Rolling Knolls Landfill Settling Parties

Addendum 1 to the Data Gaps Sampling and Analysis Plan

Rolling Knolls Landfill Superfund Site

Chatham, New Jersey

August 2015

ARCADIS

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Chatham, New Jersey

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Acronyms and Abbreviations

Agreement	Administrative Settlement Agreement and Order on Consent
ARCADIS	ARCADIS U.S., Inc.
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	constituents of concern
CLP	Contract Laboratory Program
Data Gaps SAP	Data Gaps Sampling and Analysis Plan
GPS	global positioning satellite
GSNWR	Great Swamp National Wildlife Refuge
NJDEP	New Jersey Department of Environmental Protection
PPNDP	passively placed narrow diameter points
PCB	polychlorinated biphenyl
PID	photoionization detector
QA	quality assurance
QAPP	Quality Assurance Project Plan
SCSR	Site Characterization Summary Report
site	Rolling Knolls Landfill Superfund Site, located in Chatham Township, New Jersey
SOP	Standard Operating Procedure
SRS	Soil Remediation Standard
TestAmerica	TestAmerica Laboratories, Inc.

the Group	Chevron Environmental Management Company, Lucent Technologies Inc., (now known as Alcatel-Lucent USA Inc.) and Novartis Pharmaceuticals Corporation
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
USFWS	United States Fish & Wildlife Service

1. Introduction

On behalf of Chevron Environmental Management Company for itself and on behalf of Kewanee Industries, Inc., Lucent Technologies Inc., (now known as Alcatel-Lucent USA Inc.) and Novartis Pharmaceuticals Corporation (collectively, the Group), ARCADIS U.S., Inc. (ARCADIS) prepared this Addendum 1 to the Data Gaps Sampling and Analysis Plan (Data Gaps SAP) for the Rolling Knolls Landfill Superfund Site (the "site"), located in Chatham Township, New Jersey. The location of the site is shown in Figure 1, and the site features are shown in Figure 2.

The Data Gaps SAP was submitted to USEPA on September 17, 2014 and approved by the United States Environmental Protection Agency (USEPA) on November 18, 2014 (ARCADIS 2014a). Collection and analysis of soil, sediment, and groundwater samples proposed in the Data Gaps SAP was conducted from November 2014 to July 2015. By emails dated April 6 and April 9, 2015, the USEPA's remedial project manager (RPM) indicated that seven additional soil and sediment samples would be required to complete the Data Gap sampling and that the New Jersey Department of Environmenal Protection (NJDEP) concurred with this position. On April 29, 2015, the Group submitted the Data Gaps SAP and Quality Assurance Project Plan (QAPP) addenda conforming to these requirements. On June 17, 2015, the USEPA and the NJDEP commented on the Data Gaps SAP and QAPP addenda, in part, by requiring 33 soil/sediment samples in addition to the 7 referenced in the early April email exchange. The agencies, the Group, and ARCADIS discussed these comments in a conference call on June 30, 2015. ARCADIS field verified and suggested changes to several of the proposed NJDEP sampling locations, and received comments on the suggested changes in an August 17, 2015 letter from USEPA. The sampling proposed in this Data Gaps SAP Addendum 1 is intended to comply with all requests made by the agencies in the June 17, 2015 letter, the June 30, 2015 conference call, and the August 17, 2015 letter.

1.1 Objectives

The objectives of the sampling proposed herein are to complete the objectives originally identified in Section 1.1 of the approved Data Gaps SAP (November 2014) and to address additional delineation concerns identified by the USEPA and NJDEP that were requested (letters dated June 17, 2015 and August 17, 2015) to further delineate the nature and extent of contamination at the site.

In addition, the Group is proposing additional delineation sampling to that requested by USEPA and NJDEP. This addendum contains the sampling proposed by the USEPA, NJDEP, and the Group.

1.2 Data Gaps SAP Organization

This Data Gaps SAP is organized as described below.

- Section 2, Additional Soil and Sediment Sampling, presents each new task that will be conducted as part of the Data Gaps SAP and outlines proposed technical activities that will be conducted to complete each task.
- Section 3, Schedule, presents a schedule for the Data Gaps SAP activities.
- Section 4, Project Management, introduces the project team and describes the responsibilities of each project team member.
- Section 5, References, provides references used in the development of this Addendum 1 to the Data Gaps SAP.

A QAPP, submitted on September 19, 2014 and approved by the USEPA on December 18, 2014 (ARCADIS 2014b), provides supporting information on site conditions, sampling requirements and procedures, and laboratory analytical procedures. Certain worksheets in the QAPP have been revised to accompany this addendum. These revised worksheets are submitted as Addendum 1 to the QAPP.

2. Additional Soil and Sediment Sampling

2.1 Soil Sampling

2.1.1 Soil Sample Locations

The proposed soil sampling locations are shown on Figures 3a and 3b, along with previous surface soil sample results that were used to select the proposed locations. Soil sampling locations (sample numbers SS-165 through SS-176) are located off the boundary of the landfill in native soil, near where previous soil samples contained concentrations of one or more constituents of concern (COCs) exceeding its New Jersey Soil Remediation Standard (SRS). Proposed locations are also summarized in Table 1.

In general, the topography of the site is flat, and the landfill is slightly higher than the surrounding areas. Delineation samples collected outside the boundary of the landfill, often in areas that are at times inundated, are lower than the landfill because the landfill was constructed by filling a low-lying area. Areas where constituents could flow in runoff from the landfill were targeted for sampling in previous surface water and sediment sampling.

After the discussion between the Settling Parties and the agencies on June 30, 2015, NJDEP provided information on their proposed sample locations, and ARCADIS field-verified that several of these locations were in topographically lower areas. Where appropriate and approved by USEPA in their letter of August 17, 2015, modified locations will be sampled to help ensure that NJDEP's objective of sampling in a topographically low area will be met.

All perimeter locations are in potentially wet areas and are expected to consist of wetland soil. However, if these locations are below water at the time of collection, they will be designated sediment samples and will be collected using sediment sampling techniques (see Section 2.2). Soil sample locations SS-177 through SS-183 are located in the interior of the landfill.

The matrices at the proposed sample location were observed during a July 27, 2015 site visit conducted by ARCADIS and a representative of CDM (consultant to the USEPA). Site conditions may change in response to precipitation or other factors. As a result, samples that are anticipated to consist of soil may be inundated and considered sediment at the time of sampling, and samples that were below water at the

time of the site visit may be dry and considered soil at the time of sampling. The field crew will follow the appropriate standard operating procedure (SOP) (either SOP 14 [sediment sampling], SOP 5 [drilling procedures for soil sampling], or SOP 17 [manual procedures for soil sampling]) based on the current conditions during the time of sampling.

2.1.2 Soil Sampling Procedures

ARCADIS field personnel will advance soil borings to collect soil samples using a hand-driven Macrocore®. At sample locations SS-165 through SS-176, field personnel will use hand tools (e.g., slide-hammer) to advance a 2-inch-diameter by 2-foot-long stainless steel Macrocore® fitted with a dedicated acetate liner to 2 feet below ground surface (bgs). At sample locations SS-177 through SS-183 field personnel will advance a Macrocore® using a track mounted geoprobe to a depth below the landfilled materials. The Macrocore® cutting shoe may be equipped with a disposable, plastic basket to increase recovery of loose material. Other sampling methods (e.g., hand auger, shovel) may be used to collect soil samples if conditions at a proposed sampling location do not allow for advancement of or adequate recovery with a hand-driven Macrocore®.

After the Macrocore® is advanced to the specified depth, field personnel will carefully extract the Macrocore® from the borehole to minimize soil loss, remove the acetate liner containing the soil core from the Macrocore®, cut the acetate liner open, and photograph the soil core. Field personnel will record the length of each recovered soil core in a field log book then score the soil core at 6-inch intervals and field screen with a photoionization detector (PID). PID readings will be recorded in a field log book. If other sampling methods are required to collect soil, field personnel will attempt to remove a volume of soil approximately 1 foot long and 3 to 6 inches thick from 0.0 to 1.0 foot bgs and 1.0 to 2.0 feet bgs, while attempting to minimize soil disturbance. Field personnel will process this soil volume in the same manner as a soil core contained in a Macrocore® acetate liner, as described above.

The soil's physical characteristics and other relevant visual observations will be recorded in a field log book. When soil characterization is complete, a composite sample will be collected from the remaining soil in the soil core. At the locations off the landfill (SS-165 through SS-176) soil samples will be collected from the 0.0 to 1.0 foot bgs and 1.0 to 2.0 foot bgs. At the locations on the landfill, soil samples will be collected from the 1-foot interval beneath the landfilled material and the 1-foot interval above the clay layer that underlies the site. The VOC fraction will be collected from the

lower 6-inches within each of these intervals at sample locations where VOC analysis will be conducted.

Soil samples will be collected using decontaminated, non-dedicated stainless steel hand-tools (e.g., spoons, scoops or trowels) and bowls. Field personnel will place soil samples in laboratory-supplied containers. Field personnel will document, label, package and ship soil samples in accordance with procedures provided in Worksheet #21 of the QAPP (ARCADIS 2014b). Non-disposable sample equipment (e.g., stainless steel bowls and spoons, Macrocore®, hand-auger, shovel) will be decontaminated between uses at subsequent sampling locations in accordance with the Equipment Decontamination SOP presented in the QAPP (ARCADIS 2014b).

Field personnel will advance the Macrocore® or other hand tools until adequate sample volume is obtained or until it is determined that a soil sample cannot be collected due to lack of soil at a sampling location. Field personnel will advance the Macrocore® or other tools a maximum of four times within 5 to 10 feet of each proposed sampling location in an attempt to obtain adequate sample volume. If adequate sample volume cannot be obtained after four attempts, the sampling area will be widened until adequate sample volume has been obtained.

Some sampling will take place in potential bog turtle habitat. Field personnel conducting sampling activities in potential bog turtle habitat will implement USFWS-recommended conservation measures as described in Section 3.1.1 of the Data Gaps SAP (ARCADIS 2014a).

The horizontal and vertical locations of all soil samples will be surveyed by a New Jersey licenses land surveyor.

2.1.3 Soil Sample Analyses

Soil samples will be analyzed for the COCs outlined in Table 1. The proposed soil samples that are off the boundary of the landfill (perimeter samples) are in native soil (SS-165 through SS-176). The proposed analyses for these perimeter samples include TCL SVOCs, SVOCs by SIM, PCBs (as Aroclors), pesticides, TAL metals, and cyanide. The proposed soil samples that are within the boundary of the landfill (interior samples) are in landfill material (SS-177 through SS-183). The proposed analyses for these interior samples include full TCL/TAL parameters and SVOCs by SIM.

Sample analyses for SS-173 and SS-174 will be held as contingent samples until results from SD-48 and SD-49 have been reviewed. If results from SD-48 and SD-49 indicate a connection to the landfill, SS-173 and SS-174 will be analyzed to further evaluate this connection.

2.2 Sediment Sampling

2.2.1 Sediment Sample Locations

The proposed sediment sampling locations (locations SD-45 through SD-69) are shown on Figures 3a and 3b, and are summarized in Table 1. The order of sampling will be from downstream to upstream locations. The position of sample locations may be adjusted based on accessibility or on other information gathered during field activities. If locations need to be relocated more than 10 feet from the proposed location, a Field Change Request will be submitted to USEPA for approval prior to sampling.

2.2.2 Sediment Sampling Procedures

Sediment samples will be collected in accordance with sampling procedures developed based on USEPA, USEPA ERT, and NJDEP sediment sample collection guidance documents (USEPA 1995, 1994; NJDEP 2005, 1998).

Sediment samples will be collected by advancing a dedicated Lexan® coring device or stainless steel Macrocore® sampler equipped with a dedicated acetate liner to a minimum of 1 foot beneath the surface water/sediment interface. One of these sampling methods will be selected based on site conditions at the time of sample collection. Each sediment core will be field screened with a PID. PID readings, descriptions of the sediment's physical characteristics, and other relevant visual observations will be recorded in a field log book. At sample locations where VOC analysis will be conducted (i.e., SD-61 and SD-62), a sample for VOC analysis will be collected from the 0.5 to 1.0-foot interval in accordance with NJDEP (1998). Sediment in the 0.0 to 0.5-foot interval will then be homogenized and transferred directly into laboratory-supplied containers for other analytical parameters. Field personnel will document, label, package and ship sediment samples in accordance with procedures provided in Worksheet #21 of the QAPP (ARCADIS 2014b).

The locations of all sediment samples will be surveyed by a New Jersey licenses land surveyor.

2.2.3 Sediment Sample Analysis

Sediment samples will be analyzed for the COCs outlined in Table 1. All of the proposed sediment samples are off the boundary of the landfill in native sediment. Since the purpose of these samples is to delineate the extent of COCs detected during implementation of the Data Gaps SAP, and the prior sampling (including the Data Gaps SAP and other sampling discussed in the Site Characterization Summary Report) at the site, the proposed analyses include TCL SVOCs, SVOCs by SIM, PCBs (as Aroclors), pesticides, TAL metals and cyanide. Sediment samples SD-61 and SD-62 (NJDEP samples 16 and 17, respectively) will be analyzed for full TCL/TAL parameters and SVOCs by SIM. VOCs are included in these two samples in order to delineate VOCs detected in soil samples SS-109 and POI-3. All sediment samples will also be analyzed for pH, total organic carbon, and grain size.

Sample analysis for SD-50 will be held as a contingent sample until results from SD-49 have been reviewed. If results from SD-49 indicate a connection to the landfill, SD-50 will be analyzed to further evaluate this connection.

2.3 Analytical Procedures

All analyses will be performed by TestAmerica Laboratories, Inc. (TestAmerica) using current USEPA methods. TestAmerica is a current participant in the Contract Laboratory Program (CLP). The analytical procedures are included in Table 1. Additional information on TestAmerica and the analytical procedures is provided in the QAPP (ARCADIS 2014b).

3. Schedule

Implementation of the proposed soil and sediment sampling program will begin within 2 weeks after USEPA's approval of this Addendum 1 to the SAP and Addendum 1 of the QAPP. Sample collection will require approximately 4 weeks, and sample analyses will be completed 4 weeks after collection of the last sample. Data validation will require an additional 4 weeks after analysis of the last sample. Therefore, the total time to implement this work after USEPA approval is 12 weeks. If field conditions or other factors require changes to sample locations or methods, and/or if Field Change Requests must be submitted to and approved by USEPA, the schedule will be adjusted accordingly. The schedule for submittal of the final report will depend on the completion of this sampling and other tasks (monitoring well installation and sampling) which are not part of this addendum. The Group will compress this schedule if sampling, laboratory analysis, and/or data validation can be completed in less time than anticipated.

4. Project Management

4.1 Staffing

Implementation of Data Gap SAP activities will require integration of personnel from various organizations, collectively referred to as the "Project Team." Responsibilities of each member of the project team are presented in the QAPP (ARCADIS 2014b).

A list of key project management personnel is provided below.

Company/Organization	Title	Name	Phone Number
USEPA	Remedial Project Manager	Tanya Mitchell	212-637-4362
USEPA	QA Manager	TBD	TBD
NJDEP	Case Manager	Jill McKenzie	609-292-1993
The Group	Primary Contact	Gary Fisher	908-582-5771
Independent Consultant	Project Officer	John Persico	609-903-6227
ARCADIS	Project Manager	Suzanne Walls	865-777-3502
ARCADIS	QA Manager	Dennis Capria	315-446-2570

TBD – To be determined

4.2 Coordination

Personnel performing RI/FS Work Plan activities will be directed by representatives of the Project Team. A project organizational chart is provided as Figure 4.

5. References

ARCADIS U.S., Inc. 2012. Site Characterization Summary Report.

ARCADIS U.S., Inc. 2014a. Data Gaps Sampling and Analysis Plan. November.

ARCADIS U.S., Inc. 2014b. Quality Assurance Project Plan. December.

New Jersey Department of Environmental Protection. 1998. Guidance for Sediment Quality Evaluations.

New Jersey Department of Environmental Protection. 2005. Field Sampling Procedures Manual.

USEPA. 1995. *Superfund Program Representative Sampling Guidance; Volume 5: Water and Sediment; Part 1 – Surface Water and Sediment*. Office of Emergency and Remedial Response, Office of Solid Waste and Emergency Response.

USEPA. 1994. *Sediment Sampling - SOP #: 2016*. Emergency Response Team.

Table 1
Sample Locations, Depths, and Analyses
Data Gaps Sampling and Analysis Plan Addendum 1
Rolling Knolls Landfill Superfund Site
Chatham, New Jersey

Sample ID	NJDEP Sample ID[1]	Sample Media	Depth Interval (Feet)	Sample Collection Method	Laboratory Analyses[2]								Notes
					SVOCs	SVOCs - SIM	Full TCL/TAL	PCBs (as Aroclors)	PCB Congeners	Pesticides	TAL Metals and Cyanide	pH, TOC, Grain Size	
Soil Samples													
SS-165[3]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-166[3]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-167[3]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-168[3]	NA	Soil	0.0-1.0	Macrocore	X	X		X	X	X	X		
			1.0-2.0		X	X		X	X	X	X		
SS-169[4]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-170[4]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-171[4]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-172[4]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-173[4]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		Contingent on sample SD-48
			1.0-2.0		X	X		X		X	X		
SS-174[4]	NA	Soil	0.0-1.0	Macrocore	X	X		X		X	X		Contingent on sample SD-50
			1.0-2.0		X	X		X		X	X		
SS-175	6	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-176	14	Soil	0.0-1.0	Macrocore	X	X		X		X	X		
			1.0-2.0		X	X		X		X	X		
SS-177	29	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
SS-178	30	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
SS-179	31	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
SS-180	32	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
SS-181	33	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
SS-182	34	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
SS-183	35	Soil	TBD	Macrocore		X	X						
			TBD			X	X						
Sediment Samples													
SD-45[3]	NA	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-46[3]	NA	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-47[3]	NA	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-48[4]	NA	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-49[4]	NA	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-50[4]	NA	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	Contingent on sample SD-49
SD-51	2	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-52	3	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-53	4	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-54	5	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-55	7	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-56	8	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-57	9	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-58	10	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-59	12	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-60	13	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-61	16	Sediment	0.0 - 1.0	Grab sample		X	X					X	Delineation sample for SS-109
SD-62	17	Sediment	0.0 - 1.0	Grab sample		X	X					X	Delineation sample for POI-3
SD-63	18	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-64	19	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	

Table 1
Sample Locations, Depths, and Analyses
Data Gaps Sampling and Analysis Plan Addendum 1
Rolling Knolls Landfill Superfund Site
Chatham, New Jersey

Sample ID	NJDEP Sample ID[1]	Sample Media	Depth Interval (Feet)	Sample Collection Method	Laboratory Analyses[2]								Notes
					SVOCs	SVOCs - SIM	Full TCL/TAL	PCBs (as Aroclors)	PCB Congeners	Pesticides	TAL Metals and Cyanide	pH, TOC, Grain Size	
Sediment Samples (continued)													
SD-65	22	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-66	23	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-67	25	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-68	27	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	
SD-69	28	Sediment	0.0 - 1.0	Grab sample	X	X		X		X	X	X	

Abbreviations:

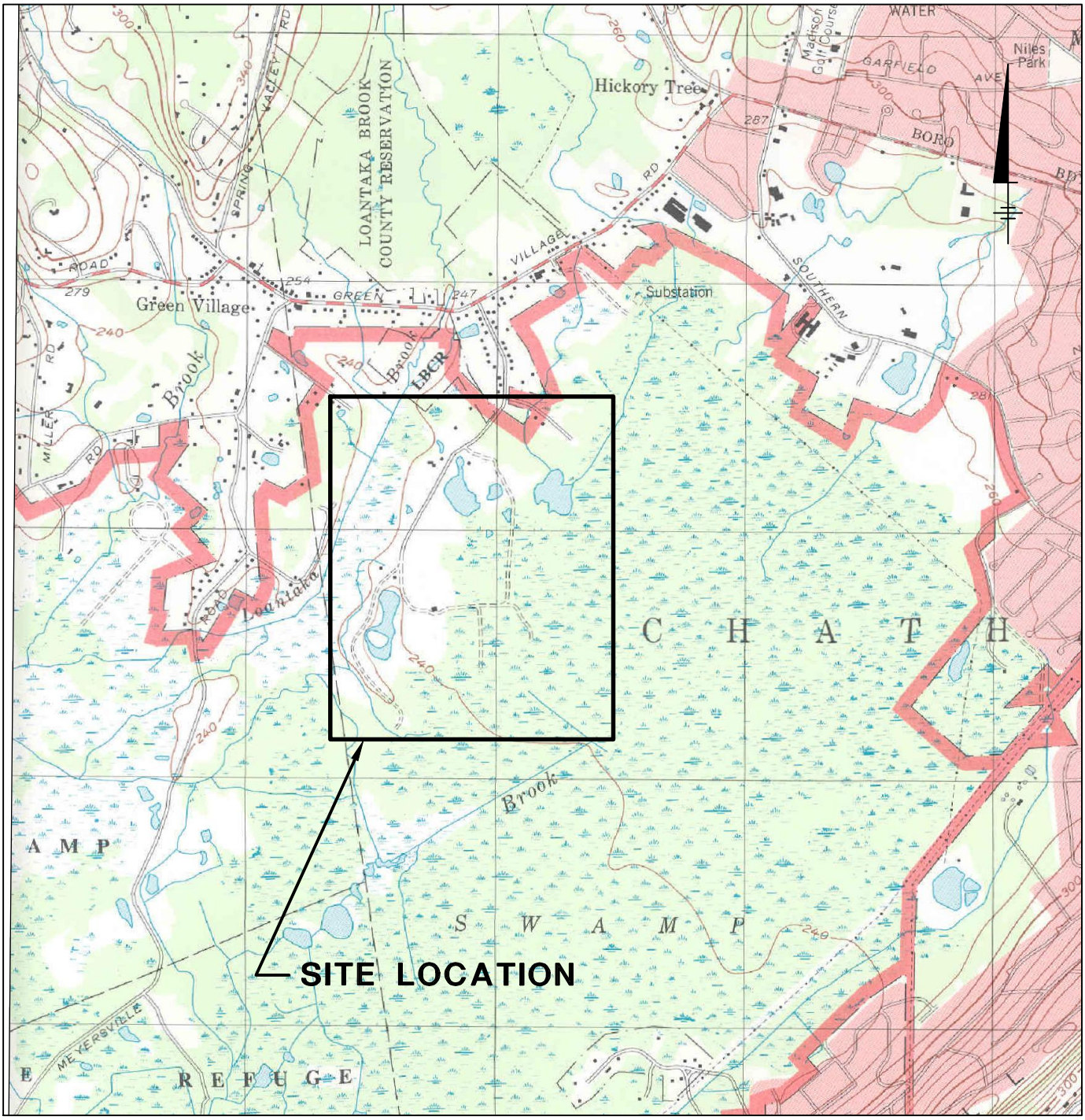
PCBs = polychlorinated biphenyls
VOC = volatile organic compound
SIM = selective ion monitoring
TOC = total organic carbon
TCL = target compound list
SVOC = semivolatile organic compound
TAL= target analyte list
NA = not applicable
TOC = total organic carbon
TBD = to be determined. Sample depth is contingent on the depth of landfilled material observed in the boring and the depth of the clay layer. One sample will be collected immediately beneath the landfilled material and one sample will be collected immediately above the clay.

[1] - Complete NJDEP sample IDs were provide by NJDEP on July 20, 2015. These sample IDs are referenced in the August 17, 2015 comments from USEPA on Addendum 1 to the SAP and are included here for clarity.

[2] - Analyses included in the full TCL/TAL parameter list include: VOCs, SVOCs, PCBs (as Aroclors), pesticides, and metals plus cyanide.
Sample analyses will be conducted using the following analytical methods:
Target Compound List organics (VOCs, SVOCs, PCBs and pesticides) via SOM01.2, *Contract Laboratory Program (CLP Statement of Work for Organic Analysis.*
Target Analyte List metals and cyanide via ISM01.3, *CLP Statement of Work for Inorganic Analyses.*
PCB Congeners via USEPA Method 1668A, *Chlorinated Biphenyl Congeners in Water, Soil, Sediment and Tissue by HRGC/HRMS.*
pH via USEPA Method 9045D.
TOC via the Lloyd Kahn method.
Grain size via ASTM D-422.

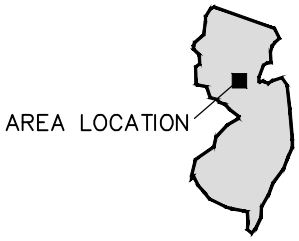
[3] - Sample requested by USEPA

[4] - Sample requested by the Group.



SOURCE:
CHATHAM QUADRANGLE, NJ
7.5 MINUTE SERIES
CONTOUR INTERVAL 20 FEET

0 2000' 4000'
GRAPHIC SCALE



NEW JERSEY

ROLLING KNOLLS LANDFILL SUPERFUND SITE
CHATHAM, NEW JERSEY
DATA GAPS SAMPLING AND ANALYSIS PLAN ADDENDUM 1

SITE LOCATION

ARCADIS

FIGURE
1

CITY: CRANBURY-NJ DIV/GROUP: ENVCAD DB: TFATTO LD: TFATTO PIC: PM: K.ROMAINE TM:K.ROMAINE LYR: ON=*;OFF=*REF*
C:\ENVCAD\CRANBURY\ACT\B0033203\0004\00004\DGSAP\33203N01.dwg LAYOUT: 1 SAVED: 4/29/2011 10:23 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/29/2011 10:24 AM BY: FATTO, TRACEY
XREFS: IMAGES: 33203X01.tif PROJECTNAME: ----

CITY:CRANBURY-NJ DIV/GROUP: ENVCAD DB: T.FATTO LD: T.FATTO PIC: PM: K.ROMAINE TM: S.WALLS LYR: ON=*;OFF=*REF*
C:\ENVCAD\CRANBURY\ACT\B0033203\0004\00004\DGSAP\33203B01.DWG LAYOUT: 2 SAVED: 4/29/2015 10:28 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/29/2015 10:29 AM BY: FATTO, TRACEY

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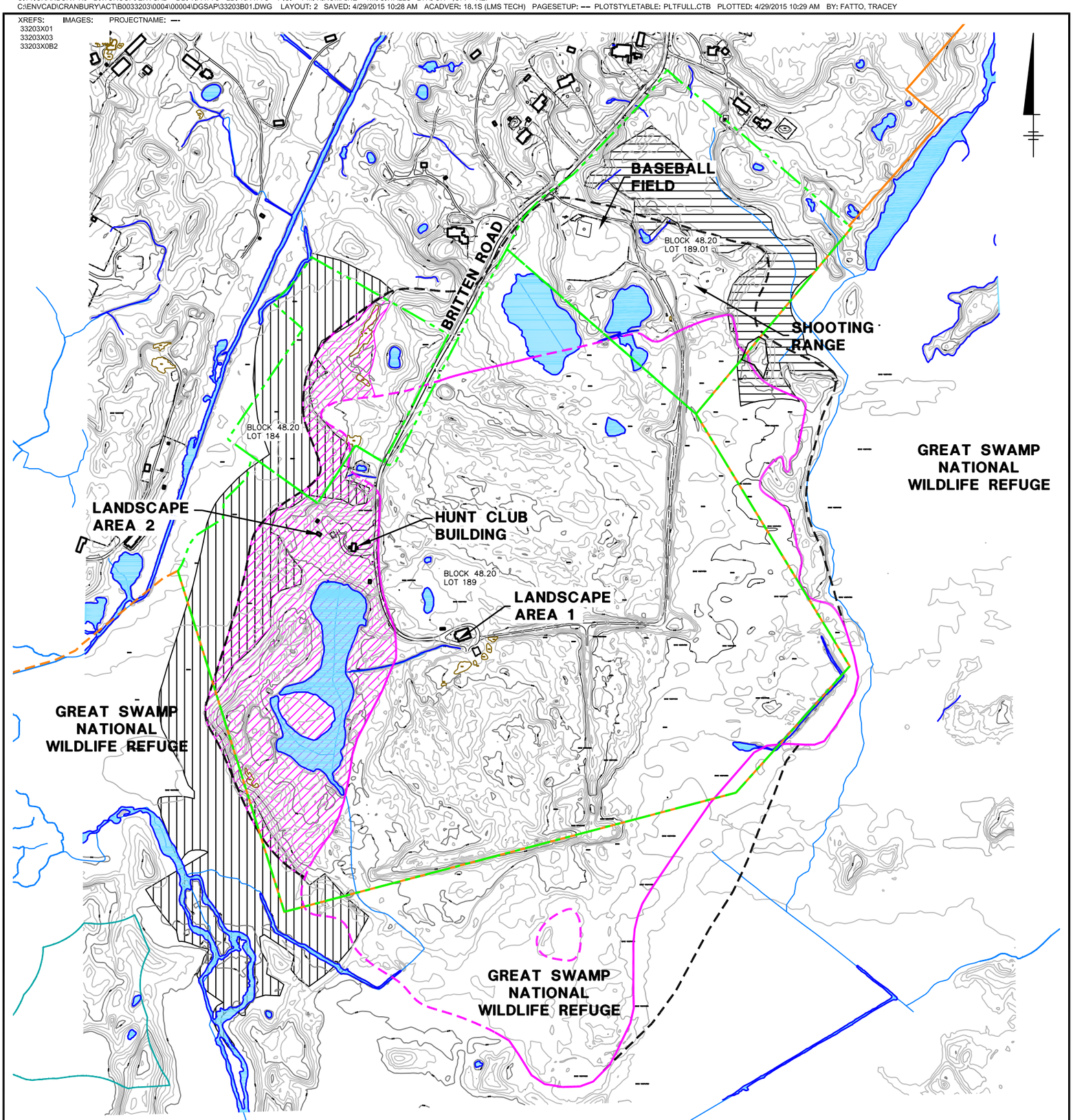


LEGEND:

- OPEN WATER
- PRE-REMEDIAL INVESTIGATION PROJECTED EDGE OF LANDFILLED MATERIALS
- EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES (DASHED WHERE APPROXIMATE)
- GREAT SWAMP NATIONAL WILDLIFE REFUGE PROPERTY BOUNDARY (DASHED WHERE APPROXIMATE)
- TAX PARCELS
- WASTE AND DEBRIS OBSERVED ON GROUND SURFACE BUT NOT OBSERVED OR ANTICIPATED TO BE BELOW GROUND SURFACE
- POTENTIAL BOG TURTLE HABITAT AREA A (35.31 ACRES)
- POTENTIAL BOG TURTLE HABITAT AREA B (10.89 ACRES)

NOTES:

1. THE PRE-REMEDIAL INVESTIGATION PROJECTED EDGE OF LANDFILLED MATERIALS ON THIS FIGURE IS APPROXIMATE AS DRAWN AND IS BASED ON VISUAL OBSERVATIONS OF THE GROUND SURFACE MADE DURING SITE VISITS CONDUCTED JUNE 20, 2006 THROUGH JULY 14, 2006.
2. THE EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES IS DRAWN BASED ON OBSERVATIONS OF MATERIALS EXCAVATED DURING TEST PIT ACTIVITIES CONDUCTED FROM JULY 26, 2007 TO SEPTEMBER 6, 2007 AND MARCH 26, 2008.
3. THE PORTION OF THE GREAT SWAMP NATIONAL WILDLIFE REFUGE (GSNWR) PROPERTY BOUNDARY ON THIS FIGURE WITHIN CHATHAM TOWNSHIP, NJ WAS OBTAINED FROM CHATHAM TOWNSHIP TAX PARCEL DATA PROVIDED BY CIVIL SOLUTIONS. THE PORTION OF THE GSNWR PROPERTY BOUNDARY ON THIS FIGURE OUTSIDE OF CHATHAM TOWNSHIP IS APPROXIMATE AND WAS OBTAINED FROM THE UNITED STATES FISH AND WILDLIFE SERVICE (GEOGRAPHIC INFORMATION SYSTEMS AND SPATIAL DATA).
4. BLOCK 48.20, LOTS 184 AND 189 ARE OWNED BY ROBERT J. MIELE AS TRUSTEE FOR THE TRUST CREATED BY THE LAST WILL AND TESTAMENT OF ANGELO J. MIELE. BLOCK 48.20, LOT 189.01 IS OWNED BY THE GREEN VILLAGE FIRE DEPARTMENT.

SOURCES:

1. BASEMAP FROM JAMES M. STEWART INC., LAND SURVEYORS, PHILADELPHIA, PA., (ELECTRONIC FILE: 292406.DWG DATED: 6/30/06)
2. TAX PARCEL DATA FOR CHATHAM TOWNSHIP WAS PROVIDED BY CIVIL SOLUTIONS.

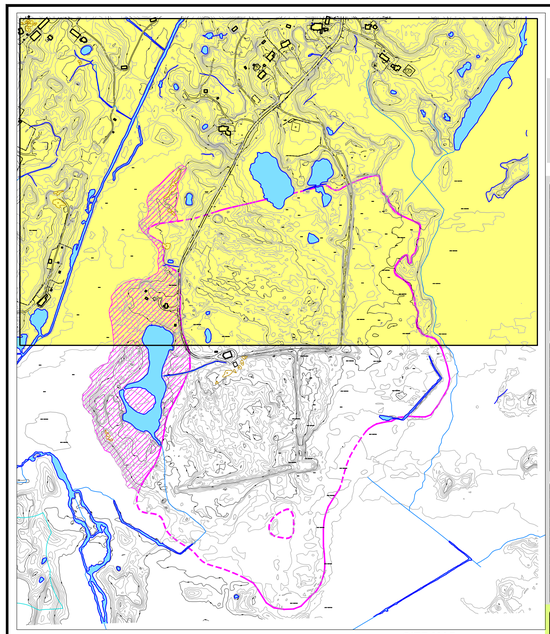
0 500' 1000'
GRAPHIC SCALE

ROLLING KNOLLS LANDFILL SUPERFUND SITE
CHATHAM, NEW JERSEY
DATA GAPS SAMPLING AND ANALYSIS PLAN ADDENDUM 1

SITE PLAN

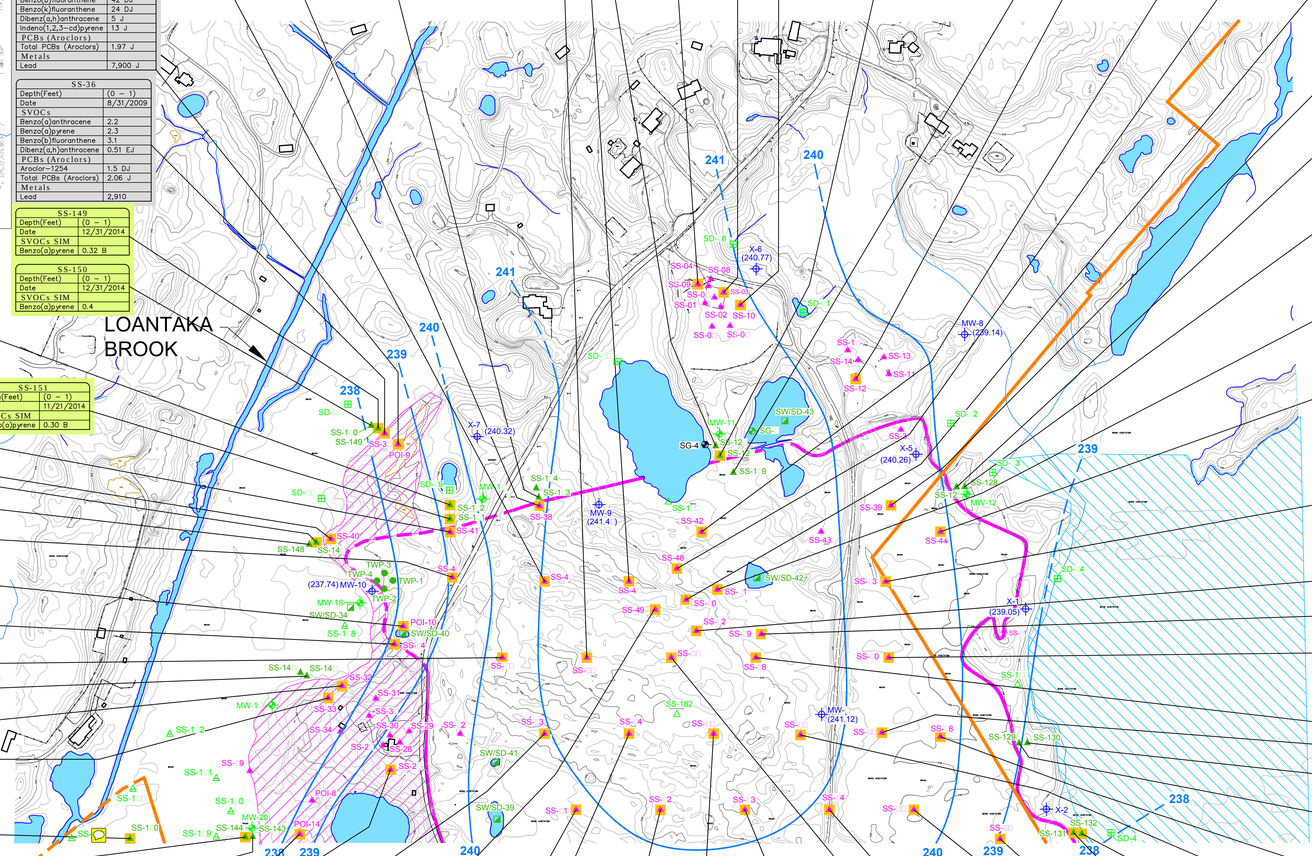
ARCADIS

FIGURE **2**



SITE MAP

0 500' 1000'
GRAPHIC SCALE



SS-38		
Depth(Feet)	(0 – 1)	(9 – 10)
Date	9/1/2009	9/1/2009
SVOCs		
Benzo(a)anthracene	5.4 D	0.0036 U
Benzo(a)pyrene	6.2 D	0.0061 UB
Benzo(b)fluoranthene	6.9 D	0.0036 U
Dibenz(a,h)anthracene	0.71	0.0036 U

SS-46		
Depth(Feet)	(0 – 1)	(6 – 7)
Date	9/1/2009	9/1/2009
SVOCs		
Benzo(a)pyrene	0.54 J	0.25 EJ
PCBs (Aroclors)		
Aroclor-1242	16 DJ	0.054 U
Aroclor-1254	12 DJ	1.2 D
Aroclor-1260	1.2 J	0.14
Aroclor-1268	2.8 J	0.067
Total PCBs (Aroclors)	32 J	2.03
PCBs (Congeners)		
Total PCBs (Congeners)	95 J	NA
Metals		
Arsenic	7 J	24.5 J
Lead	665	1,460

POI-9	
Depth(Feet)	(0 – 1)
Date	8/27/2009
SVOCs	
Benzo(a)anthracene	30 DJ
Benzo(a)pyrene	33 DJ
Benzo(b)fluoranthene	42 DJ
Benzo(k)fluoranthene	24 DJ
Dibenz(a,h)anthracene	5 J
Indeno(1,2,3-cd)pyrene	13 J
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.97 J
Metals	
Lead	7,900 J

SS-36	
Depth(Feet)	(0 – 1)
Date	8/31/2009
SVOCs	
Benzo(a)anthracene	2.2
Benzo(a)pyrene	2.3
Benzo(b)fluoranthene	3.1
Dibenz(a,h)anthracene	0.51 EJ
PCBs (Aroclors)	
Aroclor-1254	1.5 DJ
Total PCBs (Aroclors)	2.06 J
Metals	
Lead	2,910

SS-149	
Depth(Feet)	(0 – 1)
Date	12/31/2014
SVOCs SIM	
Benzo(a)pyrene	0.32 B

SS-150	
Depth(Feet)	(0 – 1)
Date	12/31/2014
SVOCs SIM	
Benzo(a)pyrene	0.4

SS-40	
Depth(Feet)	(0 – 1)
Date	8/31/2009
SVOCs	
Benzo(a)pyrene	0.25 J
PCBs (Aroclors)	
Aroclor-1254	1.3 D
Total PCBs (Aroclors)	1.56
Pesticides	
alpha-Chlordane	2.5 D
gamma-Chlordane	2.3 D
Metals	
Lead	825

SS-152	
Depth(Feet)	(0 – 1)
Date	11/21/2014
SVOCs SIM	
Benzo(a)anthracene	0.69 B
Benzo(a)pyrene	0.79
Benzo(b)fluoranthene	0.87 B
Indeno(1,2,3-cd)pyrene	0.67 B

SS-41	
Depth(Feet)	(0 – 1)
Date	8/27/2009
SVOCs	
Benzo(a)pyrene	0.26

SS-151	
Depth(Feet)	(0 – 1)
Date	11/21/2014
SVOCs SIM	
Benzo(a)pyrene	0.30 B

SS-147	
Depth(Feet)	(0 – 1)
Date	12/30/2014
SVOCs SIM	
Benzo(a)pyrene	0.80 B
Benzo(b)fluoranthene	0.93

SS-148	
Depth(Feet)	(0 – 1)
Date	12/30/2014
--	No Exceedances

SS-45		
Depth(Feet)	(0 – 1)	(9 – 10)
Date	8/31/2009	8/31/2009
SVOCs		
Benzo(a)pyrene	0.77	0.006

POI-10	
Depth(Feet)	(0 – 1)
Date	8/26/2009
PCBs (Aroclors)	
Aroclor-1254	3.6 JN
Aroclor-1260	88 D
Total PCBs (Aroclors)	91.6 J
PCBs (Congeners)	
Total PCBs (Congeners)	2.05 J
Metals	
Copper	49,900 J
Lead	1,510 J

SS-55		
Depth(Feet)	(0 – 1)	(2 – 3)
Date	9/1/2009	9/1/2009
SVOCs		
Benzo(a)pyrene	0.3 J	0.17 J
PCBs (Aroclors)		
Aroclor-1248	1.5 DJ	0.049 U
Aroclor-1254	1.4 D	0.73
Total PCBs (Aroclors)	3.54 J	1.81
Metals		
Antimony	1,960 J	2.8 J
Arsenic	529 J	8.4 J
Lead	16,500	934

SS-54		
Depth(Feet)	(0 – 1)	
Date	8/31/2009	
SVOCs		
Benzo(a)pyrene	0.22	[0.24]

SS-145	
Depth(Feet)	(0 – 1)
Date	12/30/2014
--	No Exceedances

SS-32	
Depth(Feet)	(0 – 1)
Date	11/6/2007
SVOCs	
Benzo(a)pyrene	1 J

SS-33	
Depth(Feet)	(0 – 1)
Date	11/6/2007
SVOCs	
Benzo(a)pyrene	0.39

SS-160	
Depth(Feet)	(0 – 1)
Date	12/18/2014
SVOCs SIM	
Benzo(a)pyrene	0.52
Benzo(b)fluoranthene	0.64 B
Metals	
Lead	1250*
Vanadium	87

SS-144	
Depth(Feet)	(0 – 1)
Date	12/30/2014
SVOCs SIM	
Benzo(a)pyrene	0.53
Metals	
Arsenic	35.1 N
Lead	561 *

SS-143	
Depth(Feet)	(0 – 1)
Date	12/30/2014
SVOCs SIM	
Benzo(a)pyrene	0.28 B
Vanadium	79.9

POI-14	
Depth(Feet)	(0 – 1)
Date	8/24/2009
Metals	
Arsenic	31.7 J
Lead	9,210 J

SS-26	
Depth(Feet)	(0 – 1)
Date	11/5/2007
SVOCs	
Benzo(a)pyrene	0.23 J

SS-63		
Depth(Feet)	(0 – 1)	(3.5 – 4.5)
Date	8/26/2009	8/26/2009
SVOCs		
Benzo(a)pyrene	0.26	0.19 EJ
PCBs (Aroclors)		
Aroclor-1242	0.24 U	2.8 D
Aroclor-1248	7.7 DJ	0.074 U
Aroclor-1254	5.3 DJ	4 D
Total PCBs (Aroclors)	13.9 J	7.44
PCBs (Congeners)		
Total PCBs (Congeners)	44.1 J	NA
Metals		
Arsenic	19.3 J	24.3 J
Lead	2,020 J	2,520 J

SS-49	
Depth(Feet)	(0 – 1)
Date	8/31/2009
SVOCs	
Benzo(a)pyrene	1.7
Benzo(b)fluoranthene	2.4
Dibenz(a,h)anthracene	0.25 EJ
PCBs (Aroclors)	
Aroclor-1248	1.6 D
Aroclor-1254	2.7 D
Aroclor-1260	1.3 D
Total PCBs (Aroclors)	5.6
Metals	
Arsenic	21.1
Lead	1,010

SS-71	
Depth(Feet)	(0 – 1)
Date	8/26/2009
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.1 J
Metals	
Lead	1,070 J
Vanadium	6,140

SS-64		
Depth(Feet)	(0 – 1)	(5 – 6)
Date	8/27/2009	8/27/2009
SVOCs		
Dibenz(a,h)anthracene	0.21 EJ	0.49 EJ [0.36 EJ]
PCBs (Aroclors)		
Aroclor-1242	0.061 U	0.061 U [2.6 D]
Aroclor-1248	2.1 D	3.2 DJ [0.11 U]
Aroclor-1254	1.5 D	2.3 DJ [4.9 D]
Total PCBs (Aroclors)	3.99	6.32 J [8.24]
Metals		
Lead	1,930 J	1,020 J [1,130 J]

SS-72		
Depth(Feet)	(0 – 1)	(9 – 10)
Date	8/25/2009	8/25/2009
PCBs (Aroclors)		
Aroclor-1242	0.11 U	1.8
Aroclor-1248	2.5 D	0.11 U
Aroclor-1254	3.3 D	3.9 D
Total PCBs (Aroclors)	7.07 J	6.09
PCBs (Congeners)		
Total PCBs (Congeners)	8.65 J	NA
Metals		
Arsenic	26 J	12.6 J
Lead	1,750 J	950 J

SS-73		
Depth(Feet)	(0 – 1)	(6 – 7)
Date	8/25/2009	8/25/2009
SVOCs		
Benzo(a)pyrene	0.12 EJ	0.24 J
PCBs (Aroclors)		
Aroclor-1242	0.11 U	1.7
Aroclor-1248	1.3	0.19 U
Aroclor-1254	2.5 D	1.3 J
Total PCBs (Aroclors)	4.49	3.16 J
Metals		
Lead	1,880 J	3,020 J

SS-65		
Depth(Feet)	(0 – 1)	(5 – 6)
Date	8/27/2009	8/27/2009
SVOCs		
Acetophenone	18 D	0.05 J
Benzo(a)anthracene	66 D	0.86
Benzo(a)pyrene	51 D	0.88
Benzo(b)fluoranthene	49 D	1.2
Benzo(k)fluoranthene	51 D	1.3
Dibenz(a,h)anthracene	4.8 J	0.44 EJ
Indeno(1,2,3-cd)pyrene	12 J	0.15 J
PCBs (Aroclors)		
Aroclor-1242	0.065 U	4.2 DJ
Aroclor-1248	1.8 D	0.15 U
Aroclor-1254	1.5 DJ	3 D
Total PCBs (Aroclors)	3.68 J	7.73 J
Metals		
Lead	1,560 J	3,380 J

SS-74		
Depth(Feet)	(0 – 1)	(6 – 7)
Date	8/24/2009	8/24/2009
SVOCs		
Benzo(a)anthracene	1	2.2
Benzo(a)pyrene	1.1	2.7
Benzo(b)fluoranthene	1.2	3.8 D
Dibenz(a,h)anthracene	0.3 EJ	0.76 EJ
PCBs (Aroclors)		
Aroclor-1254	0.039 U	1.3 D
Total PCBs (Aroclors)	0.211 J	2.17

SS-57		
Depth(Feet)	(0 – 1)	(4 – 5)
Date	8/27/2009	8/27/2009
SVOCs		
Benzo(a)pyrene	2.3	0.38 J
Benzo(b)fluoranthene	3.6	0.58 J
Dibenz(a,h)anthracene	0.17 J	0.69 EJ
PCBs (Aroclors)		
Aroclor-1248	2.8 D	4.2 D
Aroclor-1254	2.7 DJN	4.6 D
Aroclor-1260	7 D	3.3 D
Total PCBs (Aroclors)	12.5 J	12.1
Pesticides		
Heptachlor epoxide	RX	0.33 DJN
Metals		
Lead	795 J	1,060 J

SS-75	
Depth(Feet)	(0 – 1)
Date	9/15/2009
PCBs (Aroclors)	
Aroclor-1248	1.3
Aroclor-1254	2.3
Total PCBs (Aroclors)	4.17
Metals	
Arsenic	32.3
Lead	1,360

SS-77	
Depth(Feet)	(0 – 1)
Date	9/17/2009
PCBs (Aroclors)	
Aroclor-1248	1.7
Total PCBs (Aroclors)	2.16 J

SS-131	
Depth(Feet)	(0 – 1)
Date	12/16/2014
PCBs (Aroclors)	
Aroclor-1242	0.41
Aroclor-1254	0.24 J
Total PCBs (Aroclors)	0.72 J

SS-132	
Depth(Feet)	(0 – 1)
Date	12/16/2014
SVOCs SIM	
Benzo(a)pyrene	0.3
PCBs (Aroclors)	
Aroclor-1242	0.39
Aroclor-1254	0.30 P
Total PCBs (Aroclors)	0.79 J P

SS-66	
Depth(Feet)	(0 – 1)
Date	8/28/2009
SVOCs	
Benzo(a)pyrene	0.28
PCBs (Aroclors)	
Aroclor-1248	15
Aroclor-1254	55 D
Aroclor-1260	8.1
Total PCBs (Aroclors)	78.1
PCBs (Congeners)	
Total PCBs (Congeners)	9.66 J
Metals	
Arsenic	21.9
Lead	2,100

SS-68	
Depth(Feet)	(0 – 1)
Date	9/2/2009
SVOCs	
Benzo(a)pyrene	0.32 [0.18 EJ]
PCBs (Aroclors)	
Aroclor-1248	1.2 DJ [1.3 DJ]
Aroclor-1254	3.2 D [2.6 D]
Total PCBs (Aroclors)	4.99 J [4.41 J]
PCBs (Congeners)	
Total PCBs (Congeners)	4.91 J [9.46 J]
Metals	
Lead	1,320 [1,150]

SS-47		
Depth(Feet)	(0 – 1)	(8 – 9)
Date	8/31/2009	8/31/2009
SVOCs		
Benzo(a)pyrene	0.2 J	0.21 J
PCBs (Aroclors)		
Aroclor-1254	3 D	0.61
Aroclor-1260	1.5 D	0.13
Total PCBs (Aroclors)	5.35	1.47 J
Metals		
Arsenic	23.1	5.5 J
Lead	7,140	835

SS-56		
Depth(Feet)	(0 – 1)	(2 – 3)
Date	8/26/2009	8/26/2009
PCBs (Aroclors)		
Aroclor-1242	3 D	4.1 D
Aroclor-1254	7.2 D	4 D
Aroclor-1260	1.2	0.97
Total PCBs (Aroclors)	11.4	9.07
Pesticides		
Dieldrin	0.3 D	0.041 J
Metals		
Arsenic	14.6 J	20.6 J
Lead	2,060 J	1,120 J

SS-153	
Depth(Feet)	(0 – 1)
Date	11/21/2014
--	No Exceedances

SS-09		
Depth(Feet)	(0 – 1)	
Date	9/20/2007	
SVOCs		
Benzo(a)pyrene	1	

SS-03		
Depth(Feet)	(0 – 1)	
Date	9/19/2007	
SVOCs		
Benzo(a)pyrene	0.92	

SS-126	
Depth(Feet)	(0 – 1)
Date	11/20/2014
--	No Exceedances

SS-10		
Depth(Feet)	(0 – 1)	
Date	9/20/2007	
SVOCs		
Benzo(a)pyrene	0.74 D	

SS-125	
Depth(Feet)	(0 – 1)
Date	11/20/2014
PCBs (Aroclors)	
Aroclor-1260	0.26
Total PCBs (Aroclors)	0.26

SS-159	
Depth(Feet)	(0 – 1)
Date	12/18/2014
--	No Exceedances

SS-12	
Depth(Feet)	(0 – 1)
Date	9/20/2007
SVOCs	
Benzo(a)pyrene	0.77 D

SS-42	
Depth(Feet)	(0 – 1)
Date	8/28/2009
PCBs (Aroclors)	
Aroclor-1254	1.3 D
Total PCBs (Aroclors)	1.84

SS-48	
Depth(Feet)	(0 – 1)
Date	8/28/2009
SVOCs	
Benzo(a)pyrene	0.27 EJ
PCBs (Aroclors)	
Aroclor-1248	1.4 D
Aroclor-1254	2.4 D
Total PCBs (Aroclors)	4.4
Metals	
Lead	1,300

SS-50	
Depth(Feet)	(0 – 1)
Date	8/28/2009
PCBs (Aroclors)	
Aroclor-1254	2.3 D
Aroclor-1260	1.1
Total PCBs (Aroclors)	3.4
Metals	
Arsenic	19.1 J

SS-39	
Depth(Feet)	(0 – 1)
Date	9/16/2009
SVOCs	
Benzo(a)pyrene	0.41
PCBs (Aroclors)	
Aroclor-1242	6.1
Aroclor-1254	6.2
Total PCBs (Aroclors)	12.3
PCBs (Congeners)	
Total PCBs (Congeners)	100 J
Metals	
Lead	1,050

SS-127	
Depth(Feet)	(0 – 1)
Date	11/21/2014
--	No Exceedances

SS-128	
Depth(Feet)	(0 – 1)
Date	11/24/2014
--	No Exceedances

SS-51	
Depth(Feet)	(0 – 1)
Date	8/28/2009
SVOCs	
Benzo(a)pyrene	0.44
PCBs (Aroclors)	
Aroclor-1248	1.6 D
Aroclor-1254	3 D
Total PCBs (Aroclors)	5.45
Metals	
Lead	2,200

SS-44	
Depth(Feet)	(0 – 1)
Date	9/1/2009
PCBs (Aroclors)	
Aroclor-1254	1.1 D
Total PCBs (Aroclors)	1.83
Metals	
Lead	1,580

SS-53	
Depth(Feet)	(0 – 1)
Date	9/17/2009
SVOCs	
Benzo(a)pyrene	0.57
PCBs (Aroclors)	
Aroclor-1242	4.1
Aroclor-1254	5.6
Aroclor-1260	1.2
Total PCBs (Aroclors)	10.9
Metals	
Lead	1,110 J

SS-52	
Depth(Feet)	(0 – 1)
Date	8/31/2009
SVOCs	
Benzo(a)anthracene	2.7
Benzo(a)pyrene	3.2 J
Benzo(b)fluoranthene	4.2 J
Dibenz(a,h)anthracene	0.58 EJ
PCBs (Aroclors)	
Aroclor-1242	9.4 D
Aroclor-1254	5.3 D
Total PCBs (Aroclors)	15.4
PCBs (Congeners)	
Total PCBs (Congeners)	12.4 J
Metals	
Lead	2,850

SS-59	
Depth(Feet)	(0 – 1)
Date	8/27/2009
PCBs (Aroclors)	
Aroclor-1242	6.5 D
Aroclor-1254	2.7 D
Total PCBs (Aroclors)	10
Metals	
Lead	1,250 J

SS-60	
Depth(Feet)	(0 – 1)
Date	9/18/2009
PCBs (Aroclors)	
Aroclor-1248	1.2 J
Aroclor-1254	3.6 J
Aroclor-1260	1.2 J
Total PCBs (Aroclors)	6 J
Pesticides	
Dieldrin	0.29 DJ
Metals	
Lead	974

SS-58	
Depth(Feet)	(0 – 1)
Date	8/28/2009
PCBs (Aroclors)	
Aroclor-1248	67 D
Aroclor-1254	57 D
Aroclor-1260	17
Total PCBs (Aroclors)	126
PCBs (Congeners)	
Total PCBs (Congeners)	157 J
Pesticides	
Aldrin	0.27 DJN
Metals	
Lead	927

SS-67	
Depth(Feet)	(0 – 1)
Date	9/3/2009
SVOCs	
Benzo(a)pyrene	0.49
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.32 J
Metals	
Lead	1,580

SS-130	
Depth(Feet)	(0 – 1)
Date	11/24/2014
--	No Exceedances

SS-129	
Depth(Feet)	(0 – 1)
Date	11/24/2014
--	No Exceedances

NJDEP Soil Remediation Standards		
Constituent	Non-Residential	Residential
VOCs		
Carbon Tetrachloride	2	0.6
Chloroform	2	0.6
SVOCs		
Acetophenone	5	2
Benzo(a)anthracene	2	0.6
Benzo(a)pyrene	0.2	0.2
Benzo(b)fluoranthene	2	0.6
Benzo(k)fluoranthene	23	6
Dibenz(a,h)anthracene	0.2	0.2
Indeno(1,2,3-cd)pyrene	2	0.6
PCBs		
Aroclor-1242	1	0.2
Aroclor-1248	1	0.2
Aroclor-1254	1	0.2
Aroclor-1260	1	0.2
Aroclor-1262	1	0.2
Aroclor-1268	1	0.2
Total PCBs (Aroclors)	1	0.2
PCBs (Congeners)		
Total PCBs (Congeners)	1	0.2
Pesticides		
Aldrin	0.2	0.04
alpha-Chlordane	1	0.2
Dieldrin	0.2	0.04
gamma-Chlordane	1	0.2
Heptachlor	0.7	0.1
Heptachlor epoxide	0.3	0.07
Metals		
Antimony	450	31
Arsenic	19	19
Cadmium	78	78
Copper	45,000	3,100
Lead	800	400
Manganese	5,900	11,000
Mercury	65	23
Vanadium	1,100	78

Ecologically-Based Screening Levels for Sediment	
Constituent	Value
SVOCs	
Bis(2-ethyl hexyl) phthalate	0.182
PCBs	
Aroclor-1260	0.005
Pesticides	
4,4'-DDE	0.005
Heptachlor	0.0006
Metals	
Arsenic	6
Cadmium	0.6
Copper	16
Cyanide	0.0001
Lead	31
Mercury	0.2
Zinc	120

LEGEND:

- OPEN WATER
- EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES (DASHED WHERE APPROXIMATE)
- GREAT SWAMP NATIONAL WILDLIFE REFUGE PROPERTY BOUNDARY (DASHED WHERE APPROXIMATE)
- WASTE AND DEBRIS OBSERVED ON GROUND SURFACE BUT NOT OBSERVED OR ANTICIPATED TO BE BELOW GROUND SURFACE
- AREAS WHERE SURFACE WATER FLOW DOES NOT EXHIBIT TYPICAL BED AND BANK MORPHOLOGY
- DATA GAP SAMPLING LOCATION
- SAMPLES COLLECTED PRIOR TO DATA GAP SAMPLING
- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH DETECTED CONCENTRATIONS GREATER THAN NJDEP NONRESIDENTIAL SOIL REMEDIATION STANDARDS
- PROPOSED MONITORING WELL
- EXISTING MONITORING WELL
- DATA GAP TEMPORARY WELL POINT
- DATA GAP SOIL SAMPLE LOCATION
- PROPOSED SOIL SAMPLE LOCATION
- DATA GAP SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- PROPOSED SEDIMENT SAMPLE
- PROPOSED SEDIMENT/SOIL SAMPLE (SAMPLE TYPE WILL BE BASED ON FIELD CONDITIONS OBSERVED AT THE TIME OF SAMPLE COLLECTION)
- STREAM GAUGE
- DATA GAP STREAM GAUGE LOCATION
- GROUNDWATER ELEVATION CONTOUR – DECEMBER 2014 (DASHED WHERE INFERRED)
- (23 :.34) GROUNDWATER ELEVATION – DECEMBER 2014 (FEET ABOVE MEAN SEA LEVEL)

DATA NOTES:

UNITS = MILLIGRAMS PER KILOGRAM

[] = DUPLICATE SAMPLE

() = RESULTS OF SECONDARY ANALYSIS

PCBS = POLYCHLORINATED BIPHENYLS

SVOCS = SEMIVOLATILE ORGANIC COMPOUNDS

VOCS = VOLATILE ORGANIC COMPOUNDS

NA = NOT ANALYZED

B = FOR ORGANICS THE COMPOUND HAS BEEN FOUND IN THE SAMPLE AS WELL AS ITS ASSOCIATED BLANK, ITS PRESENCE IN THE SAMPLE MAY BE SUSPECT.

D = CONCENTRATIONS IDENTIFIED FROM ANALYSIS OF THE SAMPLE AT A SECONDARY DILUTION.

E = FOR ORGANICS THE COMPOUND WAS QUANTITATED ABOVE THE CALIBRATION RANGE.

E = FOR INORGANICS THE REPORTED VALUE IS ESTIMATED BECAUSE OF THE PRESENCE OF INTERFERENCE BASED ON SERIAL DILUTION ANALYSIS.

J = FOR ORGANICS THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.

J = FOR INORGANICS THE SAMPLE RESULT IS GREATER THAN THE MDL BUT BELOW THE CRDL.

JN = THE ANALYSIS INDICATES THE PRESENCE OF A COMPOUND FOR WHICH THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION. THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.

N = SPIKED SAMPLE RECOVERY IS NOT WITHIN CONTROL LIMITS.

P = DUAL COLUMN ANALYSIS RESULTED IN GREATER THAT 25% DIFFERENCE FOR DETECTED CONCENTRATIONS BETWEEN THE TWO COLUMNS.

q = THE REPORTED RESULT IS THE ESTIMATED MAXIMUM POSIBLE CONCENTRATION OF THE ANALYTE, QUANTITATED USING THE THEORETICAL ION RATIO. THE MEASURED ION RATION DOES NOT MEET QUALITATIVE IDENTIFICATION CRITERIA AND INDICATES A POSSIBLE INTERFERENCE.

RX = THE SAMPLE RESULTS ARE REJECTED DUE TO MATRIX INTERFERENCE.

U = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.

* = DUPLICATE ANALYSIS IS NOT WITHIN THE CALIBRATION RANGE.

SOURCES:

1. BASEMAP FROM JAMES M. STEWART INC., LAND SURVEYORS, PHILADELPHIA, PA., (ELECTRONIC FILE: 292406.DWG DATED: 6/30/06)
2. TAX PARCEL DATA FOR CHATHAM TOWNSHIP WAS PROVIDED BY CIVIL SOLUTIONS.

NOTES:

1. ANALYTICAL RESULTS GIVEN IN MILLIGRAMS PER KILOGRAM FOR SOIL SAMPLES WITH DETECTED CONCENTRATIONS GREATER THAN NEW JERSEY NON-RESIDENTIAL SOIL REMEDIATION STANDARDS (DATED OCTOBER 2011). ANALYTICAL RESULTS GREATER THAN NEW JERSEY NON-RESIDENTIAL REMEDIATION STANDARDS ARE POSTED FOR PREVIOUS SAMPLES. DATA GAP ANALYTICAL RESULTS ARE COMPARED TO THE RESIDENTIAL AND NON-RESIDENTIAL REMEDIATION STANDARDS.
2. THE EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES IS DRAWN BASED ON OBSERVATIONS OF MATERIALS EXCAVATED DURING TEST PIT ACTIVITIES CONDUCTED FROM JULY 26, 2007 TO SEPTEMBER 6, 2007 AND MARCH 26, 2008. THE EDGE OF THE LANDFILL WAS REFINED BASED ON OBSERVATIONS PRESENTED IN THE FIELD CHANGE REQUEST (FCR-02) APPROVED BY USEPA ON DECEMBER 29, 2014.
3. THE EXTENT OF AREAS WHERE SURFACE WATER FLOW DOES NOT EXHIBIT TYPICAL BED AND BANK MORPHOLOGY IS BASED ON FIELD OBSERVATIONS MADE THROUGHOUT THE PERIOD OF INVESTIGATION ACTIVITIES. THE EXTENT OF THE AREA SHOWN IS APPROXIMATE.
4. CONDITIONS ENCOUNTERED AT LOCATIONS SS-162, SS-163, AND SS-164 WERE REPRESENTATIVE OF SEDIMENT. RESULTS FOR THESE SAMPLES ARE PRESENTED WITH THE SEDIMENT RESULTS.
5. DATA GAP ANALYTICAL RESULTS HAVE NOT BEEN VALIDATED.

0 200' 400'
GRAPHIC SCALE

ROLLING KNOLLS LANDFILL SUPERFUND SITE
CHATHAM, NEW JERSEY

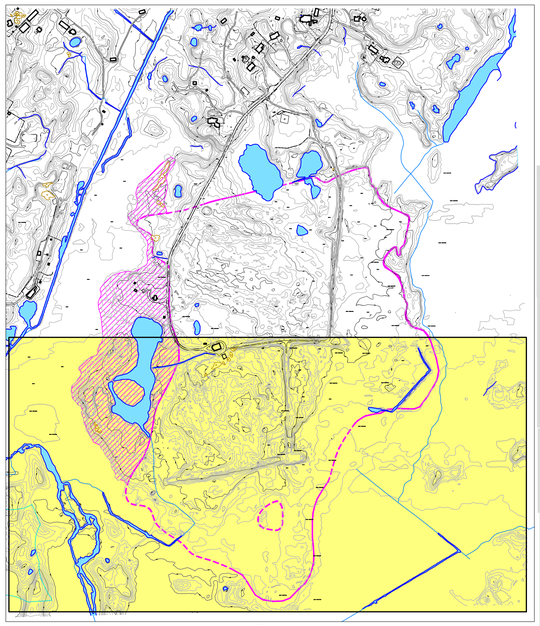
DATA GAPS SAMPLING AND ANALYSIS PLAN ADDENDUM 1

PROPOSED SAMPLE LOCATIONS - NORTH

ARCADIS

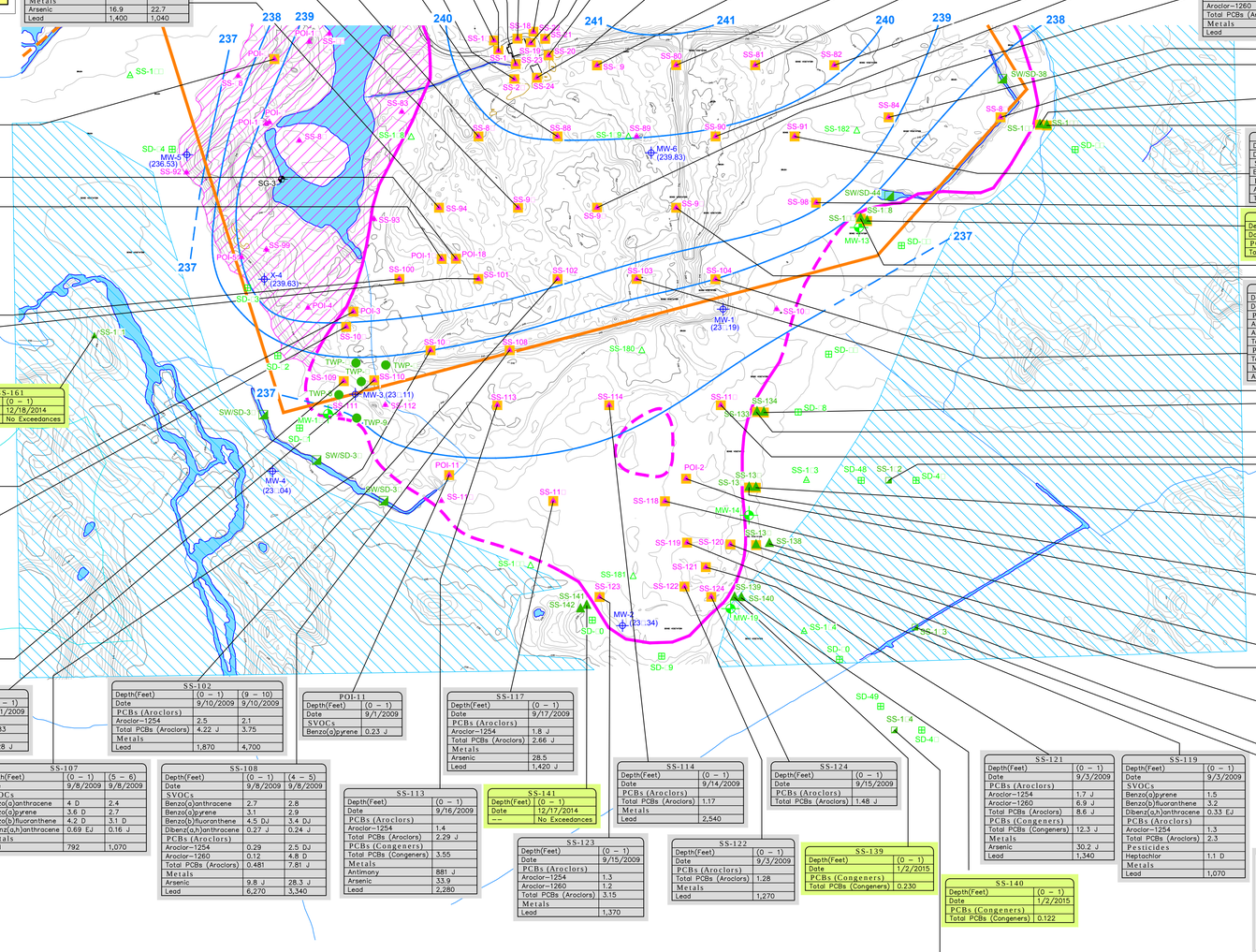
FIGURE 3a

CITY:CRANBURYNJ DIV:GROUP ENVCAD DB:T.FATTO LD:T.FATTO PIC:(0:) PM:K.ROMAINE TM:LHYATT LYR:ON=*;OFF=*PREF*
C:\ENVCAD\CRANBURY\ACT\B0033203\0004\00003\DGSAP\B0033203F901.DWG LAYOUT:3A SAVED: 8/21/2011 11:10 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/21/2011 11:10 AM BY: FATTO, TRACEY
XREFS: B0033203X1; B0033203X2; B0033203X3; B0033203X4; B0033203X5; B0033203X6; B0033203X7
IMAGES:
PROJECTNAME: ----



SITE MAP

0 500' 1000'
GRAPHIC SCALE



SS-17	
Depth(Feet)	(0 – 1)
Date	11/2/2007
SVOCs	
Benzo(a)pyrene	1.2
Metals	
Lead	901 DJ

SS-16	
Depth(Feet)	(0 – 1)
Date	11/1/2007
SVOCs	
Benzo(a)pyrene	1.1 EJ

SS-23	
Depth(Feet)	(0 – 1)
Date	11/2/2007
SVOCs	
Benzo(a)pyrene	0.75

SS-18	
Depth(Feet)	(0 – 1)
Date	11/1/2007
SVOCs	
Benzo(a)pyrene	0.77 J

SS-25	
Depth(Feet)	(0 – 0.85)
Date	11/5/2007
SVOCs	
Benzo(a)pyrene	0.21

SS-22		
Depth(Feet)	(0 – 1)	
Date	6/21/2007	
SVOCs		
Benzo(a)anthracene	2.3 [3.3]	
Benzo(a)pyrene	2.3 J [3.1]	
Benzo(b)fluoranthene	3.3 J	[4.5]

SS-19		
Depth(Feet)	(0 – 0.8)	
Date	11/2/2007	
SVOCs		
Benzo(a)anthracene	2.9	
Benzo(a)pyrene	2.9	
Benzo(b)fluoranthene	4.4	
PCBs (Aroclors)		
Aroclor-1254	2.8 D	
Total PCBs (Aroclors)	2.8	
PCBs (Congeners)		
Total PCBs (Congeners)	6.41 J	
Metals		
Lead	1,090 DJ	

SS-88		
Depth(Feet)	(0 – 1)	(7 – 8)
Date	9/9/2009	9/9/2009
SVOCs		
Benzo(a)pyrene	0.51 J [0.72 J]	0.88 J
Dibenz(a,h)anthracene	0.21 EJ [0.54 EJ]	0.23 EJ
PCBs (Aroclors)		
Aroclor-1248	1.1 J [0.42 JN]	0.26 U
Aroclor-1254	4.8 J [2.4]	1.6
Total PCBs (Aroclors)	7.29 J [3.39 J]	2.01
Metals		
Arsenic	17.7 [19.8]	17.1
Lead	1,630 [2,370]	1,440

SS-21	
Depth(Feet)	(0 – 1)
Date	6/21/2007
SVOCs	
Benzo(a)anthracene	4.3
Benzo(a)pyrene	4.3 J
Benzo(b)fluoranthene	6.2 J
Indeno(1,2,3-cd)pyrene	2.6 J

SS-87		
Depth(Feet)	(0 – 1)	(6 – 7)
Date	9/10/2009	9/10/2009
SVOCs		
Benzo(a)pyrene	0.28	0.36
PCBs (Aroclors)		
Aroclor-1254	7.3 J	0.52 J
Aroclor-1260	1.4 J	0.23 J
Aroclor-1268	0.92 U	2.3 J
Total PCBs (Aroclors)	8.7 J	3.26 J
Metals		
Arsenic	22.6	28.2
Lead	1,640	886

SS-20	
Depth(Feet)	(0 – 1)
Date	11/2/2007
SVOCs	
Benzo(a)anthracene	2.7
Benzo(a)pyrene	2.4
Benzo(b)fluoranthene	3.4

SS-24	
Depth(Feet)	(0 – 1)
Date	11/5/2007
SVOCs	
Benzo(a)pyrene	0.65 J
PCBs (Aroclors)	
Aroclor-1248	2.6 D
Aroclor-1260	2.1 D
Total PCBs (Aroclors)	4.7
PCBs (Congeners)	
Total PCBs (Congeners)	6.89 J
Metals	
Lead	1,080 DJ

SS-80		
Depth(Feet)	(0 – 1)	(9 – 10)
Date	9/2/2009	9/2/2009
SVOCs		
Benzo(a)anthracene	11 D	5.1 D
Benzo(a)pyrene	11 D	5.8 D
Benzo(b)fluoranthene	13 DJ	6 D
Dibenz(a,h)anthracene	1.1 J	0.48 J
Indeno(1,2,3-cd)pyrene	2.5 J	1.5 J
PCBs (Aroclors)		
Aroclor-1254	0.32	1.5
Total PCBs (Aroclors)	0.407	3.18
Metals		
Lead	2,490	1,010

SS-82	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Aroclor-1254	2.3
Total PCBs (Aroclors)	3.1 J
Metals	
Arsenic	22.4 J
Lead	4,010

SS-79	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Aroclor-1254	2.7 J
Total PCBs (Aroclors)	4 J
Metals	
Lead	1,900

SS-81	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Aroclor-1242	0.6 U [3.1]
Aroclor-1248	1.7 J [0.6 U]
Aroclor-1254	5 [3.8]
Aroclor-1260	1.1 [0.87]
Total PCBs (Aroclors)	7.8 J [7.77]
Metals	
Lead	2,290 [3,190]

SS-90		
Depth(Feet)	(0 – 1)	(6 – 7)
Date	9/8/2009	9/8/2009
SVOCs		
Benzo(a)pyrene	0.082 J	0.49
PCBs (Aroclors)		
Aroclor-1242	2.4 U	1.3
Aroclor-1248	17 J	0.6 U
Aroclor-1254	12 J	2.3
Aroclor-1262	2.4 U	3.9
Total PCBs (Aroclors)	29 J	7.5
Metals		
Lead	1,540	1,620 J

SS-96		
Depth(Feet)	(0 – 1)	(9 – 10)
Date	9/9/2009	9/9/2009
PCBs (Aroclors)		
Aroclor-1254	1	1.8 J
Aroclor-1260	1	1.4 J
Total PCBs (Aroclors)	2	3.61 J
Metals		
Lead	2,700	1,230

SS-84	
Depth(Feet)	(0 – 1)
Date	9/2/2009
SVOCs	
Benzo(a)pyrene	0.47 J
PCBs (Aroclors)	
Aroclor-1254	9.4 D
Aroclor-1260	1.2
Total PCBs (Aroclors)	10.6
PCBs (Congeners)	
Total PCBs (Congeners)	125 J
Metals	
Lead	4,510

SS-85	
Depth(Feet)	(0 – 1)
Date	9/2/2009
PCBs (Aroclors)	
Aroclor-1254	2.2
Total PCBs (Aroclors)	3.74
Metals	
Arsenic	22.8 J
Lead	2,360

SS-155	
Depth(Feet)	(0 – 1)
Date	12/16/2014
PCBs (Aroclors)	
Total PCBs (Aroclors)	0.24 J

SS-156	
Depth(Feet)	(0 – 1)
Date	12/16/2014
SVOCs SIM	
Benzo(a)pyrene	0.22
PCBs (Aroclors)	
Total PCBs (Aroclors)	0.22 J

POI-6	
Depth(Feet)	(0 – 1)
Date	8/25/2009
SVOCs	
Benzo(a)pyrene	0.28 J
Metals	
Lead	2,570 J

POI-18	
Depth(Feet)	(5 – 6)
Date	1/14/2010
PCBs (Aroclors)	
Aroclor-1248	1.1 DJ
Aroclor-1254	2.5 D
Total PCBs (Aroclors)	4.07 J
Metals	
Arsenic	21.2 J
Lead	1,540

POI-17		
Depth(Feet)	(5 – 6)	
Date	1/13/2010	
PCBs (Aroclors)		
Aroclor-1254	2.1 D	[3.1 D]
Aroclor-1260	3.2 D	[0.86 J]
Total PCBs (Aroclors)	5.67	[5.15 J]
Metals		
Arsenic	41.9 J	[57.7 J]
Lead	1,900	[1,940]

SS-91	
Depth(Feet)	(0 – 1)
Date	9/17/2009
SVOCs	
Benzo(a)pyrene	0.59
PCBs (Aroclors)	
Aroclor-1254	3.1
Total PCBs (Aroclors)	4.58 J

SS-98	
Depth(Feet)	(0 – 1)
Date	9/18/2009
PCBs (Aroclors)	
Aroclor-1248	2.4 J
Aroclor-1254	4.6
Total PCBs (Aroclors)	7.51 J
Metals	
Arsenic	25.7
Lead	2,710

SS-158	
Depth(Feet)	(0 – 1)
Date	12/31/2014
PCBs (Aroclors)	
Total PCBs (Aroclors)	0.25 J P

SS-157	
Depth(Feet)	(0 – 1)
Date	12/31/2014
PCBs (Aroclors)	
Total PCBs (Aroclors)	0.40 J

SS-97		
Depth(Feet)	(0 – 1)	(6 – 7)
Date	9/4/2009	9/4/2009
SVOCs		
Benzo(a)pyrene	0.31 D	0.042 D
PCBs (Aroclors)		
Aroclor-1242	5.7	20 J
Aroclor-1254	10	4.8
Total PCBs (Aroclors)	15.7	24.8 J
PCBs (Congeners)		
Total PCBs (Congeners)	50.2 J	NA
Metals		
Arsenic	8.4 J	28.4 J
Lead	1,430	648

SS-100	
Depth(Feet)	(0 – 1)
Date	9/10/2009
PCBs (Aroclors)	
Aroclor-1254	2.6
Total PCBs (Aroclors)	4.06 J
Metals	
Lead	2,650

SS-101		
Depth(Feet)	(0 – 1)	(4 – 5)
Date	9/9/2009	9/9/2009
SVOCs		
Benzo(a)pyrene	0.21 EJ	0.16 J
PCBs (Aroclors)		
Aroclor-1242	1.4	0.63 U
Aroclor-1248	0.61 U	1.9 J
Aroclor-1254	4.4	3.4 J
Aroclor-1260	1.5	2.7 J
Total PCBs (Aroclors)	7.3	8 J
PCBs (Congeners)		
Total PCBs (Congeners)	10.6 J	NA
Metals		
Arsenic	19.5	13
Lead	1,380	3,010

SS-161	
Depth(Feet)	(0 – 1)
Date	12/18/2014
--	No Exceedances

SS-104	
Depth(Feet)	(0 – 1)
Date	9/2/2009
PCBs (Aroclors)	
Aroclor-1248	3.3 D
Aroclor-1254	1.9 D
Total PCBs (Aroclors)	5.57 J
PCBs (Congeners)	
Total PCBs (Congeners)	5.83 J
Metals	
Arsenic	22 J

SS-103		
Depth(Feet)	(0 – 1)	(4 – 5)
Date	9/2/2009	9/2/2009
PCBs (Aroclors)		
Aroclor-1248	1.9 DJ	2.3 D
Aroclor-1254	3.1 D	4.1 D
Total PCBs (Aroclors)	5.55 J	7.01
Metals		
Arsenic	20.4 J	15 J
Cadmium	38.1 J	22,500 J
Lead	13,800	951

SS-134	
Depth(Feet)	(0 – 1)
Date	12/17/2014
PCBs (Aroclors)	
Total PCBs (Aroclors)	0.27 J P

POI-3		
Depth(Feet)	(0 – 1)	(0.5 – 1)
Date	8/25/2009	8/25/2009
VOCs		
Carbon Tetrachloride	NA	4.4
Chloroform	NA	4.5 D
SVOCs		
Benzo(a)pyrene	0.22 J	NA
Metals		
Arsenic	29.3 J	NA
Lead	1,720 J	NA
Manganese	13,600 J	NA
Mercury	85.1	NA

SS-105	
Depth(Feet)	(0 – 1)
Date	8/26/2009
PCBs (Aroclors)	
Aroclor-1248	4.6 D
Aroclor-1254	4.4 D
Total PCBs (Aroclors)	9.31
PCBs (Congeners)	
Total PCBs (Congeners)	22.7 J
Metals	
Lead	1,070 J

SS-133	
Depth(Feet)	(0 – 1)
Date	12/17/2014
PCBs (Aroclors)	
Total PCBs (Aroclors)	0.21 J P

SS-115	
Depth(Feet)	(0 – 1)
Date	9/14/2009
SVOCs	
Benzo(a)pyrene	1.5
Dibenz(a,h)anthracene	0.29 EJ
Metals	
Arsenic	33
Lead	6,170

SS-162	
Date	1/9/2015
SVOCs	
Bis(2-ethyl hexyl) phthalate	0.61 J B [0.52 J B]
PCBs (Aroclors)	
Aroclor-1260	0.018 J
Metals	
Arsenic	8.2
Cadmium	1.2
Copper	49.7
Cyanide	0.13 J
Lead	73.6
Mercury	0.65

SS-136	
Depth(Feet)	(0 – 1)
Date	12/17/2014
SVOCs SIM	
Benzo(a)anthracene	0.65
Benzo(a)pyrene	0.6
PCBs (Aroclors)	
Aroclor-1254	0.46 P
Total PCBs (Aroclors)	0.62 J P
Metals	
Arsenic	28.5

POI-2	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Total PCBs (Aroclors)	2.18
Metals	
Lead	1,490

SS-135	
Depth(Feet)	(0 – 1)
Date	12/17/2014
PCBs (Aroclors)	
Aroclor-1254	0.32
Total PCBs (Aroclors)	0.41 J P

SS-118	
Depth(Feet)	(0 – 1)
Date	9/15/2009
SVOCs	
Benzo(a)pyrene	0.4 D
PCBs (Aroclors)	
Aroclor-1242	11 J
Aroclor-1254	7.7 J
Aroclor-1260	4.3 J
Total PCBs (Aroclors)	23 J
Metals	
Lead	2,560

Ecologically-Based Screening Levels for Sediment	
Constituent	Value
SVOCs	
Bis(2-ethyl hexyl) phthalate	0.182
PCBs	
Aroclor-1260	0.005
Pesticides	
4,4'-DDE	0.005
Heptachlor	0.0006
Metals	
Arsenic	6
Cadmium	0.6
Copper	16
Cyanide	0.0001
Lead	31
Mercury	0.2
Zinc	120

SS-109	
Depth(Feet)	(0.5 – 1)
Date	8/31/2009
VOCs	
Chloroform	1,900 DJ

SS-110	
Depth(Feet)	(0 – 1)
Date	9/1/2009
SVOCs	
Benzo(a)pyrene	0.83
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.28 J

SS-102		
Depth(Feet)	(0 – 1)	(9 – 10)
Date	9/10/2009	9/10/2009
PCBs (Aroclors)		
Aroclor-1254	2.5	2.1
Total PCBs (Aroclors)	4.22 J	3.75
Metals		
Lead	1,870	4,700

POI-11	
Depth(Feet)	(0 – 1)
Date	9/1/2009
SVOCs	
Benzo(a)pyrene	0.23 J

SS-117	
Depth(Feet)	(0 – 1)
Date	9/17/2009
PCBs (Aroclors)	
Aroclor-1254	1.8 J
Total PCBs (Aroclors)	2.66 J
Metals	
Arsenic	28.5
Lead	1,420 J

SS-138	
Depth(Feet)	(0 – 1)
Date	1/2/2015
PCBs (Congeners)	
Total PCBs (Congeners)	0.224

SS-137	
Depth(Feet)	(0 – 1)
Date	1/2/2015
PCBs (Aroclors)	
Aroclor-1254	0.31 P [0.22 J P]
Total PCBs (Aroclors)	0.55 P [0.387 J P]
PCBs (Congeners)	
Total PCBs (Congeners)	1.178 q [1.184 q]

SS-107		
Depth(Feet)	(0 – 1)	(5 – 6)
Date	9/8/2009	9/8/2009
SVOCs		
Benzo(a)anthracene	4 D	2.4
Benzo(a)pyrene	3.6 D	2.7
Benzo(b)fluoranthene	4.2 D	3.1 D
Dibenz(a,h)anthracene	0.69 EJ	0.16 J
Metals		
Lead	792	1,070

SS-108		
Depth(Feet)	(0 – 1)	(4 – 5)
Date	9/8/2009	9/8/2009
SVOCs		
Benzo(a)anthracene	2.7	2.8
Benzo(a)pyrene	3.1	2.9
Benzo(b)fluoranthene	4.5 DJ	3.4 DJ
Dibenz(a,h)anthracene	0.27 J	0.24 J
PCBs (Aroclors)		
Aroclor-1254	0.29	2.5 DJ
Aroclor-1260	0.12	4.8 D
Total PCBs (Aroclors)	0.481	7.81 J
Metals		
Arsenic	9.8 J	28.3 J
Lead	6,270	3,340

SS-113	
Depth(Feet)	(0 – 1)
Date	9/16/2009
PCBs (Aroclors)	
Aroclor-1254	1.4
Total PCBs (Aroclors)	2.29 J
PCBs (Congeners)	
Total PCBs (Congeners)	3.55
Metals	
Antimony	881 J
Arsenic	33.9
Lead	2,280

SS-141	
Depth(Feet)	(0 – 1)
Date	12/17/2014
--	No Exceedances

SS-123	
Depth(Feet)	(0 – 1)
Date	9/15/2009
PCBs (Aroclors)	
Aroclor-1254	1.3
Aroclor-1260	1.2
Total PCBs (Aroclors)	3.15
Metals	
Lead	1,370

SS-114	
Depth(Feet)	(0 – 1)
Date	9/14/2009
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.17
Metals	
Lead	2,540

SS-122	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.28
Metals	
Lead	1,270

SS-124	
Depth(Feet)	(0 – 1)
Date	9/15/2009
PCBs (Aroclors)	
Total PCBs (Aroclors)	1.48 J

SS-139	
Depth(Feet)	(0 – 1)
Date	1/2/2015
PCBs (Congeners)	
Total PCBs (Congeners)	0.230

SS-140	
Depth(Feet)	(0 – 1)
Date	1/2/2015
PCBs (Congeners)	
Total PCBs (Congeners)	0.122

SS-121	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Aroclor-1254	1.7 J
Aroclor-1260	6.9 J
Total PCBs (Aroclors)	8.6 J
PCBs (Congeners)	
Total PCBs (Congeners)	12.3 J
Metals	
Arsenic	30.2 J
Lead	1,340

SS-119	
Depth(Feet)	(0 – 1)
Date	9/3/2009
SVOCs	
Benzo(a)pyrene	1.5
Benzo(b)fluoranthene	3.2
Dibenz(a,h)anthracene	0.33 EJ
PCBs (Aroclors)	
Aroclor-1254	1.3
Total PCBs (Aroclors)	2.3
Pesticides	
Heptachlor	1.1 D
Metals	
Lead	1,070

SS-120	
Depth(Feet)	(0 – 1)
Date	9/3/2009
PCBs (Aroclors)	
Aroclor-1254	1.8
Aroclor-1260	1.6
Total PCBs (Aroclors)	3.4
Metals	
Arsenic	25.3 J
Lead	1,310

SS-163	
Date	1/9/2015
SVOCs	
Bis(2-ethyl hexyl) phthalate	0.66 J B
Metals	
Arsenic	14.5
Cadmium	1.4
Copper	36.2
Lead	81.1
Mercury	0.53
Zinc	156

NJDEP Soil Remediation Standards		
Constituent	Non-Residential	Residential
VOCs		
Carbon Tetrachloride	2	0.6
Chloroform	2	0.6
SVOCs		
Acetophenone	5	2
Benzo(a)anthracene	2	0.6
Benzo(a)pyrene	0.2	0.2
Benzo(b)fluoranthene	2	0.6
Benzo(k)fluoranthene	23	6
Dibenz(a,h)anthracene	0.2	0.2
Indeno(1,2,3-cd)pyrene	2	0.6
PCBs		
Aroclor-1242	1	0.2
Aroclor-1248	1	0.2
Aroclor-1254	1	0.2
Aroclor-1260	1	0.2
Aroclor-1262	1	0.2
Aroclor-1268	1	0.2
Total PCBs (Aroclors)	1	0.2
PCBs (Congeners)		
Total PCBs (Congeners)	1	0.2
Pesticides		
Aldrin	0.2	0.04
alpha-Chlordane	1	0.2
Dieldrin	0.2	0.04
gamma-Chlordane	1	0.2
Heptachlor	0.7	0.1
Heptachlor epoxide	0.3	0.07
Metals		
Antimony	450	31
Arsenic	19	19
Cadmium	78	78
Copper	45,000	3,100
Lead	800	400
Manganese	5,900	11,000
Mercury	65	23
Vanadium	1,100	78

SS-164	
Date	1/9/2015
SVOCs	
Bis(2-ethyl hexyl) phthalate	0.57 J B [0.54 J B]
PCBs (Aroclors)	
Aroclor-1260	0.025 J
Pesticides	
4,4'-DDE	0.0057 J
Heptachlor	0.00079 J B
Metals	
Arsenic	8.6
Cadmium	1.3
Copper	35.7
Cyanide	0.076 J
Lead	101
Mercury	0.55

LEGEND:

- OPEN WATER
- EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES (DASHED WHERE APPROXIMATE)
- GREAT SWAMP NATIONAL WILDLIFE REFUGE PROPERTY BOUNDARY (DASHED WHERE APPROXIMATE)
- WASTE AND DEBRIS OBSERVED ON GROUND SURFACE BUT NOT OBSERVED OR ANTICIPATED TO BE BELOW GROUND SURFACE
- AREAS WHERE SURFACE WATER FLOW DOES NOT EXHIBIT TYPICAL BED AND BANK MORPHOLOGY
- DATA GAP SAMPLING LOCATION
- SAMPLES COLLECTED PRIOR TO DATA GAP SAMPLING
- SOIL SAMPLING LOCATION
- SOIL SAMPLING LOCATION WITH DETECTED CONCENTRATIONS GREATER THAN NJDEP NONRESIDENTIAL SOIL REMEDIATION STANDARDS
- PROPOSED MONITORING WELL
- EXISTING MONITORING WELL
- DATA GAP TEMPORARY WELL POINT
- DATA GAP SOIL SAMPLE LOCATION
- PROPOSED SOIL SAMPLE LOCATION
- DATA GAP SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- PROPOSED SEDIMENT SAMPLE LOCATION
- PROPOSED SEDIMENT/SOIL SAMPLE LOCATION (SAMPLE TYPE WILL BE BASED ON FIELD CONDITIONS OBSERVED AT THE TIME OF SAMPLE COLLECTION)
- STREAM GAUGE
- DATA GAP STREAM GAUGE LOCATION
- GROUNDWATER ELEVATION CONTOUR – DECEMBER 2014 (DASHED WHERE INFERRED)
- (23 .34) GROUNDWATER ELEVATION – DECEMBER 2014 (FEET ABOVE MEAN SEA LEVEL)

0 200' 400'
GRAPHIC SCALE

DATA NOTES:

UNITS = MILLIGRAMS PER KILOGRAM

[] = DUPLICATE SAMPLE

() = RESULTS OF SECONDARY ANALYSIS

PCBS = POLYCHLORINATED BIPHENYLS

SVOCS = SEMIVOLATILE ORGANIC COMPOUNDS

VOCS = VOLATILE ORGANIC COMPOUNDS

NA = NOT ANALYZED

B = FOR ORGANICS THE COMPOUND HAS BEEN FOUND IN THE SAMPLE AS WELL AS ITS ASSOCIATED BLANK, ITS PRESENCE IN THE SAMPLE MAY BE SUSPECT.

D = CONCENTRATIONS IDENTIFIED FROM ANALYSIS OF THE SAMPLE AT A SECONDARY DILUTION.

E = FOR ORGANICS THE COMPOUND WAS QUANTITATED ABOVE THE CALIBRATION RANGE.

E = FOR INORGANICS THE REPORTED VALUE IS ESTIMATED BECAUSE OF THE PRESENCE OF INTERFERENCE BASED ON SERIAL DILUTON ANALYSIS.

J = FOR ORGANICS THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.

J = FOR INORGANICS THE SAMPLE RESULT IS GREATER THAN THE MDL BUT BELOW THE CRDL.

JN = THE ANALYSIS INDICATES THE PRESENCE OF A COMPOUND FOR WHICH THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION. THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.

N = SPIKED SAMPLE RECOVERY IS NOT WITHIN CONTROL LIMITS.

P = DUAL COLUMN ANALYSIS RESULTED IN GREATER THAT 25% DIFFERENCE FOR DETECTED CONCENTRATIONS BETWEEN THE TWO COLUMNS.

q = THE REPORTED RESULT IS THE ESTIMATED MAXIMUM POSIBLE CONCENTRATION OF THE ANALYTE, QUANTITATED USING THE THEORETICAL ION RATIO. THE MEASURED ION RATION DOES NOT MEET QUALITATIVE IDENTIFICATION CRITERIA AND INDICATES A POSSIBLE INTERFERENCE.

RX = THE SAMPLE RESULTS ARE REJECTED DUE TO MATRIX INTERFERENCE.

U = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.

NOTES:

1. ANALYTICAL RESULTS GIVEN IN MILLIGRAMS PER KILOGRAM FOR SOIL SAMPLES WITH DETECTED CONCENTRATIONS GREATER THAN NEW JERSEY NON-RESIDENTIAL SOIL REMEDIATION STANDARDS (DATED OCTOBER 2011). ANALYTICAL RESULTS GREATER THAN NEW JERSEY NON-RESIDENTIAL REMEDIATION STANDARDS ARE POSTED FOR PREVIOUS SAMPLES. DATA GAP ANALYTICAL RESULTS ARE COMPARED TO THE RESIDENTIAL AND NON-RESIDENTIAL REMEDIATION STANDARDS.
2. THE EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES IS DRAWN BASED ON OBSERVATIONS OF MATERIALS EXCAVATED DURING TEST PIT ACTIVITIES CONDUCTED FROM JULY 26, 2007 TO SEPTEMBER 6, 2007 AND MARCH 26, 2008. THE EDGE OF THE LANDFILL WAS REFINED BASED ON OBSERVATIONS PRESENTED IN THE FIELD CHANGE REQUEST (FCR-02) APPROVED BY USEPA ON DECEMBER 29, 2014.
3. THE EXTENT OF AREAS WHERE SURFACE WATER FLOW DOES NOT EXHIBIT TYPICAL BED AND BANK MORPHOLOGY IS BASED ON FIELD OBSERVATIONS MADE THROUGHOUT THE PERIOD OF INVESTIGATION ACTIVITIES. THE EXTENT OF THE AREA SHOWN IS APPROXIMATE.
4. CONDITIONS ENCOUNTERED AT LOCATIONS SS-162, SS-163, AND SS-164 WERE REPRESENTATIVE OF SEDIMENT. RESULTS FOR THESE SAMPLES ARE PRESENTED WITH THE SEDIMENT RESULTS.
5. DATA GAP ANALYTICAL RESULTS HAVE NOT BEEN VALIDATED.

SOURCES:

1. BASEMAP FROM JAMES M. STEWART INC., LAND SURVEYORS, PHILADELPHIA, PA., (ELECTRONIC FILE: 292406.DWG DATED: 6/30/06)
2. TAX PARCEL DATA FOR CHATHAM TOWNSHIP WAS PROVIDED BY CIVIL SOLUTIONS.

ROLLING KNOLLS LANDFILL SUPERFUND SITE
CHATHAM, NEW JERSEY

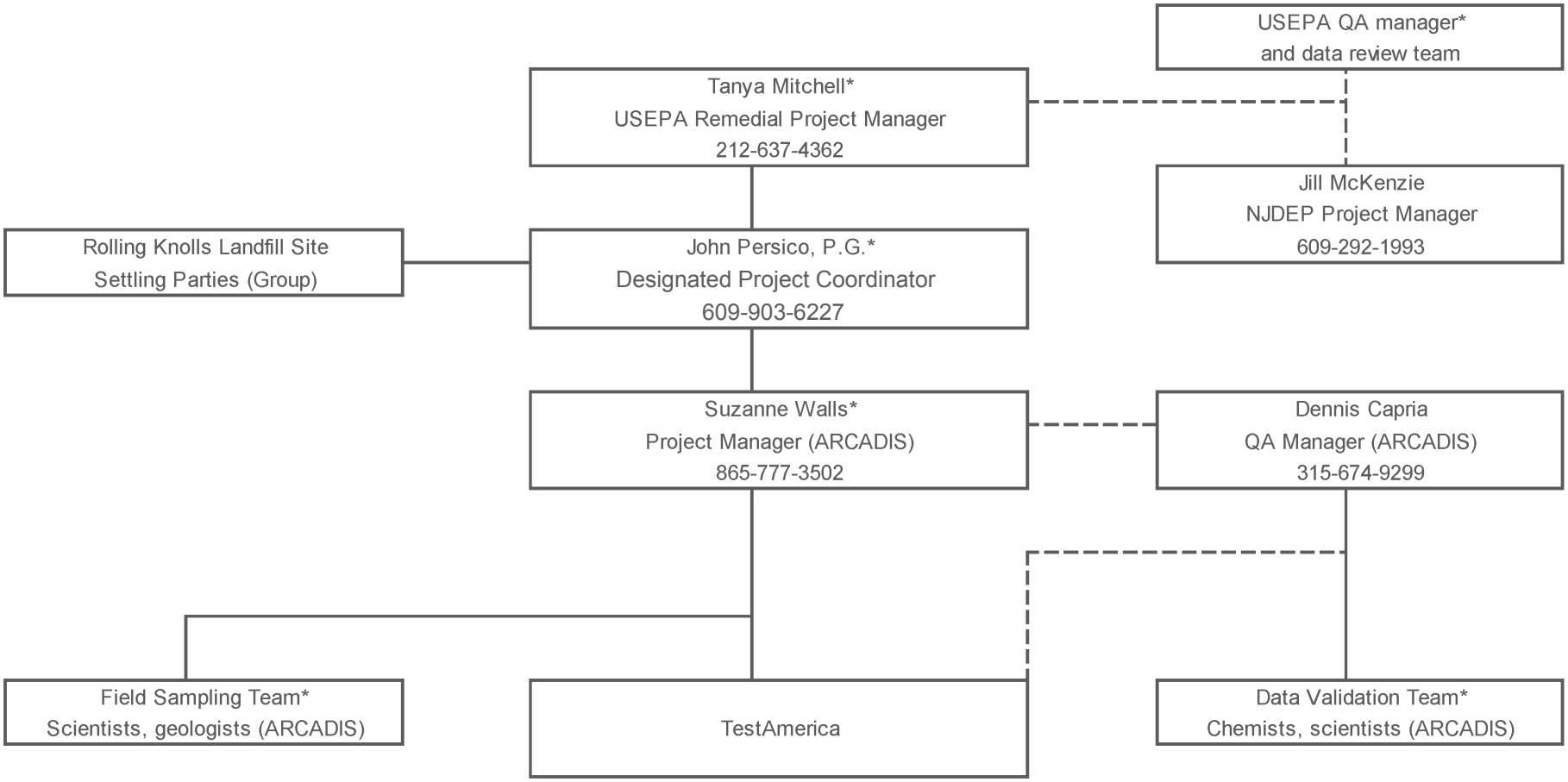
DATA GAPS SAMPLING AND ANALYSIS PLAN ADDENDUM 1

PROPOSED SAMPLE LOCATIONS - SOUTH

ARCADIS

FIGURE 3b

CITY: CRANBURY-NJ DIVGROUP: ENVCAD DB: T.FATTO LD: T.FATTO PIC:(O.) PM: K.ROMAINE TM: LHYATT LYR: ON=*;OFF=*REF* PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/24/2011 3:03 PM BY: FATTO, TRACEY
G:\ENVCAD\CRANBURY\ACT\B0032030\004\00003\DGS\APR\B0032030PR02.DWG LAYOUT: 3B SAVED: 8/24/2011 3:33 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB
XREFS: 32203X01 B0032030X B0032030X01 B0032030X11 IMAGES: PROJECTNAME: ----



* - QAPP recipient

ROLLING KNOLLS LANDFILL SUPERFUND SITE
CHATHAM, NEW JERSEY
DATA GAPS SAMPLING AND ANALYSIS PLAN ADDENDUM 1

PROJECT ORGANIZATIONAL CHART

ARCADIS

FIGURE
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