

FINAL

Remedial Investigation Report And Sediment Quality Evaluation

M-12/M-14 Landfill Site

**U. S. Army Installation Fort Monmouth
Fort Monmouth, New Jersey**



Directorate of Public Works



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Fort Monmouth, New Jersey

**Remedial Investigation Report
And Sediment Quality Evaluation
for the
M-12/M-14 Landfill Site**

Fort Monmouth, New Jersey

January 26, 2004

**REMEDIAL INVESTIGATION REPORT
AND SEDIMENT QUALITY EVALUATION
FOR THE M-12/M-14 LANDFILL SITE
FORT MONMOUTH, NEW JERSEY**



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EXECUTIVE SUMMARY

VERSAR, Inc. (VERSAR) has been contracted by the United States (U.S.) Army Installation, Fort Monmouth (Fort Monmouth), Directorate of Public Works (DPW), Fort Monmouth, New Jersey, to prepare a Remedial Investigation Report (RIR) for data collected during recent sediment sampling events at the M-12/M-14 Landfill Sites (Site). This report describes the remedial investigation activities conducted at the Site on April 10, 2000.

The Site is located on the Main Post Area of Fort Monmouth on the north and south side of Husky Brook, west of Murphy Drive, and occupies approximately 9.0 acres. The Site is comprised of both the M-12 and the M-14 landfills. The M-12 landfill consists of two separate areas, a northeast area and a southwest area. According to the Roy F. Weston (WESTON) report, *Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, Site Investigation Report (December 1995)*, both landfills were historically used for the disposal of domestic and industrial wastes. In the 1995 Site Investigation (SI), WESTON conducted a geophysical survey, groundwater sampling and tidal monitoring at each landfill. In addition, surface water samples were obtained from the portion of Husky Brook that is adjacent to the M-14 landfill. WESTON recommended that a long-term groundwater monitoring program be developed and implemented at the M-12 and M-14, but provided no recommendations related to Site-specific sediment quality. A long-term surface water monitoring program was also recommended for M-14.

Other studies conducted at similar Main Post Landfill sites (M-2 and M-8) found polychlorinated biphenyl (PCB) -containing materials (e.g., electrical ballasts) disposed of in each landfill. In addition, PCBs were detected in soil and/or groundwater at both the M-2 and M-8 Landfill sites. Therefore, assuming that other landfills on the Main Post had received similar waste materials, the DPW initiated a sediment sampling investigation in the second quarter of 2000 to evaluate potential impacts to stream sediments in creeks and/or brooks running adjacent to the Main Post and Charles Wood (CW-3A only) landfill sites. The M-12/M-14 Landfill Site was included in the sediment sampling program to supplement the WESTON findings related to soil, surface water and groundwater matrices.

To determine potential PCB-related impacts to sediments in Husky Brook, the DPW obtained 25 sediment samples on April 10, 2000, including two duplicate samples for quality assurance/quality control (QA/QC), from the surface and near-surface sediments of Husky Brook. The samples were obtained along the 1,700-foot portion of Husky Brook that flows through the M-12/M-14 Site. All 25 sediment samples were analyzed for PCBs and compared to the sediment sampling guidance concentrations defined in the New Jersey Department of Environmental Protection (NJDEP) *Guidance for Sediment Quality Evaluations (November 1998)*. The analytical data is summarized in table form in this RIR. VERSAR developed this RIR based on the evaluation of these sediment data.

Data presented in Section 3.0 of this RIR indicate that there was one anomalous detection of PCBs in a duplicate sample but that no PCBs were detected in any of the 25 samples obtained from Husky Brook. Based on NJDEP guidance criteria, the results indicate that there are no PCB-related impacts to sediments in Husky Brook, which flows through the M-12/M-14 Landfill Site.

Based on the results of this sediment quality evaluation, no PCBs were detected above the NJDEP guidance criteria for sediment quality in any sample, and no potential exists for long-term adverse benthic effects in Husky Brook associated with the M-12/M-14 Landfill Site. Therefore, No Further Action is recommended for the M-12/M-14 Landfill Site related to potential PCB impacts to the sediments of Husky Brook.

1.0 INTRODUCTION

VERSAR has been contracted by the U.S. Army Installation, Fort Monmouth, DPW, Fort Monmouth, New Jersey to prepare an RIR and sediment quality evaluation for the Site located at the Fort Monmouth Main Post Area. This report addresses the remedial investigation activities performed at the Site on April 10, 2000.

1.1 Objectives

Other studies conducted at similar Main Post Landfill sites (M-2 and M-8) found PCB-containing materials (e.g., electrical ballasts) disposed of in each landfill. In addition, PCBs were detected in soil and/or groundwater at both the M-2 and M-8 Landfill sites. Therefore, assuming that other landfills on the Main Post had received similar waste materials, the DPW initiated a sediment sampling investigation in the second quarter of 2000 to evaluate potential impacts to stream sediments in creeks and/or brooks running adjacent to the Main Post and Charles Wood (CW-3A only) landfill sites. The M-12/M-14 Landfill Site was included in the sediment sampling program to supplement the earlier WESTON findings related to the soil, surface water and groundwater matrices.

The objective of this RIR is to determine potential PCB-related impacts to stream sediments in Husky Brook, which flows through the M-12/M-14 Landfill Site. The remedial investigation was conducted in accordance with New Jersey Administrative Code (NJAC) 7:26E - *Technical Requirements for Site Remediation* (February 2003) and NJDEP *Guidance for Sediment Quality Evaluations* (November 1998).

The remedial investigation encompassed the following:

- Obtaining surface and near-surface sediment samples approximately every 100 feet along the bottom of Husky Brook, which flows through the M-12/M-14 Landfill Site.
- Analyzing the samples for PCBs by United States Environmental Protection Agency (USEPA) Method 8082.
- Comparing the analytical results to the screening level criteria defined in the NJDEP *Guidance for Sediment Quality Evaluations* (November 1998).

1.2 Report Organization

This report is organized to minimize repetition. **Section 2.0** provides background information and a general description of the M-12/M-14 Landfill Site located at the Fort Monmouth Main Post area. **Section 3.0** describes and summarizes the sampling procedure and activities. **Section 4.0** presents analytical results and compares those results with NJDEP guidance criteria. **Section 5.0** provides a summary of the findings of the remedial investigation, and requests a No Further Action determination from the NJDEP.

2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING

The following sections describe the Site background and environmental setting of the area surrounding Fort Monmouth and the M-12/M-14 Landfill Site. Included is a description of the Site location, background, current conditions and environmental setting.

2.1 Site Location and Description

Fort Monmouth is located in the central-eastern portion of New Jersey in Monmouth County, approximately 45 miles south of New York City and 70 miles northeast of Philadelphia (**Figure 2-1**). In addition to the Main Post, the installation includes two subposts, the Charles Wood Area and the Evans Area. The Main Post encompasses approximately 630 acres and is generally bounded by State Highway 35, Parkers Creek, Lafetra Creek, the New Jersey Transit Railroad and a residential area to the south. The post was established in 1918 during World War I (WWI) as an Army Signal Corps training center. The Main Post currently provides administrative, training, and housing support functions, as well as providing many of the community facilities for Fort Monmouth. The primary mission of Fort Monmouth is to provide command, administrative, and logistical support for Headquarters, U.S. Army Communications and Electronics Command (CECOM). CECOM is a major subordinate command of the U.S. Army Materiel Command (AMC) and is the host tenant at Fort Monmouth.

The M-12/M-14 Landfill Site is located on the north and south sides of Husky Brook, west of Murphy Drive, in the Main Post Area (**Figure 2-2**). The approximate area of the M-12/M-14 Landfill Site is 389,300 feet² (9.0 acres). The M-12 landfill consists of two areas, a northeast area and a southwest area. Husky Brook flows along the northern boundary of the M-14 landfill and eventually between both the M-12 and M-14 landfills, for a distance of approximately 1,700 feet. It ultimately flows into Oceanport Creek. The bank of Husky Brook contains trees, bramble and small vegetation upstream and large rocks downstream. Portions of Husky Brook have been repaired/restored as part of a streambank Landfill project.

The various Landfill Sites on the Main Post are identified on **Figure 2-3**. The map is provided to identify:

- the relative location of each of the former landfill sites due to the similarity of past site uses, the types debris deposited at these locations, and the nature of the contaminants identified in soil, groundwater and/or sediment samples during the present and former investigations; and
- the proximity and interrelatedness of the adjacent surface water bodies.

2.2 Site Background

The WESTON report, *Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, Site Investigation Report* (December 1995), summarized surface

water sampling events that have been conducted since February 1986 for samples collected in Husky Brook. These sampling events were part of a former New Jersey Pollutant Discharge Elimination System (NJPDES) Permit and were obtained in that portion of Husky Brook that flows along the northern border of the M-14 landfill. From these sampling events, a report prepared by WESTON in 1993 (*Investigation of Suspected Waste Sites at Fort Monmouth, New Jersey*) indicates that no compounds were detected above NJDEP surface-water criteria.

The WESTON SI Report (WESTON, 1995) summarizes the results of a geophysical survey for determining landfill boundaries, groundwater sampling and tidal monitoring. In addition, surface-water samples were obtained in that portion of Husky Brook flowing along the northern boundary of the M-14 landfill. The surface water samples were sampled for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs and TAL metals. According to the WESTON SI report, VOCs, SVOCs, pesticides and PCBs were not detected above laboratory method detection limits (MDLs) in the samples. For the TAL metals analysis, no metals were detected at concentrations above NJDEP surface water criteria. The WESTON SI report recommended the implementation of a long-term groundwater monitoring program due to the historical Site use as a landfill. The present investigation was undertaken to further expand the WESTON SI report and assess the potential PCB-related impacts to stream sediments based on past Site use.

2.3 Current Conditions

VERSAR conducted a site walk on December 11, 2000 to assess current conditions at the M-12/M-14 Landfill Site. The M-12 site consists of two areas separated by a tributary to Husky Brook, which is bounded by trees and shrubs. The western M-12 area was recently backfilled and graded with black fill material. There was no vegetation present at the time of the Site walk, with the exception of areas along Husky Brook on the north side of the site, which was bounded with trees. The eastern portion of the M-12 site was an open field of grass.

M-14, located on the north side of Husky Brook, consists of an open field with some trees. This area was landscaped, with the grass cut and the trees pruned. On the eastern side of the Site is a playground. Site photographs are provided in **Appendix A**.

2.4 Environmental Setting

The following is a description of the geological/hydrogeological setting of the area surrounding the M-12/M-14 Landfill Site. Included is a description of the regional geology and hydrogeology of the area surrounding Fort Monmouth, as well as descriptions of the local geology and hydrogeology of the M-12/M-14 area.

2.4.1 Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The M-12/M-14 Landfill Site is located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands. The geologic map of New Jersey is provided as **Figure 2-4**.

In general, New Jersey Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, sand and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapeczka, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units, which are generally thicker to the southeast and reflect a deeper water environment. More than 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand), while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown and Navesink Formations). The individual thickness for these units varies greatly (e.g., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line (e.g., a boundary zone between older, resistant rocks and younger, softer plain sediments) to greater than 6,500 feet in Cape May County (Brown and Zapeczka, 1990).

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post Area. The Red Bank Sand conformably overlies the Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank Sand is a yellowish-gray to reddish brown clayey, medium-to-coarse-grained sand that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark gray to black, medium-to-fine grained sand with abundant clay, mica and glauconite.

The Tinton Sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse-grained feldspathic-quartz and glauconite-sand to a glauconitic-coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard, 1969).

The Kirkwood Formation (part of the Kirkwood-Cohansey system) crops out southeast of the Main Post and dips to the southeast at a slope of 20 feet per mile (Jablonski, 1968). The Kirkwood Formation consists of alternating layers of sand and clay. The upper unit is a light gray to yellowish-brown, fine-grained quartz sand with quartz nodules and small pebbles. The lower unit is a brown silt in Monmouth County (Jablonski, 1968).

2.4.2 Regional Hydrogeology

Fort Monmouth lies in the Atlantic and Eastern Gulf Coastal Plain groundwater region (Meisler et al., 1988). This groundwater region is underlain by undeformed, unconsolidated to semi-consolidated sedimentary deposits. The chemistry of the water near the surface is variable with low dissolved solids and high iron concentrations. The water chemistry in areas underlain by glauconitic sediments (such as Red Bank and Tinton Sands) is dominated by aluminum, calcium, magnesium, manganese and iron. The sediments in the area of Fort Monmouth were deposited in fluvia-deltaic to nearshore environments.

The water table aquifer in the Main Post area is identified as part of the “composite confining units,” or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation and the basal clay of the Kirkwood Formation.

Well records indicate that wells installed in the Red Bank and Tinton Sands produce 2 to 25 gallons per minute (gpm). Water in these upper hydrogeologic units is typically encountered at shallow depths below ground surface (2 to 9 feet bgs). However, domestic wells are generally screened deeper in these upper hydrogeologic units. The shallow water table conditions in the Tinton and Red Bank Sands, and the similar composition of these sands within the Kirkwood Formation, suggest that the Tinton-Red Bank-Kirkwood sequence forms a single, laterally continuous aquifer. Water in this water-table aquifer flows east toward the Atlantic Ocean. Local topography tends to deflect the flow toward local depressions.

As stated in the SI Report (WESTON, 1995), NJAC 7:9-6, *Groundwater Quality Standards* (GWQS) establishes groundwater quality criteria for different classes of groundwater. Class II-A, which is defined as all groundwater that is not classified as one of the other special classes, is the appropriate class for groundwater at Fort Monmouth. The primary designated use for Class II-A groundwater is potable water; secondary uses include agricultural and industrial water.

Shallow groundwater is locally influenced within the Main Post Area by the following factors:

- Tidal influence (based on proximity to the Atlantic Ocean, rivers and tributaries)
- Topography
- Nature of the fill material within the Main Post Area
- Presence of clay and silt lenses in the natural overburden deposits
- Local groundwater recharge areas (e.g., streams, lakes)

Due to the fluvial nature of the overburden deposits (e.g., sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. The groundwater

flow in the vicinity of the M-12/M-14 Landfill Site is assumed to be to the north for the M-12 landfill, in the direction of Husky Brook, and south for the M-14 landfill, also towards Husky Brook.

2.4.3 Local Geology/Hydrogeology

As presented in the WESTON SI, the field logs from monitoring well installations indicate that the lithology at M-12/M-14 consists of a thin soil cover (0.3 feet) underlain by fill material. The components of the fill materials observed in the borings consisted of organic debris and coal fragments intermixed with a moderate to poorly sorted olive-green-brown silty medium-fine-grained sand with little clay. Groundwater saturation was observed at approximately 2 feet bgs across the site. Water-level elevation data collected during the WESTON SI indicate that local groundwater flow is west toward Husky Brook.

2.4.4 Soils

According to the U.S. Department of Agriculture (USDA), Soil Conservation Service, Monmouth County Soil Survey, the majority of the Main Post area is covered by urban land (**Figure 2-5**). The soil survey described urban land as areas where concrete, asphalt, buildings, shopping centers, airports or other impervious surfaces cover 80 percent or more of the surface. In addition, the survey indicated that the natural subsurface soils have largely been replaced with artificial or foreign fill materials (developed land with disturbed soils). The following soil series and classification units are mapped in the Main Post Area:

- DoB Downer sandy loam (with 2 to 5 percent slopes);
- FrB Freehold sandy loam (with 2 to 5 percent slopes);
- FUB Freehold sandy loam/urban land complex (with 0 to 10 percent slopes);
- HV Humaquepts, frequently flooded;
- KvA Kresson loam (with 0 to 5 percent slopes);
- UA Udorthents, smoothed; and
- UD Udorthents – urban land complex (with 0 to 3 percent slopes).

The Downer series soils are well-drained soils that are found on uplands and terraces. The soils are formed in acid, silty coastal plain sediments. The Freehold soils are also well drained and are formed in acid, loamy, coastal plain sediments that, by volume, are 1 to 10 percent glauconite and are found on uplands. The Humaquepts soils are somewhat poorly- to very poorly- drained soils that are formed in stratified, sandy, or loamy sediments of fluvial origins. The Humaquepts soils are located on the floodplain and are subject to flooding several times each year. The Kresson loam is a nearly level to gently sloping soil and is somewhat poorly drained. The soil is found on low divides and in depressions. The Udorthents soils have been altered by excavation or filling activities. In filled areas, these soils consist of loamy material that is more than 20 inches thick. The filled areas include floodplain, tidal marshes and areas with moderately, well drained to very poorly drained soils. Some Udorthent soils contain concrete, asphalt, metal and

glass. The soils in the vicinity of the M-12/M-14 Landfill Site are classified as UA to UD, Udorthents, smoothed to Udorthents, urban land complex.

2.4.5 Topography and Surface Drainage

Over the last 80 years, the natural topography of Fort Monmouth has been altered by excavation and filling activities by the military. The M-12/M-14 Landfill Site is located on the floodplain of Husky Brook. The USGS topographic map (**Figure 2-1**) shows that the land surface of the Site is relatively flat at an elevation of less than 20 feet above mean sea level (amsl).

Surface water bodies from the western part of the Main Post flows into the Lafetra Creek to the north or into the Mill Creek to the south. The USGS topographic map (**Figure 2-1**) shows the Lafetra Creek as Parkers Creek Branch and Mill Creek as Wampum. Both Mill and Lafetra Creek originate off-post. Mill Creek flows along the southern boundary of the Main Post, turning north just past the Auto Craft Shop. Mill Creek is channelized and flows past the north side of the M-2 Landfill. Lafetra Creek forms the northern boundary of the Main Post and joins Mill Creek to form Parkers Creek. Parkers Creek flows eastward along the northern boundary and joins Oceanport Creek east of the post. Most of Parkers Creek, Lafetra Creek and Mill Creek are tidally influenced.

The U.S Fish and Wildlife Service (FWS) National Wetland Inventory Long Branch quadrangle maps indicate the presence of wetlands at the Main Post. Parkers and Oceanport Creeks are classified as estuarine intertidal aquatic beds. The area of Parkers Creek and the part of Oceanport Creek/Husky Brook are classified as estuarine intertidal emergent wetlands. Lafetra Creek and Mill Creek are classified as riverine lower perennial open water/unknown bottom.

3.0 SEDIMENT SAMPLING ACTIVITIES

Fort Monmouth DPW conducted sediment sampling in Husky Brook to evaluate potential PCB-related impacts to stream sediments associated with the M-12/M-14 Landfill Site. On April 10, 2000, 11 borings were installed approximately every 100 feet along the bottom of Husky Brook, as shown in **Figure 3-1: M-12/M-14 Boring Location Map**. The locations extended from downstream at Boring B-1 near Murphy Drive to upstream at Boring B-11, and were sampled accordingly in that order (see chain-of-custody records, **Appendix D**). The sediment sampling was conducted in accordance with the *Installation Restoration Program Sediment Sampling Plan for Nine Former Landfill Sites* (TVS, March 2000) presented in **Appendix B**. The Sediment Sampling Plan (SSP) was approved by the NJDEP on April 3, 2000.

Twenty-five sediment samples were collected, including two duplicate samples for QA/QC, from 11 borings using a Wildco Sediment Sampler. The samples were obtained along the 1,700-foot portion of Husky Brook that flows through the Site. Sample depths ranged from surface (0 to 6 inches) to near-surface (6 inches to 12 inches below grade) at each boring location, with the exception of Borings B-1, B-4 and B-6, which were also sampled at a depth of 18 inches to 24 inches below grade. The samples consisted of black to brown fine sandy silt to green/black clay and sandy clay with black bands, some organic material and small angulars. Boring logs are provided in **Appendix C**.

Sampling equipment was thoroughly decontaminated before and after each use, in accordance with the SSP. The sediment samples were collected using a Wildco Sampler and immediately placed in laboratory-supplied bottleware. The sample containers were labeled, sealed, packed in ice and transported to the Fort Monmouth Environmental Testing Laboratory (FMETL), New Jersey Certification Number NJDEP 13461, under proper chain-of-custody procedures. The samples were analyzed by FMETL on April 10, 2000 for PCBs utilizing USEPA Method 8082. Copies of the chain-of-custody for the laboratory analysis can be found in **Appendix D**. A summary of the borings, including sample IDs, sample collection date/time, sample depths, northing/easting coordinates, analysis and general soil descriptions is provided in **Table 3-1: Sediment Sample Summary**.

4.0 SITE CHEMICAL CHARACTERIZATION

On April 10, 2000, DPW collected 25 sediment samples along the bottom of Husky Brook to evaluate potential PCB-related impacts to stream sediments from the adjacent M-12/M-14 Landfill Site. Eleven borings were installed at the approximate rate of one per 100 feet along the bottom of the brook. Twenty-five samples were collected from 11 borings at depths ranging from surface (0 to 6 inches) to near-surface (6 inches to 12 inches below grade) at each boring location with the exception of Borings B-1, B-4 and B-6, which were also sampled at a depth of 18 inches to 24 inches below grade. Samples were identified in the field using the following nomenclature: M-12 M-14/1 0-6", M-12 M-14/1 6"-12" to M-12 M-14/11 0-6", M-12 M-14/11 6"-12". The samples were analyzed for PCBs utilizing USEPA Method 8082.

4.1 Chemical Characterization

The sediment laboratory analytical data were compared to the established screening level criteria, as presented in the *NJDEP Guidance for Sediment Quality Evaluations* (November 1998). This evaluation included at least two samples from each boring to assess the sampling data and to identify potential contaminants of concern. For marine/estuarine sediment screenings, the guidelines define two guidance concentrations for Total PCBs, an Effects Range-Low (ER-L) and an Effects Range-Medium (ER-M). The ER-L (0.023 mg/kg Total PCBs) represents the concentration at which adverse benthic effects are found in approximately 10% of studies. The ER-M (0.180 mg/kg Total PCBs) represents the concentration at which a greater than 50% incidence of adverse effects to sensitive species and/or life stages is likely to occur. The ER-L and ER-M are not regulatory cleanup standards. An exceedence indicates a potential risk to the benthic community and helps determine the need for further investigations (e.g., toxicity testing, tissue bioassays, etc.). However, an exceedence of the ER-L/ER-M criteria does not necessarily mandate further investigations if the sediments proximal to the Site have similar contaminant concentration ranges to upgradient sediments. As stated previously, the samples were collected beginning with the downstream location (B-1) and proceeding to the upstream location (B-11). Therefore, the upgradient sediments are most closely represented by the laboratory data for location B-11 (see **Table 4-1**). No PCBs were detected in sediment samples collected at this location.

Based on the *NJDEP Guidance for Sediment Quality Evaluations* (November 1998), the Lowest Effects Levels (LEL) and the Severe Effects Levels (SEL) are to be used as guidelines for individual Arochlors. Arochlor 1254 is the only Arochlor found at the Landfill Sites shown on **Figure 2-3**. The LEL indicates concentrations at which adverse benthic impacts may begin to occur (level tolerated by most benthic organisms). The SEL is a contamination level that indicates severe impacts to the benthic community in most cases studied. Both the LEL and the SEL are derived from freshwater sediment screening criteria; however, they are used in conjunction with the marine/estuarine ER-L and ER-M values for screening purposes. The ER-L and ER-M apply to Total PCBs, whereas the LEL and SEL can be used for screening purposes for individual Arochlors.

In the case of non-polar organic compounds, such as PCBs, it may be necessary to modify the SEL to create a Site-specific SEL (SSEL) based on the Total Organic Carbon (TOC) fraction present in the sample. The TOC fraction is used to determine if the samples were collected in depositional zones, evidenced by a higher percentage of fine-grained particles. Depositional zones are generally the areas of highest potential contamination and are targeted during Site sampling events. To calculate a SSEL, the SEL is multiplied by the TOC fraction. If the TOC of the samples is not measured during sampling, as is the case at the M-12/M-14 Site, a default value of 1% is used. In this instance, each SEL is multiplied by 0.01 to derive the SSEL for comparison purposes. At M-12/M-14, no Arochlors were detected. However, at other Fort Monmouth Landfill Sites, the only Arochlor detected in the sediments was Arochlor 1254. The LEL, SEL and SSEL for Arochlor 1254 are shown below.

Polychlorinated Biphenyl	LEL (mg/kg, dry weight)	SEL (mg/kg organic carbon, dry weight)	SSEL (mg/kg)
Arochlor 1254	0.060	34	0.34

mg/kg=milligrams per kilogram

The USEPA, Region II, and the NJDEP Bureau of Environmental Evaluation and Risk Assessment/Environmental Toxicology and Risk Assessment (BEERA/ETRA) have discontinued the SSEL approach for general screening purposes except in cases of borderline screening exceedances and/or a weight of professional evidence suggesting that the SSEL is appropriate. The SSEL approach is discussed here for completeness, but was not otherwise used to formulate Site-related environmental risk decisions or conclusions.

The results of the PCB laboratory analysis indicated one detection above the laboratory MDL in the duplicate sample of M12M14/9 0-6". This detection is likely to be an anomalous result because PCBs were not detected in M12M14/9 0-6". Additionally, the result appears to be an isolated occurrence because no other upgradient landfill sites (M-3, M-4 and M-5) have presented similar PCB exceedances.

This sample result exceeds both the NJDEP Effects Range – Low (ER-L) and Effects Range – Medium (ER-M) guidance concentrations for Total PCBs (0.023 mg/kg and 0.180 mg/kg, respectively). The ER-L and ER-M represent the concentrations at which adverse benthic effects are found in approximately 10% and 50% of studies, respectively. This sample also exceeds the Arochlor 1254 (the only Arochlor detected at the Site) LEL of 0.060 mg/kg, the concentration at which adverse benthic impacts may begin to occur (the level tolerated by most benthic organisms). The PCB detection did not exceed the SSEL for Arochlor 1254 (0.34 mg/kg). As such, this result, if not anomalous, is unlikely to result in long-term adverse benthic effects in Husky Brook.

Due to the presence of only one potentially anomalous result that did not exceed the SSEL for Arochlor 1254, no potential exists for long-term adverse benthic effects in Husky Brook associated with the M-12/M-14 Landfill Site.

The sample results are summarized in **Table 4-1: PCB Sample Results Summary – M-12/M-14 Landfill Site**. The laboratory data sheets are available in **Appendix D**.

4.2 QA/QC

In order to verify the reliability of the analytical results, Versar reviewed the holding times for each sample and the results of the analysis of two field duplicate samples. All samples were analyzed by the FMETL within the prescribed holding time requirements for each analytical method.

Two field duplicate samples were collected during the Site sampling events to verify the consistency of the entire sampling and analysis procedure. The results for the two duplicate samples were close to those obtained for the original samples. The relative percent difference (RPD) was calculated for each duplicate sample. The RPD measures variability introduced by both the laboratory and field operations. The RPD for the duplicate samples was 175.6%. This RPD exceeds the established limit of 50% for laboratory duplicate samples. However, this is due to low sample concentrations and a correspondingly low MDL used by the laboratory and is not indicative of poor precision because the differences noted may be attributed to analytical sensitivity. Also, the comparison of one very small number with another very small number will result in a high RPD.

5.0 CONCLUSIONS

Based on the results of this sediment quality evaluation, no PCBs were detected above the NJDEP guidance criteria for sediment quality in any sample, and no potential exists for long-term adverse benthic effects in Husky Brook associated with the M-12/M-14 Landfill Site. Therefore, No Further Action is recommended for the M-12/M-14 Landfill Site related to potential PCB impacts to the sediments of Husky Brook.

6.0 REFERENCES

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FIGURES

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ROAD (PAVED)	WOODED AREA	WOODED AREA
ROAD/TRAILS (UNPAVED)	TREE/BUSH	TREE/BUSH
FENCE	LIGHT POLE	LIGHT POLE
BUILDING	UTILITY POLE	UTILITY POLE
APPROXIMATE BOUNDARY	BROOK/CREEK	BROOK/CREEK
BASE BOUNDARY	WETLAND	WETLAND
	WETLAND	WETLAND

NOTES:

REV.	REVISION	APPROVED	DATE	DRAWN BY
TITLE: FIGURE 2-2 M-12/M-14 LANDFILL SITE SITE LAYOUT FORT MONMOUTH, NEW JERSEY				
DRAWN BY: JMM		DATE DRAWN: 23 DEC 00		
CHECKED BY:		DATE CHECKED:		
APPROVED BY:		DATE APPROVED:		
Versar inc. 2558 PEARL BUCK ROAD, SUITE 1 BRISTOL, PA 19007 (215) 788-7844		DRAWING No.: M-12/M-14 FIG 2-2		FILE No.: M-12/M-14 FIG. 2-2
		SCALE: 1" = 100'		SHEET OF
				REV.: A

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Geologic Map of New Jersey

- SEDIMENTARY ROCKS**
- CENOZOIC**
- Holocene: sand
 - Tertiary: sand, silt, clay
- MESOZOIC**
- Cretaceous: sand, silt, clay
 - Jurassic: siltstone, shale, sandstone
 - Triassic: siltstone, shale, sandstone
- PALEOZOIC**
- Devonian: conglomerate, sandstone, shale, limestone
 - Silurian: conglomerate, sandstone, shale, limestone
 - Ordovician: shale, limestone
 - Cambrian: limestone, sandstone
- IGNEOUS AND METAMORPHIC ROCKS**
- MESOZOIC**
- Jurassic: basalt
 - Jurassic: diabase
- PRECAMBRIAN**
- marble
 - gneiss, granite

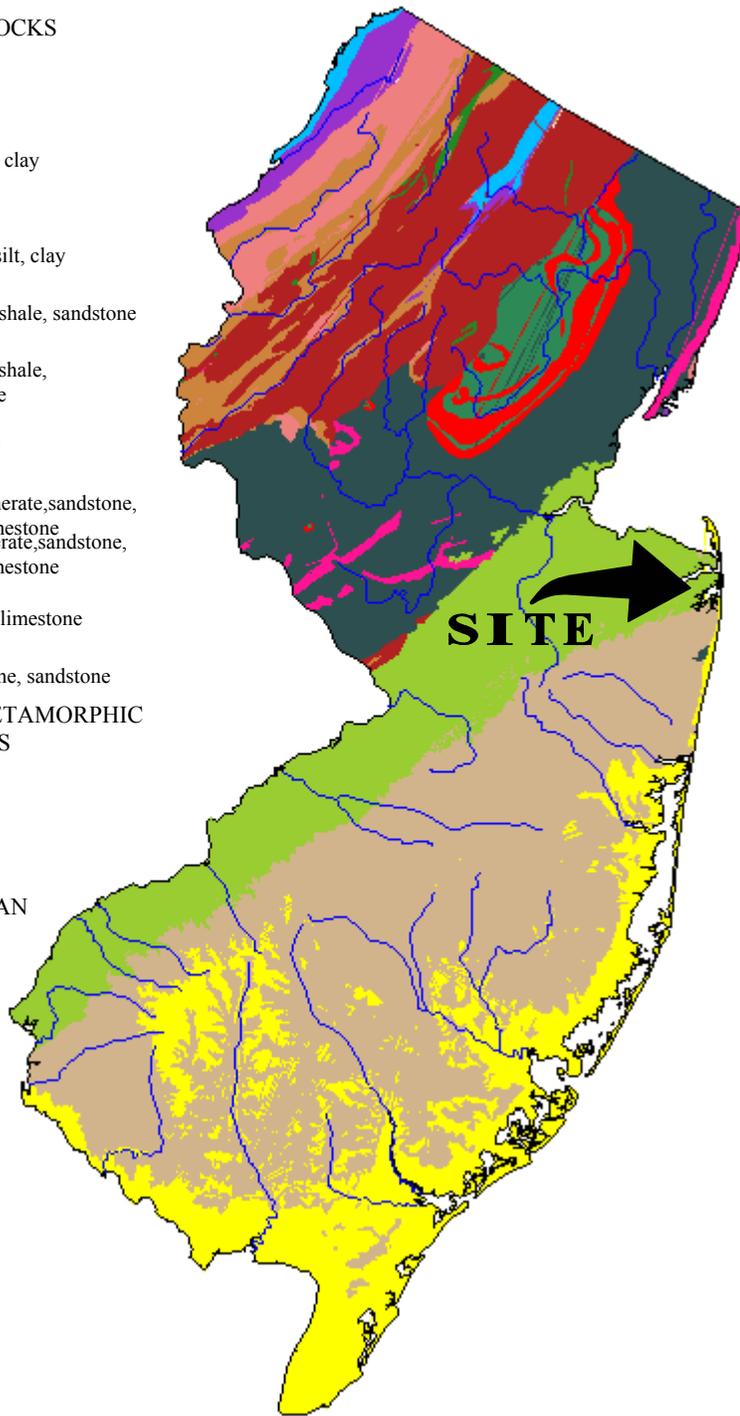
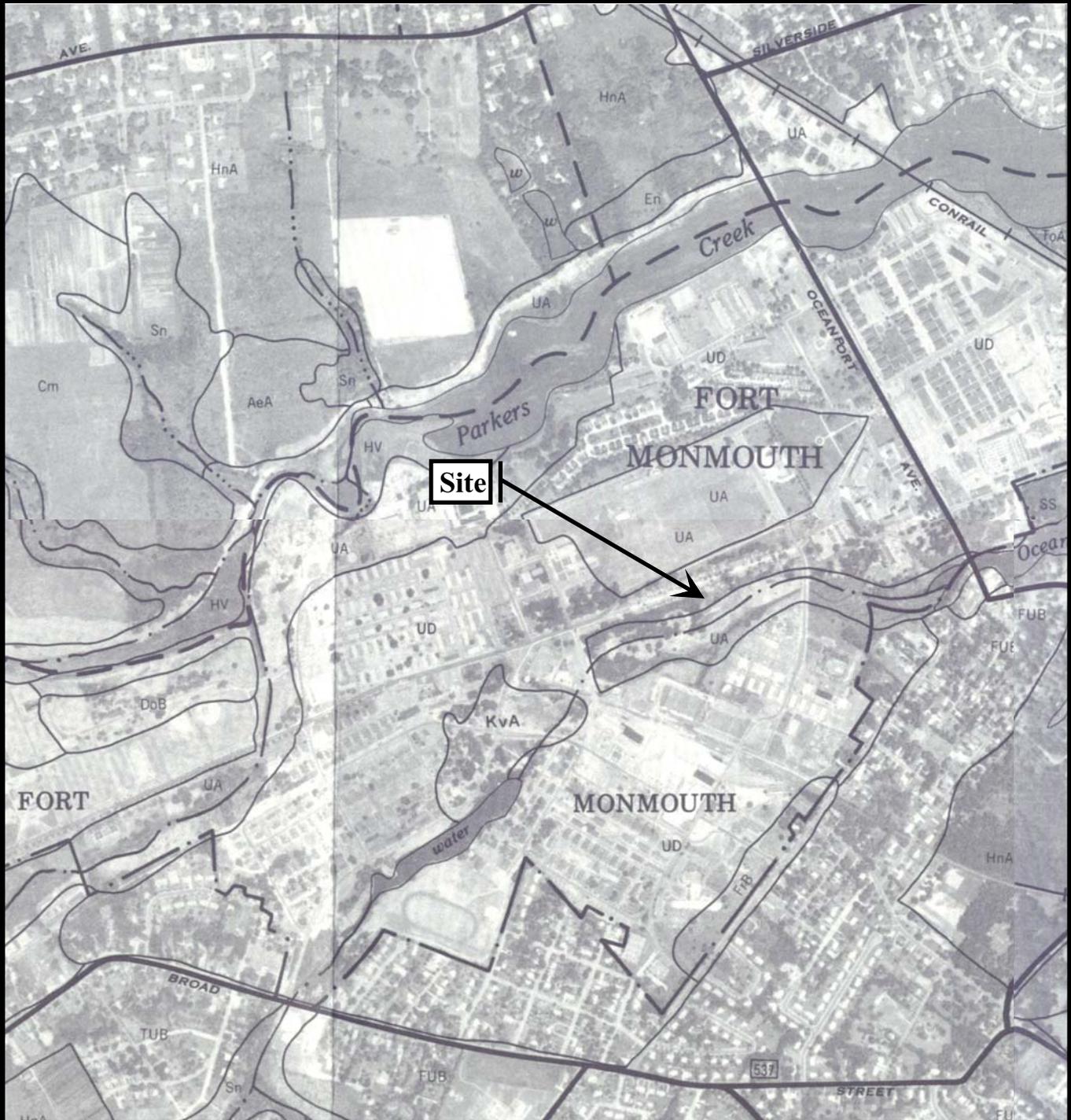


FIGURE 2-4
Geological Map of New Jersey
M-12/M-14 Landfill Site
Fort Monmouth, New Jersey



2558 Pearl Buck Road, Suite 1
 Bristol, Pennsylvania, 19007
 (215)-788-7844

Source: New Jersey Geological Survey, 1994, *Geologic Map of New Jersey*.



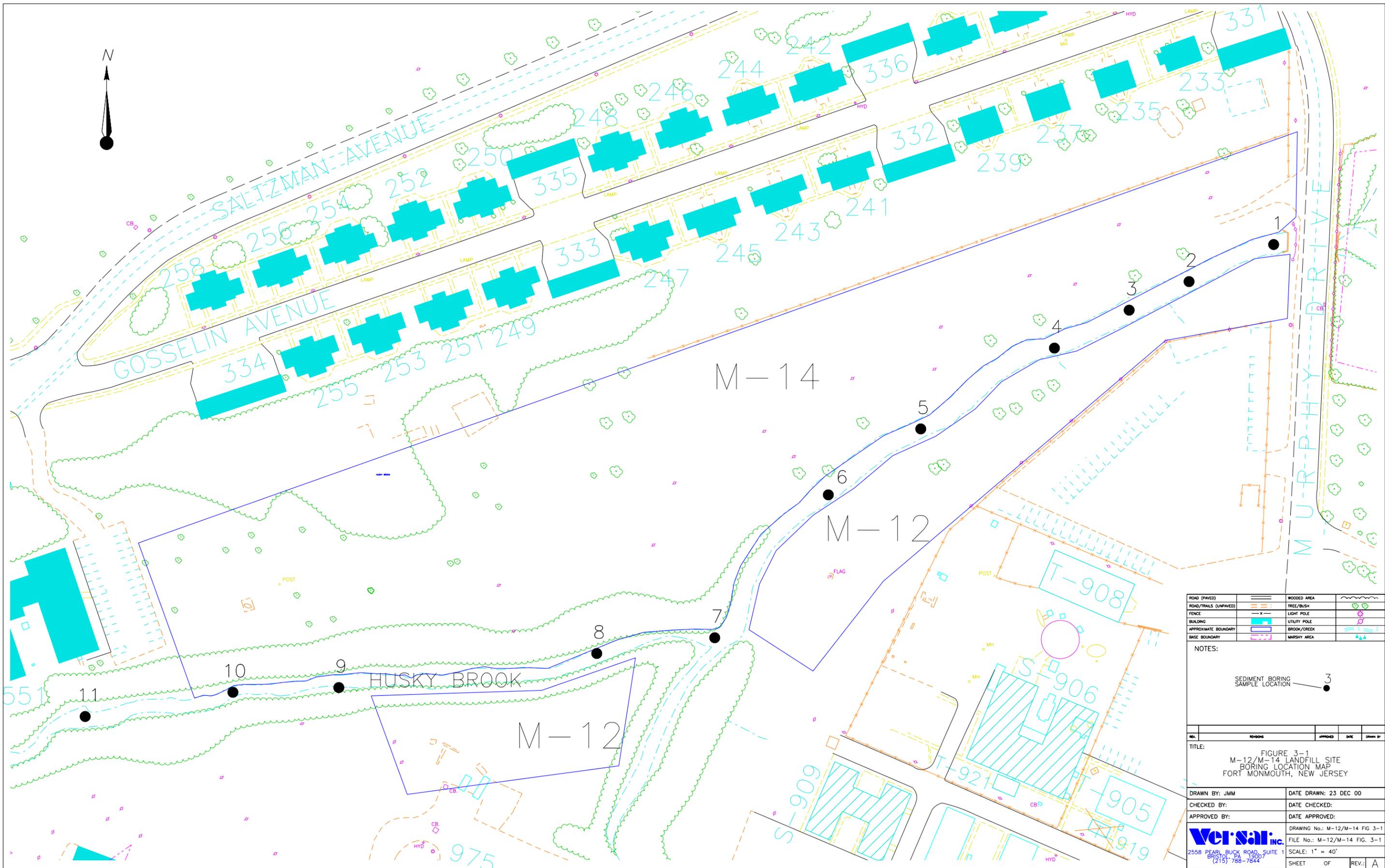
**Fort Monmouth
M-12/M-14 Landfill Site**

FIGURE 2-5

**Soil Map of Monmouth County,
New Jersey**

US Department of Agriculture
Soil Conservation Service
Soil Survey of Monmouth County, NJ
April 1989





ROAD (PAVED)	WOODED AREA	WOODED AREA
ROAD/TRAILS (UNPAVED)	TREE/BUSH	TREE/BUSH
FENCE	LIGHT POLE	LIGHT POLE
BUILDING	UTILITY POLE	UTILITY POLE
APPROXIMATE BOUNDARY	BROOK/CREEK	BROOK/CREEK
BASE BOUNDARY	MARSHY AREA	MARSHY AREA

NOTES:

SEDIMENT BORING SAMPLE LOCATION 3

NO.	REVISIONS	APPROVED	DATE	DRAWN BY
TITLE: FIGURE 3-1 M-12/M-14 LANDFILL SITE BORING LOCATION MAP FORT MONMOUTH, NEW JERSEY				
DRAWN BY: JMM		DATE DRAWN: 23 DEC 00		
CHECKED BY:		DATE CHECKED:		
APPROVED BY:		DATE APPROVED:		
VERSAR inc. 2558 PEARL BUCK ROAD, SUITE 1 BRISTOL, PA 19007 (215) 788-7844		DRAWING No.: M-12/M-14 FIG 3-1 FILE No.: M-12/M-14 FIG. 3-1 SCALE: 1" = 40' SHEET OF REV.: A		

TABLES

**Table 3-1
M-12/M-14 Landfill Site
Sediment Sample Summary**

Boring ID	Sample Depth (in bgs) ⁽¹⁾	Field Sample Location ID	Laboratory Sample ID	Date Collected	Time Collected	Coordinates Northing	Coordinates Easting	Analysis	General Soil Description
B-1	0-6"	M12M14/ 1 0-6"	5324.01	4/10/2000	1026	539716.273	621424.35	PCBs ⁽²⁾ (SW-846 Method 8082)	Black Fine Silty Sand w/Small Angulars & Some Organic Material
	6"-12"	M12M14/ 1 6-12"	5324.02	4/10/2000	1028				
	18"-24"	M12M14/ 1 18-24"	5324.03	4/10/2000	1030				
B-2	0-6"	M12M14/ 2 0-6"	5324.04	4/10/2000	1035	539673.409	621326.374	PCBs (SW-846 Method 8082)	Black Fine Sandy Silt w/Some Organic Material
	6"-12"	M12M14/ 2 6-12"	5324.05	4/10/2000	1038				
B-3	0-6"	M12M14/ 3 0-6"	5324.06	4/10/2000	1043	539640.457	621257.069	PCBs (SW-846 Method 8082)	Dark Brown to Black Fine Sandy Silt
	6"-12"	M12M14/ 3 6-12"	5324.07	4/10/2000	1045				
B-4	0-6"	M12M14/ 4 0-6"	5324.08	4/10/2000	1048	539596.634	621170.467	PCBs (SW-846 Method 8082)	Black, Fine Sandy Silt
	6"-12"	M12M14/ 4 6-12"	5324.09	4/10/2000	1050				
	18"-24"	M12M14/ 4 18-24"	5324.10	4/10/2000	1052				
B-5	0-6"	M12M14/ 5 0-6"	5324.11	4/10/2000	1100	539503.198	621015.723	PCBs (SW-846 Method 8082)	Black, Fine Sandy Silt
	6"-12"	M12M14/ 5 6-12"	5324.12	4/10/2000	1104				
B-6	0-6"	M12M14/ 6 0-6"	5324.13	4/10/2000	1114	539427.065	620908.660	PCBs (SW-846 Method 8082)	Brown Fine Sand to Green Clay and Green/Black Sandy Clay to Fine, Black Sandy Silt
	6"-12"	M12M14/ 6 6-12"	5324.14	4/10/2000	1116				
	18"-24"	M12M14/ 6 18-24"	5324.15	4/10/2000	1118				
B-7	0-6"	M12M14/ 7 0-6"	5324.16	4/10/2000	1121	539261.96 ⁽³⁾	620777.203 ⁽³⁾	PCBs (SW-846 Method 8082)	Brown w/Black Bands Fine Sand
	6"-12"	M12M14/ 7 6-12"	5324.17	4/10/2000	1123				
B-8	0-6"	M12M14/ 8 0-6"	5324.18	4/10/2000	1125	539243.786	620640.559	PCBs (SW-846 Method 8082)	Brown Fine Sand to Fine, Brown w/Black Bands Clayey Sand w/Some Organic Material
	6"-12"	M12M14/ 8 6-12"	5324.19	4/10/2000	1127				
B-9	0-6"	M12M14/ 9 0-6"	5324.20	4/10/2000	1144	539204.359	620341.923	PCBs (SW-846 Method 8082)	Black, Fine Sand w/Some Organic Material to Brown, Fine Sand
	6"-12"	M12M14/ 9 6-12"	5324.21	4/10/2000	1146				
B-10	0-6"	M12M14/ 10 0-6"	5324.22	4/10/2000	1154	539198.962	620219.296	PCBs (SW-846 Method 8082)	Fine, Brown Sand to Green w/Black Sand Bands Clay
	6"-12"	M12M14/ 10 6-12"	5324.23	4/10/2000	1156				
B-11	0-6"	M12M14/ 11 0-6"	5324.24	4/10/2000	1158	539170.975	620048.219	PCBs (SW-846 Method 8082)	Fine, Brown Sand to Green w/Black Sand Bands Clay
	6"-12"	M12M14/ 11 6-12"	5324.25	4/10/2000	1200				

⁽¹⁾ bgs = below ground surface

⁽²⁾ PCBs = Polychlorinated Biphenyls

⁽³⁾ At Convergence

Table 4-1
PCB Sample Results Summary
M-12/M-14 Landfill Site

Boring ID	Sample Depth (bgs)	Field Sample Location ID	Laboratory Sample ID	Date Collected	Analytical Results ⁽⁵⁾	MDL ⁽⁶⁾
Total PCBs ER-L⁽¹⁾					0.023	
Total PCBs ER-M⁽²⁾					0.180	
Arochlor 1254 LEL⁽³⁾					0.060	
Arochlor 1254 SEL⁽⁴⁾					34	
B-1	0-6"	M12M14/ 1 0-6"	5324.01	4/10/2000	ND	0.0224
	6"-12"	M12M14/ 1 6-12"	5324.02	4/10/2000	ND	0.0268
	18"-24"	M12M14/ 1 18-24"	5324.03	4/10/2000	ND	0.0196
B-2	0-6"	M12M14/ 2 0-6"	5324.04	4/10/2000	ND	0.0236
	6"-12"	M12M14/ 2 6-12"	5324.05	4/10/2000	ND	0.0202
B-3	0-6"	M12M14/ 3 0-6"	5324.06	4/10/2000	ND	0.0199
	6"-12"	M12M14/ 3 6-12"	5324.07	4/10/2000	ND	0.0211
B-4	0-6"	M12M14/ 4 0-6"	5324.08	4/10/2000	ND	0.0173
	6"-12"	M12M14/ 4 6-12"	5324.09	4/10/2000	ND	0.0187
	18"-24"	M12M14/ 4 18-24"	5324.10	4/10/2000	ND	0.0196
B-5	0-6"	M12M14/ 5 0-6"	5324.11	4/10/2000	ND	0.0200
	6"-12"	M12M14/ 5 6-12"	5324.12	4/10/2000	ND	0.0177
B-6	0-6"	M12M14/ 6 0-6"	5324.13	4/10/2000	ND	0.0177
	6"-12"	M12M14/ 6 6-12"	5324.14	4/10/2000	ND	0.0194
	18"-24"	M12M14/ 6 18-24"	5324.15	4/10/2000	ND	0.0177
B-7	0-6"	M12M14/ 7 0-6"	5324.16	4/10/2000	ND	0.0188
	6"-12"	M12M14/ 7 6-12"	5324.17	4/10/2000	ND	0.0129
B-8	0-6"	M12M14/ 8 0-6"	5324.18	4/10/2000	ND	0.0194
	6"-12"	M12M14/ 8 6-12"	5324.19	4/10/2000	ND	0.0209
B-9	0-6"	M12M14/ 9 0-6"	5324.20	4/10/2000	ND	0.0181
	6"-12"	M12M14/ 9 6-12"	5324.21	4/10/2000	ND	0.0198
B-10	0-6"	M12M14/ 10 0-6"	5324.22	4/10/2000	ND	0.0189
	6"-12"	M12M14/ 10 6-12"	5324.23	4/10/2000	ND	0.0209
B-11	0-6"	M12M14/ 11 0-6"	5324.24	4/10/2000	ND	0.0121
	6"-12"	M12M14/ 11 6-12"	5324.25	4/10/2000	ND	0.0696
Duplicate	0-6"	M12M14/ 9 0-6"	5324.26	4/10/2000	0.279	0.0191
	6"-12"	M12M14/ 9 6-12"	5324.27	4/10/2000	ND	0.0189

Notes:

- ⁽¹⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (ER-L) - Effects Range-Low
⁽²⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (ER-M) - Effects Range-Medium
⁽³⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (LEL) - Lowest Effects Level
⁽⁴⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (SEL) - Severe Effects Level
⁽⁵⁾All Results in milligrams per kilogram (mg/kg)
⁽⁶⁾Method Detection Limit (mg/kg) representing Total PCBs
 ND = Analyte Not Detected in Sample
 Exceedances of the NJDEP Guidances are shaded and printed **inbold-faced** type
 PCBs = Polychlorinated Biphenyls
 N/A = Not Applicable

APPENDICES

Appendix A

Site Photographic Log

M14 Landfill Site





M12 Landfill Site







Appendix B

Sediment Sampling Plan for Nine Former Landfill Sites (TVS, March 2000)



State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

Mr. Joseph Fallon
Directorate of Public Works
Headquarters, U.S. Army Garrison Fort Monmouth
Fort Monmouth, NJ 07703 - 5101

APR 03 2000

Re: Sediment Sampling Plan
Sites M-2, M-3, M-4, M-5, M-8, M-12, M-14, M-18 and CW-3A
Fort Monmouth Main Post/Charles Wood
Tinton Falls, Monmouth County

Dear Mr. Fallon:

The NJDEP has reviewed the March 29, 2000 Sediment sampling plan for the nine former landfill sites referenced above and we accept the plan as submitted.

The referenced document, developed with NJDEP using appropriate technical guidance documents and requirements, is specifically designed to determine if PCBs have impacted adjacent surface waters.

There are a few brief comments which we have previously discussed, but I wanted to note here as a reminder for you in this investigation.

- The NJDEP requires PCB method 8082 to be utilized.
- Approved sample preservation methods must be used if volatile compounds are to be investigated or reported on.
- Some discussion regarding the sediment criteria utilized along with a discussion on the application to the sample location and water body must be provided in the final report.
- Sampling must be performed on downgradient samples first.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Sincerely,

Ian R. Curtis, Case Manager
Bureau of Case Management
ICURTIS@DEP.STATE.NJ.US

FTMMTH65IRC.DOC



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY GARRISON FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY 07703-5101



REPLY TO
ATTENTION OF

Directorate of Public Works

March 29, 2000

State of New Jersey
Department of Environmental Protection
Division of Responsible Party Site Remediation
Bureau of Case Management
401 East State Street
ATTN: Ian Curtis
P. O. Box 028
Trenton, NJ 08625-0028

Re: Sediment Sampling Plan for Nine Former Landfill Sites
(i.e. M-2, M-3, M-4, M-5, M-8, M-12, M-14, M-18 & CW-3A)
Main Post and Charles Wood Area, Fort Monmouth, New Jersey

Dear Mr. Curtis:

Submitted for your review and approval, please find a copy of the above referenced sampling plan. Said plan should enable the Directorate of Public Works to ascertain whether polychlorinated biphenyls are present within stream sediments bordering the nine referenced landfills. Future site work will be based upon the findings of this sampling initiative.

Should you have any questions or require any additional information regarding this plan, please contact the undersigned at the following telephone number: (732) 532-6223.

Sincerely,

Joseph M. Fallon, CHMM
Environmental Protection Specialist
Directorate of Public Works

Encl.

**United States Army
Directorate of Public Works
Fort Monmouth, New Jersey**

**Installation Restoration Program
Sediment Sampling Plan for
Nine Former Landfill Sites**

March 2000

SITE INVESTIGATION PLAN

Installation Restoration Program Sediment Sampling Plan for Nine Former Landfill Sites

PREPARED FOR:

**JOSEPH FALLON
PROJECT MANAGER
Directorate of Public Works
BUILDING 173
FORT MONMOUTH, NJ 07703
(732)-532-6223**

PREPARED BY:

**TECOM-VINNELL SERVICES (TVS)
ENVIRONMENTAL OFFICE
BUILDING 173
FORT MONMOUTH, NJ 07703**

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1.0 SAMPLING ACTIVITIES

1.1 OVERVIEW

This report provides details for a proposed sediment sampling plan as prepared by TECOM-Vinnell Services (TVS) on the behalf of the U.S. Army Fort Monmouth, Directorate of Public Works (DPW), Fort Monmouth, New Jersey. The purpose of this sampling initiative is to ascertain whether Polychlorinated Biphenyls (PCBs) are present within stream sediments which border nine former landfill sites (i.e. M-2, M-3, M-4, M-5, M-8, M-12, M-14, M-18 and CW-3A). The streams associated with this investigation include Mill Creek, Lafetra Creek, Parkers Creek, Husky Brook, and an unnamed tributary of Wampum Brook (see attachments 1 & 2). The data generated from this study will be used in conjunction with other previously collected data involving surface soils, subsurface soils, ground water and surface water. As part of the larger, ongoing remedial investigation at these nine landfill sites, PCBs were identified within subsurface soils at landfill sites M-2 and M-8. The Final Site Investigation (SI) Report, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas (December 1995) identifies electronic components as one of the waste types being disposed of within the subject landfills. Said components (i.e. electrical ballasts) typically contained small quantities of insulating oil which may or may not have contained PCBs. Based upon the potential presence of electronic components at the other seven landfill sites, PCBs may also exist within subsurface soils at these locations. As part of previously conducted sampling initiatives, the DPW has been able to document that the PCBs identified at sites M-2 and M-8 have not impacted site ground water or surface water. Furthermore, PCBs have not been identified within site ground water or surface water at the other landfill sites. The overall goal of the proposed sampling plan is to document that the presence of PCBs at sites M-2 and M-8 have not impacted the nearby stream sediments.

This investigation will be conducted by TVS personnel in accordance with the specifications required for collecting sediment samples as determined by the New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual (May 1992) and the NJDEP Guidance For Sediment Quality Evaluations (November 1998).

1.2 SITE DESCRIPTION

Mill Creek is located along the northern side of the M-2 landfill (approximate distance 1,400 feet) and along the western side of the M-4 landfill (approximate distance 360 feet) and the M-5 landfill (approximate distance 570 feet). Lafetra Creek runs along the northern side of the M-3 landfill (approximate distance 1,200 feet), joining with Mill Creek to form Parkers Creek. Parkers Creek surrounds the M-8 landfill (approximate distance 1,500 feet) on the western, northern, and eastern sides. It then runs along the western side of the M-18 landfill (approximate distance 700 feet). Husky Brook runs along the northern side of the M-12 landfill, eventually running between the M-12 and M-14 landfills (combined approximate distance 1,700 feet) before flowing into Oceanport Creek. An unnamed tributary of Wampum Brook is located along the northern side of the CW-3A landfill (approximate distance 600 feet). Stream banks along the landfills vary from heavily vegetated with trees and bramble to simply grass. A stream bank restoration project is currently underway at the landfill sites located on the Main Post. The project entails stabilizing the stream banks through a combination of hard (rip-rap) and soft (vegetative plantings) engineering practices. All sites vary in steepness and have various access points. The streams flow constantly even in drought conditions and all but the unnamed tributary of Wampum Brook are tidally influenced. Currents and depth vary with tide.

1.3 HEALTH AND SAFETY

Before sampling activities commence, potential site hazards (physical, chemical and biological) will be evaluated by the TVS Health and Safety Office. A site specific Health and Safety Plan shall be prepared accordingly.

2.0 SITE INVESTIGATION ACTIVITIES

2.1 CONTACTS AND PERSONNEL

The following is a listing of all contacts and personnel involved in the investigation. All analyses are to be performed and reported by U.S. Army Fort Monmouth Environmental Laboratory, NJDEP- Certification # 13461. All sampling will be performed under the direct supervision of a NJDEP trained sample technician according to the methods described in the NJDEP Field Sampling Procedures Manual (1992) and as defined in this sampling plan.

The following parties are participants in this investigation:

- Environmental Protection Specialist: Joseph Fallon, CHMM
Employer: U.S. Army, Fort Monmouth Phone Number: (732) 532-6223
- Field Technician: Corey McCormack
Employer: TECOM-Vinnell Services (TVS) Phone Number: (732) 532-0989
- Analytical Laboratory: U.S. Army Fort Monmouth Environmental Laboratory
Contact Person: Daniel Wright - Phone Number: (732) 532-4359
Employer: TECOM-Vinnell Services
NJDEP Certification No.: 13461
- Field Technician Supervisor: Mark Laura
Employer: TECOM-Vinnell Services (TVS) Phone Number: (732) 532-0989
- Health and Safety Personnel: Bruce Wadlington, Chandra Jennings, and John Wierbowski. Employer: TVS - Phone Number: (732) 532-1706

2.2 SAMPLING PROCEDURES AND PROTOCOL

During the investigation, all samples will be collected with proper attention to quality assurance protocols and in accordance with the guidelines set forth by the New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual (May, 1992), the Technical Requirements for Site Remediation (NJAC 7:26E, June, 1993) and the NJDEP Guidance for Sediment Quality Evaluations (November 1998).

2.2.1 SITE ACTIVITIES

Site activities shall include recording field conditions and other relevant observations, sampling sediments, plotting sample locations by use of our Global Positioning System (GPS), decontamination of equipment, and preservation and storage of samples.

2.2.2 SEDIMENT SAMPLING

Sample locations will be determined, sampled, and recorded in the following way:

1. Samples will be taken from clearly discernable depositional areas in and along the streams. In the event that no clear depositional areas can be located, a sample will be taken from the best possible stream bed point at the rate of 1 sample for every 100 feet.
2. Samples will be taken at a depth of 0-6 inches for surface deposits and 6-12 inches for subsurface deposits in each sampling event. Based upon the individual thickness of each depositional area, an 18-24 inch deep sample will also be taken if the desired depth is obtainable.
3. Sampling will commence from downstream, working upstream. Care will be taken to minimize disturbance of sediments and washing of samples as collected.
4. Tide, weather, recent activity, and notable observations will be recorded.
5. A boring log shall be created to note any layers, particle sizes, and defining aspects to each boring.
6. Sampling will be conducted using a hand core sediment sampler.
7. Samples for PCBs analysis will be collected into new, pre-cleaned, 4oz. clear glass jars with Teflon lined caps. All samples will be stored in a cooler at 4 degrees Celsius.
8. After each sampling event, equipment will be decontaminated as stated in section 2.3.
9. Each sample location will be plotted using our GPS.

2.2.3 QA/QC

Quality control samples are required to verify that the sample collection and handling process has not affected the quality of the sediment samples. All field quality control samples will be prepared exactly as regular investigation samples with regard to volume and containers. The following quality control samples will be collected for each batch of samples:

- Field duplicate daily or one every 20 samples; homogenized before splitting.

2.3 EQUIPMENT DECONTAMINATION

Decontamination will be done after every sampling event by the following procedure:

1. Alconox and water wash
2. Water rinse
3. Deionized water rinse
4. Air dry

Appendix C
Boring Logs



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-1

(Page 1 of 1)

US ARMY FT. MONMOUTH N.J. SELFM-PW-EV JOSEPH FALLON	DATE COMPLETED : 04/10/00 SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER SAMPLER : COREY MCCORMACK CONTRACTOR : TVS-PWS-07 ENV. LOCATON : M12/M14
M12/M14 Landfill Sediments	

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SILTY SAND, Fine. Black.				
4	5324.01	1		1026			
8			SILTY SAND, Fine. Black. Some Organic Material.				
12	5324.02	2		1028			
16			SILTY SAND, Fine. Black. Sm. Angulars. Black.				
20	5342.03	3		1030			
24							

04-21-2000 X:\MTECH5\LANDFI~1\M12M14-1.BOR



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-2

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELFM-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0							
4	5324.04	1	SANDY SILT, Fine. Black.	1035			
8	5324.05	2	SANDY SILT, Fine. Black. Some Organic Material.	1038			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-3

(Page 1 of 1)

US ARMY FT. MONMOUTH N.J. SELFM-PW-EV JOSEPH FALLON	DATE COMPLETED : 04/10/00 SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER SAMPLER : COREY MCCORMACK CONTRACTOR : TVS-PWS-07 ENV. LOCATON : M12/M14
M12/M14 Landfill Sediments	

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SANDY SILT, Fine. Dk. Brown/ Black.				
4	5324.06	1		1043			
8			SANDY SILT, Fine. Black.				
12	5324.07	2		1045			
16							
20							
24							

04-18-2000 X:\MTECH5\LANDFI-1\M12M14-3.BOR



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-4

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELFM-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SANDY SILT, Fine. Black.				
4	5324.08	1		1048			
8	5324.09	2	SANDY SILT, Fine. Black.	1050			
12			SANDY SILT, Fine. Black.				
16							
20	5324.10	3		1052			
24							

04-18-2000 X:\MTECH\LANDFL-1\M12M14-4.BOR



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-5

(Page 1 of 1)

US ARMY FT. MONMOUTH N.J. SELFM-PW-EV JOSEPH FALLON		DATE COMPLETED : 04/10/00 SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER SAMPLER : COREY MCCORMACK CONTRACTOR : TVS-PWS-07 ENV. LOCATON : M12/M14					
M12/M14 Landfill Sediments							
Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SANDY SILT, Fine. Black.				
	5324.11	1		1100			
4							
	5324.12	2	SANDY SILT, Fine. Black.	1104			
8							
12							
16							
20							
24							

04-18-2000 X:\MTECH\LANDFI-1\M12M14-5.BOR



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-6

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELFM-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SAND, Fine. Brown.				
			CLAY. Green.				
4	5324.13	1		1114			
			SANDY CLAY. Green w/ Black.				
8	5324.14	2		1116			
			SANDY SILT, Fine. Black.				
12							
16							
20	5324.15	3		1118			
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-7

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0							
4	5324.10	1	SAND, Fine. Brown.	1121			
8	5324.17	2	SAND, Fine. Brown w/ Black Bands.	1123			
12							
16							
20							
24							

04-18-2000 X:\MTECH5\LANDFI-1\M12M14-7.BOR



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-8

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELFM-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDSCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SAND, Fine. Brown.				
2	5324.18	1	CLAYEY SAND, Fine. Brown w/ Black Bands. Some Organic Material.	1125			
4							
8	5324.19	2		1127			
12							
16							
20							
24							

04-18-2000 X:\MTECH5\LANDFI-1\M12M14-8 BOR



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-9

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELFM-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SAND, Fine. Black. Some Organic Material.				
4	5324.20	1		1144			
8			SAND, Fine. Brown.				
12	5324.21	2		1146			
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-10

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDSCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0							
0	5324.22	1	SAND, Fine. Brown.	1154			
4							
8	5324.23	2	CLAY. Green w/ Black SAND Bands	1156			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELFM-PW-EV

LOG OF BORING B-11

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELFM-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDSCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : M12/M14

M12/M14 Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SAND, Fine. Brown.				
4	5324.24	1		1158			
8			CLAY. Green w/ Black SAND Bands				
12	5324.25	2		1200			
16							
20							
24							

Appendix D

Sediment Sampling Laboratory Data Sheets

FORT MONMOUTH ENVIRONMENTAL TESTING LABORATORY

DIRECTORATE OF PUBLIC WORKS
 PHONE: (732) 532-6224 FAX: (732) 532-6263
 WET-CHEM - METALS - ORGANICS - FIELD SAMPLING
 CERTIFICATIONS: NJDEP #13461, NYSDOH #11699



ANALYTICAL DATA REPORT
 Fort Monmouth Environmental Laboratory
 ENVIRONMENTAL DIVISION
 Fort Monmouth, New Jersey
 PROJECT: Stream Sediments

M12/M14 Landfill

Field Sample Location	Laboratory Sample ID#	Matrix	Date and Time of Collection	Date Received
M12 M14 / 1 0-6"	5324.01	Sediment	10-Apr-00 10:26	04/10/00
M12 M14 / 1 6-12"	5324.02	Sediment	10-Apr-00 10:28	04/10/00
M12 M14 / 1 18-24"	5324.03	Sediment	10-Apr-00 10:30	04/10/00
M12 M14 / 2 0-6"	5324.04	Sediment	10-Apr-00 10:35	04/10/00
M12 M14 / 2 6-12"	5324.05	Sediment	10-Apr-00 10:38	04/10/00
M12 M14 / 3 0-6"	5324.06	Sediment	10-Apr-00 10:43	04/10/00
M12 M14 / 3 6-12"	5324.07	Sediment	10-Apr-00 10:45	04/10/00
M12 M14 / 4 0-6"	5324.08	Sediment	10-Apr-00 10:48	04/10/00
M12 M14 / 4 6-12"	5324.09	Sediment	10-Apr-00 10:50	04/10/00
M12 M14 / 4 18-24"	5324.10	Sediment	10-Apr-00 10:52	04/10/00
M12 M14 / 5 0-6"	5324.11	Sediment	10-Apr-00 11:00	04/10/00
M12 M14 / 5 6-12"	5324.12	Sediment	10-Apr-00 11:04	04/10/00
M12 M14 / 6 0-6"	5324.13	Sediment	10-Apr-00 11:14	04/10/00
M12 M14 / 6 6-12"	5324.14	Sediment	10-Apr-00 11:16	04/10/00
M12 M14 / 6 18-24"	5324.15	Sediment	10-Apr-00 11:18	04/10/00
M12 M14 / 7 0-6"	5324.16	Sediment	10-Apr-00 11:21	04/10/00
M12 M14 / 7 6-12"	5324.17	Sediment	10-Apr-00 11:23	04/10/00
M12 M14 / 8 0-6"	5324.18	Sediment	10-Apr-00 11:25	04/10/00
M12 M14 / 8 6-12"	5324.19	Sediment	10-Apr-00 11:27	04/10/00
M12 M14 / 9 0-6"	5324.20	Sediment	10-Apr-00 11:44	04/10/00
M12 M14 / 9 6-12"	5324.21	Sediment	10-Apr-00 11:46	04/10/00
M12 M14 / 10 0-6"	5324.22	Sediment	10-Apr-00 11:54	04/10/00
M12 M14 / 10 6-12"	5324.23	Sediment	10-Apr-00 11:56	04/10/00
M12 M14 / 11 0-6"	5324.24	Sediment	10-Apr-00 11:58	04/10/00
M12 M14 / 11 6-12"	5324.25	Sediment	10-Apr-00 12:00	04/10/00
DUP. 0-6"	5324.26	Sediment	10-Apr-00	04/10/00
DUP. 6-12"	5324.27	Sediment	10-Apr-00	04/10/00

ANALYSIS:
 FORT MONMOUTH ENVIRONMENTAL LAB
 PCB's, %SOLIDS


 Daniel Wright/Date
 Laboratory Director

5-15-00

**CHAIN
OF
CUSTODY**

Fort Monmouth Environmental Testing Laboratory

Bldg. 173, SELFM-PW-EV, Fort Monmouth, NJ 07703

Tel (732)532-4359 Fax (732)532-6263 Email:wrightid@mail1.monmouth.army.mil

NJDEP Certification #13461

Chain of Custody Record

Customer: J. Fallon		Project No:		Analysis Parameters		Comments:	
Phone #: 202-223		Location: M12/M14 Lnd: 11					
() DERA () OMA () Other:		Stream Sediments					
Samplers Name / Company: Corey McCormack, TUS		Sample #	Type	bottles			
Lab Sample I.D.	Sample Location	Date	Time				
0324, 01	M12 M14 1 0-6"	4/10/00	1026	✓			4°C
02	" 1 6-12"		1028	✓			Fuel Smell. ✱
03	" 1 18-24"		1030	✓			
04	M12 M14 2 0-6"		1035	✓			
05	" 2 6-12"		1038	✓			
06	M12 M14 3 0-6"		1043	✓			
07	" 3 6-12"		1045	✓			
08	M12 M14 4 0-6"		1048	✓			
09	" 4 6-12"		1050	✓			
10	M12 M14 4 18-24"		1052	✓			
11	M12 M14 5 0-6"		1100	✓			
12	" 5 6-12"		1104	✓			
13	M12 M14 6 0-6"		1114	✓			
14	" 6 6-12"		1116	✓			
Relinquished by (signature): <i>Corey McCormack</i>		Date/Time: 4/10/00 1340		Relinquished by (signature):		Date/Time:	
Relinquished by (signature):		Date/Time:		Received by (signature):		Date/Time:	
Report Type: () Full, () Reduced, () Standard, () Screen / non-certified, () EDD		Turnaround time: () Standard 3 wks, () Rush 1 wk, () ASAP Verbal _____ Hrs.		Remarks: Title: Low			

Fort Monmouth Environmental Testing Laboratory

Bldg. 173, SELFM-PW-EV, Fort Monmouth, NJ 07703

Tel (732)532-4359 Fax (732)532-6263 EMail:wrightd@mail1.monmouth.army.mil

NJDEP Certification #13461

Chain of Custody Record

Customer: J. K. (102)		Project No:		Analysis Parameters		Comments:		
Phone #: 202-223		Location: M12/M14 Landfill						
() DERA () OMA () Other:		Stream Sediments Cont						
Samplers Name / Company: Corey McCormack, TUS		Sample #	Type	bottles				
Lab Sample ID.	Sample Location	Date	Time					
5324.15	M12 M14 6 10-24"	4/10/06	1118	Sed	1	✓	24°C Remarks / Preservation Method	
.16	M12 M14 7 0-6"		1121			✓		
.17	" 7 6-12"		1123			✓		
.18	M12 M14 8 0-6"		1125			✓		
.19	" 8 6-12"		1127			✓		
.20	M12 M14 9 0-6"		1144			✓		
.21	" 9 6-12"		1146			✓		
.22	M12 M14 10 0-6"		1154			✓		
.23	" 10 6-12"		1156			✓		
.24	M12 M14 11 0-6"		1158			✓		
.25	" 11 6-12"		1200			✓		
.26	Dupe 0-6"					✓		
.27	Dupe 6-12"					✓		
Relinquished by (signature): <i>Corey McCormack</i>		Date/Time: 4/10/06 1348	Received by (signature): <i>J. K. (102)</i>		Relinquished by (signature):			Date/Time:
Relinquished by (signature):		Date/Time:	Received by (signature):		Relinquished by (signature):			Date/Time:
Report Type: () Full, () Reduced, () Standard, () Screen / non-certified, () EDD		Remarks: Tide; Low		Turnaround time: () Standard 3 wks, () Rush Says, () ASAP Verbal Hrs.				

Landfill Stream Sediment PCB's Sample Event Site Field Summary for M12/M14

Husky Brook runs along the northern side of the M12 landfill, eventually running between M12 and M14 landfills (approximately 1700 feet total) before flowing out into Oceanport Creek.

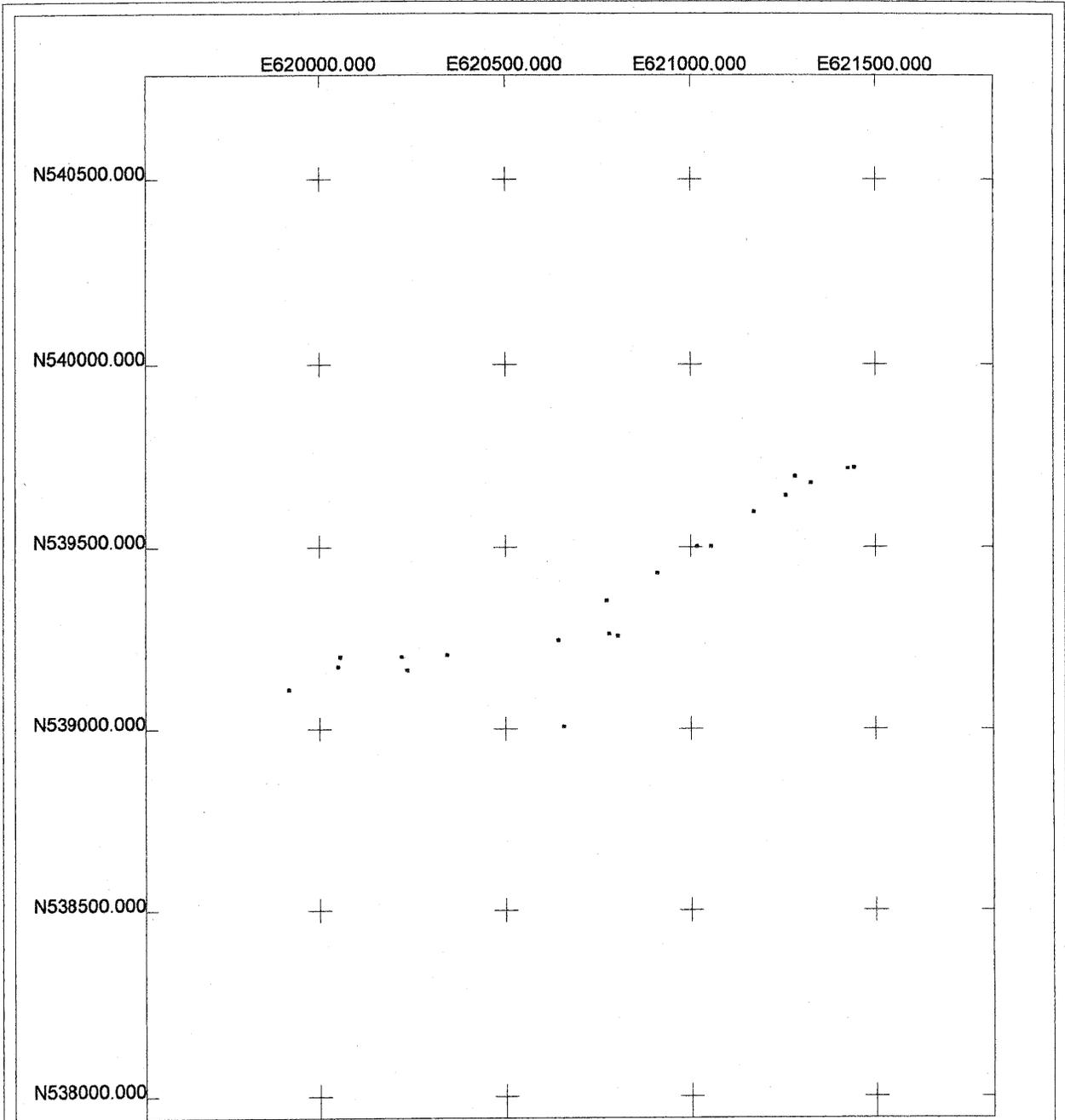
This stream has had all the lower portions of bank on both landfill sides worked on as part of the stream bank restoration project. Previously the banks were just grass covered here, exposed and eroding away into the brook. It currently is covered with large rock and rip-rap. There is little debris in the stream itself in the lower portion.

Further upstream, it is a mixed bank of tree, bramble, and smaller vegetation. There are man made materials and garbage on the banks and in the streambed here. Most materials are old poles, and rail ties. Some lighter restoration work has been done.

Flow is constant, and depth varies with tide. Even at low tide there are pools 3-4 feet deep. Most occur in the lower portion of the brook. The weather at time of sampling was cold, and sunny. There was a rain/snow event a day prior to the sampling. Tide was low.

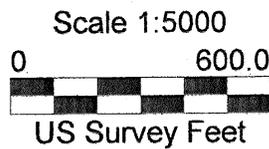
Depositional areas are scattered here as well. Sampling targeted these areas. When none were available, 1 sample per 100 feet was taken.

GPS



M12 and M14 Landfills Husky Brook Sediment PCBs Samples GPS Map

US State Plane 1983
New Jersey (NY East) 2900
NAD 1983 (Conus)



m12m14 strm pcbs r04211
04/21/2000
Pathfinder Office
 Trimble

M12 AND M14 LANDFILLS HUSKY BROOK STREAM SEDIMENT PCBS SAMPLES COORDINATES & POSITIONS

US STATE PLANE 1983 NJ (NY EAST) 2900 NAD 1983 (CONUS)

(IN US SURVEY FEET)

SAMPLE POINTS

<u>POSITION / DESC.</u>	<u>Y COORD. (NORTHING)</u>	<u>X COORD. (EASTING)</u>
1	539716.273	621424.35
2	539673.409	621326.374
3	539640.457	621257.069
4	539596.634	621170.467
5	539503.198	621015.723
6	539427.065	620908.66
7 (AT CONVERGANCE)	539261.96	620777.203
8	539243.786	620640.559
9	539204.359	620341.923
10	539198.962	620219.296
11	539170.975	620048.219

REFERENCE POINTS

<u>POSITION / DESC.</u>	<u>Y COORD. (NORTHING)</u>	<u>X COORD. (EASTING)</u>
Murphy Drive Drain to Oceanport Creek	539718.642	621441.09
M14 MW21	539691.296	621282.795
M14 MW19	539351.919	620770.075
CNTR DRAIN PIPE OUTFALL	539198.452	620053.926
Malterer Ave. OUTFALL	539108.356	619916.845
M12 WEST MW26	539162.666	620234.185
CNTR DRAIN OUTFALL	539008.516	620654.182
CNTR DRAIN OUTFALL	539256.093	620800.775
CNTR DRAIN OUTFALL	539503.749	621054.082

PCB's

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : PBLK505
Date Rec'd:
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location :
Field ID:

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	100.00	0.0022	ND	0.007	53.000	10.00
Arochlor 1221	1	100.00	0.0041	ND	NA	NA	10.00
Arochlor 1232	1	100.00	0.0028	ND	NA	NA	10.00
Arochlor 1242	1	100.00	0.0032	ND	NA	NA	10.00
Arochlor 1248	1	100.00	0.0013	ND	0.030	150.000	10.00
Arochlor 1254	1	100.00	0.0008	ND	0.060	34.000	10.00
Arochlor 1260	1	100.00	0.0007	ND	0.005	24.000	10.00
Total PCB	1	100.00	0.0152	ND	0.070	530.000	10.00

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : PBLK507
Date Rec'd:
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location :
Field ID:

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	100.00	0.0022	ND	0.007	53.000	10.00
Arochlor 1221	1	100.00	0.0041	ND	NA	NA	10.00
Arochlor 1232	1	100.00	0.0028	ND	NA	NA	10.00
Arochlor 1242	1	100.00	0.0032	ND	NA	NA	10.00
Arochlor 1248	1	100.00	0.0013	ND	0.030	150.000	10.00
Arochlor 1254	1	100.00	0.0008	ND	0.060	34.000	10.00
Arochlor 1260	1	100.00	0.0007	ND	0.005	24.000	10.00
Total PCB	1	100.00	0.0152	ND	0.070	530.000	10.00

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.01
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 1 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	63.71	0.0033	ND	0.007	53.000	10.64
Arochlor 1221	1	63.71	0.0061	ND	NA	NA	10.64
Arochlor 1232	1	63.71	0.0041	ND	NA	NA	10.64
Arochlor 1242	1	63.71	0.0047	ND	NA	NA	10.64
Arochlor 1248	1	63.71	0.0019	ND	0.030	150.000	10.64
Arochlor 1254	1	63.71	0.0012	ND	0.060	34.000	10.64
Arochlor 1260	1	63.71	0.0011	ND	0.005	24.000	10.64
Total PCB	1	63.71	0.0224	ND	0.070	530.000	10.64

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.02
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 1 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	56.76	0.0040	ND	0.007	53.000	9.97
Arochlor 1221	1	56.76	0.0073	ND	NA	NA	9.97
Arochlor 1232	1	56.76	0.0049	ND	NA	NA	9.97
Arochlor 1242	1	56.76	0.0057	ND	NA	NA	9.97
Arochlor 1248	1	56.76	0.0023	ND	0.030	150.000	9.97
Arochlor 1254	1	56.76	0.0014	ND	0.060	34.000	9.97
Arochlor 1260	1	56.76	0.0013	ND	0.005	24.000	9.97
Total PCB	1	56.76	0.0268	ND	0.070	530.000	9.97

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.03
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 1 18-24"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	76.97	0.0029	ND	0.007	53.000	10.07
Arochlor 1221	1	76.97	0.0053	ND	NA	NA	10.07
Arochlor 1232	1	76.97	0.0036	ND	NA	NA	10.07
Arochlor 1242	1	76.97	0.0041	ND	NA	NA	10.07
Arochlor 1248	1	76.97	0.0017	ND	0.030	150.000	10.07
Arochlor 1254	1	76.97	0.0010	ND	0.060	34.000	10.07
Arochlor 1260	1	76.97	0.0009	ND	0.005	24.000	10.07
Total PCB	1	76.97	0.0196	ND	0.070	530.000	10.07

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.04
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 2 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	61.96	0.0035	ND	0.007	53.000	10.35
Arochlor 1221	1	61.96	0.0064	ND	NA	NA	10.35
Arochlor 1232	1	61.96	0.0044	ND	NA	NA	10.35
Arochlor 1242	1	61.96	0.0050	ND	NA	NA	10.35
Arochlor 1248	1	61.96	0.0020	ND	0.030	150.000	10.35
Arochlor 1254	1	61.96	0.0012	ND	0.060	34.000	10.35
Arochlor 1260	1	61.96	0.0011	ND	0.005	24.000	10.35
Total PCB	1	61.96	0.0236	ND	0.070	530.000	10.35

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.05
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 2 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	72.58	0.0030	ND	0.007	53.000	10.34
Arochlor 1221	1	72.58	0.0055	ND	NA	NA	10.34
Arochlor 1232	1	72.58	0.0037	ND	NA	NA	10.34
Arochlor 1242	1	72.58	0.0043	ND	NA	NA	10.34
Arochlor 1248	1	72.58	0.0017	ND	0.030	150.000	10.34
Arochlor 1254	1	72.58	0.0011	ND	0.060	34.000	10.34
Arochlor 1260	1	72.58	0.0010	ND	0.005	24.000	10.34
Total PCB	1	72.58	0.0202	ND	0.070	530.000	10.34

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.06
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 3 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	69.98	0.0029	ND	0.007	53.000	10.89
Arochlor 1221	1	69.98	0.0054	ND	NA	NA	10.89
Arochlor 1232	1	69.98	0.0037	ND	NA	NA	10.89
Arochlor 1242	1	69.98	0.0042	ND	NA	NA	10.89
Arochlor 1248	1	69.98	0.0017	ND	0.030	150.000	10.89
Arochlor 1254	1	69.98	0.0010	ND	0.060	34.000	10.89
Arochlor 1260	1	69.98	0.0009	ND	0.005	24.000	10.89
Total PCB	1	69.98	0.0199	ND	0.070	530.000	10.89

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.07
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 3 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	70.75	0.0031	ND	0.007	53.000	10.16
Arochlor 1221	1	70.75	0.0057	ND	NA	NA	10.16
Arochlor 1232	1	70.75	0.0039	ND	NA	NA	10.16
Arochlor 1242	1	70.75	0.0045	ND	NA	NA	10.16
Arochlor 1248	1	70.75	0.0018	ND	0.030	150.000	10.16
Arochlor 1254	1	70.75	0.0011	ND	0.060	34.000	10.16
Arochlor 1260	1	70.75	0.0010	ND	0.005	24.000	10.16
Total PCB	1	70.75	0.0211	ND	0.070	530.000	10.16

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.08
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 4 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	79.65	0.0026	ND	0.007	53.000	10.99
Arochlor 1221	1	79.65	0.0047	ND	NA	NA	10.99
Arochlor 1232	1	79.65	0.0032	ND	NA	NA	10.99
Arochlor 1242	1	79.65	0.0037	ND	NA	NA	10.99
Arochlor 1248	1	79.65	0.0015	ND	0.030	150.000	10.99
Arochlor 1254	1	79.65	0.0009	ND	0.060	34.000	10.99
Arochlor 1260	1	79.65	0.0008	ND	0.005	24.000	10.99
Total PCB	1	79.65	0.0173	ND	0.070	530.000	10.99

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.09
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 4 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	80.07	0.0028	ND	0.007	53.000	10.12
Arochlor 1221	1	80.07	0.0051	ND	NA	NA	10.12
Arochlor 1232	1	80.07	0.0035	ND	NA	NA	10.12
Arochlor 1242	1	80.07	0.0039	ND	NA	NA	10.12
Arochlor 1248	1	80.07	0.0016	ND	0.030	150.000	10.12
Arochlor 1254	1	80.07	0.0010	ND	0.060	34.000	10.12
Arochlor 1260	1	80.07	0.0009	ND	0.005	24.000	10.12
Total PCB	1	80.07	0.0187	ND	0.070	530.000	10.12

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

Column-Primary:

Rtx-5 30m/.32mmID/.25um

MDL = Method Detection Limit

Column-Confirmation:

Rtx-1701 30m/.32mmID/.25um

NA = Not Applicable

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.10
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 4 18-24"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	72.72	0.0029	ND	0.007	53.000	10.63
Arochlor 1221	1	72.72	0.0053	ND	NA	NA	10.63
Arochlor 1232	1	72.72	0.0036	ND	NA	NA	10.63
Arochlor 1242	1	72.72	0.0041	ND	NA	NA	10.63
Arochlor 1248	1	72.72	0.0017	ND	0.030	150.000	10.63
Arochlor 1254	1	72.72	0.0010	ND	0.060	34.000	10.63
Arochlor 1260	1	72.72	0.0009	ND	0.005	24.000	10.63
Total PCB	1	72.72	0.0196	ND	0.070	530.000	10.63

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.11
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 5 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	75.80	0.0030	ND	0.007	53.000	10.00
Arochlor 1221	1	75.80	0.0054	ND	NA	NA	10.00
Arochlor 1232	1	75.80	0.0037	ND	NA	NA	10.00
Arochlor 1242	1	75.80	0.0042	ND	NA	NA	10.00
Arochlor 1248	1	75.80	0.0017	ND	0.030	150.000	10.00
Arochlor 1254	1	75.80	0.0011	ND	0.060	34.000	10.00
Arochlor 1260	1	75.80	0.0009	ND	0.005	24.000	10.00
Total PCB	1	75.80	0.0200	ND	0.070	530.000	10.00

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.12
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/14/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 5 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	80.33	0.0026	ND	0.007	53.000	10.69
Arochlor 1221	1	80.33	0.0048	ND	NA	NA	10.69
Arochlor 1232	1	80.33	0.0033	ND	NA	NA	10.69
Arochlor 1242	1	80.33	0.0037	ND	NA	NA	10.69
Arochlor 1248	1	80.33	0.0015	ND	0.030	150.000	10.69
Arochlor 1254	1	80.33	0.0009	ND	0.060	34.000	10.69
Arochlor 1260	1	80.33	0.0008	ND	0.005	24.000	10.69
Total PCB	1	80.33	0.0177	ND	0.070	530.000	10.69

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.13
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/15/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 6 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	79.58	0.0026	ND	0.007	53.000	10.77
Arochlor 1221	1	79.58	0.0048	ND	NA	NA	10.77
Arochlor 1232	1	79.58	0.0033	ND	NA	NA	10.77
Arochlor 1242	1	79.58	0.0037	ND	NA	NA	10.77
Arochlor 1248	1	79.58	0.0015	ND	0.030	150.000	10.77
Arochlor 1254	1	79.58	0.0009	ND	0.060	34.000	10.77
Arochlor 1260	1	79.58	0.0008	ND	0.005	24.000	10.77
Total PCB	1	79.58	0.0177	ND	0.070	530.000	10.77

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.14
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/15/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 6 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	78.17	0.0029	ND	0.007	53.000	10.00
Arochlor 1221	1	78.17	0.0053	ND	NA	NA	10.00
Arochlor 1232	1	78.17	0.0036	ND	NA	NA	10.00
Arochlor 1242	1	78.17	0.0041	ND	NA	NA	10.00
Arochlor 1248	1	78.17	0.0016	ND	0.030	150.000	10.00
Arochlor 1254	1	78.17	0.0010	ND	0.060	34.000	10.00
Arochlor 1260	1	78.17	0.0009	ND	0.005	24.000	10.00
Total PCB	1	78.17	0.0194	ND	0.070	530.000	10.00

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.15
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 6 18-24"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	80.39	0.0026	ND	0.007	53.000	10.67
Arochlor 1221	1	80.39	0.0048	ND	NA	NA	10.67
Arochlor 1232	1	80.39	0.0033	ND	NA	NA	10.67
Arochlor 1242	1	80.39	0.0037	ND	NA	NA	10.67
Arochlor 1248	1	80.39	0.0015	ND	0.030	150.000	10.67
Arochlor 1254	1	80.39	0.0009	ND	0.060	34.000	10.67
Arochlor 1260	1	80.39	0.0008	ND	0.005	24.000	10.67
Total PCB	1	80.39	0.0177	ND	0.070	530.000	10.67

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.16
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 7 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	77.96	0.0028	ND	0.007	53.000	10.37
Arochlor 1221	1	77.96	0.0051	ND	NA	NA	10.37
Arochlor 1232	1	77.96	0.0035	ND	NA	NA	10.37
Arochlor 1242	1	77.96	0.0040	ND	NA	NA	10.37
Arochlor 1248	1	77.96	0.0016	ND	0.030	150.000	10.37
Arochlor 1254	1	77.96	0.0010	ND	0.060	34.000	10.37
Arochlor 1260	1	77.96	0.0009	ND	0.005	24.000	10.37
Total PCB	1	77.96	0.0188	ND	0.070	530.000	10.37

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.17
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 7 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	55.35	0.0019	ND	0.007	53.000	10.63
Arochlor 1221	1	55.35	0.0035	ND	NA	NA	10.63
Arochlor 1232	1	55.35	0.0024	ND	NA	NA	10.63
Arochlor 1242	1	55.35	0.0027	ND	NA	NA	10.63
Arochlor 1248	1	55.35	0.0011	ND	0.030	150.000	10.63
Arochlor 1254	1	55.35	0.0007	ND	0.060	34.000	10.63
Arochlor 1260	1	55.35	0.0006	ND	0.005	24.000	10.63
Total PCB	1	55.35	0.0129	ND	0.070	530.000	10.63

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.18
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 8 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	69.72	0.0029	ND	0.007	53.000	11.22
Arochlor 1221	1	69.72	0.0053	ND	NA	NA	11.22
Arochlor 1232	1	69.72	0.0036	ND	NA	NA	11.22
Arochlor 1242	1	69.72	0.0041	ND	NA	NA	11.22
Arochlor 1248	1	69.72	0.0016	ND	0.030	150.000	11.22
Arochlor 1254	1	69.72	0.0010	ND	0.060	34.000	11.22
Arochlor 1260	1	69.72	0.0009	ND	0.005	24.000	11.22
Total PCB	1	69.72	0.0194	ND	0.070	530.000	11.22

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.19
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 8 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	72.98	0.0031	ND	0.007	53.000	9.93
Arochlor 1221	1	72.98	0.0057	ND	NA	NA	9.93
Arochlor 1232	1	72.98	0.0039	ND	NA	NA	9.93
Arochlor 1242	1	72.98	0.0044	ND	NA	NA	9.93
Arochlor 1248	1	72.98	0.0018	ND	0.030	150.000	9.93
Arochlor 1254	1	72.98	0.0011	ND	0.060	34.000	9.93
Arochlor 1260	1	72.98	0.0010	ND	0.005	24.000	9.93
Total PCB	1	72.98	0.0209	ND	0.070	530.000	9.93

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.20
Date Rec'd: 4/10/00
Extraction Date: 4/11/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 9 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	78.11	0.0027	ND	0.007	53.000	10.75
Arochlor 1221	1	78.11	0.0049	ND	NA	NA	10.75
Arochlor 1232	1	78.11	0.0033	ND	NA	NA	10.75
Arochlor 1242	1	78.11	0.0038	ND	NA	NA	10.75
Arochlor 1248	1	78.11	0.0015	ND	0.030	150.000	10.75
Arochlor 1254	1	78.11	0.0010	ND	0.060	34.000	10.75
Arochlor 1260	1	78.11	0.0009	ND	0.005	24.000	10.75
Total PCB	1	78.11	0.0181	ND	0.070	530.000	10.75

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW, SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.21
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 9 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	76.29	0.0029	ND	0.007	53.000	10.02
Arochlor 1221	1	76.29	0.0054	ND	NA	NA	10.02
Arochlor 1232	1	76.29	0.0037	ND	NA	NA	10.02
Arochlor 1242	1	76.29	0.0042	ND	NA	NA	10.02
Arochlor 1248	1	76.29	0.0017	ND	0.030	150.000	10.02
Arochlor 1254	1	76.29	0.0010	ND	0.060	34.000	10.02
Arochlor 1260	1	76.29	0.0009	ND	0.005	24.000	10.02
Total PCB	1	76.29	0.0198	ND	0.070	530.000	10.02

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA – Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.22
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 10 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	79.56	0.0028	ND	0.007	53.000	10.08
Arochlor 1221	1	79.56	0.0051	ND	NA	NA	10.08
Arochlor 1232	1	79.56	0.0035	ND	NA	NA	10.08
Arochlor 1242	1	79.56	0.0040	ND	NA	NA	10.08
Arochlor 1248	1	79.56	0.0016	ND	0.030	150.000	10.08
Arochlor 1254	1	79.56	0.0010	ND	0.060	34.000	10.08
Arochlor 1260	1	79.56	0.0009	ND	0.005	24.000	10.08
Total PCB	1	79.56	0.0189	ND	0.070	530.000	10.08

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW, SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.23
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 10 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	69.70	0.0031	ND	0.007	53.000	10.43
Arochlor 1221	1	69.70	0.0057	ND	NA	NA	10.43
Arochlor 1232	1	69.70	0.0039	ND	NA	NA	10.43
Arochlor 1242	1	69.70	0.0044	ND	NA	NA	10.43
Arochlor 1248	1	69.70	0.0018	ND	0.030	150.000	10.43
Arochlor 1254	1	69.70	0.0011	ND	0.060	34.000	10.43
Arochlor 1260	1	69.70	0.0010	ND	0.005	24.000	10.43
Total PCB	1	69.70	0.0209	ND	0.070	530.000	10.43

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.24
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 11 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	31.33	0.0018	ND	0.007	53.000	10.02
Arochlor 1221	1	31.33	0.0033	ND	NA	NA	10.02
Arochlor 1232	1	31.33	0.0022	ND	NA	NA	10.02
Arochlor 1242	1	31.33	0.0025	ND	NA	NA	10.02
Arochlor 1248	1	31.33	0.0010	ND	0.030	150.000	10.02
Arochlor 1254	1	31.33	0.0006	ND	0.060	34.000	10.02
Arochlor 1260	1	31.33	0.0006	ND	0.005	24.000	10.02
Total PCB	1	31.33	0.0121	ND	0.070	530.000	10.02

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.25
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: M12M14 11 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	21.65	0.0103	ND	0.007	53.000	10.06
Arochlor 1221	1	21.65	0.0189	ND	NA	NA	10.06
Arochlor 1232	1	21.65	0.0129	ND	NA	NA	10.06
Arochlor 1242	1	21.65	0.0147	ND	NA	NA	10.06
Arochlor 1248	1	21.65	0.0059	ND	0.030	150.000	10.06
Arochlor 1254	1	21.65	0.0037	ND	0.060	34.000	10.06
Arochlor 1260	1	21.65	0.0033	ND	0.005	24.000	10.06
Total PCB	1	21.65	0.0696	ND	0.070	530.000	10.06

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.26
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: Dupe 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	78.54	0.0028	ND	0.007	53.000	10.13
Arochlor 1221	1	78.54	0.0052	ND	NA	NA	10.13
Arochlor 1232	1	78.54	0.0035	ND	NA	NA	10.13
Arochlor 1242	1	78.54	0.0040	ND	NA	NA	10.13
Arochlor 1248	1	78.54	0.0016	ND	0.030	150.000	10.13
Arochlor 1254	1	78.54	0.0010	0.279	0.060	34.000	10.13
Arochlor 1260	1	78.54	0.0009	ND	0.005	24.000	10.13
Total PCB	1	78.54	0.0191	0.279	0.070	530.000	10.13

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Rtx-5 30m/.32mmID/.25um

Column-Confirmation:

Rtx-1701 30m/.32mmID/.25um

Report of Analysis
 U.S. Army, Fort Monmouth Environmental Laboratory
 NJDEP Certification # 13461

Client : U.S. Army
 DPW. SELFM-PW-EV
 Bldg. 173
 Ft. Monmouth, NJ 07703

Lab. ID # : 5324.27
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : M12/M14 Landfill
 Stream Sediments
Field ID: Dupe 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	78.45	0.0028	ND	0.007	53.000	10.20
Arochlor 1221	1	78.45	0.0051	ND	NA	NA	10.20
Arochlor 1232	1	78.45	0.0035	ND	NA	NA	10.20
Arochlor 1242	1	78.45	0.0040	ND	NA	NA	10.20
Arochlor 1248	1	78.45	0.0016	ND	0.030	150.000	10.20
Arochlor 1254	1	78.45	0.0010	ND	0.060	34.000	10.20
Arochlor 1260	1	78.45	0.0009	ND	0.005	24.000	10.20
Total PCB	1	78.45	0.0189	ND	0.070	530.000	10.20

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um