compounds (VOCs), SVOCs, pesticides, and PCBs conducted by TRC and other consultants (BETA and VHB). Absent combustion of waste materials containing

chlorinated organic precursor compounds such as PCBs, dioxin formation is not expected to be significant.

TRC used this same approach to identify a population of samples at the Acquired Residential Properties from which TRC selected sample locations to undergo dioxin, furan and dioxin-like PCB congener analyses based on existing chemical signatures as further described herein. Considering previous Massachusetts Department of Environmental Protection (MassDEP) comments on the outcome of the April 2010 NBHS sampling (MassDEP 2011) and consistent with previously proposed and implemented dioxin compounds investigative activities at the NBHS campus, the approach proposed herein is designed to accomplish the following at the Acquired Residential Properties:

- **Evaluate worst-case conditions –** To identify sample locations where the highest concentrations of dioxins, furans and dioxin-like PCB congeners would be expected. This biased sampling approach would avoid underestimating risk from exposure to dioxins compounds in this area of evaluation.
- **Risk Assessment –** To support the evaluation of current and future human health risk under the MCP using dioxin compound data that is representative of potential human exposures across the site.

This sampling program will also help: 1) examine what relationship (if any) exists between PCBs and dioxins in soils at the site and 2) to efficiently target areas potentially impacted by dioxin compounds in lieu of a larger sampling program.

Acquired Residential Properties Technical Approach (Proposed) - Dioxin Investigation

TRC will plan, implement and oversee the dioxin compounds investigative work at the Acquired Residential Properties. TRC's approach is consistent with that discussed in TRC's Proposed NBHS Dioxin Follow-Up Sampling – Technical Approach memorandum for NBHS dated April 13, 2011 (TRC 2011). The approach targets both biased ("worst case") and unbiased sample locations to evaluate potential exposures that may be present following implementation of a soil remedy and Activity and Use Limitation (AUL) at depths greater than three feet below ground surface at the Acquired Residential Properties.

From this evaluation, TRC identified the following prior soil sampling locations listed below for further consideration (see Figure 1).

Sample locations	Property
E_52 G2 H2 SB-101-4A/5C **SB-101-5A** SB-101-6A **SB-101-6B** SB-101-6C	**101 Greenwood Street**

Sample locations	Property
TP-101-H TP-101-I	**101 Greenwood Street**
SB-185 **SB-194** SB-102-6 SB-102-8A SB-102-8B SB-102-8C **SB-102-8D** TP-102-B	**102 Greenwood Street**
SB-98-4	**98 Ruggles Street**
A15 **SB-118-1A**	**118 Ruggles Street**

The data analysis identified sample locations clustered geographically in a limited number of areas. The sample points within those areas, as a result, were relatively closely distributed. Therefore, a subset of the soil sample locations were selected as representative of these areas. The selected locations from each of these four properties are as follows: SB-101-5A, SB-101-6B, SB-194, SB-102-8D, SB-98-4 and SB-118-1A. These locations are in boldface in the table for ease of identification.

TRC then selected eight more sample locations (at least one from each of the remaining properties) that will potentially have exposed surface soil at the conclusion of the remedial action, including the 111 Greenwood Street and 108 Ruggles Street properties, to further evaluate where exposure potential is likely to support additional quantification of risk.

Sample locations	Property
SB-101-8A	**101 Greenwood Street**
SB-111-1 SB-111-3 SB-111-7	**111 Greenwood Street**
SB-98-7	**98 Greenwood Street**
SB-108-1 SB-108-4	**108 Ruggles Street**
SB-118-3	**118 Ruggles Street**

The locations proposed supplement the existing database of analytical results for PAHs, PCBs (homologs or Aroclors), and metals for the 0 to 3 foot depth zone, while providing an adequate spatial distribution of sample points within the Acquired Residential Properties area to support risk characterization. At least two sample locations were identified on two properties not selected for biased sampling (i.e., 111 Greenwood Street and 108 Ruggles Street). TRC selected no further sample locations within the 101 and 102 Greenwood Street properties since these properties are likely to be paved at the conclusion of remedial actions.

At each location, TRC proposes to conduct sampling in the top foot of soil (0 to 1 foot) and the 1 to 3 foot depth zone.

The fill layer below 3 feet will not be sampled since the AUL to be placed on the Acquired Residential Properties will control exposure to soils greater than three feet below ground surface. This approach

is consistent with Mass DEP's screening criteria requested in their January 13, 2011 comment letter regarding the dioxin compounds investigation conducted at the NBHS campus in April 2010.

For each sample, TRC proposes the following analyses:

- Chlorinated dioxin/dibenzofuran congeners by SW-846 Method 8290 to evaluate the presence/absence of these compounds.
- PCB congeners by SW-846 Method 1668A to evaluate the presence/absence of PCB dioxin-like congeners and evaluate what relationship (if any) exists between PCBs and dioxins in soils at the site.

The existing database is deemed sufficient to support characterization of risk from exposure to PAHs, PCBs (homologs or Aroclors), and metals; therefore, no further sampling is proposed for these compounds.

TRC will conduct field screening of soil samples based on visual and olfactory observations, jar headspace readings using a calibrated PID, and professional judgment. Screening will be conducted consistent with TRC Standard Operating Procedures (SOPs) and general industry practice. TRC field investigators may collect soil samples for analysis to supplement the findings of the soil boring program. Sample decisions will be based on professional judgment in consultation with the Licensed Site Professional (LSP).

As a contingency, TRC is prepared to submit soil samples for VOC analysis contingent upon the results of field screening and professional judgment. TRC will notify the City when such judgments are made. The following analytical method will be specified in such an event:

- VOCs by Method SW-846 Method 8260B.

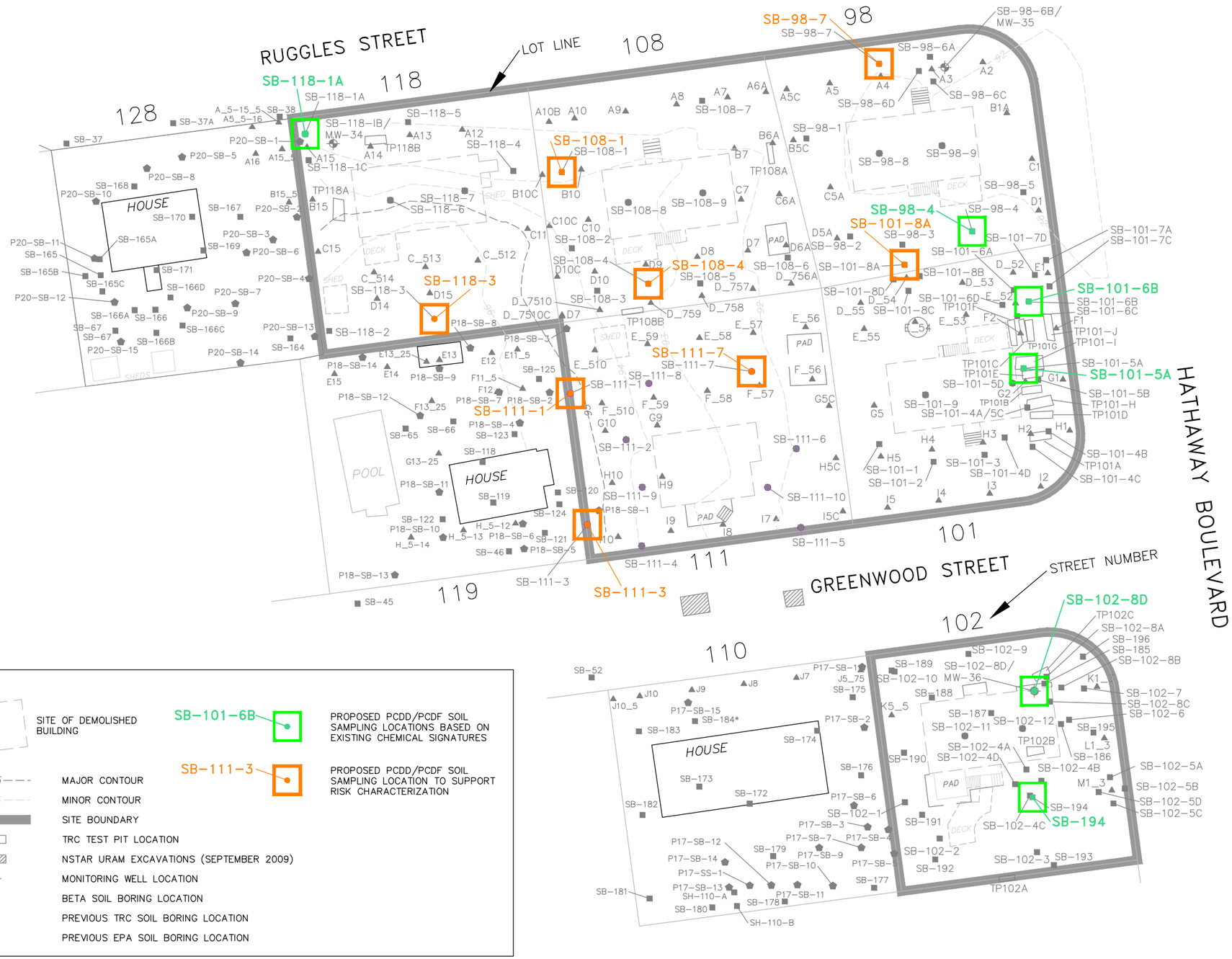
We look forward to discussing this memorandum with you at your earliest convenience.

References

MassDEP 2011 Letter. Prepared by Massachusetts Department of Environmental Protection (Leonard J. Pinaud). Addressed to: City of New Bedford (Scott Alfonse). RE: New Bedford High School Campus [Dioxin Sampling]. January 13, 2011

TRC 2010 Memorandum. Proposed New Bedford High School Dioxin Investigation Technical Approach. Prepared for the City of New Bedford. Prepared by TRC Environmental Corporation. March 3, 2010.

TRC 2011 Memorandum. Proposed NBHS Dioxin Follow-up Sampling - Technical Approach. Prepared for the City of New Bedford. Prepared by TRC Environmental Corporation. April 13, 2011.



LEGEND:

- SITE OF DEMOLISHED BUILDING
- MAJOR CONTOUR (95)
- MINOR CONTOUR (94)
- SITE BOUNDARY
- TRC TEST PIT LOCATION
- NSTAR URAM EXCAVATIONS (SEPTEMBER 2009)
- MONITORING WELL LOCATION
- BETA SOIL BORING LOCATION
- PREVIOUS TRC SOIL BORING LOCATION
- PREVIOUS EPA SOIL BORING LOCATION
- SB-101-6B — PROPOSED PCDD/PCDF SOIL SAMPLING LOCATIONS BASED ON EXISTING CHEMICAL SIGNATURES
- SB-111-3 — PROPOSED PCDD/PCDF SOIL SAMPLING LOCATION TO SUPPORT RISK CHARACTERIZATION

APPROXIMATE GRAPHIC SCALE

0' 20' 40' 80'

ENVIRONMENTAL INVESTIGATION AND RELATED
ENVIRONMENTAL CONSULTING SERVICES
NEW BEDFORD HIGH SCHOOL & SURROUNDING
NEIGHBORHOOD
NEW BEDFORD, MASSACHUSETTS

ACQUIRED RESIDENTIAL PROPERTIES PROPOSED
PCDD/PCDF SOIL SAMPLING LOCATIONS

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
(978) 970-5600

DRAWN BY: HWB
CHECKED BY: JBS
DATE: APR 2011

FIGURE 1

FILE: T:\E_CAD\115058\ACQUIRED PROP PROP PCDD PCDF-G.dwg