FIRST ENVIRONMENT

90 Riverdale Road
Riverdale, New Jersey 07457
Tel: 973.616.9700 Fax: 973.616.1930
www.firstenvironment.com

January 15, 2001

Mr. Peter Scherrer
Assistant Airport Manager
Westchester County Airport
240 Airport Road, Suite 202
White Plains, New York 10604

Re: Progress Report – Aircraft Rescue & Firefighting (ARFF) Burn Pit
NYSDEC SPILL #9911702
Westchester County Airport

In accordance with the initial AARF Work Plan dated April 3, 2000 and a revised Phase II Investigation and Proposed Workplan letter dated May 22, 2000, incorporating the comments of the New York State Department of Environmental Conservation (NYSDEC), First Environment has conducted site investigation and remediation activities at the AARF Burn Pit. This Progress Report has been prepared in order to document site investigation and remediation activities completed to date. Since existing analyte concentrations in groundwater at one location exceed regulatory guidelines additional investigation is warranted prior to requesting closure from the NYSDEC for this spill (#9911702). The proposed additional investigation is described at the end of this report.

BACKGROUND

The Westchester County Airport study area, including the subject area is located in Westchester County, New York as shown in Figure 1. Based on information provided by Airport personnel, an area near the north end of the airport, southwest of Building 10, was used for ARFF training. The ARFF training activities consisted of the repeated burning and extinguishing of aviation fuel. The training activities were initially conducted by the Air National Guard from approximately 1950 and were later conduced by Airport personnel. The training activities are reported to have been conducted in this area for the past 20 years by Airport personnel and were suspected to have potentially impacted soil and groundwater at this location. ARFF training activities at this area of the site were permanently discontinued prior to this investigation and remediation.

The soil in the area of the ARFF Burn Pit consists of approximately 12 feet of sand, gravel and silt overlying schist bedrock. The area contains up to 7 feet of fill that includes pieces of asphalt, concrete and angular gravel. Groundwater in the shallow (unconfined) aquifer is encountered at a depth of approximately three feet below ground. Groundwater flow in the shallow aquifer is towards the north as shown on Figure 2. Based on limited data from the investigation of this and other areas of the airport, groundwater flow in the bedrock aquifer is expected to be towards the south.

SITE INVESTIGATION/REMEDIATION

The investigation, and subsequent remediation conducted by First Environment was conducted in stages as further information on site conditions became evident based on analytical testing results. The stages of the investigation and remediation of the ARFF Burn Pit Area are discussed below.

Initial Sampling

The initial investigation of the ARFF Burn Pit Area was conducted on December 22, 1999, and consisted of the drilling of eight soil borings (B-1 through B-8) and installing two temporary wells (B-5W and B-7W) as shown on Figure 2, to assess the soil and groundwater conditions in the area. Based on field screening results, specifically photoionization detector (PID) readings of 17 and 225 ppm, at B-5 and B-7 respectively, soil and groundwater samples were collected from borings and temporary wells at each of the two locations. The samples were submitted to a NYS-certified laboratory for volatile organic compounds (VOCs) and semi volatile organic compounds (SVOCs) analysis by EPA methods 8260 and 8270, respectively. There were no elevated PID readings, at borings B-1, 2, 3, 4, 6 or 8, therefore no samples were collected from these locations for chemical analysis. On April 17, 2000 two soil samples (Sample-1 and Sample-2) were collected for waste classification analysis from test pits excavated at boring locations B-5 and B-7 respectively. All boring logs are presented in Appendix A.

The surface water in the area of the former ARFF burn pit was observed to have a sheen when the sediment was disturbed, therefore a soil/sediment sample was also collected and submitted to a NYS-certified laboratory for VOC and SVOC analysis by methods 8260 and 8270, respectively.

The analytical results from the samples collected identified the presence of VOCs and SVOCs in the soil and groundwater in excess of the NYSDEC Technical Administrative Guidance Memorandum (TAGM) and Technical and Operational Guidance Series (TOGS) standards respectively. The exceedances identified in the soil and groundwater samples warranted additional investigation, as discussed below. Analytical results are discussed in detail in a subsequent section.

Monitoring Wells FMW-5, FMW-6, FMW-7, FMW-8, and FMW-23

Three permanent monitoring wells were installed and developed on January 28, 2000 to assess groundwater quality in the area of ARFF Burn Pit. The locations of all monitoring wells in the area of the ARFF Burn Pit are shown on Figure 2. One monitoring well (FMW-5) was installed at the suspected source area identified at B-5 and two monitoring wells (FMW-6 and FMW-7) were installed approximately 100 feet down gradient (northwest) of the ARFF source location, consistent with the northwesterly direction of groundwater flow as had been reported in the Draft Groundwater Flow Evaluation and Sampling Plan. All three monitoring wells were installed to a total depth of 12 feet below grade and were screened across the water table. All boring logs and well construction summaries are presented in Appendix A. Groundwater samples were collected from each of the wells on February 17, 2000 and were analyzed for VOCs and SVOCs by EPA Method 8260 and 8270, respectively by the Westchester Department of Laboratories and Research, a NYS-certified laboratory. The

results of those analyses identified VOCs and SVOCs at the source area location (FMW-5), but no VOCs or SVOCs were detected in either of the two down gradient wells (FMW-6 and FMW-7).

Monitoring well FMW-8 was installed to the east of the Former ARFF Burn Pit on June 15, 2000 to a depth of 12 feet. This monitoring well was installed to provide background data upgradient of the ARFF Burn Pit area. A groundwater sample was collected from monitoring well FMW-8 on November 30, 2000 and was analyzed for VOCs and SVOCs by a NYS-certified laboratory by USEPA methods 8260 and 8270, respectively.

Previous sampling of monitoring well FMW-5 detected several VOCs in groundwater above the NYSDEC regulatory guidelines, including cis-1,2-dichloroethene, a chlorinated solvent, which is more dense than water. Compounds that are more dense than water will tend to sink in groundwater when present at high concentrations. In order to evaluate the potential for contaminants in a deeper hydrologic unit, specifically the bedrock, a bedrock monitoring well (FMW-23) was completed on November 16, 2000. A groundwater sample was collected from monitoring well FMW-23 on November 30, 2000 and analyzed for VOCs and SVOCs by a NYS-certified laboratory by USEPA methods 8260 and 8270, respectively.

The results of the groundwater sample analysis are discussed in detail in a subsequent section.

Soil Excavation And Post-Excavation Soil Sampling

Soil in the area of the Former Burn Pit was excavated in several stages. Initially, an area approximately 60 by 90 by 6 feet deep was excavated between May 16 and 19, 2000. Post-excavation bottom and sidewall samples were collected at a frequency of approximately one per 35 linear feet of excavation sidewall (S1 through S-13). The extent of excavation and locations of post-excavation samples are presented on Figure 3. Soil samples were analyzed for VOCs and SVOCs by USEPA methods 8260 and 8270, respectively. Based on the initial round of post excavation soil sampling results, four locations were identified as having concentrations above the TAGM recommended soil cleanup criteria for SVOCs, therefore additional excavation and sampling was warranted.

The second round of soil excavation addressed the soil with SVOC concentrations above the TAGM criteria identified at S-4, S-6, S-9, and S-11. The second round of excavation was conducted on July 3, 2000 at the eastern and western edges of the excavation, where additional post excavation soil samples S-14 through S-20 were collected.

The final rounds of excavation addressed soil with SVOC concentrations above the TAGM criteria identified at sample locations S-14 through S-17. Additional post excavation soil samples S-21 through S-24 were collected from geoprobe borings on August 25, 2000, and post excavation samples S-25 through S-28 were collected from geoprobe borings on September 15, 2000. Post excavation samples S-29 and S-30 were collected on October 20, 2000.

A total of 2,803 tons of soil was excavated and transported off-site to Soil Safe, Inc of Salem, New Jersey for disposal. Copies of the non-hazardous material manifests for the soil removed from the ARFF Burn Pit Area are included in Appendix B.

Soil Re-Use Sampling

In order to restore the area of the excavation to original grade, soil previously stockpiled on site was evaluated to determine if it was suitable for reuse to backfill the ARFF Burn Pit area excavation. The proposed backfill soil consisted of a stockpile of soil located west of Hanger B. The stockpile was generated from the construction of a taxiway as part of the Phase III Construction at the Airport.

Although not a regulatory requirement, the soil pile was sampled to confirm its suitability for use as backfill material. The stockpile was sampled on October 30, 2000 (GB-49 through 59) for VOCs and SVOCs. Each sample consisted of a composite sample collected from a depth ranging from 0 to 7 to 0 to 12 feet from the top of the soil pile, to be representative of the entire soil pile thickness. The soil consisted of reddish-brown sand, gravel and silt, free of deleterious material, with no elevated PID readings observed. Boring logs for the geoprobe borings are included in Appendix A.

ANALYTICAL RESULTS

Initial Sampling

The results of the initial soil sampling in the ARFF Burn Pit Area identified trace concentrations of VOCs, including toluene, ethylbenzene and xylenes below recommended soil cleanup objectives, and total tentatively identified compounds (TICs) at B-5 of 14.18 ppm, above the recommended soil cleanup criteria of 10 ppm for total VOCs. The total TICs at B-7 and the sediment sample were below the soil cleanup criteria of 10 ppm with concentrations of 3.977 and 3.214 ppm, respectively. The concentration of the SVOC benzo(a)pyrene in all three soil samples exceeded the recommended soil cleanup criteria for benzo(a)pyrene of 61 ppb, with concentrations ranging from 144 to 2,580 ppb. The SVOCs benzo(a)anthracene, chrysene, and dibenz(a,h)anthracene were detected in soil sample B-5 and the sediment sample in excess of the recommended soil cleanup levels. The results of the initial soil sampling at B-5 and B-7 as well as the waste classification sampling Sample 1 and Sample 2 are presented in Table 1. The laboratory report for the soil and groundwater samples collected at B-5 and B-7, including Samples 1 and 2 were previously submitted in the Phase II Investigations and Proposed Workplan dated May 22, 2000.

The concentrations of the following VOCs were above the guidance values in one or both of the initial groundwater samples; vinyl chloride, benzene, toluene, ethylbenzene, and total xylenes. The VOC trichloroethene was detected in groundwater at B-5, but at a concentration below the regulatory guidance value. The SVOCs naphthalene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene were detected in groundwater at B-5 above the regulatory guidance value. Other SVOCs, including phenanthrene, anthracene, and pyrene were detected in groundwater at both B-5 and B-7, but at concentrations below regulatory guidelines. The results of the groundwater sampling at B-5 and B-7 are presented on Table 2.

The analysis of Sample 1 and Sample 2 identified total xylenes at 1,910 ppb above the TAGM recommended soil cleanup criteria of 1,200 ppb. The analysis of Sample 2 identified toluene at 44,300 ppb above the recommended cleanup criteria of 1,500 ppb. Based on the results of the soil sampling, the soil was characterized as non-hazardous.

Monitoring Wells FMW-5 through FMW-8 and FMW-23

The groundwater sample from FMW-5 had detections for the VOCs cis-1, 2 dichloroethene (62 ppb) and total xylenes (29.91 ppb) above the regulatory guideline of 5 ppb, and the VOCs vinyl chloride (40 ppb) and benzene (1.2 ppb), above the regulatory guidelines of 2 and 1, respectively. The VOCs ethylbenzene and trichloroethene were also detected at FMW-5, but below the regulatory guideline of 5 ppb. The SVOCs naphthalene, phenanthrene, 2-methylnaphthalene, carbozole, and fluorene were detected at FMW-5, but at concentrations below the regulatory guideline of 5 ppb. The groundwater sample analytical results for the former ARFF Burn Pit area monitoring wells are presented in Table 3. The laboratory reports for the groundwater samples collected from monitoring wells in the former ARFF Burn Pit area are presented in Appendix C.

During excavation activities, FMW-5 was destroyed. Since all contaminated soil in the area of FMW-5 was removed to a depth of six feet, no further monitoring of shallow groundwater at this location was warranted therefore FMW-5 was not replaced.

No VOCs or SVOCs were detected at either FMW-6 or FMW-7. The groundwater sample from monitoring well FMW-8 detected the VOC trichloroethene at 0.606 ppb, and the SVOC bis-(2-ethylhexyl)phthalate at 1.77 ppb, both below their regulatory guidelines of 5 ppb.

The groundwater sample from the bedrock monitoring well FMW-23 identified the VOC vinyl chloride at 15.2 ppb, above the regulatory guideline of 2 ppb. The VOCs trichloroethene (4.66 ppb) and chloroform (0.986) were detected at FMW-23 at concentrations below their regulatory guidelines of 5 and 7 ppb, respectively. The SVOCs di-n-butylphthalate (1.8 ppb) and bis(2-ethylhexyl)phthalate (0.881) were detected at concentrations below their regulatory guidelines of 50 and 5 ppb, respectively.

Soil Excavation and Post-Excavation Soil Sampling

The results of the post-excavation soil sampling are presented in Table 4. The laboratory reports for post excavation sample analysis are presented in Appendix C. No exceedances of the recommended soil cleanup objectives for VOCs were identified in any of the soil samples. Post-excavation soil sampling after the first round of soil excavation identified concentrations above the recommended soil cleanup objectives for one or more of the following SVOCs: benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and/or dibenz(a,h)anthracene at the following locations:S-4, S-6, S-9, S-10 and S-11. The slight exceedances at S-10 are believed to be attributable to asphalt in the fill therefore additional excavation at this area was not warranted.

The results of the second round of post-excavation soil sampling identified soil concentrations above the recommended soil cleanup objectives for one or more of the following SVOCs: benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and/or dibenz(a,h)anthracene, at one or more of the following locations: S-14, S-15, S-16 and S-17. Based on the concentrations identified, additional soil sampling was conducted.

The third round of soil sampling at the former burn pit identified exceedances for SVOCs at S-23 (benzo(a)anthracene, chrysene, and benzo(a)pyrene) and S-24 (chrysene). The soil encountered at S-23 was excavated, however the SVOC concentrations identified at S-24

were attributed to asphalt in the fill, therefore no additional excavation was warranted at this location.

The final round of post-excavation soil sampling (S-29 and S-30) identified soil concentrations above the recommended soil cleanup objectives for the SVOCs benzo(a)anthracene, chrysene, benzo(b)fluoranthene, and benzo(a)pyrene, however these exceedances are believed to be attributable to asphalt in the fill therefore no additional excavation was warranted at this location.

Soil Re-Use Sampling

Soil samples collected from the soil pile did not identify any VOCs or SVOCs above the recommended soil cleanup criteria. Based on the results of the soil re-use sampling, presented on Table 5, the soil pile was determined to be suitable for backfilling the excavation at the former ARFF Burn Pit. The excavation at the former ARFF Burn Pit area was backfilled to match the elevation of the surrounding area of the site. The results of the soil reuse sampling are summarized on Table 5. The laboratory report for the soil reuse sampling analysis is presented in Appendix C.

CONCLUSIONS/RECOMMENDATIONS

The results of the post excavation soil sampling verify that all soil with VOC and SVOC concentrations above the recommended soil cleanup objectives related to the operations at the Former ARFF Burn Pit has been removed. The remaining locations where SVOC concentrations were identified in soil above the recommended soil cleanup objectives are believed to be attributable to asphalt in the fill. The soil used to backfill the excavation was suitable for reuse, and the excavation has been backfilled to grade. No further remediation of the soil contamination previously identified is warranted.

The results of the groundwater sampling from the remaining monitoring wells in the overburden aquifer (FMW- 6 through FMW-8) identify no exceedances of the regulatory guidelines for either VOCs or SVOCs.

The analytical results of the groundwater sampling of the bedrock monitoring well (FMW-23) identified the VOC vinyl chloride at a concentration in excess of the regulatory guideline and the VOCs tetrachloroethene and trichloroethene at concentrations below regulatory guidelines. The installation of two additional bedrock monitoring wells is warranted in the area of FMW-23 in order to determine the extent of VOCs in the bedrock aquifer above the regulatory guidelines.

The additional bedrock monitoring wells are proposed adjacent to FMW-8 to the east of the former ARFF Burn Pit and a second well approximately 100 feet south (hydraulically downgradient) of the former ARFF Burn Pit. The proposed locations of the additional bedrock monitoring wells are presented on Figure 2. The two proposed bedrock monitoring wells as well as the four existing monitoring wells are proposed to be sampled regularly for VOCs and SVOCs. The installation and monitoring of the additional bedrock monitoring wells, combined with the existing bedrock monitoring well FMW-23, will be used to evaluate both the extent of VOCs as well as groundwater flow direction in the shallow and bedrock aquifers.

If you have any questions or require additional information, please do not hesitate to contact me.

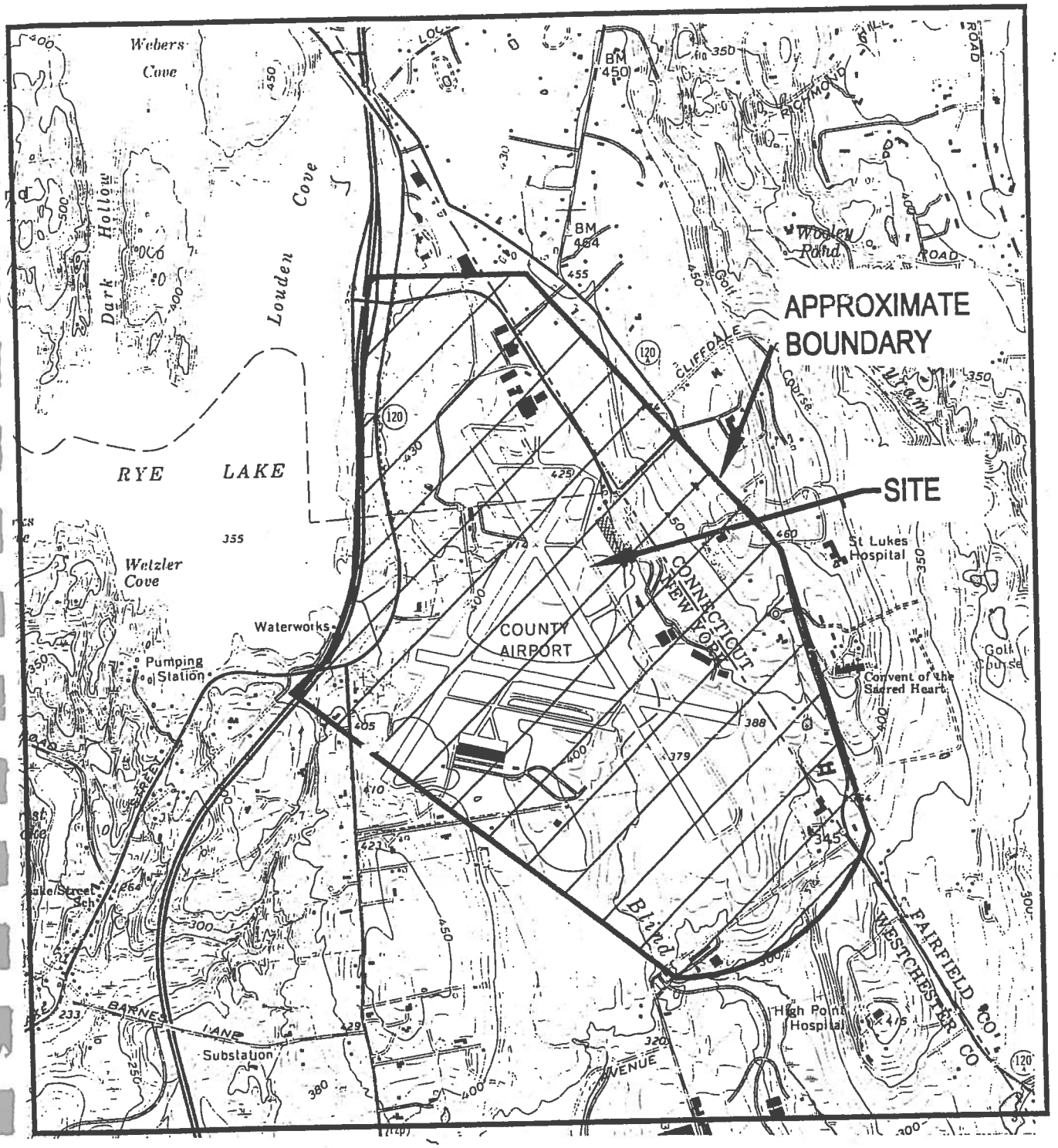
Very truly yours,

FIRST ENVIRONMENT, INC.

Timothy B. Egan
Project Hydrogeologist

cc: Robert Funicello
Henry Stanton
Todd Delaney Ph.D., P.E., DEE
Reeva Schiffman, Esq.
Scott Green, P.G.

FIGURES



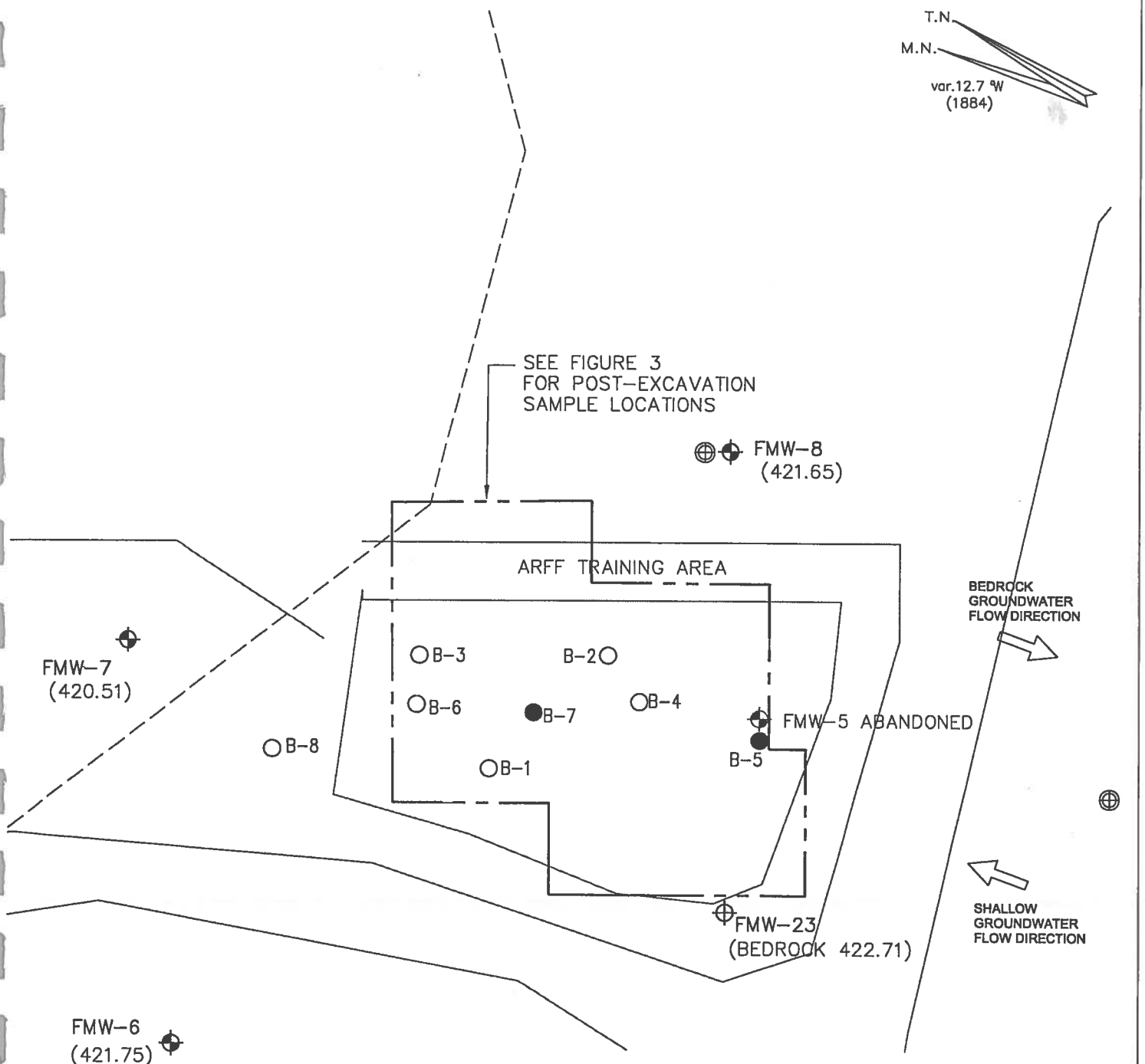
REFERENCE: GLENVILLE, CONN. - N.Y.
QUADRANGLES 7.5 MIN SERIES
1960 PHOTOREVISED 1971

N

SCALE: 1" = 2000'

FIGURE 1
SITE LOCATION MAP
WESTCHESTER COUNTY
AIRPORT
HARRISON, N.Y.

WES001



LEGEND

- MONITORING WELL – SHALLOW
- MONITORING WELL – BEDROCK
- PROPOSED MONITORING WELL – BEDROCK
- GEOPROBE – (SOIL FIELD SCREENING SAMPLE)
- GEOPROBE – (SOIL & GROUNDWATER SAMPLE)
- WELL – ABANDONED
- 20.51) GROUNDWATER ELEVATION (MEASURED 12/5/00)

WESTCHESTER COUNTY AIRPORT

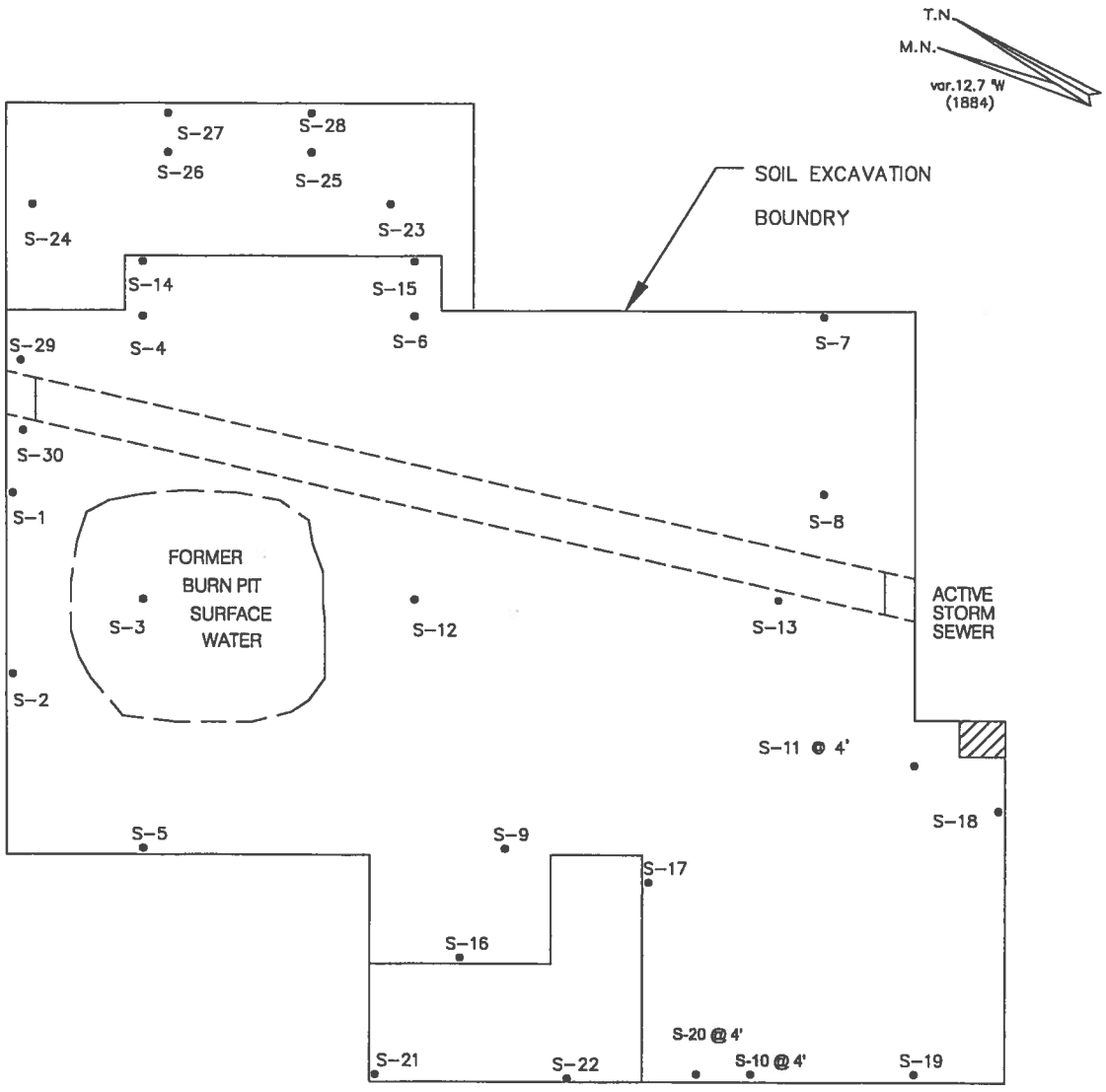
WESTCHESTER NEW YORK

SOIL BORING AND
MONITORING WELL LOCATIONS

FIGURE	DRAWN STR	CHKD TE
2	SCALE 1"=50'	
	DATE 1/8/01	DATE

FIRST ENVIRONMENT

RIVERDALE NEW JERSEY



LEGEND:

- • POST EXCAVATION SAMPLE LOCATION
- ▨ 4' DEEP EXCAVATION
- ▭ 6' DEEP EXCAVATION

NOTE: ALL SAMPLES TAKEN FROM BOTTOM OF EXCAVATION UNLESS OTHERWISE NOTED.

WESTCHESTER COUNTY AIRPORT	
WESTCHESTER	NEW YORK
POST EXCAVATION SAMPLE LOCATIONS	
FIGURE 3	DRAWN STR / CHKD. TE / SCALE 1"=20' / DATE 1/8/01 / DATE
FIRST ENVIRONMENT	
RIVERDALE	NEW JERSEY

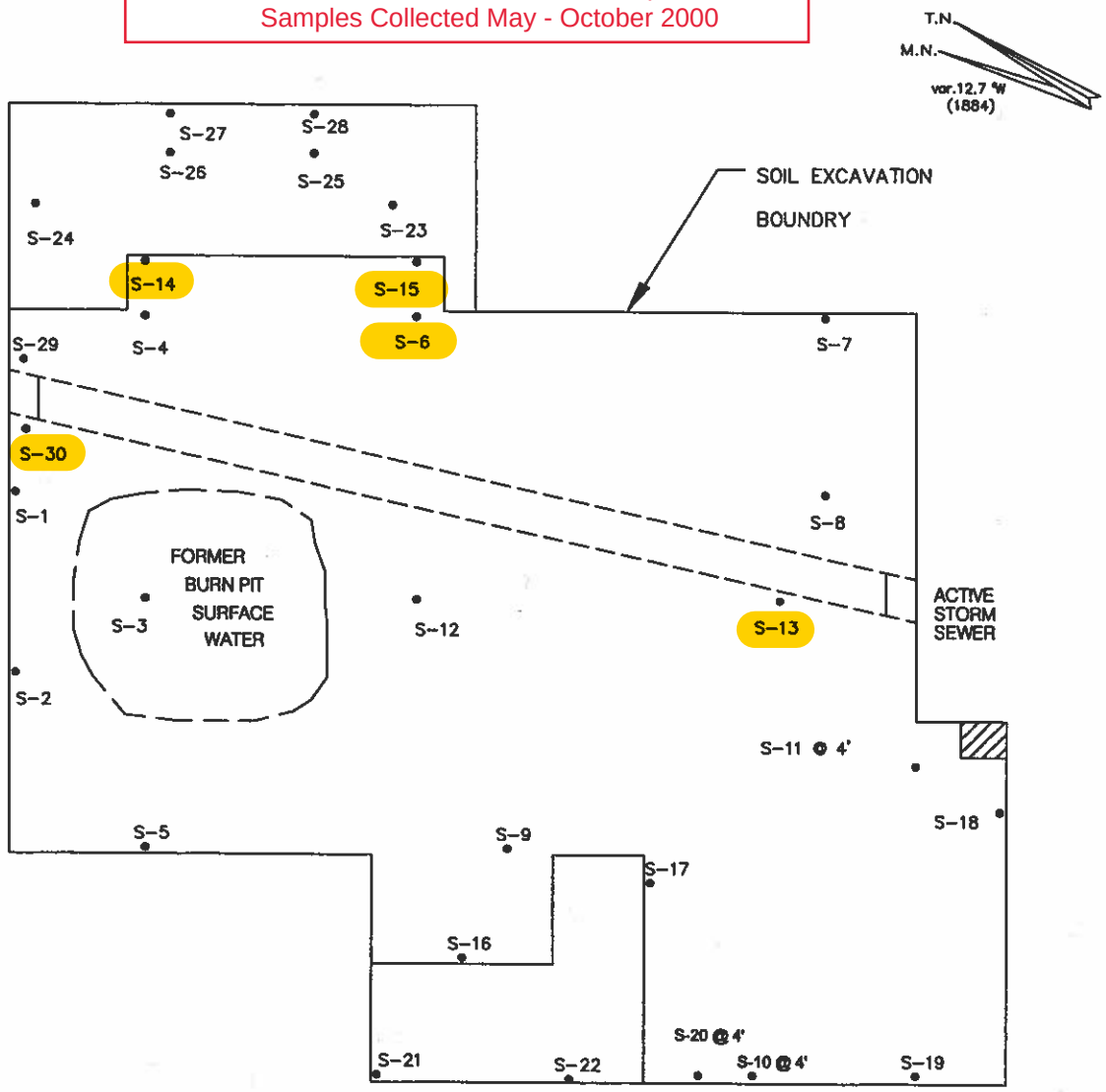
BROWNFIELD CLEANUP APPLICATION # C360174
WESTCHESTER COUNTY AIRPORT
APPLICATION SECTION IV. #6

Former ARFF Burn Pit Post Excavation Sample Results - Comparison to Current Standards
Samples Collected May - October 2000
(see following page for sample locations)

Client ID: **Sample Depth (ft):** **Lab ID:** **Date Sampled:** **Matrix:**	**S-6** **5** **2983-010** **5/19/2000** **Soil**	**S-13** **6** **2983-006** **5/19/2000** **Soil**	**S-14** **4** **4012-001** **7/3/2000** **Soil**	**S-15** **4** **4012-002** **7/3/2000** **Soil**	**S-30** **5** **6614-015** **10/20/2000** **Soil**	**NYSDEC Part 375 Soil Cleanup Objectives Commercial**	**NYSDEC Part 375 Soil Cleanup Objectives Protection of GW**
Semi-Volatiles	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Phenanthrene	867	4420	402	1100	626	500,000	1,000,000
Anthracene	158	481	149	127	209	500,000	1,000,000
Carbazole	122	ND	ND	171	ND	NS	NS
Di-n-butylphthalate	222	385	ND	ND	ND	NS	8,100
Fluoranthene	1580	3120	1440	2370	1340	500,000	1,000,000
Pyrene	1280	2440	1710	2010	1470	500,000	1,000,000
Benzo[a]anthracene	835	**1350**	983	942	779	5,600	1,000
Chrysene	**1080**	**1220**	916	**1070**	920	56,000	1,000
bis(2-Ethylhexyl)phthalate	443	709	ND	ND	ND	NS	435,000
Benzo[b]fluoranthene	**2070**	**2130**	**2470**	**2070**	1460	5,600	1,700
Benzo[k]fluoranthene	632	933	777	670	428	5,600	1,700
Benzo[a]pyrene	**1490**	**1620**	**1730**	**1320**	**1040**	1,000	22,000
Indeno[1,2,3-cd]pyrene	559	521	482	450	446	5,600	8,200
Dibenz[a,h]anthracene	160	ND	137	122	ND	560	1,000,000
Benzo[g,h,i]perylene	567	508	490	476	531	500,000	1,000,000

ug/kg - micrograms per kilogram
ND = Not Detected
NS = No Standard

Former ARFF Burn Pit Post Excavation Sample Locations
Samples Collected May - October 2000



Note: highlighted locations exceed current commercial or protection of groundwater Soil Cleanup Objectives for SVOC's per 6 NYCRR Part 375-6.8(b).

LEGEND:

- • POST EXCAVATION SAMPLE LOCATION
- ▨ 4' DEEP EXCAVATION
- ▭ 6' DEEP EXCAVATION

NOTE: ALL SAMPLES TAKEN FROM BOTTOM OF EXCAVATION UNLESS OTHERWISE NOTED.

WESTCHESTER COUNTY AIRPORT
WESTCHESTER NEW YORK
POST EXCAVATION SAMPLE LOCATIONS
FIGURE 3
DRAWN STR CHKD. TE
SCALE 1"=20'
DATE 1/8/01 DATE
FIRST ENVIRONMENT
RIVERDALE NEW JERSEY