FINAL FEASIBILITY STUDY

SOUTH HILL DUMP
CORTLANDVILLE, NEW YORK
SITE NO. 7-12-009

WORK ASSIGNMENT NO. D003826-17

Prepared For:

New York State Department of Environmental Conservation
Albany, New York

Prepared By:

MACTEC Engineering and Consulting, P.C.
Portland, Maine

Project Number: 3612052032

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STATE OF NEW YORK
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ACRONYMS AND ABBREVIATIONS

CCHD	Cortland County Health Department
CCPD	Cortland County Planning Department
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm/sec	centimeters per second
COCs	contaminants of concern
CRDL	contract required detection limit
CRQL	contract required quantitation limit
DFW	Department of Fish and Wildlife
1,2-DCE	1,2-dichloroethene
°F	degrees Fahrenheit
FS	Feasibility Study
FWIA	Fish and Wildlife Impact Analysis
HASP	Health and Safety Plan
IRM	interim removal measure
Kd_s	soil adsorption partition coefficients
MACTEC	MACTEC Engineering and Consulting, P.C.
µg/gOC	microgram of contaminant per gram organic content
µg/L	micrograms per liter
NAPL	non-aqueous phase liquid
NPW	net present worth
NYSDEC	New York State Department of Environmental Conservation
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
PAHs	polyaromatic hydrocarbons
Parsons	Parsons Engineering Science, Inc.
PCBs	polychlorinated biphenyls
PID	photoionization detector
POTW	publicly owned treatment works
PRPs	potentially responsible parties
RAOs	Remedial action objectives
RCRA	Resource Conservative and Recovery Act
RGs	remediation goals
RI	Remedial Investigation

SCGs	Standards, Criteria, and Guidance
Site	South Hill Dump site
STARS	Spill Technology and Remediation Series
SUNY	State University of New York
SVOCs	semi-volatile organic compounds
TAGM	Technical and Administrative Guidance Memorandum
TCE	trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Series
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOCs	volatile organic compounds
WA	Work Assignment
WRS	Wetland Restoration Specification

1.0 INTRODUCTION

1.1 SCOPE AND PURPOSE

MACTEC Engineering and Consulting, P.C. (MACTEC), under contract to the New York State Department of Environmental Conservation (NYSDEC), is submitting this Feasibility Study (FS) Report (Report) for the South Hill Dump site (Site) in Cortlandville, Cortland County, New York. The Site (Site No. 7-12-009) is listed as a Class 2 hazardous waste site in the Registry of Hazardous Waste Sites in New York State. This FS Report has been prepared in accordance with the NYSDEC requirements in Work Assignment (WA) No. D003826-17 (NYSDEC, 2005), and with the July 1997 Superfund Standby Contract between MACTEC (formerly Harding Lawson Associates) and the NYSDEC.

The FS was conducted in accordance with the WA, as well as with applicable portions of the following documents:

- United States Environmental Protection Agency (USEPA) Remedial Investigation (RI)/FS guidance (USEPA, 1988);
- USEPA guidance for conducting RI/FS for Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Municipal Landfill Sites (USEPA, 1991);
- NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4025 entitled "Guidelines for Remedial Investigations/Feasibility Studies" (NYSDEC, 1989);
- TAGM #4030 entitled "Selection of Remedial Actions at Inactive Hazardous Waste Sites" (NYSDEC, 1990); and
- NYSDEC Draft DER-10 "Technical Guidance for Site Investigation and Remediation" (NYSDEC, 2002).

An RI has been completed for the Site. The approach to the FS involves integration of conclusions from the RI report (NYSDEC, 2003) with screening and evaluation of proposed remedial alternatives from engineering, environmental, public health, and economic perspectives. A recommended alternative will be identified based upon a comparative analysis of remedial alternatives (see Subsection 7.0), and presented in a separate document.

This FS Report is organized into seven sections.

- Section 1.0 – Introduction
- Section 2.0 – Site Characterization
- Section 3.0 – Development of Remedial Response Objectives and Target Clean-Up Values
- Section 4.0 – Identification and Screening of Technologies
- Section 5.0 – Development and Screening of Alternatives
- Section 6.0 – Detailed Analysis of Alternatives
- Section 7.0 – Comparative Analysis of Alternatives

1.2 SITE DESCRIPTION AND HISTORY

The Site is located in the Town of Cortlandville, Cortland County; two miles south of the Village of McGraw, on the south side of South Hill Road (see Figure 1.1). The area surrounding the Site includes wooded areas, orchards, and active and former farm fields (Parsons, 1998). A mix of forested areas and apple orchards are located east of the Site. The topography in this area slopes to the east, toward an unnamed stream located approximately 1/4 mile east of the Site. Most of the area southeast, south, and southwest of the Site contains second and third generation forest. Steep slopes are located adjacent to the unnamed stream in this area.

The Hoxie Gorge Field Station, a 169-acre parcel owned and used by the State University of New York (SUNY) in Cortland for biological field studies, is located approximately 1 mile southeast of the Site. Approximately 1,000 students per year are involved in academic field study there (SUNY Cortland, 2005). The Hoxie Gorge property also includes the McDermott Nature Trail, a portion of which runs along the Hoxie Gorge Creek.

Two residential parcels are located along the southern side of South Hill Road, less than ¼ mile southwest of the Site (Parsons, 1998). The area west and north of the Site consists primarily of active farm land. A former apple orchard is located farther west. A mix of meadow, farm land, apple orchards, and forest area are located northeast of the Site. The Tioughnioga River is located southwest of the Site within 2 miles. The unnamed stream located south and east of the Site discharges to the Tioughnioga River via Hoxie Gorge Creek.

Situated on a moderately to steeply sloping hillside, the parcel containing the landfill generally consists of three tiers and occupies approximately 6 acres. Steep, unstable embankments exist at each tier, with a variety of solid wastes protruding from the slopes.

The Site was operated as a municipal disposal facility by the Town of Cortlandville from the early 1960s until 1972, although it is reported that local residents used the site for trash disposal as early as 1949. During its years of operation, wastes were received from the Village of McGraw and the Towns of Cortlandville and Solon, as well as local industry. Access to the Site was reportedly unrestricted. It has also been reported that waste was often permitted to burn during landfill operation, and that at one time a waste oil pit may have existed. Operations are reported to have involved pushing waste over the working face of the landfill with some spreading and compaction. Cover material was reportedly spread one or more times per week. Presently, waste is protruding from the surface of the landfill across much of the site, and includes road construction debris, brush, stumps, tires, white metal, automobile parts, and miscellaneous industrial waste materials. Numerous decomposed drums are present across many areas of the landfill.

Landfill operations disturbed approximately one-third of the Site property. Vegetation in the landfill area is sparse; most of the area is covered with only grasses. The remaining vegetative cover consists of small areas of shrubs, saplings, and trees along the perimeter of the landfill. Aerial photographs indicate similar conditions were present since at least 1960. Trees and shrubs cover roughly 50% of the Site property, mainly the western, southern, and northeastern portions.

Aquatic features at the Site are limited to small areas of standing water which appear to be seasonal (Parsons, 1998). Upgradient surface water runoff is collected in open drainage ditches adjacent to South Hill Road. A portion of this flow is diverted through a culvert into a drainage swale located within the northeastern portion of the Site. Surface runoff overflows this swale area and flows across the southern portions of the Site during rainfall events, collecting in a ditch located adjacent to the eastern property line of the Site and discharging to the unnamed stream located approximately 1,000 feet south of the Site. Similarly, surface runoff from other parts of the Site flow towards the unnamed stream, either directly, or via the drainage ditch along the eastern boundary.

The only identified aquatic vegetation at the Site is common cattail, in the drainage swale located within the northeastern portion. Most of the southern third of the Site is forested, predominantly with white ash, as well as with oaks, maples, and beech. The understory consists of mainly saplings of these species, with some buckthorn, honeysuckle, staghorn sumac, sensitive fern and Christmas fern (Parsons, 1998).

The cool, humid, continental climate common to most of New York State prevails in the Site vicinity (USDA, 1961). Winters are long and cold; summers are warm with occasional periods of high temperature. The average winter, spring, summer, and fall temperatures are 24.2 degrees Fahrenheit (°F), 43.4 °F, 66.4°F, and 48.6°F, respectively. The average growing season in Cortland County is approximately 142 days. Average annual precipitation is approximately 40 inches. The average winter, spring, summer, and fall precipitation is 7.76 inches, 9.63 inches, 12.38 inches, and 10.03 inches, respectively. Average snowfall is 50 inches, but frequent thaws tend to keep accumulation low.

1.3 PREVIOUS INVESTIGATIONS

This Subsection presents the various environmental investigations conducted at the Site, prior to the 1997 RI.

1.3.1 1990 Site Inspection

In 1990, the NYSDEC conducted a site inspection and collected soil and leachate samples. Analysis revealed the presence of solvents and pesticides. Based on these data, the observed condition of the landfill (leachate seeps, numerous drum carcasses, etc.) and reported disposal history, the Site was proposed for listing on the New York State Registry in February 1991 and assigned a Class 2 designation. Class 2 sites are defined as those which pose a significant threat to the public health or environment. In response to site findings, the NYSDEC planned an interim removal measure (IRM) drum removal program. The purpose of the program was to characterize contents of the drums observed to contain suspect materials, and properly dispose of the drums. In March 1991 five drums of hazardous waste were removed from the site. Analysis revealed that the drums contained trichloroethene (TCE). The waste was disposed at Frontier Chemical in Niagara Falls, New York.

1.3.2 Preliminary Environmental Sampling

In 1991 and 1992, the Cortland County Planning Department (CCPD) collected several surface water samples at the Site. The samples were collected from the intermittent stream at the toe of the landfill. Analytical data revealed elevated concentrations of the solvents TCE and 1,2-dichloroethene (1,2-DCE). In the 1991 sampling event, a concentration of 200 micrograms per liter (µg/L) of each of these compounds was detected (NYSDEC, 2003).

In 1994, the NYSDEC collected two surface water samples, three sediment samples and three soil samples from the site. Analytical results revealed the presence of TCE and 1,2-DCE in two surface water samples at concentrations slightly above the NYSDEC Guidance Values. The samples were collected in immediate proximity to the CCPD sample locations. One sediment sample contained a relatively low concentration (9 µg/L) of TCE. Polychlorinated biphenyls (PCBs) (at 79 µg/L) were detected in one sediment sample. Sediment sample results revealed slightly elevated concentrations of several metals including copper, mercury, nickel, and zinc. Analysis of the soil samples revealed relatively low concentrations of TCE, PCBs, cadmium, copper, and polyaromatic hydrocarbons (PAHs).

Based upon the findings of the sampling programs, further investigation was deemed appropriate. The consistent presence of TCE in separate sampling events, coupled with the presence of low levels of other contaminants including PCBs, suggested the presence of a contaminant source(s) within the landfill. Potential sources included visible and buried drums, and the reported former waste oil pit. Prior to conducting the RI, the NYSDEC conducted a search for potentially responsible parties (PRPs) to fund the investigation. It was determined that the Town of Cortlandville operated the landfill on an informal basis, keeping no records as to who used the Site or what was disposed. Even when commercial entities used the site, no contracts were required and records were not maintained. A historical search was further complicated by the fact that the Town Supervisor and Highway Superintendent primarily responsible for operating the site are deceased.

Rosen Brothers, a nearby junkyard that is the subject of a federal CERLCA action and is on the State Registry, is believed to have disposed waste at the Site. Rosen Brothers has filed for Chapter 7 bankruptcy. Two other PRPs, Smith Corona and Overhead Door, were served with information requests; both of their responses indicated a lack of records due to the lapse of time. Because the Town of Cortlandville was believed to have limited financial resources, the NYSDEC opted to conduct an RI/FS using funds from the 1986 Environmental Quality Bond Act. PRPs may be pursued in the future, if information connecting them to the site is discovered. RI field activities were subsequently planned.

1.4 REMEDIAL INVESTIGATION

A work plan was developed in 1996 and fieldwork was initiated in January of 1997 and completed later the same year. The RI field work was conducted by Parsons Engineering Science, Inc., of Liverpool, New York, under contract to the NYSDEC. The RI Report was completed by the NYSDEC (NYSDEC, 2003).

The RI included the following activities:

- A records search to identify the site history, past operations and probable contaminants of concern. The records search involved a review and compilation of available State, County and Town records pertaining to the site.
- Development of a site base map illustrating site topographic contours, roadways, property boundaries, and environmental sample locations.
- A test pit investigation to visually delineate the extent of subsurface contamination and characterize the shallow overburden geology.
- Collection and analysis of subsurface soil samples during the test pit investigation to identify the nature of the contamination present.
- Collection and analysis of sediment and surface water samples from visible seeps and from the intermittent stream located at the toe of the landfill.
- Installation of monitoring wells in overburden and bedrock to characterize site geology and hydrogeology.
- Collection and analysis of subsurface soil samples during the installation of monitoring wells.
- Collection and analysis of groundwater samples to identify any site impacts to groundwater.
- A Fish and Wildlife Impact Analysis (FWIA) to identify existing or potential impacts to fish and wildlife.
- Review of Applicable Standards, Criteria, and Guidance (SCGs) and comparison to on-site contaminant levels to assess the threat, if any, posed at the site.

1.4.1 Records Search

A background search, consisting of a review and compilation of existing NYSDEC site records, Cortland County Health Department (CCHD) records, Cortlandville Township records, historical aerial photographs, and pertinent hydrogeological and soil survey reports, was conducted. The background search confirmed many of the earlier reports pertaining to site operations. Records of note include the following:

- A 1969 hand-sketched drawing of the site which illustrates the various tiers of the landfill. The drawing shows an area on the middle tier labeled "burning area for demolition material, brush and small limbs". The lower portion of the site is labeled "heavy metal area cars, appliances, etc.".
- A 1969 New York State Department of Health inspection report discussing industrial waste burning and the resulting "heavy black smoke".
- Correspondence from 1970 between the NYSDEC and the CCHD, discussing a complaint received by the NYSDEC pertaining to chemical disposal at the site and potential impact on the drainage basin.
- Correspondence which indicated that on at least one occasion, April 1972, the Town was advised by the State Environmental Quality Office that the landfill was being operated in violation of Part 19 of the State Sanitary Code. Ongoing burning, extensive quantities of leachate, and unsatisfactory daily cover were among the reasons for the citation, and
- CCHD files/records of a 1989 discussion with a nearby resident who indicated familiarity with the site and past knowledge of an on-site lagoon, possibly used for deposition of oil.

Aerial photos from 1960, 1967, 1971, 1973 and 1994 were also reviewed. The 1960 photo shows relatively little disturbance of the property, with dumping apparent in the vicinity of South Hill Road only. The 1967 photo reveals the active use of three distinct tiers and a well-defined access road which progresses from the upper tier, through the middle tier to the lower tier. The upper tier appears to be the most actively used of the three tiers. The 1971 photo reveals greater disturbance of the property and the presence of a structure in the vicinity of the landfill entranceway. It has been reported that a structure existed at this location which functioned as a gatehouse/equipment storage facility. The 1973 photo shows a clear system of roadways accessing the various tiers and a pattern of site disturbance consistent with that in the 1971 photo. The 1994 photo shows the site generally in its present condition. The background search was conducted to help define the nature of the wastes disposed at the landfill and locate, to the extent possible, existing or potential contaminant source areas. As file information did not provide definitive information regarding potential source areas (e.g., the waste oil lagoon), rather than target specific areas for investigation, the field program was planned to provide a comprehensive examination of site conditions.

1.4.2 Test Pit Investigation

50 test pits were excavated to examine the subsurface soils and characterize the waste at locations across the site. The locations were selected to provide a comprehensive assessment of subsurface conditions. The test pit program began on February 26, 1997 and was completed on March 19, 1997. Test pit locations are shown on Figure 1.2. Table 1.1 summarizes the results of the Test Pit Investigation, including PID readings, extent of fill materials, bedrock depth (if encountered), description of drums encountered, observations of staining or odors, and a determination of whether additional drums are suspected to exist within that area of the landfill.

Test pits were excavated using a track-mounted backhoe capable of excavating to depths of 20 to 25 feet. Test pits were visually inspected to examine the quality of subsurface soils and monitored using a photoionization detector (PID). A PID was used to detect the presence of certain types of volatile organic compounds (VOCs). Test pit excavations continued vertically until groundwater, undisturbed soil, bedrock or intact drums were encountered. If drums were encountered, the number and condition of drums was logged for future reference and the test pit abandoned to avoid risk of drum damage and leakage. In several instances, however, drums in stable condition were excavated and overpacked as discussed below.

Test pits were typically six feet wide; however, trench widths were expanded, as necessary, based on the conditions and/or materials encountered. Test pit lengths ranged from 10 to 85 feet. If suspect material or stained soils were encountered, test pit dimensions were expanded to adequately characterize the nature of the subsurface. In general, excavations proceeded as necessary to delineate the extent of any contamination identified either visually or with field instrumentation.

Test pit logs were prepared describing the subsurface conditions encountered for each test pit (e.g., thickness and type of fill material; depth to groundwater; depth to native soil; type of native soil; length-width-depth of pit; and other pertinent information). The logs are presented in Appendix C of the RI. A minimum of two soil samples were collected from each test pit for visual inspection and screening using a PID. Samples were selected based on visual staining, proximity to buried drums or elevated PID readings. Twenty-six of these samples were sent for chemical analysis.

Native soil beneath the landfill is glacial till. Bedrock was encountered in many test pits, at depths ranging from 4 feet to 21 feet below the ground surface.

The test pit investigation revealed the widespread presence of decomposed drums at the site. Drums or drum remnants were encountered at 25 of the 50 test pit locations. Drums encountered during the test pit program which contained suspect materials were overpacked and staged for characterization and disposal. A total of 11 drums from six test pits were overpacked during the test pit investigation. Each of the drums contained solid materials. Samples were collected from the majority of the drums for analysis. Analysis of the drum samples revealed low levels of a variety of VOCs, semi-volatile organic compounds (SVOCs), and inorganics. Three of the drums were subject to Toxicity Characteristic Leaching Procedure (TCLP) analysis. None of the samples failed the TCLP tests. In some cases, test pit excavation ceased prior to the excavation of all obvious drums. These drums may or may not contain hazardous wastes.

Other materials encountered during test pit excavation included construction and demolition material, household waste, typewriter parts, auto parts, newspapers, tires, appliances and appliance parts. In many of the test pits, ash and/or other evidence of burning was encountered. PID readings above background were detected in 17 of the 50 test pits. The highest reading, 124 ppm, was detected in TP-20. Three drums were excavated and overpacked at this location.

Excavation at TP-40 was terminated when water reportedly containing a non-aqueous phase liquid (NAPL) was encountered. Water and what was reported to be NAPL was observed flowing into the pit. Drums and drum remnants were observed to be present; however, all the drums appeared to be empty. An estimated 660 gallons of liquid was pumped from test pit TP-40 as an IRM (see Subsection 1.6). Analysis of the liquid revealed the presence of 1,2-DCE, TCE, vinyl chloride, acetone, methylphenol and several inorganics (metals) including calcium, iron, magnesium and potassium.

As a component of the test pit program, 26 soil samples (total) were collected for analysis from 22 test pits. Analysis included Target Compound List (TCL) VOCs, SVOCs, PCBs/pesticides, inorganics and TCLP parameters.

In summary, the test pit investigation confirmed the presence of municipal/household and industrial wastes, consistent with the Site's reported past usage. Evidence of burning was encountered in numerous test pits, supporting reports of burning as a means of disposal during landfill operation. Though an oil pit was reported to have been present during the landfill's years of operation (or a portion thereof), no direct evidence of such a pit was encountered during the test pit program. Indirect evidence such as the NAPL reportedly encountered in TP-40 suggests that an oil pit could have existed. Drums and/or drum remnants were observed to be present across much of the site. While the drums encountered were typically crushed and/or empty, in a number of instances intact drums were observed. Where determined to be necessary, the drums were removed and overpacked. The locations of drums left in place were logged for future action. Analysis of samples from test pit soils revealed site-wide presence of metal compounds. SVOCs were also observed to be present, though more infrequently than metals. Typewriter keys and ribbon, molded plastic parts, and plastic molds labeled *Smith-Corona* were found in many test pits. 55-gallon drums filled with resins and fishing line were found in several excavations. These materials suggest the site was used by local industry.

1.4.3 Environmental Sampling

In addition to samples collected during the test pit investigation, samples of surface water, sediment, soil, and groundwater were also collected. The purpose of the sampling program was to evaluate potential exposure pathways to humans and/or fish and wildlife. The samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs and inorganics. Sample locations are presented on Figure 1.2.

<u>Surface Water and Sediment Sampling.</u> Surface water and sediment samples were collected and analyzed from visible seeps or stains and from the intermittent stream located at the toe of the landfill. Where possible, surface water samples were collected from the same locations as the sediment samples. A total of six surface water samples and seven sediment samples were collected at the site on May 22, 1997.

SW001, situated approximately 150 feet east of South Hill Road, was the most upgradient of the surface water samples collected. SW004 was collected in the proximity of test pit TP-40, where water reportedly containing NAPL was encountered. This location was selected because staining and flow from the test pit area was observed two months after it was backfilled. Surface water and sediment samples were analyzed for VOCs, SVOCs, inorganics, PCBs, and pesticides. Sediment analyses included TCLP metals.

Soil Boring/Monitoring Well Installation. Geologic and hydrogeologic properties of the overburden material and bedrock were investigated through a soil boring and monitoring well installation program. The program included installation of nine monitoring wells in four well clusters. Well clusters are made up of an overburden well and a bedrock well. At well cluster MW-2, two shallow wells were installed; however, one failed to produce water. Monitoring well locations were selected based on site topography and observations made during the test pit excavations. The MW-1 cluster was installed at a location upgradient of the site to provide information on background groundwater quality. Well locations are shown on Figure 1.2. A discussion of subsurface geology and hydrogeology is in Subsection 1.7.

Soil Boring Sampling. During the drilling program, a total of 8 soil samples were collected from 4 borings. Samples were selected randomly as no staining, odors or PID readings were encountered during drilling.

Groundwater Sampling – 1997. Groundwater samples were collected on May 22, 1997. Prior to sampling, at least 3 well volumes of groundwater were removed from each monitoring well using a dedicated bailer. Field parameters (temperature, pH, and specific conductance) were monitored during purging to insure the water had stabilized thus allowing for samples representative of the aquifer(s). Groundwater samples were analyzed for VOCs, SVOCs, inorganics, PCBs, and pesticides.

Groundwater Sampling – 2001. Additional groundwater samples were collected in September of 2001. Groundwater samples were submitted for VOCs analyses only.

1.4.4 Fish and Wildlife Impact Analysis

In support of the RI, Parsons Engineering Science, Inc. (Parsons) prepared a FWIA (Parsons, 1998) in accordance with Steps I (Site Description) and Steps IIA (Pathway Analysis) of NYSDEC's Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites NYSDEC, 1994b).

Preparation of the FWIA report included literature review, file search, telephone interviews, and a site visit. The ecological values of the Site and vicinity appear to be numerous and diverse, with field observations indicating habitat for transient species, frequent occupants, and permanent residents. Wildlife directly or indirectly observed within a ½-mile radius of the Site included woodchuck, cottontail rabbit, white-tailed deer, wild turkey, rough grouse, and eastern mole. Birds observed in the vicinity included black-capped chickadee, scarlet tanager, American redstart, blue jay, brownheaded cowbird, song sparrow, and downy woodpecker. The Site does not appear to provide a unique or exceptional wildlife habitat, and no state or federal listed species or communities were identified in the vicinity.

State and federal wetlands maps indicate that jurisdictional wetlands do not exist within a ½-mile radius of the site; but the presence of cattails and potentially hydric-type soils in the drainage swale in the northeast portion of the Site might qualify the swale as a federally-protected wetland under the authority of the U.S. Army Corps of Engineers (see Figure 1.2).

1.4.5 Comparison to Applicable Standards, Criteria, and Guidance

The RI report identified Chemical-Specific Standards, Criteria, and Guidance (SCGs) which apply to the chemicals and media present at the Site. Further discussion of SCGs is presented in Subsection 2.3. Chemical Specific SCGs determined in the RI report are as follows:

- TAGM #4046, Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, 1994a).
- 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes (NYSDEC, 1999c).
- NYSDEC Division of Hazardous Substance Regulation TAGM #3028, "Contained in Criteria for Environmental Media" (11/92)
- NYSDEC Technical Guidance for Screening Contaminated Sediments (NYSDEC, 1999)
- 6 NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater (NYSDEC, 1999b)

- NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 (NYSDEC 1998c)

1.4.5.1 Chemical-Specific SCGs for Soil

Recommended Soil Cleanup Objectives determined in accordance with TAGM #4046 are presented in Tables 1.2 (organic contaminants, i.e., VOCs, SVOCs, pesticides, and PCBs) and Table 1.3 (inorganic contaminants). Table 1.2 presents the determination of Recommended Soil Cleanup Objectives for organic contaminants through comparison of Soil Cleanup Objectives to Protect Groundwater Quality, USEPA Health Based criteria, and the contract required quantitation limit (CRQL). The Recommended Soil Cleanup Objectives for inorganic contaminants are determined based upon Eastern United States Background values, the contract required detection limit (CRDL), which is approximately 10 times the CRDL for water, and site-specific background levels (see Table 1.3). Site-specific background values were calculated as the average of data from MW-1S and MW-1B located upgradient of the Site, across South Hill Road. Recommended Soil Cleanup Objectives presented for TCLP data in Tables 1.2 and Table 1.3 are from Appendix A of NYSDEC Division of Environmental Remediation Spill Technology and Remediation Series (STARS) Memo #1 Petroleum-Contaminated Soil Guidance Policy (NYSDEC, 1998b).

1.4.5.2 Chemical-Specific SCGs for Surface Water and Groundwater

Ambient water quality standards and guidance values are presented in TOGS 1.1.1, and apply to both surface water and groundwater. All values published in 6 NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater, are included in TOGS 1.1.1.

Surface water at the Site is designated Class C, and human consumption of fish is not a pathway for the Site. Therefore, the published standard and guidance values for Water Class C for the protection of fish, wildlife, or aesthetics apply. Where standards or guidance values were not available, the Groundwater Effluent Criteria (Class GA) have been used. The published standard value for many inorganic contaminants detected at the Site requires a calculation utilizing the hardness of site-specific surface water. Hardness data for Site surface water is not available; and, therefore, determination of standard or guidance values for the applicable inorganic contaminants should be calculated using site-specific values once available.

The published standard and guidance values for Water Class GA apply to site groundwater, which is conservative as it considers groundwater at the Site as a source of drinking water. Where standards or guidance values were not available, the Groundwater Effluent Criteria (Class GA) have been used.

1.4.5.3 Chemical-Specific SCGs for Sediment

The NYSDEC Technical Guidance for Screening Contaminated Sediments presents human and ecological health risk-based values for freshwater, saltwater, and both for use in determination of Sediment Screening Values for organic contaminants. The freshwater and fresh and saltwater criteria values are applicable to the Site, and the Sediment Screening Values are derived from the lowest of the published Sediment Criteria, presented as microgram of contaminant per gram organic content (µg/gOC). Data regarding the organic content of site-specific sediment are not available; therefore, Sediment Screening Values presented in Table 1.4 have been calculated for an organic content of 1 percent, and should be adjusted according to site-specific values once available. Table 2 of the NYSDEC Technical Guidance for Screening Contaminated Sediments presents the Lowest Effect Level and Severe Effect Level values published for twelve inorganic contaminants. According to the guidance, *"a sediment is considered contaminated if either criterion is exceeded. If both are criteria are exceeded, the sediment is considered to be severely impacted. If only the Lowest Effect Level criterion is exceeded, the impact is considered moderate"*. Inorganic contaminants detected in sediment at the Site have been compared to both effects levels.

1.4.6 Remedial Investigation Conclusions

The RI recommended that an FS be conducted due to the following reported concerns:

- Unregulated historic landfill operation;
- Observation of existing waste protruding from the ground surface;
- Reported contamination in site soil, surface water, sediment, and groundwater;
- Unfavorable geologic conditions, particularly the shallow depth to fractured bedrock; and
- Likely existence of additional drums within the landfill; the drums may be acting as a continuing source of contamination, creating potential for long-term offsite migration via surface water or groundwater.

1.5 2005 SITE WALKOVER

On April 28, 2005 a representative from MACTEC and representatives from the NYSDEC conducted a walkover of the Site to view the landfill and to discuss appropriate potential remedial actions to be evaluated in the FS. MACTEC documented the walkover with photographs of the Site which are included in Appendix A.

1.6 INTERIM REMEDIAL MEASURES

In response to the findings of the 1990 site investigation, the NYSDEC conducted an IRM drum removal program (see Subsection 1.3.1). In March 1991 five drums of hazardous waste were removed from the site. Analysis revealed that the drums contained TCE.

During the RI Test Pit Investigation, excavation of TP-40 was terminated when water reportedly containing NAPL was observed flowing into the hole. TP-40 is located at the Site's eastern edge near the area where the five drums of waste containing TCE were removed in 1991. Drums and drum remnants were also observed to be present, but all the drums appeared to be empty. Per the recommendation of the NYSDEC Spill Response Unit the area was fenced off, sorbent pads were applied to contain the seep and a spill response contractor, Marcor Environmental, was procured. On March 17, 1997, Marcor Environmental pumped 660 gallons of liquid into a tanker truck. Samples were collected for analysis to characterize the liquid for off-site disposal. Analysis revealed the presence of 1,2-DCE, TCE, vinyl chloride, acetone, methylphenol and several inorganics including calcium, iron, magnesium and potassium. The waste was disposed at CWM Chemical Services in Model City, NY. A seep emanating from this same area was sampled (SW004) during subsequent RI environmental sampling. The analytical results indicated that many of the same compounds were present, suggesting that additional residual contamination remains.

1.7 GEOLOGIC AND HYDROGEOLOGIC SETTING

The Site is located in an upland area of the Tioughnioga River valley. The Tioughnioga River flows south from the City of Cortland where five valleys converge. The river flows southeast from the Cortland area approximately 30 miles, where it joins the Chenango River and eventually the Susquehanna River. The Tioughnioga is one of five major tributaries to the Susquehanna in New

York State and the site falls within the Susquehanna River basin, which covers 6,100 square miles in New York. The basin is characterized by highly productive, deep stratified drift aquifers its valleys. The site and surrounding area also overlie a 25-square mile USEPA designated sole-source aquifer system. The Cortland-Homer-Preble Aquifer System has also been designated by the NYSDEC as a primary aquifer. By definition, a primary aquifer is a highly productive aquifer which is presently being utilized as a source of water supply by a major municipal water supply system, and is highly vulnerable to contamination from activities on the land surface directly over the aquifer. The Site is situated at the eastern edge of this aquifer system.

Based on studies of this regional aquifer by the United States Geological Survey (USGS) and other parties, the hydrogeologic setting of the aquifer has been well characterized. According to the USGS, approximately 85 percent of the Susquehanna River basin is characterized as a bedrock upland with a till veneer and the remaining areas consist of broad valleys floored by stratified sediments. The valley areas are typically characterized by outwash deposits overlying lacustrine silt and clay. Below the lacustrine deposit, a lower sand and gravel unit is often observed which overlies till and bedrock. In the valley areas, hydraulic conductivity values calculated for the upper outwash can range from approximately 300 to 1200 feet/day.

Unlike the valley geology where municipal and industrial supply wells are common, significantly lower well yields are observed in the upland areas. Upland areas in the region are typically characterized by somewhat poorly drained till overlying shale bedrock.

The Site is situated approximately 500 feet above the Tioughnioga River valley. The drilling program revealed site geology underlying the fill generally consists of lodgement till overlying bedrock. The till unit consists of a dense compacted mixture of silt and clay with minor amounts of sand and gravel. Twelve to thirty-three feet of till was observed overlying the bedrock, depending on location. Monitoring wells installed within the till produced low yields of groundwater after proper well development, as expected due to the nature of the till. Hydraulic conductivity tests were not conducted on any monitoring wells during the RI.

Site bedrock consists of shale units of the Upper Devonian Genesee Group encountered at depths of 12 to 33 feet below the ground surface. The upper 20 feet of bedrock sampled at the site is characterized as a grey fossiliferous shale with a weathered surface of one to three feet. Numerous bedding plane fractures as well as some vertical fractures were observed in the rock cores, with the upper bedding plane fractures at some locations containing clay and iron staining. The upper bedrock exhibited low groundwater yield, despite fracturing observed during the drilling. Two bedrock monitoring wells (MW-2B and MW-3B) could be bailed dry during sampling; the remaining two (MW-1B and MW-4B) could be pumped dry at pumping rates of approximately one gallon per minute.

As part of the RI, nine monitoring wells were installed in four well clusters. The deep boring installed in each well cluster location was subject to continuous split spoon samples for purposes of visual classification of the soils. The deep well was cored in 10-foot sections and cores were examined and logged consistent with standard practices. Boring logs and well logs are included in Appendix C of the RI (NYSDEC, 2003).

Based on groundwater elevation data collected during sampling efforts, groundwater flow in both the till and the bedrock is to the south. Groundwater elevation data indicates a general downward vertical hydraulic gradient between the till and bedrock water bearing units, suggesting that vertical groundwater flow, if any, would be from the till into the bedrock. Surface water drainage is also to the south as controlled by the steep sloping site terrain. Numerous seeps break out along the sloping sides of the landfill, especially during the spring and fall seasons, adding to the surface water flow away from the site.

Figure 1.3 presents a cross-section of the Site. Information presented on Figure 1.3 was interpreted from information presented in the RI. Where data exist for location of the bottom of landfill waste, the water table, and bedrock relative to the surface of the landfill, the information is depicted.

2.0 SITE CHARACTERIZATION

This Section provides a characterization of the Site, based upon the results of previous investigations, including:

- Nature and extent of contamination;
- Fate and transport characteristics of site-specific contaminants;
- Identification of Chemical-Specific SCGs;
- Analysis of site-specific exposure pathways; and
- Development of a Site Conceptual Model.

2.1 NATURE AND DISTRIBUTION OF CONTAMINATION

Appendix B presents the RI analytical data results for soil, water, and drum samples collected during the Test Pit investigation, from surface water and sediment within the drainage located along the northern and eastern extent of the landfill, soil borings associated with installation of monitoring wells, and groundwater monitoring wells, located upgradient and downgradient of the landfill materials. Table 1.1 presents the results of the Test Pit investigation, including PID readings, the location of bottom of fill, water table, and/or bedrock, odors or stains observed, and drums encountered. Analytical samples were submitted generally for VOC, SVOC, pesticide/PCB, and inorganics analyses. Select samples of test pit soils, drums, and sediment were submitted for TCLP analysis.

Chemical analysis of samples has revealed the presence of contamination in subsurface soils, sediment, surface water and groundwater. Surface soil samples were not collected at the Site.

Inorganic compounds were the most predominant contaminants detected in the various media, and were detected site-wide in soil, sediment and surface water samples. Inorganic concentrations were detected above SCG levels for at least one analyte wherever samples were submitted for inorganic analysis (refer to data tables). The presence of inorganic compounds is typical of solid waste landfills.

Several SVOCs were detected at concentrations above SCGs in soil samples collected during the test pit program (see Figure 1.2). Benzo(a)pyrene, benzo(a)anthracene and chrysene were detected above SCGs, and are among a category of SVOCs referred to as PAHs. PAHs are often the result of incomplete combustion and can be found in such media as coal tar, automobile exhaust or ash. The reported burning of waste as a means of disposal is a likely source of the SVOCs detected. Phenol was also detected above SCGs in several test pit soil samples. SVOC concentrations did not exceed SCGs in soil boring samples or sediment, and in general were at concentrations less than 1 mg/kg. SVOCs did not exceed SCGs in surface water and groundwater, with the exception of bis(2-ethylhexyl)phthalate, which was detected above SCGs in five of the six surface water samples.

1,2-DCE and TCE were the only VOCs detected in groundwater, sediment, and soil boring soils. 1,2-DCE, TCE, vinyl chloride was detected in surface water. In test pit soils, 1,2-DCE, PCE, TCE, and vinyl chloride were detected; though PCE was detected only at low concentrations. These analytes or their degradation products are chlorinated solvents, and TCE was commonly used as a degreaser in industry during the time of Site operations. TCE is also known to have been disposed at the Site. Fuel-related contaminants, benzene, toluene, ethylbenzene, and xylene, were also detected in test pit soils, but at concentrations less than 1 mg/kg. 1,2-DCE and TCE concentrations in three monitoring wells and one surface water sample were at concentrations above SCGs. In the same surface water sample, vinyl chloride was detected above SCGs. VOCs were not detected at concentrations greater than SCGs in test pit soils, soil boring soils, or in sediment.

Pesticides were detected in test pit soils, soil boring soils, and sediment; however, only the concentration of 4,4-DDT at sample location SD-003 was above SCGs. PCBs were detected in test pit soils only, and did not exceed SCG levels.

Select sediment and test pit soil samples were analyzed for TCLP metals, and a select set of test pit soils for TCLP VOCs, SVOCs, pesticides, and herbicides. No VOCs, SVOCs, pesticides, or herbicides were detected in test pit soils by TCLP method. Concentrations of inorganics detected in sediment and test pit soil TCLP samples were less than SCGs.

2.2 CONTAMINANT FATE AND TRANSPORT

Site conditions and the physical and chemical properties of site contaminants determine which contaminant transport mechanisms will predominate. Once the dominant transport mechanisms have been identified, the contaminant distribution can be interpreted in terms of past events, and the future contaminant distribution can be estimated.

2.2.1 Transport Mechanisms

Migration of contaminants in air occurs primarily by: (1) volatilization of the chemical into air, and (2) release of fugitive dust with chemicals adsorbed to soil or landfill particulates. Volatilization is a major pathway for VOCs from surface or near surface soils or surface water. Fugitive dust release predominates for organic compounds with high adsorption characteristics (i.e., high organic carbon partition coefficient K_{oc} values) such as SVOCs, and for many inorganics. In general, remaining contaminated materials are not exposed to the atmosphere; however, volatilization is a potential pathway for VOCs in groundwater seeps present at the Site. Due to the relatively low concentrations of VOCs, and the intermittent nature of the seeps, volatilization of VOCs does not represent a significant pathway at the Site.

Surface water can transport chemicals either as a dissolved phase or adsorbed onto entrained particulate matter. Dissolved and adsorbed phase contaminants move to surface water via either runoff from contaminated surface soils and refuse or discharge from contaminated groundwater. Discharge of shallow groundwater (dissolved phase) contamination to surface water at the Site is possible given the presence of contaminated shallow groundwater and VOCs, inorganics, and other contaminants in surface water and sediment at shallow groundwater seeps at the Site.

Contaminants enter groundwater at the Site through the downward movement of chemicals, either as pure liquids or dissolved in water by the action of rain, surface water, or shallow groundwater percolating (leaching) through stockpiled debris materials or subsurface soil. In all cases, the concentrations in groundwater depend on the solubility of the chemical in water, among other factors. Contaminants entering groundwater as a dissolved phase move with groundwater flow. If contaminants enter groundwater as a non-aqueous phase liquid, the contaminants will migrate in a direction dependent on the specific gravity of the chemical phase, groundwater flow, entry pressures, and the surface topography of any confining layers. Rule of thumb suggests that if concentrations exceed one percent of solubility in groundwater, some residual NAPL may be a contributing source. The maximum VOC concentration detected in groundwater, 540 µg/L of TCE, is only 0.05 percent of the solubility (1,100,000 µg/L). This suggests that NAPL chemical contamination may not be present at the Site; however, site monitoring wells are located outside of the limits of fill materials. NAPL was reportedly observed during the Test Pit investigation in the area of TP-40 and 660 gallons of fluids removed for proper disposal. Results of analytical analysis for fluids removed for disposal and from the groundwater seep, also indicated concentrations not suggestive of NAPL contamination (see Table 2.2).

2.2.2 Site Contaminant Fate

VOCs, SVOCs, pesticides, and inorganics are the primary contaminants at the Site. Many of these contaminants, primarily VOCs and inorganics, appear to be migrating from the landfill materials or subsurface soil to groundwater, and ultimately to downgradient overburden and bedrock groundwater and to surface water at groundwater seeps.

VOC contaminants detected at concentrations greater than SCGs include TCE, 1,2-DCE, and vinyl chloride. These contaminants are classified as halogenated hydrocarbons, and are present in groundwater and surface water at concentrations much less than their solubilities. The processes that control the fate of VOCs at the Site include volatilization, dissolution, and biodegradation.

The fate of VOCs in surface soils, and in groundwater which discharges to downgradient surface water, is likely volatilization, as VOCs partition rapidly to the atmosphere, and neither biodegradation nor hydrolysis (a photolytic decomposition due to exposure to sunlight) occurs at a rapid rate. In surface water, however, because VOCs are more dense than and only moderately soluble in water, that which is not immediately volatilized or dissolved may be expected to submerge and thus be removed from contact with the surface (ATSDR, 1997).

Dissolution of VOCs from site sources to groundwater is a significant transport mechanism for VOCs at the Site. Factors affecting dissolution of VOCs from the site sources are: (1) water table elevation in comparison to source areas; (2) flow rate (residence time) of the groundwater in the contaminated material; (3) solubility of the compound; (4) amount of recharge through VOCs in the unsaturated zone; and (5) the degree of partitioning to soils and sediments

Biodegradation reactions can reduce the total mass of VOCs in surface water and groundwater. Naturally occurring soil and aquatic microorganisms are capable of degrading VOCs. The microorganisms require oxygen to aerobically biodegrade VOCs and the concentration of dissolved oxygen is an indicator of the potential for aerobic biologic activity in groundwater or surface water. Aerobic biodegradation is particularly effective for aromatic hydrocarbons, such as benzene and toluene, and may be effective in mineralizing chlorinated solvent daughter products such as 1,2-DCE and vinyl chloride.

Under aerobic conditions, TCE is relatively stable and persistent in the environment. Under anaerobic conditions, however, TCE may undergo biologic transformation as the dominant fate process. The complete anaerobic biologic transformation pathway for TCE is:

TCE → 1,2-DCE → vinyl chloride → ethane → carbon dioxide and water.

The relative rate of degradation decreases as chlorine atoms are sequentially removed from the molecule. As such, vinyl chloride is relatively persistent in anaerobic environments, and the formation of carbon dioxide or ethylene from vinyl chloride is rather slow. However, under favorable conditions, reductive dechlorination of vinyl chloride does occur. As noted, degradation of 1,2-DCE and vinyl chloride can occur quite readily under aerobic conditions, with carbon dioxide as the primary end product.

Processes that control the fate of SVOCs (primarily PAHs) at the Site include adsorption, biodegradation, and dissolution. The SVOCs detected in source materials at the Site are expected to be relatively immobile because of strong adsorption of these compounds to the organic carbon fraction of the soil. Three soil samples from the Test Pit Investigation were submitted for TCLP SVOC analysis, and no samples failed TCLP. However, leaching of some SVOCs from source materials to surface water is likely occurring on the basis that contaminants detected in soil samples from the Test Pit Investigation are also present in the downgradient surface water at the groundwater seeps. This likely provides a continuing source of SVOCs in sediment at the groundwater seeps. Overall, adsorption to soil and sediment is the expected fate of SVOCs at the Site, while some biodegradation may occur in favorable locations (primarily aerobically).

Pesticides can be long lasting in the environment, particularly in soil or sediment. Studies have shown that half the 4,4'-DDT in soil breaks down within 2 years, while other studies show that it may take more than 15 years (Habeck, 2005). 4,4'-DDT attaches tightly to soil and does not move down through the soil quickly to underground water supplies. 4,4'-DDT in surface soils may attach to small particles and be carried by the wind. In surface water, 4,4'-DDT may also bind to soil particles mixed in water and settle to the bottom of the body of water. Resultant distributions in sediments may be partly a product of scour and deposition processes in streams. Some 4,4'-DDT may evaporate from soil and enter the air, and some may be broken down by the sun or by microorganisms. 4,4'-DDT in soil usually breaks down to form 4,4'-DDE or 4,4'-DDD. All of these forms may undergo further degradation, but typically quite slowly in the environment. 4,4'-DDT in surface water may also evaporate into the air, and the sun or microorganisms break down some 4,4'-DDT in water. 4,4'-DDE is only found in the environment as a result of contaminant release or breakdown of 4,4'-DDT. Concern for pesticides such as 4,4'-DDT and daughter products arises from their persistence, toxicity, and tendency to bioaccumulate through the food chain.

Inorganics include metals and other non-carbon compounds, such as chlorides, sulfates, and nitrates. Metals are not destroyed by chemical or biological processes, but may exhibit different properties such as mobility and toxicity, depending on the geochemical conditions existing at the site. For example, the divalent iron (ferrous) ion is quite soluble and may be mobile at higher concentrations than the trivalent iron (ferric) ion at typically encountered pH values. Geochemical conditions may mobilize naturally occurring metals such as iron or arsenic and it may be difficult to determine if concentrations of some constituents are naturally present or due to a contaminant source. Under some pH and oxidation-reduction potentials (ORP), some metals may exhibit strong soil adsorption partition coefficients (Kd_s). Further, soil cation exchange capacity (CEC) may retard migration of metal ions.

Typical anions associated with landfills include chlorides, sulfates, and nitrates. Chloride is typically associated with sodium ions and both typically undergo no chemical bonding and are very mobile. Under typically anoxic conditions in leachate impacted groundwater, sulfates, and nitrates may be used in microbial biodegradation, being reduced to sulfide and ammonium ions, respectively. The presence of sulfide ions may, in turn, scavenge some dissolved metal ions and precipitate them out of solution as insoluble sulfides.

2.3 IDENTIFICATION OF APPLICABLE STANDARDS, CRITERIA, AND GUIDELINES

6 NYCRR Part 375-1.10(c)(1)(I) requires that remedial actions comply with applicable Standards, Criteria, and Guidance "unless good cause exists why conformity should be dispensed with" (NYSDEC, 1998a). Standards and Criteria are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance. Guidance includes non-promulgated criteria and guidelines that are not legal requirements; however, the site's remedial program should be designed with consideration given to guidance that, based on professional judgment, is determined to be applicable to the site. SCGs are categorized as Chemical-Specific, Location-Specific, or Action-Specific.

Chemical-Specific SCGs are health or risk-based numerical values or methodologies which, when applied to site specific conditions, result in the establishment of numerical values for the chemicals of interest. These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the environment. Chemical Specific SCGs were identified in the RI Report, and are presented in Subsection 1.4.5 above.

Location-Specific SCGs are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a specific location. The drainage swale in the northeast portion of the Site might qualify as a federally-protected wetland under the authority of the U.S. Army Corps of Engineers (USACE). Therefore, if remedial activities are to impact wetland areas, measures will be taken to minimize alteration/destruction of the area in accordance with Protection of Wetlands Executive Order No. 11990, 40 CFR Part 6, App. A, and Clean Water Act, Dredge or Fill Requirements Section 404, 33 CFR Part 230; 40 CFR Part 230.

Action-Specific SCGs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous waste management and site cleanup. The New York State Solid Waste Management Facilities regulations would apply to remediation and closure activities conducted at the Site. In 1972, when Site operations as a municipal disposal facility by the Town of Cortlandville were discontinued, the New York State Sanitary Code Part 19 – Refuse Disposal

(NYS, 1962) was in effect. However, the Site was never properly closed in accordance with New York Sanitary Code Part 19. Current New York State Solid Waste Management Facilities regulations are contained in 6 NYCRR Part 360.

2.4 EXPOSURE PATHWAY ANALYSIS

The following Subsections identify contaminants of concern (COCs) for the Site on the basis of comparison to the Chemical-Specific SCGs, present an evaluation of potential human exposure pathways, and discuss the potentially complete exposure pathways for wildlife located on and downgradient of the Site.

Chemical-Specific SCGs which apply to the media present at the Site were identified in the RI. Subsection 2.4.1 presents a discussion of the nature of site-specific contaminants relative to the Chemical Specific SCGs.

Existing or potential exposure pathways and existing wildlife, their habitats, and or other natural resources were identified during the Human Health Evaluation and the Fish and Wildlife Impact Analysis components of the RI. Subsection 2.4.2 presents the conclusions of the Human Health Evaluation; Subsection 2.4.3 presents the conclusions of the Fish and Wildlife Impact Analysis.

Projected future site use is not known. Future use of the Site would be dependent upon future remedial actions, and will be evaluated for the specific remedial alternatives developed in Section 6 of this report.

2.4.1 Contaminants of Concern

Analytical results were compared to Chemical-Specific SCGs as discussed in Subsection 2.1 above. Contaminants detected at concentrations greater than SCG values are considered COCs. However, site-specific remedial objectives for the impacted media will be developed with additional consideration for:

- the frequency of contaminant detection;
- background concentrations;
- the chemical and toxicological properties of the COC;

- existing or potential exposure pathways;
- the present or projected site use; and
- existing wildlife, their habitats, and other natural resources.

Table 2.1 presents the COCs for each of the various media sampled at the Site. The Chemical-Specific SCGs for groundwater, surface water, sediment, and organic soil contaminants are derived with consideration for chemical or toxicological characteristics.

Chemical-specific SCGs for inorganics presented in TAGM #4046, which apply to both test pit soils and soil boring soils, generally were derived from NYSDEC compiled regional background concentrations or from site-specific background concentrations (NYSDEC, 1994a). Site-specific soil background conditions used in determining SCG values were derived from the soil boring data from monitoring wells MW-1S and MW-1B. Similarly, background concentrations for inorganic contaminants in groundwater presented in Table 2.1 were derived from groundwater data collected from MW-1S and MW-1B. Comparison indicates that background values for aluminum, iron, and manganese range from 200 percent to several orders of magnitude greater than respective SCG values.

Inorganic contaminants detected in surface water for which hardness data is required in order to calculate Chemical-Specific SCG values were retained for further evaluation once hardness data are available.

2.4.2 Human Health Evaluation

Potential human exposure pathways for the Site were assessed in the RI Report. The RI identified a potential for trespassers at the site to be exposed to contaminated surface soils, sediment or surface water. Data suggests, however, that the potential for exposure via offsite migration of contaminants through surface water exists; however, it appears to be very low. Also, as there are no identified downgradient groundwater users, the groundwater pathway is not complete. The potential for exposure(s), therefore, appears limited to the Site itself and the receptor population appears limited to trespassers or potential future on-site workers.

2.4.3 Fish and Wildlife Impact Analysis

The FWIA concluded that groundwater, surface soil, surface water, and sediment are potential complete exposure pathways for wildlife located on and downgradient of the site. Chemicals disposed onsite were detected in leachate (groundwater), surface water, and sediment samples collected from locations which are directly accessible to wildlife. The presence of chemicals in surface soil is indicated by stained soil adjacent to leachate seeps. However, field observations and sample results indicate that ecologically significant migration of chemicals in surface water and sediment to the unnamed stream south of the site is unlikely. Concentrations in downgradient groundwater, surface water, and sediment samples collected near the site property line (approximately 500 feet from the landfill area) were near or below analytical detection limits. Furthermore, little aquatic vegetation was observed in the stream during the site visit, and the bottom sediment consists mostly of a mixture of rock and gravel with very little organic content.

2.5 SITE CONCEPTUAL MODEL

The Site is situated in a relatively isolated location along South Hill Road in Cortlandville, NY. The Site, operated by the town, received municipal and commercial wastes over a period spanning from about the early 1960s until about 1972. Over much of its period of operation, access to the site was relatively unrestricted, and few records were kept regarding either the materials dumped, dump operating procedures, or the users of the site. The relatively steep sloped landfill was operated along three tiers, and materials dumped on the tiers or over the edges. Dumping activities were confined to about 2 acres of the 6-acre site. Open burning was reported to have taken place at the Site, and ash deposits have been encountered in some subsurface explorations. Although some cover was applied, all types of solid wastes are apparent in places protruding at ground surface and along the faces of the steeper slopes. Some liquids were disposed of at the Site, including some drums of waste chlorinated solvents. A waste oil pit was also reported at the Site, but this location has yet to be determined in site investigations. Some drums have apparently corroded and leaked or were otherwise emptied at the Site.

The natural setting consists of a relatively thin layer (12 to 33 feet) of till overlying fractured shale bedrock. The topography dips steeply to the south with about 80 feet of relief, and arrives at an intermittent tributary of the Tioughnioga River at the base of the landfill. Further downstream, this tributary also passes through the Hoxie Gorge Nature Preserve. The steep slopes and low conductivity tills overlying bedrock restrict infiltration of precipitation, although the creation of operating terraces and placement of more permeable fill materials in landfill operation provided more opportunity for recharge of precipitation to the groundwater. Cores of bedrock indicate that some of the fractures are clay filled and iron stained, which may restrict groundwater flow in bedrock. However, where groundwater water level data are available, the water table appears to reside in the bedrock over a large portion of the Site. In places, groundwater flow in till and bedrock is restricted, and seeps appear along the landfill slopes. The intermittent tributary is a probable discharge location for site groundwater, although the possibility of some deeper flow that might discharge further down the stream is not excluded.

Several site inspections and investigations have determined the presence of hazardous material, principally associated with drums or drum remnants. Some intact drums have been removed from the site for proper disposal, while locations of some remaining drums have been identified for future action. During execution of one test pit, NAPL was reportedly encountered which occasioned a removal action of some 660 gallons of fluids. However, indications are that, in addition to remaining soil contamination, ash, and other waste materials, some wastes remain that may potentially greatly increase risks at the Site (e.g., if drums containing hazardous liquid materials corrode and/or leak their contents). Principal COCs that have been identified at the site in excess of their SCG values include: 1,2-DCE, TCE, vinyl chloride, benzo(a)anthracene, benzo(a)pyrene, chrysene, phenol, bis(2-ethylhexyl)phthalate, 4,4'-DDT, and numerous inorganics.

Due to the age of the Site, the most active contaminant migration pathways would be caused by leaching of constituents by infiltrating precipitation into groundwater and subsequent migration of dissolved species. These dissolved constituent may leave the site via seeps, discharge of groundwater to the intermittent tributary, and possible deeper groundwater flow. Several of the constituents of potential concern, metals, pesticides and SVOCs, are likely to be greatly retarded in their potential migration off-site due to strong sorption potentials for these compounds and elements. The Site constituents, excluding metals, may also be subject to biodegradation and other natural attenuation mechanisms. Significant volatilization loss of VOCs in surface and near surface soils would not be expected unless some new release of remaining contained VOCs were to occur as, again, the site is old and such volatilization loss would already have occurred. Surficial soils with SVOCs, pesticides and metals may be subject to wind erosion and wind-blown migration off site. Potential receptors would include human residents, trespassers and transients, and environmental receptors within range of windblown particulates. Significant risk via this pathway is not anticipated, however. Some dissolved constituents in surface water and seeps may be prone to volatilization, sorption to sediments, and migration downstream as dissolved species or via scour and deposition of contaminated sediment particles.

2.5.1 Limitations of Current Site Understanding

Chemical analysis of samples from the Site has revealed the presence of contamination in subsurface soils, sediment, surface water, and groundwater. The Human Health Evaluation and the FWIA concluded that the potential for exposure(s) to contaminants at the Site appears limited to the Site itself. However, the current understanding of site contamination is limited to conditions at the Site only. Groundwater monitoring wells are located upgradient of the Site, downgradient of the landfill area, and along the Site property line, but not downgradient of the Site. The 2001 groundwater data indicates concentrations above SCGs in the monitoring wells downgradient of the landfill area, including cis-1,2-DCE and TCE in monitoring wells MW-3S and MW-3B, and TCE in MW-4B. Surface water concentrations of VOCs are below SCGs at the sample located where the surface water discharges off-site.

Soil samples were collected primarily from the landfill area of the Site only, with the exception of soil boring samples during monitoring well installation, and no surface soil samples were collected. Soil samples collected during the RI Test Pit Investigation were limited to 26 subsurface soil samples collected from 22 of the 50 test pits, generally collected from areas of staining, burning, odors, or in the vicinity of drums which were encountered. The location and extent of test pits was limited by steep slopes along the edges of the landfill tiers or by subsurface drums which could not be removed without damage. If drums were encountered which could not be removed safely, the number and condition of the drums was logged for future reference and the test pit abandoned. The actual number, condition, and location of remaining drums within the landfill area are unknown.

Evaluations of remedial alternatives in this FS will be restricted to on-site contamination and media. Groundwater contamination has been documented in overburden and bedrock monitoring wells located adjacent to the site property boundary, and is likely migrating off-site. However, recognizing that there are no obvious identified groundwater receptors due to the isolated location of the Site, this

FS will concentrate on evaluation of remedial actions which would address on-site contamination, and would include those that can be verified by monitoring of on-site groundwater monitoring wells as part of the eventual selected remedy. If exposure to groundwater contamination is identified in the future, the remedial alternatives may need to be revised.

3.0 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES, GENERAL RESPONSE ACTIONS, AND CONTAMINATION REQUIRING REMEDIATION

Remedial action objectives (RAOs) form the basis for identifying remedial technologies and developing remedial alternatives. This section identifies RAOs for site media, general response actions to address the RAOs, and contamination requiring remedial action.

As discussed in Subsection 2.4.1, site-specific remedial objectives for the impacted media were developed with consideration for the frequency of contaminant detection; background concentrations; the chemical and toxicological properties of the COC; existing or potential exposure pathways; the present or projected site use; and existing wildlife, their habitats, and other natural resources.

3.1 IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES

RAOs consist of medium-specific or operable unit-specific goals for protecting human health and the environment (USEPA, 1988). RAOs specify the COCs, exposure pathways(s) and receptor(s), and acceptable contaminant levels or range of levels for each exposure route. Site-specific COCs were determined by comparison of contaminant levels to Chemical-Specific SCG values, as discussed in Subsection 1.4.5, but did not consider site-specific exposure pathways. RAOs presented in the following subsections were developed for the specific media and receptors identified in the Human Health Evaluation and FWIA. Acceptable contaminant levels or range of levels for each media are referred to as remediation goals (RGs). The RGs developed for the Site consider both the identified COCs and the potential exposure pathways and receptors. The Chemical-Specific SCGs listed in Subsection 1.4.5 generally provide both exposure pathway- and receptor-specific criteria, and were used in the development of site-specific RGs. RG values for the RAOs identified in the following subsections are presented in Table 3.1.

In addition to the media-specific contamination identified at the Site, hot-spot areas or additional drums (source areas) within the landfill may be acting as a continuing source of contamination. As such, site-specific RAOs are prepared for source areas.

3.1.1 Remedial Action Objectives for Surface Soil

The Human Health Evaluation concluded that site surface soil represents a potential exposure pathway for trespassers or potential future on-site workers. The FWIA concluded that surface soil at the Site represents a potential exposure pathway for wildlife located on and downgradient of the site. No surface soil data is currently available for the Site. Therefore, the following RAOs were identified for site surface soil:

- Prevent contaminants in excess of Soil Cleanup Objectives for Protection of Groundwater Quality from leaching to groundwater from site surface soil.
- Protect trespassers or potential future on-site workers from unacceptable risk resulting from exposure to site surface soil contaminants at concentrations in excess of Recommended Soil Cleanup Objectives.

3.1.2 Remedial Action Objectives for Subsurface Soil

The COCs identified for subsurface soil include benzo(a)anthracene, benzo(a)pyrene, chrysene, phenol, and numerous inorganics (refer to Table 2.1). Subsurface soil was not identified as a potential exposure pathway in the Human Health Evaluation and the FWIA, as it is not directly accessible to these receptors. However, subsurface soil may be contributing to groundwater and surface water contamination resulting in exposure through those media. Recommended Soil Cleanup Objectives for organic contaminants in subsurface soil that are calculated to be protective of groundwater quality were identified as Soil Cleanup Objectives for Protection of Groundwater (see Table 1.2). Evaluation of the organic COCs indicates that chrysene and phenol concentrations in subsurface soil exceed Soil Cleanup Objectives for Protection of Groundwater. For landfill sites the presumptive approach to addressing the subsurface soil to groundwater transport pathway is through measures to minimize water infiltration and contaminant leaching. The Recommended Soil Cleanup Objectives for inorganic contaminants in soil are not based upon values protective of groundwater quality. Therefore, the following RAO was identified for site subsurface soil:

- Prevent leaching of chrysene and phenol to groundwater from site subsurface soil in excess of Soil Cleanup Objectives for Protection of Groundwater Quality values.

3.1.3 Remedial Action Objectives for Sediment

The COCs identified for sediment include the pesticide 4,4'-DDT and numerous inorganics (refer to Table 2.1). The Human Health Evaluation concluded that site sediment represents a potential exposure pathway for trespassers or potential future on-site workers. The FWIA concluded that sediment at the Site is a potential complete exposure pathway for wildlife located on and downgradient of the Site. Evaluation of the organic COCs indicates that 4,4'DDT concentrations in sediment exceed the freshwater Human Health Bioaccumulation Sediment Screening Value, and that inorganic COCs in sediment exceed Lowest Effects Level Sediment Screening Values, which apply to potential ecological receptors. Therefore, the following RAOs are identified for site sediment:

- Protect trespassers or potential future on-site workers from unacceptable risk resulting from exposure to 4,4'-DDT in site sediment at concentrations in excess of the freshwater Human Health Bioaccumulation Sediment Screening Value.
- Protect wildlife located on and downgradient of the site from unacceptable risk resulting from exposure to inorganics in site sediment at concentrations in excess of Sediment Screening Values based upon inorganic contaminant Lowest Effects Level values.

3.1.4 Remedial Action Objectives for Surface Water

The COCs identified for surface water include the 1,2-DCE, TCE, vinyl chloride, bis(2-ethylhexyl)phthalate, and numerous inorganics (refer to Table 2.1). The Human Health Evaluation concluded that surface water at the Site represents a potential exposure pathway for trespassers or potential future on-site workers. The FWIA concluded that surface water at the Site is a potential complete exposure pathway for wildlife located on and downgradient of the Site. SCG values used to determine COCs were calculated for Class C surface water, or in the absence of Class C values, using the Groundwater Effluent Limitations (Class GA Groundwater). Class GA Groundwater ambient water quality standard or guidance values, appropriate for potential drinking water sources, are not used in the development of site-specific surface water RAOs. Class C surface water is considered suitable for fish propagation and survival and for primary and secondary contact recreation, but not as a potential drinking water source. Therefore, there are no ambient water quality standard and guidance values for Class C surface water for the protection of human health. Furthermore, the Class C designation is conservative, since surface water at the Site consists of an intermittent swale and ditch, not suitable for the propagation or survival of fish species. Evaluation of ambient water quality standard or guidance values providing protection for wildlife indicates that mercury exceeds this criterion. Therefore, the following RAO is identified for site surface water:

- Protect wildlife located on and downgradient of the Site from unacceptable risk resulting from exposure to mercury in excess of the Class C surface water ambient water quality standard or guidance value (0.0026 µg/L) providing protection for wildlife.

3.1.5 Remedial Action Objectives for Groundwater

Groundwater was not identified as a potential exposure pathway in the Human Health Evaluation. The FWIA concluded that site groundwater (leachate) seeps are a potential complete exposure pathway for wildlife located on and downgradient of the Site. The COCs identified for groundwater include the 1,2-DCE, TCE, aluminum, iron, manganese, and sodium. However, the exposure pathway for wildlife consists of groundwater (leachate) seeps, or surface water. Therefore, site groundwater data has been compared to Class C surface water ambient water quality standard or guidance values providing protection for wildlife. This comparison indicates that no COCs exceed protection for wildlife values. Therefore, no RAOs are identified for site groundwater.

3.1.6 Remedial Action Objectives for Source Areas

During the RI Test Pit Investigation intact drums were encountered, some of which were removed for disposal. If drums were not able to be removed without drum damage and leakage, the number and condition of drums were logged for future reference and the test pit abandoned. The Human Health Evaluation and FWIA did not identify Source Areas as potential exposure pathways. However, sampling and analysis of drum contents revealed concentrations of VOCs, SVOCs, and inorganics generally detected in other media at the Site. Soil hot-spot areas or additional intact or leaking drums containing contaminants may act as source areas within the landfill, contributing to contamination in soil, groundwater, sediment, and surface water. Therefore, the following RAOs were identified for site source areas:

- Prevent release of source area contaminants to site surface water and groundwater.
- Prevent exposure of trespassers or potential future on-site workers to source area contaminants.

3.2 IDENTIFICATION OF GENERAL RESPONSE ACTIONS AND EXTENT OF CONTAMINATION REQUIRING REMEDIAL ACTION

General response actions describe those actions that will satisfy RAOs (USEPA, 1988). General response actions may include treatment, containment, excavation, disposal, institutional actions, or a combination of these. Like RAOs, general response actions are medium-specific. The general response actions presented in the following subsections include those identified as relevant in "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites" (landfill remediation guidance) (USEPA, 1991). This landfill remediation guidance was prepared by the USEPA to streamline the selection of a remedy for municipal landfill sites, and considers the following potential threats to human health and the environment from municipal landfills:

- Leachate generation and groundwater contamination,
- Soil contamination,
- Landfill contents,
- Landfill gas, and
- Contamination of surface waters, sediments, and adjacent wetlands.

Based upon the current understanding and characterization of the Site, no additional potential threats than those listed above exist at the Site.

Site-specific RAOs have been developed to address contamination requiring remedial action in subsurface soil, sediment, and surface water, as well as for potential source areas. The following paragraphs present a discussion of general response actions for each of these media and for the potential source areas.

3.2.1 General Response Actions for Soil

Soil contamination requiring remediation is limited to chrysene and phenol detected in subsurface soil samples from five test pit locations. Surface soil was identified as an exposure pathway, but no surface soil data is currently available. Potential general response actions appropriate for soil requiring remediation at landfill sites include:

- No Action
- Access Restriction

- Containment

These general response actions are appropriate for site-specific soil contamination requiring remediation. These general response actions also are applicable to potential surface soil contamination.

3.2.2 General Response Actions for Sediment

Concentrations of one or more inorganic contaminants are above RGs at all sediment sample locations. Sediment sample location SD003 contains 4,4'DDT contamination requiring remediation. Potential general response actions appropriate for sediment requiring remediation at landfill sites include:

- Removal
- Disposal
- Treatment
- Containment

These general response actions are appropriate for site-specific sediment contamination requiring remediation.

3.2.3 General Response Actions for Surface Water

Concentrations of mercury at SW002 through SW006 are above the RG value. Potential general response actions appropriate for surface water requiring remediation at landfill sites include:

- Detention and Sedimentation
- Collection
- Treatment
- Monitoring

These general response actions are appropriate for surface water contamination requiring remediation at the Site; however, it is assumed that general response actions for soil and sediment will eliminate source contamination to site surface water and thus address surface water contaminant concerns.

3.2.4 General Response Actions for Source Areas

Potential source areas at the Site include possible and known drums identified during the Test Pit Investigation. Potential hot-spot contamination exists in the vicinity of TP-40 and TP-50, based upon visual observation of contamination, and results of the IRM and additional sampling conducted at TP-40. Potential general response actions to meet source area (i.e., landfill content and/or hot-spot) RAOs include:

- No Action
- Access Restrictions
- Containment
- Removal
- Soil Treatment
- In-Situ Treatment

These general response actions are appropriate for source area contamination requiring remediation at the Site.

3.2.5 Contamination Requiring Remedial Action

This subsection identifies the contaminated media (soil, sediment, and surface water) to which remedial alternatives will apply. The contaminants and associated locations where RGs are exceeded are presented in Table 3.2.

3.2.5.1 Soil

Figure 1.3 depicts the estimated extent of landfill materials based upon the RI Test Pit Investigation results. According to the RI, dumping activities at the Site were confined to about 2 acres of the 6-acre site. Concentrations of chrysene and phenol exceed RGs in soil at five test pit locations within the landfill area. It is assumed that both surface and subsurface soil contamination requiring remediation is limited to the extent of landfill materials at the Site. The location of surface debris observed during the April 2005 Site Walk is also indicated on Figure 1.3. Site surface debris will also be considered during the development of remedial alternatives for soil.

3.2.5.2 Surface Water and Sediment

Sediment contamination exceeding RGs is present at all sediment sample locations at the Site. Surface water contamination exceeding RGs is present at surface water sample locations SW002 through SW006 at the Site. Surface water and sediment samples were collected from the ditch along the eastern boundary of the Site. This ditch receives flow from the roadside ditch and culvert via the swale in the northern portion of the Site, surface runoff from the landfill area, and groundwater (leachate) seeps located along the southeastern edge of the landfill area. The entire length of this drainage is approximately 1,040 feet, from the culvert at South Hill Road to where the ditch leaves the Site to the southeast.

3.2.5.3 Source Areas

Potential and known drum locations, considered potential source areas, are presented on Figure 1.3. Additional drum locations may exist, contributing to contamination in other media at the Site. It is assumed that source areas are confined within the limit of the landfill waste, an area of approximately 2 acres.

4.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

This section identifies and screens potential remedial technologies. Technologies are identified for the purpose of attaining the remedial action objectives established in Subsection 3.1. Identified technologies correspond to the categories of general response actions described in Subsection 3.2.

Following identification, candidate technologies are screened based on their applicability to site- and contaminant-limiting characteristics. The purpose of the screening is to produce an inventory of suitable technologies that can be assembled into remedial alternatives capable of mitigating actual or potential risks at the Site. Potential technologies representing a range of general response actions (i.e., no action, limited action, containment, removal, treatment, and disposal) are considered. The result of technology screening is a list of potential remedial technologies that may be developed into candidate remedial alternatives.

4.1 TECHNOLOGY IDENTIFICATION

Remedial technologies and specific process options applicable to landfill sites are identified in USEPA's guidance for Conducting RI/FS for CERCLA Municipal Landfill Sites (USEPA, 1991). This guidance was used to generate the list of applicable remedial technologies and associated process options identified for each general response action presented in Table 4.1. General response actions were developed for soil (surface and subsurface), sediment, surface water, and source areas. However, as described in Subsection 3.2.3, technologies for surface water remediation were not identified. Instead, remedial actions for soil, sediment, and source areas will be developed to eliminate source contamination to site surface water and thus address surface water contaminant concerns indirectly.

4.2 TECHNOLOGY SCREENING

The technology screening process reduces the number of potentially applicable technologies and process options by evaluating factors that may influence process-option effectiveness and implementability. This overall screening is consistent with guidance for conducting an FS under CERCLA (USEPA, 1988). Effectiveness and implementability are incorporated into two screening criteria: waste- and site-limiting characteristics. Waste-limiting characteristics consider the suitability of a technology based on contaminant types, individual compound properties (e.g., volatility, solubility, specific gravity, adsorption potential, and biodegradability), and interactions that may occur between mixtures of compounds. Site-limiting characteristics consider the effect of site-specific physical features on the implementability of a technology, such as site topography and geology, the location of buildings and underground utilities, available space, and proximity to sensitive operations. Technology screening serves a two-fold purpose of screening out technologies whose applicability is limited by site-specific waste or site considerations, while retaining as many potentially applicable technologies as possible.

Table 4.2 presents the technology-screening process. Technologies and process options judged ineffective or not implementable were eliminated from further consideration. The technologies retained following screening (see Table 4.3) represent an inventory of technologies considered most suitable for remediation of soil, sediment, or source areas at the Site and may be used alone or integrated with other technologies to develop remedial alternatives. Pilot-scale treatability studies may be required prior to final technology selection to confirm the effectiveness of a given technology.

5.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

The retained technologies identified in Table 4.3 are considered technically feasible and applicable to the waste types and physical conditions at the Site. These medium-specific technologies were assembled into potential remedial alternatives capable of achieving the RAOs. Because the media for which technologies were identified, (i.e., soil, sediment, and source areas/hot spots), are generally co-located, and because the retained technologies generally apply to two or more of these media, site-specific rather than medium-specific remedial alternatives were developed. Each of the site-specific remedial alternatives developed in the following paragraphs incorporate technologies which address the three media requiring remediation at the Site. The screening of remedial alternatives was not performed; instead, all of the alternatives developed in this Section are retained for detailed analysis in Section 6.0.

5.1 ALTERNATIVE IDENTIFICATION

5.1.1 Alternative 1: No Action

Alternative 1 was developed as a baseline against which to compare other remedial alternatives. This alternative involves no actions to protect human health or the environment and does not meet the RAOs because it lacks remedial measures that would reduce contamination at the Site. No environmental monitoring is conducted as part of this alternative.

5.1.2 Alternative 2: Limited Action

Alternative 2 for the Site consists of:

- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Institutional controls include implementing land-use restrictions and installing additional fencing and warning signs. Land-use restrictions prohibit subsurface activity and installation of drinking water wells in the area of contamination. Land-use restrictions would be implemented through legal instruments such as deeds and/or water well permitting processes. Fencing and warning signs limit human exposure to contamination at the Site. The existing site fence is expanded to encompass the entire property. Warning signs indicate potential danger of contact with site contaminants. Long-term maintenance of fencing and warning signs are included in the alternative.

Environmental monitoring includes groundwater and surface water sampling and analysis. Results would be used to evaluate natural attenuation of site contaminants and to assess continued effectiveness and protectiveness of this Alternative.

5.1.3 Alternative 3: Construction of Low Permeability Cover System

Alternative 3 consists of:

- pre-design investigations;
- construction of a low permeability cover system;
- leachate collection and disposal/treatment;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Alternative 3 includes construction of a low-permeability cover system over the landfill waste area and contaminated sediments contained in the drainage ditch. The cover system would be designed and constructed in accordance with the current New York State Solid Waste Management Facilities regulations, 6 NYCRR Part 360. The Site is a class 2 non-Resource Conservation and Recovery Act (RCRA) regulated site and, therefore, does not require a low permeability cover system designed and constructed to meet RCRA requirements. Major components of this alternative include cover system design, site preparation and mobilization, cover system construction, and long-term monitoring and maintenance.

The cover system would consist of the following components, from the waste upward:

- a subgrade fill layer of variable depth necessary to construct design cover grades;
- a gas venting layer in accordance with 6 NYCRR Part 360-2.13(p);
- a low-permeability barrier, consisting of a geomembrane in accordance with 6 NYCRR Part 360-2.13(r);

- a soil barrier protection layer in accordance with 6 NYCRR Part 360-2.13(r); and
- a topsoil, or alternative soil material, layer in accordance with 6 NYCRR Part 360-2.13(t) to maintain vegetative growth over the extent of the cover system.

Pre-design investigations would be conducted to provide site-specific data needed to conduct final design of the remedial actions. The investigations would include a shallow test pit investigation to identify the extent of landfill materials at the Site. Once the extent of the landfill cover system is identified, bulky metal surface debris would either be removed and potentially recycled, or crushed and consolidated at the base of the landfill tier embankments. The presence of steep embankment slopes at the edge of the landfill tiers would require placement of clean fill materials and/or regrading to provide a stable slope for cover system construction. Construction of the cover system requires rerouting of the drainage ditch to an area beyond the toe of the constructed cover system.

The low-permeability cover system would effectively contain the waste and reduce infiltration of precipitation and surface runoff, thus significantly reducing leaching of contaminants to groundwater. This containment feature also would prevent overland migration of soil contamination via runoff and other physical modes of transport. The cover system would greatly reduce infiltration of precipitation and increase surface runoff, thereby greatly reducing the amount of potential landfill leachate.

To address potential landfill leachate, the cover system would include a leachate collection system. The leachate collection system would consist of toe drain with subsurface drain pipes along the downgradient perimeter of the landfill material to collect contaminated groundwater and/or leachate and transport to a central location for treatment or proper disposal.

Because contamination above RGs would remain on Site, institutional controls would be implemented to prevent exposure, as described in Subsection 5.1.2 above, until the RGs are met.

Environmental monitoring would include groundwater and leachate sampling and analysis. The results would be used to evaluate natural attenuation of site contaminants and to assess the continued effectiveness and protectiveness of this Alternative. Maintenance activities would include periodic inspection and, if necessary repair of the cover system.

5.1.4 Alternative 4: Excavation and Off-site Disposal of Source Wastes

Alternative 4 consists of:

- pre-design investigations;
- excavation of contaminated sediment exceeding RGs;
- excavation of source areas (i.e., drums) and soil hot-spots;
- transportation and off-site disposal/treatment of contaminated sediment and source materials;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

This alternative consists of excavation of contaminated sediment, source areas (i.e., drums), and soil hot-spots within the landfill material and transportation to an off-site RCRA landfill for disposal. RCRA Land Disposal Regulations may require the treatment of waste prior to disposal. Excavation areas within the area of landfill waste would include identified locations of drums as documented during the RI Test Pit Investigation as well as other drums encountered during the pre-design investigation or cover construction. Confirmation sampling would be conducted during excavation activities. Analytical results for soil and sediment confirmation samples would be screened against Soil Cleanup Objectives for Protection of Groundwater Quality values and Sediment Screening Values, respectively. Following source waste removal, excavated areas would be backfilled with clean fill and re-vegetated. Excavated soil, sediment, and drums would be sampled for characterization prior to transportation for off-site treatment and/or disposal.

Because contamination above RGs may remain on-site, institutional controls would be implemented to prevent exposure, as described in Subsection 5.1.2 above, until the RGs are met.

Environmental monitoring would include groundwater and surface water sampling and analysis. The results would be used to evaluate natural attenuation of site contaminants and to assess the continued effectiveness and protectiveness of this Alternative.

5.1.5 Alternative 5: Consolidation and Construction of a Low Permeability Cover

Alternative 5 consists of:

- pre-design investigations;
- excavation of contaminated sediment exceeding RGs;
- excavation of source areas (i.e., drums);
- transportation and off-site disposal/treatment of source wastes;
- consolidation of contaminated sediment and landfill materials;
- construction of a low permeability cover system;
- leachate collection and disposal/treatment;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

This alternative consists of consolidation of landfill wastes and contaminated sediment from within the drainage ditch and/or drainage swale beneath an on-site low-permeability cover system. Compared to Alternative 3, this alternative would reduce the extent and/or volume of a required low permeability cover system through consolidation of contaminated materials, and minimize the quantity of clean fill required. This Alternative would combine the advantages of the cover system (Alternative 3) with benefits derived from source waste removal (Alternative 4). Following consolidation of landfill materials and the removal of source wastes, the low-permeability cover system would be constructed as described under Alternative 3.

Pre-design investigations would include a shallow test pit investigation to identify the extent of landfill materials, and sampling and analysis to identify the extent of contaminated sediments. Once the extent of the landfill materials is identified, bulky metal surface debris would be crushed and consolidated at the base of the landfill tier embankments. The landfill contents would then be excavated from the perimeter and consolidated within the central portion of the landfill. Excavation areas within the landfill materials would also include subsurface soil exceeding RGs located outside the proposed extent of the low-permeability cover system and remaining drums as documented during the RI Test Pit Investigation or identified during pre-design investigations or cover construction. During the consolidation of landfill materials, the steep embankment slopes at the edge of the landfill tiers would be reduced either through placement of fill or cutting of landfill materials, based upon the depth of the groundwater table and bedrock surface.

To address potential landfill leachate, the cover system would include a leachate collection system as described for Alternative 3, except that the location of the collection system for this Alternative would be based upon the final conditions following consolidation of the landfill materials.

Confirmation sampling would be conducted during excavation activities. Analytical results for soil and sediment confirmation samples would be screened against Soil Cleanup Objectives for Protection of Groundwater Quality values and Sediment Screening Values, respectively. Following excavation, excavated areas would be backfilled with clean soil and re-vegetated, as applicable.

Excavated soil and drums would be sampled for characterization prior to consolidation. At the direction of NYSDEC, the results of characterization sampling may require that select source or hot-spot materials be transported off-site for treatment and disposal.

Because contamination above RGs may remain on-site, institutional controls would be implemented to prevent exposure, as described in Subsection 5.1.2 above, until the RGs are met.

Environmental monitoring would include groundwater and leachate sampling and analysis. The results would be used to evaluate natural attenuation of site contaminants and to assess the continued effectiveness and protectiveness of this Alternative. In addition, maintenance activities would include periodic inspection and, if necessary, repair of the cover system.

5.1.6 Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes

Alternative 6 consists of:

- pre-design investigations;
- excavation of contaminated sediment exceeding RGs;
- excavation of entire landfill;

- transportation and off-site disposal/treatment of hazardous wastes;
- transportation and off-site disposal/treatment of solid wastes;
- wetlands/site restoration;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

This alternative includes excavation of the entire landfill, including source areas (i.e., drums) and soil hot-spots within the landfill material, and off-site treatment and/or disposal. Excavated soil, sediment, and drums would be sampled for characterization prior to transportation for off-site treatment and/or disposal. Drum excavation, handling, and staging would be conducted similar to Alternative 4.

Characterization samples would include hazardous waste characteristics, TCLP, and PCBs, and would be collected for every 500 cubic yards of landfill materials removed.

Excavated and/or overpacked drums, drummed soils, and excavated landfill materials would be transported off-site for treatment and/or disposal.

Because contamination above RGs may remain on-site, institutional controls would be implemented to prevent exposure, as described in Subsection 5.1.2 above, until the RGs are met.

Environmental monitoring would include groundwater sampling and analysis. The results would be used to evaluate natural attenuation of site contaminants and to assess the continued effectiveness and protectiveness of this Alternative.

5.1.7 Alternative 7: Construction of Soil Cover System

Alternative 7 consists of:

- pre-design investigations;
- construction of a 2-ft soil cover over entire landfill;
- institutional controls;
- environmental monitoring; and

- evaluation of natural attenuation processes.

Alternative 7 includes construction of a two-foot soil cover system over the landfill waste area and contaminated sediments contained in the drainage ditch. The cover system would be designed and constructed in accordance with New York State Sanitary Code Part 19.2(4) which requires that a final compacted cover of at least two feet of a suitable cover material shall be placed within one week after the final deposit of refuse (NYS, 1962). Major components of this alternative include cover system design, site preparation and mobilization, cover system construction, and long-term monitoring and maintenance.

Pre-design investigations would be conducted to provide site-specific data needed to conduct final design of the remedial actions. The investigations would include a shallow test pit investigation to identify the extent of landfill materials at the Site. Once the extent of the landfill cover system is identified, bulky metal surface debris would either be removed and potentially recycled, or crushed and consolidated at the base of the landfill tier embankments. The presence of steep embankment slopes at the edge of the landfill tiers would require placement of clean fill materials and/or regrading to provide a stable slope for cover system construction. Construction of the cover system requires rerouting of the drainage ditch to an area beyond the toe of the constructed cover system.

The cover system would effectively contain the waste and provide some reduction of infiltration of precipitation and surface runoff, thus reducing leaching of contaminants to groundwater. This containment feature also would prevent overland migration of soil contamination via runoff and other physical modes of transport.

Because contamination above RGs would remain on Site, institutional controls would be implemented to prevent exposure, as described in Subsection 5.1.2 above, until the RGs are met.

Environmental monitoring would include groundwater and leachate/surface water sampling and analysis. The results would be used to evaluate natural attenuation of site contaminants and to assess the continued effectiveness and protectiveness of this Alternative. Maintenance activities would include periodic inspection and, if necessary repair of the soil cover.

6.0 DETAILED ANALYSIS OF ALTERNATIVES

This section presents the detailed analyses of remedial action alternatives for the Site. The detailed analysis is intended to provide decision-makers with the relevant information with which to aid in selection of a site remedy. The detailed description of technologies or processes used for each alternative includes, where appropriate, preliminary site layouts and a discussion of limitations, assumptions, and uncertainties for each component. The descriptions provide a conceptual design of each alternative and are intended to support alternatives-comparison and cost-estimation.

The detailed analysis of each alternative includes evaluation using the seven evaluation criteria outlined in TAGM #4030 "Selection of Remedial Actions at Inactive Hazardous Waste Sites" (NYSDEC, 1990). The criteria are identified in the following paragraphs.

Compliance with New York SCGs. How the alternative would comply with applicable or relevant and appropriate federal regulations and New York SCGs. Chemical-specific SCGs were identified in Subsection 1.4.5; Location- and Action-specific SCGs were identified in Subsection 2.3 of this report. Additional Action-specific SCGs are identified in this Section.

Overall Protection of Human Health and the Environment. How each alternative protects human health and the environment. This evaluation is based on a composite of factors assessed under other evaluation criteria, especially long- and short-term effectiveness and compliance with SCGs.

Short-term Impacts and Effectiveness. Impacts on the community, workers, and environment during the construction phase of each alternative until RAOs are met. Includes the time required to complete the remedial action.

Long-term Effectiveness and Permanence. Effectiveness of alternatives in protecting human health and the environment after RAOs are met. Includes an evaluation of the permanence of the alternative, the magnitude of residual risk, and the adequacy and reliability of controls required to manage wastes or residuals remaining at the site.

Reduction of Toxicity, Mobility, and Volume. Reduction in toxicity, mobility, or volume of hazardous material through treatment. The irreversibility of the treatment process and the type and quantity of residuals remaining after treatment are also evaluated.

Implementability. Technical and administrative feasibility of implementing the alternative and the availability of required services and materials.

Cost. Provides an estimate of the direct capital, indirect, operation and maintenance, and total present-worth cost of implementing the alternative.

Costs are intended to be within the target accuracy range of minus 30 to plus 50 percent of actual cost (USEPA, 1988). Costs are presented as a present worth and as a total cost for up to a 30-year period, in accordance with TAGM #4030.

A summary of the costs for each alternative and identifying capital and net present worth (NPW) costs are included in each alternative's cost description. Each cost estimate includes a present worth analysis to evaluate expenditures that occur over different time periods. The analysis discounts future costs to a NPW and allows the cost of remedial alternatives to be compared on an equal basis. NPW represents the amount of money that, if invested now and disbursed as needed, would be sufficient to cover costs associated with the remedial action over its planned life. Consistent with USEPA guidance (USEPA, 2000), a discount rate of 3.1 percent was used to prepare the cost estimates (OMB, 2005).

Each cost estimate includes the following indirect costs, consistent with TAGM #4030:

- engineering at 10 percent of direct capital costs;
- health and safety at 5 percent of direct capital costs;
- legal, administration, and permitting at 5 percent of direct capital costs; and
- services during construction at 10 percent of direct capital costs; and
- a contingency to account for unforeseen project complexities such as adverse weather, the need for additional and unexpected site characterization, and increased construction standby times at 25 percent of direct capital costs.

Each cost estimate includes the following operation and maintenance and periodic cost items:

- administrative costs at 5 percent of annual or periodic costs; and

- contingency to account for unforeseen project complexities, insurance, taxes, and licensing costs, at 25 percent.

Details and assumptions pertaining to the cost estimates are also included in each alternative's cost description. In addition to the alternative-specific assumptions, the following cost assumptions were applied, as applicable:

- A Work Plan would be prepared prior to alternative implementation detailing the proposed activities.
- Excavations would be completed with minimum 2:1 sideslopes.
- Eight additional monitoring wells would be installed, and would be included in long-term monitoring of the Site.
- Fencing and signs would incur maintenance costs every five years over 30 years.
- A Site Closure Report would be prepared following remedy implementation, and would describe the proposed long-term monitoring program.
- Long-term activities would be conducted for 30 years.
- Quarterly monitoring of groundwater, surface water, and/or sediment would be required for the first five years following remedy implementation, after which the frequency would be reduced. It is assumed that after the first five years the frequency would then be reduced to semi-annually for year six through ten and to annually thereafter for a total of 30 years.
- Ten percent of samples would be collected in duplicate and analyzed off-site for quality assurance/quality control purposes.
- Data evaluation reports would be prepared on an annual basis, presenting long-term monitoring results, evaluation of the continued effectiveness of institutional controls, and evaluation of the natural attenuation of site contaminants.
- Institutional control inspections would be conducted every five years over 30 years.

The following remedial alternatives were retained in Section 5.0:

Alternative 1: No Action

Alternative 2: Limited Action

Alternative 3: Construction of Low Permeability Cover System

Alternative 4: Excavation and Off-site Disposal of Source Wastes

Alternative 5: Consolidation and Construction of a Low Permeability Cover System

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes

Alternative 7: Construction of Soil Cover System

6.1 ALTERNATIVE 1: NO ACTION

No actions would be conducted as part of this alternative. Alternative 1 was developed as a baseline against which to compare other remedial alternatives.

The following paragraphs present an assessment of Alternative 1 based upon the seven criteria identified above.

Compliance with New York SCGs. The No Action Alternative would not comply with New York SCGs.

Overall Protection of Human Health and the Environment. Site-specific RAOs for protection of human health and the environment were developed for soil, surface water, sediment, and source areas. The No-Action Alternative would not provide any additional protection of human health and the environment compared to present conditions.

Short-term Impacts and Effectiveness. No construction activities would be implemented for the No-Action Alternative; therefore, no short-term impacts or effects on the community, workers, or the environment would occur.

Long-term Effectiveness and Permanence. The remedial action objectives would not be met if the No-Action Alternative were implemented at the Site. This alternative would not provide long-term effectiveness.

Reduction of Toxicity, Mobility, and Volume. Because no processes would be used to treat waste or contaminated media at the Site, no reduction of toxicity, mobility, or volume of site contaminants would be achieved through treatment. Natural attenuation processes would be expected to result in the reduction of the toxicity, mobility, and volume of site contaminants over time.

Implementability. Although, no services or materials would be required to implement the No-Action Alternative, obtaining approval for the No-Action Alternative at the Site would be difficult.

Cost. The cost of this Alternative is $0. No remedial actions, institutional controls, or environmental monitoring would be conducted.

6.2 ALTERNATIVE 2: LIMITED ACTION

Alternative 2 includes long-term environmental monitoring. The major components of Alternative 2 are the following:

- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Alternative 2 would protect human health and the environment by limiting access to Site contaminants.

Institutional Controls. Institutional controls in the form of deed and land-use restrictions would be implemented to restrict future site use, thereby limiting the potential for exposure to site contaminants. A chain-link fence with warning signs would be installed around the site to limit access by trespassers. Although investigations have concluded that groundwater presents minimal health risk to human health and the most likely future use of the site is non-residential, institutional controls would be implemented to prohibit groundwater use within and around the Site as an added safety measure. The controls would be drafted, implemented, and enforced in cooperation with the site owner, state, and local governments. Operation and maintenance activities would include routine repairs to the fence and signs.

Environmental Monitoring. An environmental monitoring program would be implemented to evaluate the effectiveness of the remedial action for controlling groundwater and surface water contamination. A detailed plan would be developed and submitted for NYSDEC review and approval before implementation.

Environmental monitoring would involve routine, periodic sampling of groundwater, sediments, and leachate/surface water. Results of environmental monitoring would be used to evaluate natural attenuation of site contaminants and to assess continued effectiveness and protectiveness of this Alternative.

The following paragraphs present an assessment of Alternative 2 based upon the seven criteria identified above.

Compliance with Federal and State SCGs. Alternative 2 does not include any remedial actions to remove contamination or to prevent the leaching of contaminants to groundwater; therefore, Alternative 2 would not meet Chemical-Specific SCGs. Alternative 2 includes access restrictions and land-use restrictions to minimize exposure to contaminants at the Site. Land-use restrictions would not trigger Location- and Action-Specific SCGs; and the construction of fencing and warning signs would be conducted without impacts to the drainage swale, which is a potential wetland.

Overall Protection of Human Health and the Environment. This Alternative provides protection of human health and the environment through restricting access to and use of the Site. Risks to wildlife from contaminants at the Site would be minimized for some receptors, such as larger mammals, but this Alternative would not prevent all wildlife exposures at the Site. Some decrease in contaminant levels due to natural attenuation and transport processes would result in an increase in protection of the environment over time. However, the time period required to reduce risks to acceptable levels is not known. Continuation of the limited protection of human health and the environment would be contingent upon long-term maintenance of fencing and signs, enforcing land-use restrictions, and environmental monitoring.

Short-term Impacts and Effectiveness. Implementation of land-use restrictions, construction of fencing, and placement of warning signs would not result in short-term impacts to human health or the environment. The time for implementation of Alternative 2 is approximately 1 year.

Long-term Effectiveness and Permanence. This Alternative would provide long-term effectiveness as long as institutional controls are maintained. Some decrease in contaminant levels due to natural attenuation and transport processes would occur over time; however, the time period required to achieve RGs is formidable (probably decades).

Reduction of Toxicity, Mobility, and Volume. This Alternative would not include actions to reduce the toxicity, mobility, or volume of hazardous material through treatment. Natural attenuation processes would be expected to result in the reduction of the toxicity, mobility, and volume of site contaminants over time.

Implementability. No innovative technologies would be used as part of this Alternative. Required services or materials required to implement this Alternative are readily available. Coordination with state and federal agencies would be required; however, due to the remoteness of the Site, implementation of land-use restrictions would not likely be difficult. This Alternative would not interfere with other potential remedial actions at the Site.

Cost. The capital cost of this Alternative is $182,000. The NPW of this Alternative is $1,400,000. In addition to the assumptions and components of this Alternative as discussed above, the following assumptions were made:

- Sampling events will include collection and off-site analysis of surface water and groundwater samples from existing and proposed sample locations. Two surface water samples for VOCs and metals analysis and fourteen groundwater samples for VOCs, natural attenuation parameters, and metals analysis are planned.

6.3 ALTERNATIVE 3: CONSTRUCTION OF LOW PERMEABILITY COVER SYSTEM

Alternative 3 includes capping of buried wastes and contaminated sediment and long-term environmental monitoring. The major components of Alternative 3 are the following:

- pre-design investigations;
- site preparation/mobilization;
- construction of a low permeability cover system;
- leachate collection and disposal/treatment;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Alternative 3 would protect public health by constructing a low-permeability cover system in accordance with 6 NYCRR Part 360-2 requirements for design and construction of a low permeability cover system.

Pre-Design Investigations. Pre-design investigations would be conducted to provide site-specific data for final design of the remedial actions. The investigations include a geotechnical boring program to identify the extent of landfilled materials at the Site and more accurately characterize subsurface conditions, and identification of on-site wetlands. Geotechnical data would provide the necessary information to assess final cover slope stability and identify engineering requirements that may be necessary as part of the design to prevent slope failure. If on-site wetlands are identified and it is determined that impacts to the wetlands as a result of remedy implementation are likely, the Work Plan would include a Wetlands Restoration Specification (WRS).

Site Preparation and Mobilization. Site preparation and mobilization would include activities required to prepare the site for construction such as delivery and setup of site trailers, temporary utilities, and civil work including clearing trees, grubbing stumps, and grading and relocating waste material. Layout of the cap would be surveyed during this period.

Construction of a Low Permeability Cover System. Alternative 3 includes a low permeability cover designed in accordance with 6 NYCRR Part 360-2, Landfills (NYSDEC, 1999d), and in accordance with sound engineering design practices. The objectives of the low-permeability cap design are to: 1) comply with 6 NYCRR Part 360-2; 2) minimize infiltration of precipitation through landfill wastes into groundwater; 3) promote surface drainage; and 4) separate waste from animals and insects. The proposed cap extent is approximately 4.3 acres (see Figure 6.1). A permanent access road would be constructed along the western side of the cover system, providing access to the southernmost extent of the landfill.

As part of final remedial design, settlement of the landfill as a result of cover system placement would be estimated. This analysis would consider both consolidation of the waste and subgrade as a result of the additional weight of the cover system and effect on the groundwater table associated with reduced infiltration. Additionally, the effect of potential subsidence on the integrity of the cover system and methods to minimize long-term settlement of the cap would be evaluated.

6 NYCRR Part 360-2 recommends a low-permeability cover system composed of a vegetative cover layer, a barrier protection layer, a low-permeability barrier, and a landfill gas venting system. A cross-section of the proposed cap is shown in Figure 6.2. Preliminary modeling results suggest a

70 percent reduction in percolation through the landfill as a result of the construction of a low-permeability cover (see Appendix C.3).

The landfill would be graded and fill material would be placed to achieve a minimum grade of 4 percent to promote positive drainage and a maximum grade of 33 percent to ensure stability for the final cover system. Bulky metal surface debris (i.e., cars, appliances) and empty drums would be crushed and consolidated within the landfill.

A gas venting system would be placed above the clean fill. The gas vent layer would consist of a minimum 12 inches of soil having a hydraulic conductivity of at least 1 x 10^{-3} centimeters per second (cm/sec) and a maximum of 10 percent by weight passing the No. 200 sieve after placement. A soil or geosynthetic filter layer would be installed below this layer (a filter layer is not required above the gas venting layer when a geomembrane is used) to inhibit the migration of finer material into or out of the layer. For cost-estimating purposes, it was assumed that a geosynthetic filter would be installed beneath the gas venting layer. Gas venting risers would be placed one per acre of cover system, installed a minimum of five feet into the waste and extending three feet above final grade of the cover system. The vents would be constructed of 6-inch diameter pipe, with gooseneck cap, or equivalent, and perforated within the gas venting layer. Gas venting risers would be backfilled with rounded stone or other acceptable porous media. Anti-seep collars would be installed on the vent pipe within the hydraulic barrier layer and the geomembrane would be attached to the vent with a pipe boot.

A low-permeability barrier would be placed above the gas vent system. The barrier would have a maximum average hydraulic conductivity of 1 x 10^{-7} cm/sec and consist of a synthetic membrane at least 40 mils (60 mils for geomembranes constructed of high density polyethylene) thick.

A 24-inch-thick barrier protection layer of soil would overlie the hydraulic barrier to protect it from burrowing animals and climatic effects. A vegetative topsoil layer of at least 6 inches would overlie the barrier protection layer to promote vegetative growth and help prevent erosion of the cap. The final slope of the cap surface would have a minimum grade of 4 percent to promote positive drainage. Sideslopes would have a maximum grade of 33 percent to prevent erosion. Surface water drainage would be directed off the cap to surface water collection ditches along the eastern and western sides of the cap, ultimately discharging to the on-site drainage ditch.

If construction activities impact a wetland area (the drainage swale is a potential wetland), the area would need to be restored according to an appropriate WRS. Restoration of wetlands would reduce the long-term impacts of activities in and adjacent to the wetlands; compensate for losses of wetland habitats; restore or replace degraded wetlands; and meet state and federal permitting and regulatory guidelines and requirements.

A leachate collection system, consisting of a toe drain along the downgradient perimeter of the waste, is assumed to be required to intercept contaminated leachate and/or groundwater. If, during design, it is determined that leachate/groundwater storage capacity is required, an appropriately sized storage system would be constructed to facilitate the disposal/treatment of contaminated leachate/groundwater.

Leachate Collection and Disposal/Treatment. If necessary, collected leachate would be treated on-site and discharged, transported off-site for discharge to a publicly owned treatment works (POTW), or discharged on-site without treatment. This determination would be made based upon analytical results for the leachate, and may be altered if leachate characteristics change. For purposes of cost estimating, it is assumed that leachate would be collected by 5,000-gallon tanker truck on a monthly basis and transported off-site for disposal at a POTW.

Institutional Controls. Institutional controls in the form of deed and land-use restrictions would be implemented to restrict future site use, thereby limiting the potential for exposure to site contaminants. A chain-link fence with warning signs would be installed around the site to limit access by trespassers. Although investigations have concluded that groundwater presents minimal health risk to human health and the most likely future use of the site is non-residential, institutional controls would be implemented to prohibit groundwater use within and around the Site as an added safety measure. The controls would be drafted, implemented, and enforced in cooperation with the site owner, state, and local governments. Operation and maintenance activities would include routine repairs to the fence and signs.

Environmental Monitoring. An environmental monitoring program similar to Alternative 2 would be implemented. Environmental monitoring would involve the routine, periodic sampling of groundwater and leachate/surface water.

Monitoring of wetland restoration, if any, would determine the success of the project and compliance with permitted project goals. Monitoring requirements would be defined in the WRS and would include an evaluation of restored wetland functions and values, water levels, sedimentation, wildlife utilization, and a variety of vegetative parameters. For cost-estimating purposes, it was assumed that restoration monitoring would include semi-annual (spring and fall) site inspections. An annual report would be submitted to the appropriate regulatory agency. A detailed monitoring plan for these long-term activities would be developed during final design.

The following paragraphs present an assessment of Alternative 3 based upon the seven criteria identified above.

Compliance with New York SCGs. The major component of this alternative, the low permeability cover system, would be designed to meet the performance criteria set forth under 6 NYCRR Part 360-2. Location-specific SCGs for Alternative 3 would be those regulations associated with wetlands. It may be difficult to implement this alternative without impacting potential wetlands. Activities conducted in wetlands may require approval and permits from both the USACE and the NYSDEC Department of Fish and Wildlife (DFW). Groundwater conformance will take more than what may be considered reasonable (i.e., 30 years); however, compliance with Chemical-specific SCGs for groundwater was not identified as an RAO.

Overall Protection of Human Health and the Environment. Alternative 3 would protect human health and the environment by constructing a low-permeability cover system in accordance with 6 NYCRR Part 360-2. The low-permeability cap would enhance surface runoff and reduce the amount of water infiltrating through waste material. It is anticipated that the reduction in infiltration would prevent groundwater flow through buried wastes. Institutional controls would prevent ingestion of on-site groundwater and disturbance of the cap. To ensure continued protection of human health and the environment, environmental monitoring would be required. Because this alternative would reduce infiltration through waste material, discharge of contaminated leachate and shallow groundwater to surface water and sediment would be reduced. Therefore, surface water and sediment quality, as well as groundwater quality, would improve over time.

Short-term Impacts and Effectiveness. Remedial construction activities are not likely to adversely affect the local community. An increase in truck traffic near the site would be expected during hauling of materials for cap construction. Truck beds would be covered to minimize the possibility of material loss onto roadways and generation of dust. Initial grading of the cap area may produce nuisance dust. Ambient air monitoring for respirable dust would be conducted during remedial construction and engineering controls for dust suppression can be easily implemented if action levels are exceeded.

Significant temporary impacts to the environment are not expected, with the exception of earthwork that would be required along the east side of the landfill in or near the potential wetland.

A remedial action Health and Safety Plan (HASP) would be followed to minimize risks to workers during remedial construction. Although most of the work should not require levels of protection greater than Level D, the HASP would outline situations when an upgrade of personal protective equipment would be necessary.

Hazards associated with heavy equipment use can be minimized by following Occupational Safety and Health Administration (OSHA) guidelines. These risks would be minimized by fencing around the site and proper site security.

The time for implementation of Alternative 3 is approximately 1.5 to 2 years.

Long-term Effectiveness and Permanence. Because wastes would remain on-site and untreated, Alternative 3 is not considered a permanent remedy. Capping is considered a control and isolation technology in the hierarchy of technologies described in the TAGM #4030 “Selection of Remedial Actions at Inactive Hazardous Waste Sites” (NYSDEC, 1990). The cap would provide long-term effectiveness if maintained.

Environmental monitoring and site inspections would be used to assess the long-term fate and migration of site-related chemical contamination. For cost-estimating purposes, it was assumed that additional monitoring wells would be installed to monitor chemicals in groundwater. The final environmental monitoring program would be developed during the remedial design and may or may not include additional wells and/or piezometers.

The low-permeability cap would enhance runoff and reduce the amount of water infiltrating through waste material, reducing leaching to groundwater and the production of leachate. Institutional controls would prevent ingestion of groundwater on-site and disturbance of the cap.

Periodic post-closure inspections would be conducted to check for burrow holes created by animals, cracking, or subsidence. If the holes are believed deep enough to penetrate the liner, the cap may need to be reconstructed in that area. The grass would be mowed and reseeded as necessary. Inspection and maintenance of the cap system would be addressed in the operation and maintenance plan which would be developed during the remedial design and reviewed and approved by appropriate regulatory agencies.

Reduction of Toxicity, Mobility, and Volume. There would be no reduction of toxicity, mobility, or volume of soil or sediment contaminants through treatment. This Alternative would include treatment of leachate, as necessary, thereby reducing the toxicity, mobility, and volume of leachate and shallow groundwater contamination. Natural attenuation processes would be expected to result in reduction of the toxicity, mobility, and volume of site contaminants over time.

Implementability. Capping is a well-developed technology for landfill closure and has been used at numerous Superfund sites and municipal landfills. Construction techniques used for cap construction would not be difficult to implement. Delays due to technical problems would be unlikely or minimal.

Coordination between the NYSDEC and the USACE may be required to get the necessary approvals for work in the potential wetland. Seaming during geomembrane placement would involve quality control and quality assurance procedures to ensure the effectiveness of the seams. Manufacturers typically have patented approaches as to how they perform the welding for their particular product. Therefore, placement of the geomembrane must be done by a manufacturer certified installer under their quality assurance policy.

Contractors to perform the construction services (including placement and testing of the geomembrane) required for this alternative are available and several could be included in a competitive bidding process.

Cost. The capital cost of this Alternative is $1,500,000. The NPW of this Alternative is $3,200,000. In addition to the assumptions and components of this Alternative as discussed above, the following assumptions were made:

- Each long-term sampling event will include collection and off-site analysis of leachate for VOCs and metals analysis and fourteen groundwater samples for VOCs, natural attenuation parameters, and metals analysis.
- During grading activities associated with cover system construction, six drums will be encountered, removed, sampled and analyzed for hazardous waste characteristics, TCLP, and PCBs for characterization purposes, overpacked, and transported off-site for disposal as hazardous waste.
- Approximately 60,000 gallons of leachate per year will be collected and transported off-site for disposal at a POTW.

The NPW of this Alternative could be significantly different if the following conditions occur:

- Leachate volume collected is significantly different.
- The extent of landfilled waste is significantly different.

6.4 ALTERNATIVE 4: EXCAVATION AND OFF SITE DISPOSAL OF SOURCE WASTES

Alternative 4 is a more aggressive approach to remediation of the Site aimed at eliminating the source of groundwater, surface water, and sediment contamination at the Site. The major components of Alternative 4 are the following:

- pre-design investigations;
- site preparation/mobilization;
- excavation of contaminated sediment exceeding RGs;
- excavation of source areas (i.e., drums) and soil hot spots;
- transportation and off-site disposal/treatment of contaminated sediment and source materials;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Alternative 4 would reduce risks to public health and the environment by transferring source wastes to a regulated NYSDEC-approved landfill.

Pre-Design Investigations. Pre-design investigations would be conducted similar to Alternative 3 to provide site-specific data for final design of the remedial actions, If on-site wetlands are identified and it is determined that impacts to the wetlands as a result of remedy implementation are likely, the Work Plan would include a WRS.

Site Preparation/Mobilization. Site preparation and mobilization for Alternative 4 would be similar to that described in Subsection 6.3 for Alternative 3, with the exception of regrading, which would not be conducted under this Alternative.

Excavation of Contaminated Sediment. Contaminated sediment within the drainage ditch would be excavated for off-site disposal. The actual extent of contaminated sediment to be excavated would be based upon pre-design investigation results. For FS cost-estimating purposes, it is assumed that one foot of sediment from the entire length of the drainage ditch and three feet wide would be excavated using a using a large excavator or crane equipped with a dragline. Excavated sediment would then be stockpiled for sampling and analysis prior to transportation for off-site treatment and/or disposal. Excavated material would be loaded into 20 cubic yard dump trucks for transport to a secure landfill. Excavation would proceed from downgradient to upgradient. The volume of contaminated sediment that would be excavated is estimated to be 100 cubic yards. This estimate is based on the areal extent of the drainage ditch (299 square yards) and an assumed average depth of fill of 1 foot. To facilitate excavation, dewatering and surface water controls may be required; however, for FS cost estimating purposes dewatering was not evaluated because flow in the drainage ditch is intermittent and would not likely be required during sediment removal. Confirmation sampling would be conducted during excavation activities. Analytical results for sediment confirmation samples would be compared to RGs, based upon Sediment Screening Values. Following contaminated sediment removal, excavated areas would be backfilled with clean granular fill.

Excavation of Source Areas. Source areas (i.e., drums) and soil hot-spots within the landfill material would be excavated for off-site disposal. The extent of proposed excavation areas within the landfilled waste include identified or suspected locations of remaining drums as documented during the RI Test Pit Investigation, additional drums encountered during the pre-design investigations or drum removal activities, and soil source areas encountered during the removal action. Eleven test pit locations were flagged as possible locations of remaining drums (TP-5, 10, 11, 12, 13, 20, 21, 40, 45, 49, and 50). Additionally, soil at five test pit locations (TP-1, 11, 18, 38, and 39) exceeds RGs. Soil excavation would proceed to the original dimensions of these test pits with soil stockpiled for sampling and analysis prior to transportation for off-site treatment and/or disposal. The volume of contaminated soil is based upon the original excavation extent of the test pits identified for excavation, an estimated 500 cubic yards.

Drum staging would be conducted within the existing drum staging area. The existing drum staging area consists of a secure area with a six-foot high chain link fence and locking gate, which was constructed during the RI Test Pit Investigation to stage removed drums. Fencing prevents unauthorized access to the Site and secures the existing entrance to the landfill access road. The existing drum staging area is large enough to accommodate staged drums, overpacked drums, bulk soil containers, and other equipment that may be required for waste sampling, compositing, and/or bulking for disposal. A temporary decontamination pad would be established where heavy equipment and tools could be decontaminated by steam cleaning. The decontamination pad would not be lined; the minimal amount of runoff generated by steam cleaning would infiltrate into the soil. The pad would be situated and constructed to minimize erosion resulting from steam cleaning.

Drum removal would be conducted with an excavator, with excavation conducted to minimize impact to buried drums (i.e., hand excavation around drums). For cost estimating purposes, it has been assumed that the required extent of excavation would be based upon the original excavation extent of the test pits where additional drums are expected. Once a drum is exposed, its integrity would be determined, and the drum would be removed and over-packed. Empty drums, if encountered, would be crushed and buried in the excavations. The overpacked drums would be labeled, field tested for pH and visual characteristics to determine waste streams, then grouped by waste stream within the staging area.

If, during drum removal, free product, elevated PID readings, or other substantial evidence of contamination is observed (e.g., odors or visual staining), soils within the excavation would be segregated for disposal within the staging area.

At each of the eleven discrete drum location or drum nest, and for each of the five additional locations proposed for contaminated soil excavation, three grab confirmation samples of soil would be collected. Soil from drum locations would be analyzed for VOCs, while soil from contaminated soil locations would be analyzed for SVOCs. Analytical results for soil confirmation samples would be compared to Soil Cleanup Objectives for Protection of Groundwater Quality values. Following source waste removal, excavated areas would be backfilled, covered with clean fill, and re-vegetated.

The excavated soil and each of the stockpiled drums would be sampled for characterization prior to transportation for off-site treatment and/or disposal. Characterization samples would include hazardous waste characteristics, TCLP, and PCBs.

Transportation and Off-site Disposal. Excavated and/or overpacked drums and drummed soils would be transported off-site for disposal. Disposal options would include:

- stabilization and landfill disposal of RCRA regulated solids;
- landfill disposal of RCRA regulated solids; and
- landfill disposal of Solid Waste regulated solids.

Site Restoration. The Site would be restored to a condition consistent for its selected future land use. For cost-estimating purposes, it was assumed that the excavated area would be filled and regraded to enable revegetation of the area to prevent erosion. If an excavated area is designated as a wetland (the drainage swale is a potential wetland), the area would need to be restored according to an appropriate WRS. Restoration of wetlands will reduce long-term impacts of activities in and adjacent to the wetlands; compensate for losses of wetland habitats; restore or replace degraded wetlands; and meet state and federal permitting and regulatory guidelines and requirements.

Institutional Controls. Institutional controls would be implemented as described in Subsection 6.2 for Alternative 2. However, controls would be required only until results of environmental monitoring indicate that the site no longer poses any unacceptable risks to public health.

Environmental Monitoring. An environmental monitoring program similar to that described in Subsection 6.2 for Alternative 2 would be included as part of Alternative 4. Additionally, monitoring of wetland restoration would be conducted as presented for Alternative 3 (see Subsection 6.3, Environmental Monitoring).

The following paragraphs present an assessment of Alternative 4 based upon the seven criteria identified above.

Compliance with New York SCGs. The significant action-specific regulations associated with this alternative are those associated with the transportation of drums and landfill wastes and the regulatory status of the receiving treatment and/or disposal facility. Transportation of the drums and wastes would be subject to 6 NYCRR Part 364: Waste Transporter Permits. Compliance with these requirements can be attained by contracting with a licensed hauler. The receiving facility(s) would need to be properly permitted for handling, treatment, and/or disposal of the wastes in accordance with 6 NYCRR Part 373: Hazardous Waste Management Facilities or 6 NYCRR Part 360: Solid Waste Management Facilities, as applicable. The requirement for treatment prior to disposal would be made in accordance with these regulations and with 6 NYCRR Part 376: Land Disposal Restrictions.

Location-specific SCGs are those regulations associated with wetlands. Because of the close proximity of wetlands to the landfill, activities associated with excavating the sediment materials may necessitate some work in the potential wetlands. Any activities conducted in wetlands may require approval and permits from both the USACE and the NYSDEC DFW.

Groundwater conformance will take more than what may be considered reasonable (i.e., 30 years); however, compliance with Chemical-specific SCGs for groundwater was not identified as an RAO.

Overall Protection of Human Health and the Environment. Because Alternative 4 includes removal of source wastes at the Site, it is expected to provide long-term protection of human health and the environment. Treatment and/or disposal of the source waste in a properly designed off-site facility would provide control of migration of chemicals from the wastes. Short-term impacts are expected, including dust, odors, noise, and additional truck traffic during remedial action. Site restoration would be implemented to make the site suitable for its selected future use. Institutional controls would be implemented to prevent contact with contaminated groundwater.

Short-term Impacts and Effectiveness. Alternative 4 may have short-term impacts on the local community. Truck traffic would increase near the site because waste material would be transported from the site to an off-site facility. Odors from exposed waste material could be released during excavation and loading of trucks. Nuisance dust during excavation would be controlled through engineering controls. The site would be fenced during construction to discourage trespassers.

Excavation may be required in and adjacent to the potential wetland to the east of the landfill. Therefore, some effects on the potential wetlands could be expected; however, these effects would be mitigated after construction through site restoration activities. Silt fencing would be used to minimize releases from the site.

A remedial action HASP would be implemented to minimize risks to workers during remedial construction. The HASP would describe proper monitoring procedures and how to determine when upgrading to a higher level of protection would be required. Because this alternative would involve excavating the waste material and drums, special considerations should be given to the various types of wastes likely to be exposed at the site.

The time for implementation of Alternative 4 is approximately 1.5 to 2 years.

Long-term Effectiveness and Permanence. Land disposal of wastes is lowest on the NYSDEC hierarchy of preferred technologies, and would therefore not be considered a permanent remedy as defined in Section 2.1(c) of the TAGM #4030 “Selecting Remedial Actions at Inactive Hazardous Waste Sites” (NYSDEC, 1990). However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal. Treatment of wastes at a permitted facility would be considered permanent.

Sources of sediment, surface water, leachate, and groundwater contamination would be removed from the site. Therefore, Alternative 4 would be expected to substantially reduce risks to public health and the environment.

Environmental monitoring and site inspections would be used to assess the long-term fate and migration of groundwater contamination. For FS cost-estimating purposes, it is assumed that additional monitoring wells would be installed to monitor chemicals in shallow groundwater. The final environmental monitoring program would be developed during the remedial design and may or may not include additional wells and/or piezometers.

Reduction of Toxicity, Mobility, or Volume. For landfill wastes disposed at an off-site landfill, no reduction of toxicity, mobility, or volume would occur. However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal, which would result in a reduction in toxicity, mobility, and volume.

Implementability. The techniques that would be used for sediment and landfill waste excavation and drum removal are well-developed and commonly used and therefore not difficult to implement. Treatment and/or disposal of wastes at a permitted landfill would be conducted in accordance with 6 NYCRR Part 373: Hazardous Waste Management Facilities, 6 NYCRR Part 360: Solid Waste Management Facilities, and/or 6 NYCRR Part 376: Land Disposal Restrictions, as applicable. The treatment and/or disposal techniques and any required permitting are not anticipated to be difficult to implement. Although future remedial actions at the site would be unlikely, they would not be made more difficult to implement.

Because of the potential wetland, coordination between the USACE, NYSDEC DFW, and the design contractor may be required to obtain the necessary approvals and permits for wetlands alteration and a site restoration plan.

Contractors to provide the excavation and transportation services required for Alternative 4 are available and several would be included in a competitive bidding process. Permitted and available treatment and/or disposal facilities are anticipated to be available.

Cost. The capital cost of this Alternative is $1,600,000. NPW of this Alternative is $2,700,000. In addition to the assumptions and components of this Alternative as discussed above, the following assumptions were made:

- Each long-term sampling event will include collection and off-site analysis of surface water and groundwater samples, and will include: two surface water samples for VOCs and metals analysis and fourteen groundwater samples for VOCs, natural attenuation parameters, and metals analysis.
- Two drums will be removed, overpacked, and transported off-site for disposal/treatment from each of the eleven identified test pit locations;
- An additional soil source area (100 cubic yards) will be encountered and removed and transported off-site for disposal/treatment; and
- Drums, sediment, and soil transported off-site will be disposed as hazardous waste.

The NPW of this Alternative could be significantly different if the following conditions occur:

- Additional or larger source areas, including drums and soil contamination are encountered. The capital cost associated with excavation and disposal of contaminated soil and drums is approximately $800,000.

6.5 ALTERNATIVE 5: CONSOLIDATION AND CONSTRUCTION OF A LOW PERMEABILITY COVER SYSTEM

Alternative 5 combines the source area and hot-spot removal aspects of Alternative 4 and the capping of buried wastes associated with Alternative 3. This combination reduces the costs associated with construction of a low permeability cover system as proposed under Alternative 3 by consolidating waste within a smaller area and adding the benefits derived from source waste removal. The major components of Alternative 5 are the following:

- pre-design investigations;
- site preparation/mobilization;
- excavation of contaminated sediment exceeding RGs;
- excavation of source areas (i.e., drums) and soil hot-spots;
- transportation and off-site disposal/treatment of source wastes;
- consolidation of contaminated sediment and landfill materials;
- construction of a low permeability cover system;
- leachate collection and disposal/treatment;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Pre-Design Investigations. Pre-design investigations would be conducted similar to Alternative 3 (see Subsection 6.3) to provide site-specific data needed to conduct final design of the remedial actions. Additionally, sediment sampling would be conducted similar to Alternative 4.

Site Preparation/Mobilization. Site preparation and mobilization activities for Alternative 5 would be similar to those described in Subsection 6.3 for Alternative 3, and would also include construction of temporary access roads capable of supporting heavy equipment over the landfill similar to Alternative 4.

Excavation of Contaminated Sediment. Contaminated sediment within the drainage ditch would be excavated similar to Alternative 4. Unlike Alternative 4, the excavated sediments would be consolidated under the low permeability cover, rather than disposed off-site. Other assumptions and methodologies described under Alternative 4 would apply.

Excavation of Source Areas. Source areas (i.e., drums) and soil hot-spots within the landfill material would be excavated for off-site disposal similar to Alternative 4.

Transportation and Off-site Disposal. Excavated and/or overpacked drums and contaminated soils would be transported off-site for disposal similar to Alternative 4.

Consolidation of Contaminated sediment and Landfill Materials. Following source removal, landfilled material would be excavated from the lower perimeter, where waste thickness is generally 3 feet or less, and consolidated within the central portion of the landfill (see Figure 6.3). Excavated areas would be backfilled with clean fill. For FS cost estimating purposes, the volume of landfill waste to be relocated is based upon subgrade fill requirements for Alternative 3 (approximately 2,000 cubic yards), which will result in final grades similar to Alternative 3; though the cover system footprint would be reduced to 3.3 acres. Empty drums, if encountered, and bulky metal surface debris (i.e., cars, appliances) would be crushed and buried within the consolidated landfill materials.

A low permeability cover system similar to that of Alternative 3 would be constructed over the consolidated landfill. The cover system would include a leachate collection system similar to that of Alternative 3, consisting of a toe drain along the downgradient perimeter of the consolidated landfill.

Site Restoration. Disturbed areas outside the extent of the consolidated landfill cover system would be restored similar to Alternative 4. If an excavated or disturbed area is designated as a wetland the area would be restored according to a WRS similar to Alternative 4.

Institutional Controls. Institutional controls would be implemented as described in Subsection 6.2 for Alternative 2. However, controls would be required only until results of environmental monitoring indicate that the site no longer poses unacceptable risk to public health.

Environmental Monitoring. An environmental monitoring program similar to that described in Subsection 6.3 for Alternative 3 is included as part of Alternative 5.

The following paragraphs present an assessment of Alternative 5 based upon the seven criteria identified above.

Compliance with New York SCGs. The significant action-specific regulations associated with this alternative are those associated with the transportation of drums and landfill wastes, the regulatory status of the receiving treatment and/or disposal facility, and closure of the landfill.

Transportation of the drums and wastes would be subject to 6 NYCRR Part 364: Waste Transporter Permits. Compliance with these requirements can be attained by contracting with a licensed hauler. The receiving facility(s) would need to be properly permitted for handling, treatment, and/or disposal of the wastes in accordance with 6 NYCRR Part 373: Hazardous Waste Management Facilities or 6 NYCRR Part 360: Solid Waste Management Facilities, as applicable. The requirement for treatment prior to disposal would be made in accordance with these regulations and with 6 NYCRR Part 376: Land Disposal Restrictions. The low permeability cover system would be designed to meet the performance criteria set forth under 6 NYCRR Part 360-2.

Location-specific SCGs are those regulations associated with wetlands. Because of the close proximity of wetlands to the landfill, activities associated with excavating the sediment materials may necessitate some work in the potential wetlands. Any activities conducted in wetlands may require approval and permits from both the USACE and the NYSDEC DFW.

Groundwater conformance will take more than what may be considered reasonable (i.e., 30 years); however, compliance with Chemical-specific SCGs for groundwater was not identified as an RAO.

Overall Protection of Human Health and the Environment. Because Alternative 5 would include removal of source wastes and the consolidating of landfilled wastes and contaminated sediment beneath a low permeability cover system, it would be expected to achieve the remedial action objectives. Therefore, it would provide protection of human health and the environment. Treatment and/or disposal of the source waste in a properly designed off-site facility would provide control of migration of chemicals from the wastes. Construction of the low permeability cover system would protect human health by constructing a low-permeability cover system in accordance with 6 NYCRR Part 360-2. The low-permeability cap would enhance surface runoff and reduce the amount of water infiltrating through the consolidated waste material. It is anticipated that the reduction in infiltration would prevent groundwater flow through buried wastes. Institutional controls would prevent ingestion of on-site groundwater and disturbance of the cap. To ensure continued protection of human health and the environment, environmental monitoring would be required. Because this alternative would reduce infiltration through waste material, discharge of contaminated leachate and shallow groundwater to surface water. Therefore, surface water, as well as groundwater quality, would improve over time.

Short-term Impacts and Effectiveness. Remedial construction activities are not likely to adversely affect the local community. An increase in truck traffic near the site would be expected during hauling of materials for cap construction and because waste material would be transported from the site to an off-site facility. Odors from exposed waste material could be released during excavation and loading of trucks. Nuisance dust during excavation would be controlled through engineering controls. Truck beds would be covered to minimize the possibility of material loss onto roadways and generation of dust. Ambient air monitoring for respirable dust would be conducted during remedial construction and engineering controls for dust suppression can be easily implemented if action levels are exceeded. The site would be fenced during construction to discourage trespassers.

Excavation may be required in and adjacent to the potential wetland to the east of the landfill. Therefore, some effects on the potential wetlands could be expected; however, these effects would be mitigated after construction through site restoration activities. Silt fencing would be used to minimize releases from the site.

Significant temporary impacts to the environment are not expected, with the exception of earthwork that would be required along the east side of the landfill in or near the potential wetland.

A HASP would be followed to minimize risks to workers during remedial construction. Although most of the work should not require levels of protection greater than Level D, the HASP would outline situations when an upgrade of personal protective equipment would be necessary. Because this alternative would involve excavating the waste material and drums, special considerations should be given to the various types of wastes likely to be exposed at the Site.

Hazards associated with heavy equipment use can be minimized by following OSHA guidelines. These risks would be minimized by fencing around the site and proper site security.

The time for implementation of Alternative 3 is approximately 1.5 to 2 years.

Long-term Effectiveness and Permanence. Land disposal of wastes is lowest on the NYSDEC hierarchy of preferred technologies, and would therefore not be considered a permanent remedy as defined in Section 2.1(c) of the TAGM #4030 “Selection of Remedial Actions at Inactive Hazardous Waste Sites” (NYSDEC, 1990). However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal. Treatment of wastes at a permitted facility would be considered permanent.

Sources of sediment, surface water, leachate, and groundwater contamination would be removed from the site, and contaminated sediment and landfill wastes would be consolidated under a low permeability cover system on-site. Therefore, Alternative 5 would be expected to substantially reduce risks to public health and the environment.

Environmental monitoring and site inspections would be used to assess the long-term fate and migration of groundwater contamination. For cost-estimating purposes, it was assumed that additional monitoring wells would be installed to monitor chemicals in shallow groundwater. The final environmental monitoring program would be developed during the remedial design and may or may not include additional wells and/or piezometers.

The low-permeability cap would enhance runoff and reduce the amount of water infiltrating through waste material, reducing leaching to groundwater and the production of leachate. Institutional controls would prevent ingestion of groundwater on-site and disturbance of the cap.

Periodic post-closure inspections would be conducted to check for burrow holes created by animals, cracking, or subsidence. If the holes are believed deep enough to penetrate the liner, the cap may need to be reconstructed in that area. The grass would be mowed and reseeded as necessary. Inspection and maintenance of the cap system would be addressed in the operation and maintenance plan which would be developed during the remedial design and reviewed and approved by appropriate regulatory agencies.

Reduction of Toxicity, Mobility, and Volume. For landfill wastes disposed at an off-site landfill, no reduction of toxicity, mobility, or volume would occur for Alternative 5; However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal, which would result in a reduction in toxicity, mobility, and volume. This Alternative would include treatment of leachate, as necessary, thereby reducing the toxicity, mobility, and volume of leachate and shallow groundwater contamination.

Implementability. The techniques that would be used for sediment and landfill waste excavation and drum removal are well-developed and commonly used and should, therefore, not be difficult to implement. Treatment and/or disposal of wastes at a permitted landfill would be conducted in accordance with 6 NYCRR Part 373: Hazardous Waste Management Facilities, 6 NYCRR Part 360: Solid Waste Management Facilities, and/or 6 NYCRR Part 376: Land Disposal Restrictions, as applicable. The treatment and/or disposal techniques and any required permitting are not anticipated to be difficult to implement.

Contractors to provide the excavation and transportation services required for Alternative 5 are available, and several could be included in a competitive bidding process. Permitted and available treatment and/or disposal facilities are anticipated to be available.

Capping is a well-developed technology for landfill closure and has been used at numerous Superfund sites and municipal landfills. Construction techniques used for cap construction are not difficult to implement. Delays due to technical problems would be unlikely or minimal.

Seaming during geomembrane placement would involve quality control and quality assurance procedures to ensure the effectiveness of the seams. Manufacturers typically have patented approaches as to how they perform the welding for their particular product. Therefore, placement of the geomembrane must be done by a manufacturer certified installer under their quality assurance policy.

Because of the potential wetland, coordination between the USACE, NYSDEC DFW, and the design contractor may be required to obtain the necessary approvals and permits for wetlands alteration and a site restoration plan.

Contractors to perform the construction services (including placement and testing of the geomembrane) required for this alternative are available, and several could be included in a competitive bidding process.

Cost. The capital cost of this Alternative is $2,600,000. The NPW of this Alternative is $4,200,000. In addition to the assumptions and components of this Alternative as discussed above, the following assumptions were made:

- Each sampling event would include collection and off-site analysis of leachate for VOCs and metals analysis and fourteen groundwater samples for VOCs, natural attenuation parameters, and metals analysis.
- Two drums would be removed and overpacked from each of the eleven identified test pit locations;
- Twelve additional drums would be encountered, removed, and overpacked during excavation of the landfill materials for consolidation.
- Additional source areas totaling 150 cubic yards would be encountered and removed
- All drums and soil transported off-site would be disposed as hazardous waste, and
- 2000 cubic yards of landfill waste would be excavated and consolidated on-site, resulting in a consolidated landfill cover within an area of 3.3 acres.

The NPW of this Alternative could be significantly different if the following conditions occur:

- Volume of waste which is relocated is significantly greater than estimated.
- Leachate volume collected is significantly different.
- Additional or larger source areas, including drums and soil contamination. The capital cost associated with excavation and disposal of contaminated soil and drums is approximately $600,000.

6.6 ALTERNATIVE 6: EXCAVATION OF LANDFILL AND OFF-SITE DISPOSAL OF HAZARDOUS AND NON-HAZRDOUS WASTES

Alternative 6 is the most aggressive approach to remediation of the Site proposed in this FS. Alternative 6 would aim to eliminate the source of groundwater, surface water, and sediment contamination at the Site similar to Alternative 4, but would also provide for the removal of all landfilled materials with subsequent disposal within a licensed landfill. The major components of Alternative 6 are the following:

- pre-design investigations;
- excavation of contaminated sediment exceeding RGs;
- excavation of entire landfill;
- transportation and off-site disposal/treatment of hazardous wastes;
- transportation and off-site disposal/treatment of solid wastes;
- wetlands/site restoration;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Alternative 6 would reduce long-term risks to public health and the environment by transferring all source wastes and landfill materials to a regulated NYSDEC-approved landfill.

Pre-Design Investigations. Pre-design investigations would be conducted similar to Alternative 3 to provide site-specific data for final design of the remedial actions. If on-site wetlands are identified and it is determined that impacts to the wetlands as a result of remedy implementation are likely, the Work Plan would include a WRS.

Site Preparation/Mobilization. Site preparation and mobilization for Alternative 6 would be similar to that described in Subsection 6.3 for Alternative 3.

Excavation of Contaminated Sediment. Contaminated sediment within the drainage ditch would be excavated for off-site disposal similar to Alternative 4.

Excavation of Entire Landfill. The entire landfill, including source areas (i.e., drums) and soil hot-spots within the landfill material, would be excavated for off-site disposal. Excavated soil, sediment, and drums would be sampled for characterization prior to transportation for off-site treatment and/or disposal. Drum excavation, handling, and staging would be conducted similar to Alternative 4.

Characterization samples would include hazardous waste characteristics, TCLP, and PCBs, and would be collected for every 500 cubic yards of landfill materials removed.

Transportation and Off-site Disposal. Excavated and/or overpacked drums, drummed soils, and excavated landfill materials would be transported off-site for disposal. Disposal options would include:

- treatment or stabilization and landfill disposal of RCRA regulated solids;
- landfill disposal of RCRA regulated solids; and
- landfill disposal of Solid Waste regulated solids.

Site Restoration. The Site would be restored to a condition consistent for its selected future land use. For cost-estimating purposes, it was assumed that the excavated area would be roughly graded to enable revegetation of the area to prevent erosion. If an excavated area is designated as a wetland (the drainage swale is a potential wetland), the area would need to be restored according to an appropriate WRS. Restoration of wetlands, if required, would reduce long-term impacts of activities in and adjacent to the wetlands; compensate for losses of wetland habitats; restore or replace degraded wetlands; and meet state and federal permitting and regulatory guidelines and requirements.

Institutional Controls. Institutional controls would be implemented as described in Subsection 6.2 for Alternative 2. However, controls would be required only until results of environmental monitoring indicate that the site no longer poses any unacceptable risks to public health.

Environmental Monitoring. An environmental monitoring program would be implemented to evaluate the effectiveness of the remedial action, and would include 5 years of groundwater monitoring. Additionally, monitoring of wetland restoration would be conducted as presented for Alternative 3.

The following paragraphs present an assessment of Alternative 6 based upon the seven criteria identified above.

Compliance with New York SCGs. The significant action-specific regulations associated with this alternative are those associated with the transportation of drums and landfill wastes and the regulatory status of the receiving treatment and/or disposal facility. Transportation of the drums and wastes would be subject to 6 NYCRR Part 364: Waste Transporter Permits. Compliance with these requirements can be attained by contracting with a licensed hauler. The receiving facility(s) would need to be properly permitted for handling, treatment, and/or disposal of the wastes in accordance with 6 NYCRR Part 373: Hazardous Waste Management Facilities or 6 NYCRR Part 360: Solid Waste Management Facilities, as applicable. The requirement for treatment prior to disposal would be made in accordance with these regulations and with 6 NYCRR Part 376: Land Disposal Restrictions.

Location-specific SCGs are those regulations associated with wetlands. Because of the close proximity of wetlands to the landfill, activities associated with excavating the sediment materials may necessitate some work in the potential wetlands. Any activities conducted in wetlands may require approval and permits from both the USACE and the NYSDEC DFW.

Groundwater conformance will take more than what may be considered reasonable (i.e., 30 years); however, compliance with Chemical-specific SCGs for groundwater was not identified as an RAO.

Overall Protection of Human Health and the Environment. Because Alternative 6 includes removal of source wastes at the Site, it is expected to provide long-term protection of human health and the environment. Treatment and/or disposal of the source waste in a properly designed off-site facility would provide control of migration of chemicals from the wastes. Short-term impacts are expected, including dust, odors, noise, and additional truck traffic during remedial action. Site restoration would be implemented to make the site suitable for its selected future use. Institutional controls would be implemented to prevent contact with contaminated groundwater.

Short-term Impacts and Effectiveness. Alternative 6 will have significant short-term impacts on the local community. Truck traffic would increase near the site because waste material would be transported from the site to an off-site facility. Odors from exposed waste material could be released during excavation and loading of trucks. Nuisance dust during excavation would be controlled through engineering controls. The site would be fenced during construction to discourage trespassers.

Excavation may be required in and adjacent to the potential wetland to the east of the landfill. Therefore, some effects on the potential wetlands could be expected; however, these effects would be mitigated after construction through site restoration activities. Silt fencing would be used to minimize releases from the site.

A remedial action HASP would be implemented to minimize risks to workers during remedial construction. The HASP would describe proper monitoring procedures and how to determine when upgrading to a higher level of protection would be required. Because this alternative would involve excavating the waste material and drums, special considerations should be given to the various types of wastes likely to be exposed at the site.

The time for implementation of Alternative 6 is approximately 1.5 to 2 years.

Long-term Effectiveness and Permanence. Land disposal of wastes is lowest on the NYSDEC hierarchy of preferred technologies, and would therefore not be considered a permanent remedy as defined in Section 2.1(c) of the TAGM #4030 “Selecting Remedial Actions at Inactive Hazardous Waste Sites” (NYSDEC, 1990). However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal, and it is assumed that approximately 1,000 cubic yards of solvent contaminated soil would be treated off-site as part of this alternative. Treatment of wastes at a permitted facility would be considered permanent.

Sources of sediment, surface water, leachate, and groundwater contamination would be removed from the site. Therefore, Alternative 6 would be expected to substantially reduce risks to public health and the environment.

Environmental monitoring and site inspections would be used to assess the long-term fate and migration of groundwater contamination. For FS cost-estimating purposes, it is assumed that additional monitoring wells would be installed to monitor chemicals in shallow groundwater. The final environmental monitoring program would be developed during the remedial design and may or may not include additional wells and/or piezometers.

Reduction of Toxicity, Mobility, or Volume. For landfill wastes disposed at an off-site landfill, no reduction of toxicity, mobility, or volume would occur. However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal, which would result in a reduction in toxicity, mobility, and volume. It is assumed that approximately 1,000 cubic yards of solvent contaminated soil would be treated off-site as part of this alternative

Implementability. The techniques that would be used for sediment and landfill waste excavation and drum removal are well-developed and commonly used; however, the extent of hazardous wastes within the landfill is not well characterized and removal of the entire landfill would require significant measures protective of health and safety. Treatment and/or disposal of wastes at a permitted landfill would be conducted in accordance with 6 NYCRR Part 373: Hazardous Waste Management Facilities, 6 NYCRR Part 360: Solid Waste Management Facilities, and/or 6 NYCRR Part 376: Land Disposal Restrictions, as applicable. The treatment and/or disposal techniques and any required permitting are not anticipated to be difficult to implement. Although future remedial actions at the site would be unlikely, they would not be made more difficult to implement.

Because of the potential wetland, coordination between the USACE, NYSDEC DFW, and the design contractor may be required to obtain the necessary approvals and permits for wetlands alteration and a site restoration plan.

Contractors to provide the excavation and transportation services required for Alternative 6 are available and several would be included in a competitive bidding process. Permitted and available treatment and/or disposal facilities are anticipated to be available.

Cost. The capital cost of this Alternative is $5,000,000. NPW of this Alternative is $5,500,000. In addition to the assumptions and components of this Alternative as discussed above, the following assumptions were made:

- Each sampling event would include collection and off-site analysis of fourteen groundwater samples for VOCs, natural attenuation parameters, and metals analysis.
- The volume of landfill materials is an estimated 36,000 cubic yards.
- Characterization samples would include hazardous waste characteristics, TCLP, and PCBs, and would be collected for every 500 cubic yards of landfill materials removed.
- Two drums would be removed and overpacked from each of the eleven identified test pit locations;
- Twelve additional drums would be encountered, removed, and overpacked during excavation of the landfill materials.
- Additional source areas totaling 500 cubic yards would be encountered and removed.
- Solvent contaminated soils and sediment would be treated off-site by chemical oxidation.
- All drums and drummed wastes would be disposed of at an approved landfill.

The NPW of this Alternative could be significantly different if the following conditions occur:

- Volume of landfill waste is significantly greater than estimated. The capital cost associated with excavation and disposal of landfill materials is $2,500,000.
- Additional or larger source areas, including drums and soil contamination. The capital cost associated with disposal of contaminated soil and drums is approximately $400,000.

6.7 ALTERNATIVE 7: CONSTRUCTION OF SOIL COVER

Alternative 7 includes soil capping of buried wastes and contaminated sediment and long-term environmental monitoring. The major components of Alternative 7 are the following:

- pre-design investigations;
- site preparation/mobilization;
- construction of a soil cover system;
- institutional controls;
- environmental monitoring; and
- evaluation of natural attenuation processes.

Alternative 7 would protect public health by complying with the requirements of New York State Sanitary Code Part 19.2(4) which requires that a final compacted cover of at least two feet of a suitable cover material shall be placed within one week after the final deposit of refuse (NYS, 1962). State Sanitary Code Part 19 was in effect in 1972 when the Site operation as a municipal disposal facility by the Town of Cortlandville was discontinued.

Pre-Design Investigations. Pre-design investigations would be conducted to provide site-specific data for final design of the remedial actions. The investigations include a geotechnical boring program to identify the extent of landfilled materials at the Site and more accurately characterize subsurface conditions, and identification of on-site wetlands. Geotechnical data would provide the necessary information to assess final cover slope stability and identify engineering requirements that may be necessary as part of the design to prevent slope failure. If on-site wetlands are identified and it is determined that impacts to the wetlands as a result of remedy implementation are likely, the Work Plan would include a Wetlands Restoration Specification (WRS).

Site Preparation and Mobilization. Site preparation and mobilization would include activities required to prepare the site for construction such as delivery and setup of site trailers, temporary utilities, and civil work including clearing trees, grubbing stumps, and grading and relocating waste material. Layout of the cap would be surveyed during this period.

Construction of a Soil Cover System. Alternative 7 includes a soil cover designed to comply with State Sanitary Code Part 19.2(4) (NYS, 1962) and in accordance with sound engineering design practices. The objectives of the soil cover design are to: 1) comply State Sanitary Code Part 19; 2) reduce infiltration of precipitation through landfill wastes into groundwater; 3) promote surface drainage; and 4) separate waste from animals and insects. The proposed cap extent is approximately 4.3 acres, similar to Alternative 3. A permanent access road would be constructed along the western side of the cover system, providing access to the southernmost extent of the landfill.

Preliminary modeling results suggest an overall 5 percent reduction in percolation through the landfill as a result of the construction of a soil cover utilizing only a two-foot soil cover (see Appendix C.3).

As part of final remedial design, settlement of the landfill as a result of cover system placement would be estimated. This analysis would consider both consolidation of the waste and subgrade as a result of the additional weight of the cover system and effect on the groundwater table associated with reduced infiltration. Additionally, the effect of potential subsidence on the integrity of the cover system and methods to minimize long-term settlement of the cap would be evaluated.

The landfill would be graded and fill material would be placed to achieve a minimum grade of 4 percent to promote positive drainage and a maximum grade of 33 percent to ensure stability for the final cover system. Bulky metal surface debris (i.e., cars, appliances) and empty drums would be crushed and consolidated within the landfill.

A vegetative topsoil layer of at least 6 inches would overlie the two-foot soil cover to promote vegetative growth and help prevent erosion of the cap. The final slope of the cap surface would have a minimum grade of 4 percent to promote positive drainage. Sideslopes would have a maximum grade of 33 percent to prevent erosion. Surface water drainage would be directed off the cap to surface water collection ditches along the eastern and western sides of the cap, ultimately discharging to the on-site drainage ditch.

If construction activities impact a wetland area (the drainage swale is a potential wetland), the area would need to be restored according to an appropriate WRS. Restoration of wetlands would reduce the long-term impacts of activities in and adjacent to the wetlands; compensate for losses of wetland habitats; restore or replace degraded wetlands; and meet state and federal permitting and regulatory guidelines and requirements.

Institutional Controls. Institutional controls in the form of deed and land-use restrictions would be implemented to restrict future site use, thereby limiting the potential for exposure to site contaminants. A chain-link fence with warning signs would be installed around the site to limit access by trespassers. Although investigations have concluded that groundwater presents minimal health risk to human health and the most likely future use of the site is non-residential, institutional controls would be implemented to prohibit groundwater use within and around the Site as an added safety measure. The controls would be drafted, implemented, and enforced in cooperation with the site owner, state, and local governments. Operation and maintenance activities would include routine repairs to the fence and signs.

Environmental Monitoring. An environmental monitoring program similar to Alternative 2 would be implemented. Environmental monitoring would involve the routine, periodic sampling of groundwater and leachate/surface water.

Monitoring of wetland restoration, if any, would determine the success of the project and compliance with permitted project goals. Monitoring requirements would be defined in the WRS and would include an evaluation of restored wetland functions and values, water levels, sedimentation, wildlife utilization, and a variety of vegetative parameters. For cost-estimating purposes, it was assumed that restoration monitoring would include semi-annual (spring and fall) site inspections. An annual report would be submitted to the appropriate regulatory agency. A detailed monitoring plan for these long-term activities would be developed during final design.

The following paragraphs present an assessment of Alternative 7 based upon the seven criteria identified above.

Compliance with New York SCGs. The major component of this alternative, the soil cover system, would be designed to meet the performance criteria set forth under State Sanitary Code Part 19. Location-specific SCGs for Alternative 7 would be those regulations associated with wetlands. It may be difficult to implement this alternative without impacting potential wetlands. Activities conducted in wetlands may require approval and permits from both the USACE and the NYSDEC Department of Fish and Wildlife (DFW). Groundwater conformance will take more than what may be considered reasonable (i.e., 30 years); however, compliance with Chemical-specific SCGs for groundwater was not identified as an RAO.

Overall Protection of Human Health and the Environment. Alternative 7 would protect human health and the environment by complying with the State Sanitary Code Part 19 for landfill closure. The soil cover would prevent direct exposure to contaminated sediments and soils and enhance surface runoff and reduce the amount of water infiltrating through waste material. It is anticipated that the reduction in infiltration would reduce groundwater flow through buried wastes. Institutional controls would prevent ingestion of on-site groundwater and disturbance of the cap. To ensure continued protection of human health and the environment, environmental monitoring would be required. Because this alternative would reduce infiltration through waste material, discharge of contaminated leachate and shallow groundwater to surface water and sediment would be reduced. Therefore, surface water and sediment quality, as well as groundwater quality, would improve over time.

Short-term Impacts and Effectiveness. Remedial construction activities are not likely to adversely affect the local community. An increase in truck traffic near the site would be expected during hauling of materials for cap construction. Truck beds would be covered to minimize the possibility of material loss onto roadways and generation of dust. Initial grading of the cap area may produce nuisance dust. Ambient air monitoring for respirable dust would be conducted during remedial construction and engineering controls for dust suppression can be easily implemented if action levels are exceeded.

Significant temporary impacts to the environment are not expected, with the exception of earthwork that would be required along the east side of the landfill in or near the potential wetland.

A remedial action Health and Safety Plan (HASP) would be followed to minimize risks to workers during remedial construction. Although most of the work should not require levels of protection greater than Level D, the HASP would outline situations when an upgrade of personal protective equipment would be necessary.

Hazards associated with heavy equipment use can be minimized by following Occupational Safety and Health Administration (OSHA) guidelines. These risks would be minimized by fencing around the site and proper site security.

The time for implementation of Alternative 7 is approximately 1 to 1.5 years.

Long-term Effectiveness and Permanence. Because wastes would remain on-site and untreated, Alternative 7 is not considered a permanent remedy. Capping is considered a control and isolation technology in the hierarchy of technologies described in the TAGM #4030 “Selection of Remedial Actions at Inactive Hazardous Waste Sites” (NYSDEC, 1990). The cap would provide long-term effectiveness if maintained.

Environmental monitoring and site inspections would be used to assess the long-term fate and migration of site-related chemical contamination. For cost-estimating purposes, it was assumed that additional monitoring wells would be installed to monitor chemicals in groundwater. The final environmental monitoring program would be developed during the remedial design and may or may not include additional wells and/or piezometers.

The soil cover would enhance runoff and reduce the amount of water infiltrating through waste material, reducing leaching to groundwater and the production of leachate, and prevent direct exposure to waste materials. Institutional controls would prevent ingestion of groundwater on-site and disturbance of the cap.

Periodic post-closure inspections would be conducted to check for burrow holes created by animals, cracking, or subsidence. If significant holes are identified, the cap may need to be reconstructed in that area. The grass would be mowed and reseeded as necessary. Inspection and maintenance of the cover would be addressed in the operation and maintenance plan which would be developed during the remedial design and reviewed and approved by appropriate regulatory agencies.

Reduction of Toxicity, Mobility, and Volume. There would be no reduction of toxicity, mobility, or volume of soil or sediment contaminants through treatment. Natural attenuation processes would be expected to result in reduction of the toxicity, mobility, and volume of site contaminants over time.

Implementability. Capping is a well-developed technology for landfill closure and has been used at numerous Superfund sites and municipal landfills. Construction techniques used for cap construction would not be difficult to implement. Delays due to technical problems would be unlikely or minimal.

Coordination between the NYSDEC and the USACE may be required to get the necessary approvals for work in the potential wetland.

Contractors to perform the construction services required for this alternative are available and several could be included in a competitive bidding process.

Cost. The capital cost of this Alternative is $900,000. The NPW of this Alternative is $2,000,000. In addition to the assumptions and components of this Alternative as discussed above, the following assumptions were made:

- Each long-term sampling event will include collection and off-site analysis of leachate for VOCs and metals analysis and fourteen groundwater samples for VOCs, natural attenuation parameters, and metals analysis.
- During grading activities associated with cover system construction, six drums will be encountered, removed, sampled and analyzed for hazardous waste characteristics, TCLP, and PCBs for characterization purposes, overpacked, and transported off-site for disposal as hazardous waste.

The NPW of this Alternative could be significantly different if the following conditions occur:

- The extent of landfilled waste is significantly different.

7.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The comparative analysis evaluates the relative performance of each alternative using the same criteria by which the detailed analysis of each alternative was conducted. The purpose of the comparative analysis is to identify the advantages and disadvantages of each alternative relative to one another to aid in selecting a remedy for the Site.

In accordance with TAGM #4030 "Selection of Remedial Actions at Inactive Hazardous Waste Sites" (NYSDEC, 1990), the comparative analysis includes a narrative discussion of the strengths and weaknesses of the alternatives relative to one another with respect to each criterion, and how reasonable variations of key uncertainties could change the expectations of their relative performance, as applicable. The comparative analysis presented in this document uses a qualitative approach to comparison, with the exceptions of comparing alternative costs and the required time to implement each alternative. A recommended alternative will be identified based upon this comparative analysis of the remedial alternatives, and presented in a separate document.

7.1 COMPLIANCE WITH NEW YORK SCGs

Alternative 1 does not comply with SCGs. Alternatives 2 through 7 would not result in reduction in compliance of Chemical-specific SCGs for groundwater within a timeframe considered reasonable (i.e., 30 years); however, compliance with Chemical-specific SCGs for groundwater was not identified as an RAO.

Alternative 2 does not include any remedial actions to remove contamination above RGs or to prevent the leaching of contaminants to groundwater; therefore, Alternative 2 would not meet Chemical-Specific SCGs. Alternative 2 would not trigger Location- or Action-Specific SCGs.

Alternatives 3 and 5 would minimize leaching of contaminants to groundwater and surface water at the Site and minimize exposure to contaminants through the construction of a low-permeability soil cover. Alternatives 3 and 5 would be designed and implemented in accordance with applicable Location- or Action-Specific SCGs.

Alternatives 4, 5, and 6 would comply with Chemical-Specific SCGs through the excavation and off-site treatment and/or disposal of source wastes, including drummed wastes, soil hot spots, and sediment contamination. Actions associated with transportation of hazardous wastes and the treatment and/or disposal of solid and/or hazardous wastes at an off-site treatment and/or disposal facility would comply with applicable regulations.

Alternative 7 would reduce leaching of contaminants to groundwater and surface water at the Site and minimize exposure to contaminants through the construction of a soil cover system. Alternative 7 would be designed and implemented in accordance with applicable Location- or Action-Specific SCGs.

7.2 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative 1 would not provide any additional protection of human health and the environment over existing conditions.

Alternative 2 would provide protection of human health and limited protection of the environment through restricting access to and use of the Site.

Alternative 3 would protect human health and the environment through restricting access to soil, sediment, and source area contamination, and reducing the leaching of these contaminants to surface water and groundwater; however, unlike under Alternatives 4, 5, and 6 source wastes would remain on-site.

Alternative 4 would provide protection of human health and the environment through removal of source wastes, including soil and sediment exceeding RGs and drummed wastes, which are the source of surface water, sediment, and groundwater contamination. However, Alternatives 5 and 6 would likely result in the removal of larger quantities of source wastes.

Alternative 5 would provide protection of human health and the environment through removal of source wastes contributing to surface water and groundwater contamination, and consolidating landfill wastes and contaminated sediment exceeding RGs beneath a low permeability cover system. Alternative 5 would provide additional protection to human health and the environment relative to Alternative 4 through the consolidation of landfill wastes beneath a low permeability cover system and reducing the leaching of remaining residual contamination following source waste removal. Alternative 5 would not include removal of the entire landfill as provided for by Alternative 6; therefore, source wastes may remain on-site.

Alternative 6 would provide protection of human health and the environment through removal of all landfill wastes and source wastes, including soil and sediment exceeding RGs and drummed wastes, which are the source of surface water, sediment, and groundwater contamination.

Alternative 7, similar to Alternative 3, would protect human health and the environment through restricting access to soil, sediment, and source area contamination, and reducing the leaching of these contaminants to surface water and groundwater; however, unlike under Alternatives 4, 5, and 6, source wastes would remain on-site. Alternative 3 utilizes a low-permeability cover system which would reduce infiltration significantly more than the soil cover provided by Alternative 7.

7.3 SHORT-TERM IMPACTS AND EFFECTIVENESS

No construction activities would be implemented for Alternative 1; therefore, no short-term impacts or effects on the community, workers, or the environment would occur. Implementation of Alternative 2 would not result in short-term impacts to human health or the environment, and this Alternative would be effective in the short-term, because components of this Alternative could be implemented within a short amount time. However, the time period required for natural attenuation to reduce risks to acceptable levels is not known.

Components of Alternatives 3, 4, 5, 6, and 7 are not likely to adversely affect the local community and the environment as measures would be taken to minimize erosion, fugitive dust, risks to site workers, and impacts to the potential wetlands. Implementation of Alternatives 3 and 7 would include the least amount subsurface disturbance, that which is necessary to meet maximum grade of 33 percent, and would therefore result in less potential short-term risk to receptors. Alternative 6 would include the most subsurface disturbance, followed by Alternative 5 and then 4, and therefore presents the greatest potential risk to receptors. The estimated total time to implement these Alternatives is 1 to 2 years. Alternatives 3, 4, 5, 6, and 7 are anticipated to meet RAOs for sediment upon completion of remedial activities, as sediment would either be removed from the site for off-site disposal/treatment or covered by a cover system. Alternatives 3, 4, 5, 6, and 7 include actions to address contaminated subsurface soil contributing to groundwater contamination, but Alternative 6 would result in removal of all contaminated soil. Alternatives 3, 5, and 7 would provide short-term protection from contaminated soil by incorporating a cover system to minimize direct exposure to contaminated surface and subsurface soil and sediment not removed from the Site.

7.4 LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternative 1 would not meet RAOs because no remedial actions would implemented at the Site. This alternative would not provide long-term effectiveness.

Alternative 2 would provide long-term effectiveness as long as institutional controls are maintained. Some decrease in contaminant levels due to natural attenuation and transport processes would occur over time; however, the time period required to achieve RGs is formidable (likely decades).

Alternatives 3 and 7 would not be considered a permanent remedy because wastes would remain on-site, untreated. They would, however, provide long-term protection against direct exposure to contamination at the Site.

Alternatives 4, 5, and 6 would be expected to further reduce risks to human health and the environment by removing the sources of sediment, surface water, leachate, and groundwater contamination from the Site. Land disposal of these wastes is lowest on the NYSDEC hierarchy of preferred technologies, and would, therefore, not be considered a permanent remedy as defined in Section 2.1(c) of the TAGM for Selecting Remedial Actions at Inactive Hazardous Waste Sites (NYSDEC, 1990). However, RCRA Land Disposal Regulations may require the treatment of waste prior to disposal. Treatment of wastes at a permitted facility would be considered a permanent remedy.

Alternative 6 has the potential to provide the greatest long-term effectiveness and permanence as a result of the excavation of the entire landfill, which best allows for all hazardous wastes on Site to be identified and removed from the Site.

7.5 REDUCTION OF TOXICITY, MOBILITY AND VOLUME

Alternatives 1, 2, and 7 do not include any actions to reduce the toxicity, mobility, or volume of hazardous material through treatment. Natural attenuation processes would result in the reduction of the toxicity, mobility, and volume of some site contaminants over time.

Alternatives 3 and 5 would include treatment of leachate, as necessary, thereby providing reduction of toxicity, mobility, and volume of leachate and shallow groundwater contamination, but there would be no reduction of toxicity, mobility, or volume of soil or sediment contaminants through treatment.

Alternatives 4, 5, and 6 would only result in the reduction of toxicity, mobility, or volume if waste is treated prior to disposal. Alternatives 4, 5, and 6 include off-site treatment of solvent-contaminated soil. RCRA Land Disposal Regulations may require the treatment of drummed waste prior to disposal, which would result in a reduction in toxicity, mobility, and volume.

Alternative 6 has the potential to result in the greatest reduction in toxicity, mobility, and volume of soil and sediment contamination through treatment. It is assumed that approximately 1,000 cubic yards of solvent contaminated soil would be treated off-site as part of this alternative.

7.6 IMPLEMENTABILITY

No services or materials would be required to implement Alternative 1; however, obtaining approval for the No-Action Alternative at the Site would be difficult.

No innovative technologies would be used as part of Alternative 2. Required services or materials required to implement this Alternative are readily available. Coordination with state and federal agencies would be required; however, due to the remoteness of the Site, implementation of land-use restrictions would not likely be difficult. This Alternative would not interfere with other potential remedial actions at the Site.

Alternatives 3 and 5 propose construction of a low permeability cover system and Alternative 7 proposes construction of a soil cover. Capping is a well-developed technology for landfill closure and has been used at numerous Superfund sites and municipal landfills. Contractors to perform the construction services (including placement and testing of the geomembrane for Alternative 3 and 5) required for this alternative are available and several could be included in a competitive bidding process.

Alternatives 4, 5, and 6 include the excavation, transportation, and off-site disposal of source materials and contaminated media at the Site. The techniques that would be used for sediment and landfill waste excavation and drum removal are all well-developed and commonly used and should therefore not be difficult to implement. The treatment and/or disposal techniques and any required permitting are not anticipated to be difficult to implement.

Contractors to provide the excavation and transportation services required for Alternative 4, 5, and 6 are available and several would be included in a competitive bidding process. Permitted and available treatment and/or disposal facilities are anticipated to be available, though the distance to these locations may likely be substantial. However, the extent of hazardous wastes within the landfill is not well characterized and removal of the entire landfill (Alternative 6) would require significant measures protective of health and safety.

Alternatives 4 and 6 would not make future remedial actions more difficult to implement because it incorporates only a removal action. Construction of a low permeability cover system, as proposed under Alternative 3 and 5, would provide some limitation to future remedial actions. Construction of a soil cover under Alternative 7 would not limit future remedial actions.

Because of the potential wetland, Alternative 3, 4, 5, 6, and 7 may require coordination between the USACE, NYSDEC DFW, and the design contractor to obtain the necessary approvals and permits for wetlands alteration and a site restoration plan.

7.7 COST

Capital costs for Alternatives 2 through 7 range from approximately $182,000 to $5,000,000, with Alternative 2 having the lowest cost. Alternative 7 has the second lowest capital cost at $888,000.

NPW of Alternatives 2 through 7, all projected for 30 years, range from approximately $1,400,000 to $5,500,000, with Alternative 2 having the lowest cost. Alternative 7 has the second lowest NPW of these alternatives at $2,000,000.

Alternative 1 has no cost associated with it.

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TABLES

Table 1.1: Test Pit Investigation Summary

TEST PIT	PID READING (NOTE 1)	BOTTOM OF FILL (FT BGS)	DRUMS ENCOUNTERED	STAINS OBSERVED	OTHER	ADDITIONAL DRUMS SUSPECTED (Yes/No)	SAMPLES COLLECTED	DEPTH TO GROUNDWATER (FT)	SAMPLES FROM BENEATH WT (Yes/No)	SAMPLE RESULTS (see Note 2)
TP-1	0 ppm	7.5	Drum fragments	Black stained area approx. 15 feet from west edge of trench		No, native soil encountered	TP-01-01 from stained area 17 feet west of end of trench and 5 feet deep	NE	No	SVOCs, primarily PAHs above SCGs.
TP-2	--	17	No	No		No, native soil encountered	No	NE	No	NS
TP-3	29 ppm	8	Crushed w/ 1 intact	No		No, native soil encountered	TP-03-01 soil below excavated drum 20 feet from top of slope and 3 feet deep	NE	No	PAHs above SCGs.
TP-4	No elevated readings	11	Corroded drum, crushed and corroded carcasses, and open drum 15 feet from base of slope	No, burn zones only		No, native soil encountered	No	NE	No	NS
TP-5	--	unknown, slope unstable at 11 feet	No	No, burn zones only		Possibly - native soil not encountered	TP-05-01 from burn area 20 feet from west end of trench and 4 feet deep	NE	No	No concentrations above SCGs. Elevated aroclor 1260 concentration (2.8 mg/kg).
TP-6	--	5	No	No		No, native soil encountered	No	NE	No	NS
TP-7	0.5 ppm	15	No	No, burn zones only		No, native soil encountered	TP-07-01 from stained area 5 feet from south end of trench and 8 feet deep	NE	No	No concentrations above SCGs.
TP-8	--	13	No	No, burn zones only	Fuel oil odor	No, native soil encountered	TP-08-01 from ash with hydrocarbon odor 2 feet deep from east end of trench	NE	No	No concentrations above SCGs. Elevated phenanthrene concentration (5.3 mg/kg).
TP-9	--	11	No	No		No, native soil encountered	No	NE	No	NS
TP-10	--	unknown, slope unstable at 15 feet	No	No		Possibly - native soil not encountered	TP-10-01 near rubber caps 15 feet from south end of trench and 15 feet deep	NE	No	No concentrations above SCGs. Elevated butylbenzylphthalate concentration (4.1 mg/kg).
TP-11	1.0 ppm	unknown, slope unstable at 17 feet	Crushed drums and corroded drum fragments	Yes, near drum		Possibly - native soil not encountered	TP-11-01 stained area near crushed drum 20 feet from north end, 12 feet deep; TP-11-02 from gray-blue clay 3 feet from north end of trench and 4 feet deep	NE	No	SVOCs, including one PAH above SCGs.
TP-12	2.7 ppm	unknown, slope unstable at 17 feet	Crushed drums encountered	No, burn zones only	Slight sheen	Yes, drums near trench termination depth	TP-12-01(DUP TP-12-11) stained soil from center of trench 17 feet deep	NE	No	One PAH above SCGs.
TP-13	5.0 ppm	unknown, slope unstable at 16 feet	Crushed drum	No		Possibly - native soil not encountered	No	NE	No	NS
TP-14	0.8 ppm	21, bedrock at 21 feet	Flattened drum	No	Water at 14 feet	No, bedrock encountered	No	14	No	NS
TP-15	--	17	No	No		No, native soil encountered	No	NE	No	NS
TP-16	8 ppm	17, bedrock at 17 feet	Sheared drum with resin and fibers, crushed drum with orange-rust colored soil and glue odor	No	Water at 17 feet	No, bedrock encountered	TP-16-01 resin and fibers near crushed drum 5 feet from south end, 5 feet deep; TP-16-02 from crushed drum 12 feet from south end of trench, 8 feet deep	17	No	One PAH above SCGs. Concentration of 2-methylnaphthalene slightly below SCG value.
TP-17	--	15, bedrock at 17 feet	No	No	Water at 17 feet	No, bedrock encountered	No	17	No	NS

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TP-18	26 ppm	18, bedrock at 19 feet	1 Crushed w/ soil staining	Yes, near drum	Water at 19 feet	No, bedrock encountered	TP-18-01 adjacent to flattened drum 8 feet deep and 24 feet from east end of trench	19	No	SVOCs, including one PAH above SCGs. Elevated bis(2-ethylhexyl)phthalate concentration.
TP-19	31 ppm	13, bedrock at 15 feet	Burned & crushed drum 30 feet, crushed drum 51 feet, & fragments 42 from east end	No, soil in burned area is rust colored		No, bedrock encountered	TP-19-01 near crushed drum 42 feet from east end, 10 feet deep; TP-19-02 near crushed drum 51 feet from east end, 10 feet deep.	NE	No	Low concentrations detected, primarily VOCs.
TP-20	124 ppm	15	Four crushed drums 48 feet from south end, two drums empty, one left undisturbed in bank, fourth contained dark gray-black fine shavings, all located approx 1 foot below grade; a fifth crushed drum 40 feet from south end, contains gray sandy material, slightly cemented, located 4 feet below grade	No, burn zone at southern end		Yes, drum left in-place	DS-20-01 from drum 40 feet from south end, 4 feet deep; DS-20-02 from drum in nest 48 feet from south end, 1 foot deep	NE	No	VOCs, PAHs, pesticides, and PCBs detected.
TP-21	10.8 ppm	unknown, trench terminated at 5 feet, no explanation	Crushed drum empty at north end, three crushed drums at south end, two lef undisturbed, third intact with label "__NT "Wilmington Delaware". Third drum opened, contained approx 2 inches black oily substance	No		Yes - trench terminated at 5 feet	TP-21-01 soil below drum nest at south end of trench, 3 feet deep; TP-21-D1 from overpacked drum	NE	No	Low concentrations detected, primarily SVOCs. In drum, elevated concentrations of TCE, methylene chloride, phenanthrene, 2,4,5-trichlorophenol, and bis(2-ethylhexyl)phthalate.
TP-22	--	3, bedrock at 7 feet	No	No		No, bedrock encountered	No	NE	No	NS
TP-23	--	4, bedrock 7 feet	No	No		No, bedrock encountered	No	NE	No	NS
TP-24	30.2 ppm	13, bedrock at 14 feet	1 Corroded - overpacked	No		No, bedrock encountered	TP-24-01 resin from crushed drum at east end, 4 feet deep	NE	No	
TP-25	3 ppm	14, bedrock at 14 feet	1 Crushed, empty	No	Water at 14 feet	No, bedrock encountered	No	14	No	NS
TP-26	0 ppm	4, bedrock at 8 feet	No	No	2 to 3 foot diameter white-tan resin fragment	No, bedrock encountered	No	NE	No	NS
TP-27	--	14	No	No		No, native soil encountered	TP-27-01(DUP TP-27-11) burned fill from wall of slope 10 feet deep	NE	No	Low concentrations detected, primarily pests/PCBs
TP-28	--	5, bedrock at 8 feet	No	No		No, bedrock encountered	No	NE	No	NS
TP-29	--	9, bedrock at 10 feet	No	No		No, bedrock encountered	No	NE	No	NS
TP-30	0 ppm	4, bedrock at 7 feet	No	black residue on soil at 4 feet below grade	pungent odor at 4 feet below grade	No, bedrock encountered	TP-30-01 stained area from center of trench 4 feet deep	NE	No	No concentrations above SCGs. Elevated bis(2-Ethylhexyl)phthalate concentration.
TP-31	--	20	No	No		No, native soil encountered	No	NE	No	NS

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TP-32	0 ppm	3	3 Crushed, empty at 15, 32, & 45 ft from east end	Gray green residue 1 foot deep at east end of trench		No, native soil encountered	TP-32-01 gray-green residue from east end of trench, 1 foot deep	NE	No	No concentrations above SCGs. Elevated Aroclor 1248 concentration (4 mg/kg).
TP-33	--	1 to 4	Several crushed, most empty, some contain yellow paint residue	No		No, native soil encountered	No	NE	No	NS
TP-34	--	no fill, bedrock at 8 feet	No	No	wet at 6 feet	No, native soil encountered	No	possibly 6	No	NS
TP-35	--	no fill, bedrock at 4 feet	No	No		No, native soil encountered	No	NE	No	NS
TP-36	96 ppm	varies 0 to 3	1 Crushed, empty	No		No, native soil encountered	TP-36-01 soil beneath crushed drum on east portion of trench, 2 feet deep; TP-36-02 from soil at west end of trench, 3 feet deep	NE	No	Only a low concentration of methylene chloride detected, both samples.
TP-37	--	varies 1 to 2	Multiple drums on ground at west and at east end	No		No, native soil encountered	No	NE	No	NS
TP-38	57 ppm, LEL 1% on drum contents	3	Mult. drums on surface	No	wet at 5 feet, fuel odor at 3 feet	No, native soil encountered	TP-38-01 soil from 2 feet deep; TP-38-D1 from overpacked drum	possibly 5	No	Phenol above SCGs in soil. In drum sample, phenol not detected, low concentrations of VOCs, and elevated xylene, 4-methyl-2-pentanone and bis(2-ethylhexyl)phthalate (60,000 mg/kg).
TP-39	--	2	Carcasses at and just below ground surface	No		No, native soil encountered	TP-39-01(DUPTP-39-11) soil from beneath empty drums, 1 foot deep	NE	No	Several PAHs above SCGs.
TP-40	0 ppm	5	Crushed drums & fragments	No, NAPL encountered entering trench from north		Possibly - NAPL reportedly encountered entering trench from the north	TP-40-01 soil below seep at north portion of trench, 4 feet deep; TP-40-W aqeous sample from seep at north end of trench; TP-40-SEEP from drainage into swale downstream of TP-40; additional aqueous samples collected from trench by Buck Labs for waste disposal characterization	4 to 5	Yes	No concentrations elevated or above SCGs in soil. Elevated benzene, 1,2-DCE, TCE, toluene, and vinyl chloride detected in aqueous samples.
TP-41	0 ppm	4	2 Leaking and 1 empty at 1 foot; contents maroon-colored solid mixed with metal typerwriter pieces	No	water at 7 feet	No, native soil encountered	TP-41-01 composite sample of 2 leaking drums; TP-41-D1 (DUP TP-41-DR1) from overpacked drum	7	No	Elevated 2,4,5-trichlorophenol.
TP-42	2.5 ppm	4	No	No		No, native soil encountered	No	NE	No	NS
TP-43	--	6 in southwest, 0 in northeast	No	No		No, native soil encountered	TP-43-01 gray till 6 feet deep	NE	No	No concentrations elevated or above SCGs in soil.
TP-44	--	0 to 1	No	No		No, native soil encountered	No	NE	No	NS

Table 1.1: Test Pit Investigation Summary

TEST PIT	PID READING (NOTE 1)	BOTTOM OF FILL (FT BGS)	DRUMS ENCOUNTERED	STAINS OBSERVED	OTHER	ADDITIONAL DRUMS SUSPECTED (Yes/No)	SAMPLES COLLECTED	DEPTH TO GROUNDWATER (FT)	SAMPLES FROM BENEATH WT (Yes/No)	SAMPLE RESULTS (see Note 2)
TP-45	0 ppm	unknown, no subsurface excavation	Eleven total drums encountered at surface, four drums with following contents; first half-full, oil-like contents, second one-thrid full, oil-like contents, third less than one-quarter full, oil-like contents, and fourth containing ash; remaining drums empty	No		Possibly - No subsurface excavation	TP-45-D1 from overpacked drum; TP-45-D2 from overpacked drum	NE	No	Several elevated SVOCs, acid test yielded elevated aroclor 1254.
TP-46	2 ppm	1.5 to 2	1 empty crushed drum	No		No, native soil encountered	TP-46-01 gray silt clay at north end of trench 2 feet deep	NE	No	Low concentrations of several VOCs.
TP-47	--	No fill	No	Possible reddish stain at surface		No, native soil encountered	No	NE	No	NS
TP-48	--	1	2 Drum lids	Occassionally red stained near surface	water at between 3 and 5 feet	No, native soil encountered	No	3 to 5	No	NS
TP-49	--	1.5	No	Black and red stained organics	water at 3.5 feet	Possibly - native soil not encountered	No	3.5	No	NS
TP-50	--	unknown, trench terminated at 5 feet, no explanation	No	No	water and oil encountered near surface, oil recovered with pads	Possibly - native soil not encountered, oil encountered	No	possibly less than 5	No	NS

Notes:
1. PID reading presented is the highest observed for that location.
2. Concentrations of inorganics exceed SCGs at all test pit locations.
Only organic analyte results are discussed.
-- = not indicated
NS = not sampled
NE = not encountered
ppm = parts per million
FT = feet
FT BGS = feet below ground surface
WT = water table
VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds
PAHs = polyaromatic hydrocarbons
pests = pesticides

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Table 1.2: Determination of Recommended Soil Cleanup Objectives for Organic Contaminants

COMPOUND	UNITS:	SOIL CLEANUP OBJECTIVE TO PROTECT GW QUALITY (see Note 1)	USEPA HEALTH BASED CARCIN-OGENS	USEPA HEALTH BASED SYSTEMIC TOXICANTS	CRQL (see Note 2)	RECOMMENDED SOIL CLEAN-UP OBJECTIVE (see Note 3)
VOLATILES*						
Acetone	mg/Kg	0.11	N/A	8000	0.01	0.2
Benzene	mg/Kg	0.06	24	N/A	0.005	0.1
2-Butanone	mg/Kg	0.3	N/A	4000	0.01	0.3
Chlorobenzene	mg/Kg	1.7	N/A	2000	0.005	1.7
1,2-Dichloroethene (total)	mg/Kg	0.3	N/A	2000	0.005	0.3
Ethylbenzene	mg/Kg	5.5	N/A	8000	0.005	5.5
4-Methyl-2-Pentanone	mg/Kg	1	N/A	N/A	0.01	1
Methylene Chloride	mg/Kg	0.1	93	5000	0.005	0.1
Tetrachloroethene	mg/Kg	1.4	14	800	0.005	1.4
Toluene	mg/Kg	1.5	N/A	20000	0.005	1.5
Trichloroethene	mg/Kg	0.7	64	N/A	0.005	0.7
Vinyl Chloride	mg/Kg	0.12	N/A	N/A	0.01	0.2
Xylene (total)	mg/Kg	1.2	N/A	200000	N/A	1.2
SEMIVOLATILES*						
Acenaphthene	mg/Kg	90	N/A	5000	0.33	50
Acenaphthylene	mg/Kg	41	N/A	N/A	0.33	41
Anthracene	mg/Kg	700	N/A	20000	0.33	50
Benzo(a)anthracene	mg/Kg	3	0.224	N/A	0.33	0.224/MDL
Benzo(a)pyrene	mg/Kg	11	0.0609	N/A	0.33	0.061/MDL
Benzo(b)fluoranthene	mg/Kg	1.1	N/A	N/A	0.33	1.1
Benzo(g,h,i)perylene	mg/Kg	8000	N/A	N/A	0.33	50
Benzo(k)fluoranthene	mg/Kg	1.1	N/A	N/A	0.33	1.1
bis(2-Ethylhexyl)phthalate	mg/Kg	435	50	2000	0.33	50
Butylbenzylphthalate	mg/Kg	122	N/A	20000	0.33	50.00
Carbazole	mg/Kg	N/A	N/A	N/A	N/A	N/A
4-Chloroaniline	mg/Kg	0.22	200	300	0.33	0.220/MDL
Chrysene	mg/Kg	0.4	N/A	N/A	0.33	0.4
Di-n-butylphthalate	mg/Kg	8.1	N/A	8000	0.33	8.1
Di-n-octylphthalate	mg/Kg	120	N/A	2000	0.33	50
Dibenzofuran	mg/Kg	6.2	N/A	N/A	0.33	6.2
1,4-Dichlorobenzene	mg/Kg	N/A	N/A	N/A	N	N/A
Diethylphthalate	mg/Kg	7.1	N/A	60000	0.33	7.1
Dimethylphthalate	mg/Kg	2	N/A	80000	0.33	2
2,6-Dinitrotoluene	mg/Kg	1	1.03	N/A	0.33	1
Fluoranthene	mg/Kg	1900	N/A	3000	0.33	50
Fluorene	mg/Kg	350	N/A	3000	0.33	50
Hexachlorocyclopentadiene	mg/Kg	N/A	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	mg/Kg	3.2	N/A	N/A	0.33	3.2
2-Methylnaphthalene	mg/Kg	36.4	N/A	N/A	0.33	36.4
4-Methylphenol	mg/Kg	0.9	N/A	4000	0.33	0.9
N-Nitrosodiphenylamine	mg/Kg	N/A	N/A	N/A	N/A	N/A
Naphthalene	mg/Kg	13	N/A	300	0.33	13
Pentachlorophenol	mg/Kg	1	N/A	2000	1.6	1.0/MDL

Table 1.2: Determination of Recommended Soil Cleanup Objectives for Organic Contaminants

COMPOUND	UNITS:	SOIL CLEANUP OBJECTIVE TO PROTECT GW QUALITY (see Note 1)	USEPA HEALTH BASED CARCIN-OGENS	USEPA HEALTH BASED SYSTEMIC TOXICANTS	CRQL (see Note 2)	RECOMMENDED SOIL CLEAN-UP OBJECTIVE (see Note 3)
Phenanthrene	mg/Kg	220	N/A	N/A	0.33	50
Phenol	mg/Kg	0.03	N/A	50000	0.33	0.03/MDL
Pyrene	mg/Kg	665	N/A	2000	0.33	50
1,2,4-Trichlorobenzene	mg/Kg	N/A	N/A	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate	mg/Kg	435	50	2000	0.33	50
PESTICIDES/PCBs*						
alpha-BHC	mg/Kg	0.2	0.111	N/A	0.008	0.11
alpha-Chlordane***	mg/Kg	2	0.54	50	0.08	0.54
beta-BHC	mg/Kg	0.2	3.89	N/A	0.008	0.20
delta-BHC	mg/Kg	0.3	N/A	N/A	0.008	0.30
gamma-BHC (Lindane)	mg/Kg	0.06	5.4	20	0.008	0.06
gamma-Chlordane	mg/Kg	14	0.54	5	0.08	0.54
Aldrin	mg/Kg	9.6	0.041	2	0.008	0.041
4,4'-DDD	mg/Kg	7.7	2.9	N/A	0.016	2.9
4,4'-DDE	mg/Kg	4.4	2.1	N/A	0.016	2.1
4,4'-DDT	mg/Kg	2.5	2.1	40	0.016	2.1
Dieldrin	mg/Kg	0.1	0.044	4	0.016	0.044
Endosulfan I	mg/Kg	0.9	N/A	N/A	0.016	0.9
Endosulfan II	mg/Kg	0.9	N/A	N/A	0.016	0.9
Endosulfan sulfate	mg/Kg	1	N/A	N/A	0.016	1
Endrin	mg/Kg	0.1	N/A	20	0.008	0.10
Endrin aldehyde	mg/Kg	N/A	N/A	N/A	N/A	N/A
Endrin ketone	mg/Kg	N/A	N/A	N/A	N/A	N/A
Heptachlor	mg/Kg	0.1	0.16	40	0.008	0.1
Heptachlor epoxide	mg/Kg	0.002	0.077	0.8	0.008	0.02
Methoxychlor	mg/Kg	900	N/A	400	0.08	N/A
Toxaphene	mg/Kg	N/A	N/A	N/A	N/A	N/A
Aroclor-1016**	mg/Kg	10	1	N/A	0.16	1, 10
Aroclor-1221**	mg/Kg	10	1	N/A	0.161	1, 10
Aroclor-1232**	mg/Kg	10	1	N/A	0.162	1, 10
Aroclor-1242**	mg/Kg	10	1	N/A	0.163	1, 10
Aroclor-1248**	mg/Kg	10	1	N/A	0.164	1, 10
Aroclor-1254**	mg/Kg	10	1	N/A	0.165	1, 10
Aroclor-1260**	mg/Kg	10	1	N/A	0.166	1, 10
TCLP VOLATILES						
NONE	mg/L					
TCLP SEMIVOLATILES						
NONE	mg/L					
TCLP PESTICIDES						
NONE	mg/L					
TCLP HERBICIDES						
NONE	mg/L					

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Table 1.2: Determination of Recommended Soil Cleanup Objectives for Organic Contaminants

COMPOUND	UNITS:	SOIL CLEANUP OBJECTIVE TO PROTECT GW QUALITY (see Note 1)	USEPA HEALTH BASED CARCIN-OGENS	USEPA HEALTH BASED SYSTEMIC TOXICANTS	CRQL (see Note 2)	RECOMMENDED SOIL CLEAN-UP OBJECTIVE (see Note 3)

Notes:
1. Soil cleanup objective to protect groundwater quality according to TAGM 4046, 1994.
This value was calculated for 1% (5% for PCBs) soil organic carbon content, and should be adjusted according to site-specific values.
2. Cleanup objective not to be less than CRQL.
3. Cleanup objective lesser of value to protect groundwater and health based values, unless otherwise specified in TAGM 4046. TCLP criteria values from STARS Memo #1, 1992.
*Per TAGM 4046, total VOCs less than 10 ppm, individual SVOCs less than 50 ppm, total SVOCs less than 500 ppm, total pesticides less than 10 ppm.
**PCB criteria 1 mg/kg surface soil, 10 mg/kg subsurface soil. No surface soils presented; data compared to value of 10 mg/kg.
TCLP Criteria from Spill Technology and Remediation Series (STARS) Memo #1 Petroleum-Contaminated Soil Guidance Policy.
*** chlordane criteria value used
CRQL = contract required quantitation limit
MDL = Method detection limit
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
N/A = not available

Table 1.3: Determination of Recommended Soil Cleanup Objectives for Inorganic Contaminants

COMPOUND	UNITS:	EASTERN US BACKGROUND (see Note 1)	CRDL (see Note 2)	SITE BACKGROUND (see Note 3)	RECOMMENDED SOIL CLEAN-UP OBJECTIVE (see Note 4)
INORGANICS					
Aluminum	mg/Kg	33,000	2	16200	SB
Antimony	mg/Kg	N/A	0.6	1.6	SB
Arsenic	mg/Kg	3-12**	0.1	7.9	7.5 or SB
Barium	mg/Kg	15-600	2	89.8	300 or SB
Beryllium	mg/Kg	0-1.75	0.05	0.6	0.16 (HEAST) or SB
Cadmium	mg/Kg	0.1-1	0.05	N/A	1 or SB
Calcium	mg/Kg	130-35000	50	1135	SB
Chromium	mg/Kg	1.5-40 **	0.1	21.85	10 or SB
Cobalt	mg/Kg	2.5-60 **	0.5	15.75	30 or SB
Copper	mg/Kg	1-50	0.25	19.1	25 or SB
Iron	mg/Kg	2000-550000	1	33550	2000 or SB
Lead	mg/Kg	****	0.03	14.3	SB
Magnesium	mg/Kg	100-5000	50	6085	SB
Manganese	mg/Kg	50-5000	0.15	918	SB
Mercury	mg/Kg	0.001-0.2	0.002	ND	0.1
Nickel	mg/Kg	0.5-25	0.4	34.5	13 or SB
Potassium	mg/Kg	8500-43000 **	50	1270	SB
Selenium	mg/Kg	0.1-3.9	0.05	N/A	2 or SB
Silver	mg/Kg	N/A	0.1	N/A	SB
Sodium	mg/Kg	6000-8000	50	167	SB
Thallium	mg/Kg	N/A	0.1	ND	SB
Vanadium	mg/Kg	1-300	0.5	20.35	150 or SB
Zinc	mg/Kg	9-50	0.2	69.25	20 or SB
Total Cyanide	mg/Kg	N/A	0.1	ND	***
TCLP METALS					
Arsenic	mg/L				5.00
Barium	mg/L				100.00
Cadmium	mg/L				1.00
Lead	mg/L				5.00
Silver	mg/L				5.00

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Notes:
1. Represents average background concentrations for Eastern US soils.
** values represent New York State background
2. Recommended Soil Cleanup Objective not to be less than CRDL.
3. Site Background is average of results from samples MW-1B and MW-1E (refer to Table B.6)
4. Recommended Soil Cleanup Objectives from TAGM 4046, 1994. TCLP values from STARS Memo #1, 1992.
Recommended Soil Cleanup Objective is the higher of the values listed.
***site-specific forms of cyanide should be evaluated in determining cleanup objective
****background levels for lead vary widely, from 4-61 mg/kg for rural areas, to 200-500 mg/kg for urban
CRDL = contract required detection limit, which is approximately 10 times the CRDL for water.
HEAST = USEPA HEAST database value
MDL = Method Detection Limit
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
N/A = not available
ND = not detected
SB = site background

Table 1.4: Determination of Sediment Screening Values for Organic Contaminants

COMPOUND	SAMPLE ID: LAB ID: SOURCE: SDG: MATRIX: SAMPLED: VALIDATED: UNITS:	HUMAN HEALTH BIOACCUM-ULATION µg/g OC	BENTHIC AQUATIC LIFE ACUTE TOXICITY µg/g OC	BENTHIC AQUATIC LIFE CHRONIC TOXICITY µg/g OC	WILDLIFE BIOACCUM-ULATION µg/g OC	SEDIMENT SCREENING VALUE mg/kg (see Note 1)
VOLATILES						
1,2-Dichloroethene (total)	mg/Kg	NL	NL	NL	NL	NL
Trichloroethene	mg/Kg	2	NL	NL	NL	20
SEMIVOLATILES						
Acenaphthene	mg/Kg	NL	NL	140	NL	1400
Anthracene	mg/Kg	NL	986	107	NL	1070
Benzo(a)anthracene	mg/Kg	1.3	NL	NL	NL	13
Benzo(a)pyrene	mg/Kg	1.3	NL	NL	NL	13
Benzo(b)fluoranthene	mg/Kg	1.3	NL	NL	NL	13
Benzo(k)fluoranthene	mg/Kg	1.3	NL	NL	NL	13
Carbazole	mg/Kg	NL	NL	NL	NL	NL
Chrysene	mg/Kg	1.3	NL	NL	NL	13
Fluoranthene	mg/Kg	NL	NL	NL	1020	10200
Fluorene	mg/Kg	NL	73	8	NL	80
Naphthalene	mg/Kg	NL	258	30	NL	300
Phenanthrene	mg/Kg	NL	NL	120	NL	1200
Pyrene	mg/Kg	NL	8775	961	NL	9610
bis(2-Ethylhexyl)phthalate	mg/Kg	NL	NL	199.5	NL	1995
PESTICIDES/PCBs						
4,4'-DDD	mg/Kg	0.01	1100	1	1	0.1
4,4'-DDE	mg/Kg	0.01	1100	1	1	0.1
4,4'-DDT	mg/Kg	0.01	1100	1	1	0.1
Endosulfan II	mg/Kg	NL	0.78	0.03	NL	0.3
Endrin	mg/Kg	0.8	NL	4	0.8	8
alpha-Chlordane	mg/Kg	0.001	1.4	0.03	0.006	0.01

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Notes:
1. Sediment Screening Values according to Table 1, NYSDEC Department of Fish and Wildlife Technical Guidance for Screening Contaminated Sediments, 1999.
Risk based values presented based upon Fresh (FW) or Fresh and Saltwater (FS) Criteria.
Sediment Screening Values presented in this table calculated for sediment organic content of 1%, and should be adjusted according to site-specific values.
mg/kg =milligrams per kilogram
µg/g OC = micrograms per gram organic content

Table 2.1: Contaminants of Concern

	UNITS	CHEMICAL-SPECIFIC SCG VALUES	MIN DETECT	MAX DETECT	NO OF SAMPLES	FREQUENCY OF EXCEEDANCE	BACK-GROUND
TEST PIT SOILS							
VOLATILES							
None	mg/Kg						
SEMIVOLATILES							
Benzo(a)anthracene	mg/Kg	0.224/MDL	ND	0.76	24	13%	ND
Benzo(a)pyrene	mg/Kg	0.061/MDL	ND	0.78	24	33%	ND
Chrysene	mg/Kg	0.4	ND	0.81	24	8%	ND
Phenol	mg/Kg	0.03/MDL	ND	1.4	24	13%	ND
PESTICIDES/PCBs							
None	mg/Kg						
TCLP VOLATILES							
None	mg/L						
TCLP SEMIVOLATILES							
None	mg/L						
TCLP PESTICIDES							
None	mg/L						
TCLP HERBICIDES							
None	mg/L						
INORGANICS							
Aluminum	mg/Kg	SB	6610	32900	24	21%	16200
Antimony	mg/Kg	SB	1.7	24	24	100%	1.6
Arsenic	mg/Kg	7.5 or SB	4.8	40.7	24	50%	7.9
Barium	mg/Kg	300 or SB	45.6	904	24	13%	89.8
Beryllium	mg/Kg	0.16 or SB	ND	0.7	24	8%	0.6
Cadmium	mg/Kg	1 or SB	ND	49.8	24	63%	N/A
Calcium	mg/Kg	SB	688	61900	24	75%	1135
Chromium	mg/Kg	10 or SB	11.8	435	24	71%	21.85
Cobalt	mg/Kg	30 or SB	6	34.2	24	8%	15.75
Copper	mg/Kg	25 or SB	11.8	1820	24	63%	19.1
Iron	mg/Kg	2000 or SB	17100	569000	24	54%	33550
Lead	mg/Kg	SB	7.5	2910	24	75%	14.3
Magnesium	mg/Kg	SB	1650	9510	24	21%	6085
Manganese	mg/Kg	SB	304	3490	24	29%	918
Mercury	mg/Kg	0.1	ND	0.79	24	46%	ND
Nickel	mg/Kg	13 or SB	15.3	249	24	50%	34.5
Potassium	mg/Kg	SB	519	4950	24	63%	1270
Sodium	mg/Kg	SB	185	2440	24	100%	167
Thallium	mg/Kg	SB	ND	2.1	24	17%	ND
Zinc	mg/Kg	20 or SB	50.7	4130	24	88%	69.25
Total Cyanide	mg/Kg	(see Note 1)	ND	3.01	24	17%	ND
TCLP METALS							
None	mg/L						
SURFACE WATER							
VOLATILES							
1,2-Dichloroethene (total)	µg/L	5	ND	180	6	17%	NA
Trichloroethene	µg/L	40	ND	530	6	17%	NA
Vinyl Chloride	µg/L	2	ND	2	6	17%	NA
SEMIVOLATILES							
bis(2-Ethylhexyl)phthalate	µg/L	0.6	ND	18	6	83%	NA
PESTICIDES/PCBs							
None	µg/L						
INORGANICS							

Table 2.1: Contaminants of Concern

	UNITS	CHEMICAL-SPECIFIC SCG VALUES	MIN DETECT	MAX DETECT	NO OF SAMPLES	FREQUENCY OF EXCEEDANCE	BACK-GROUND
Aluminum	µg/L	100	137	283000	6	100%	NA
Antimony	µg/L	6	ND	105	6	33%	NA
Barium	µg/L	2000	19.9	4830	6	33%	NA
Beryllium	µg/L	11, 1100*	ND	12.6	6		NA
Cadmium	µg/L	(see Note 2)	ND	16.2	6		NA
Chromium	µg/L	(see Note 2)	ND	457	6		NA
Cobalt	µg/L	5	ND	237	6	83%	NA
Copper	µg/L	(see Note 2)	2.9	595	6		NA
Iron	µg/L	300	105	2420000	6	83%	NA
Lead	µg/L	(see Note 2)	ND	2970	6		NA
Magnesium	µg/L	35,000	3710	102000	6	33%	NA
Manganese	µg/L	600	4.9	11000	6	83%	NA
Mercury	µg/L	0.0007	ND	2.8	6	83%	NA
Nickel	µg/L	(see Note 2)	ND	819	6		NA
Silver	µg/L	0.1**	ND	11	6	33%	NA
Sodium	µg/L	(see Note 2)	8690	26700	6		NA
Vanadium	µg/L	14	ND	405	6	83%	NA
Zinc	µg/L	(see Note 2)	9.4	14500	6		NA
Total Cyanide	µg/L	5.2***	ND	32	6	17%	NA
SEDIMENT (see Note 3)							
VOLATILES							
None	mg/Kg						
SEMIVOLATILES							
None	mg/Kg						
PESTICIDES/PCBs							
4,4'-DDT	mg/Kg	0.1	ND	0.2	7	14%	NA
INORGANICS							
Antimony	mg/Kg	2	ND	8.4	7	43%	NA
Arsenic	mg/Kg	6	ND	7.3	7	43%	NA
Cadmium	mg/Kg	0.6	ND	8.3	7	43%	NA
Chromium	mg/Kg	26	15.4	97.7	7	29%	NA
Copper	mg/Kg	16	13.6	60.5	7	71%	NA
Iron	mg/Kg	20,000	26100	167000	7	100%	NA
Lead	mg/Kg	31	15.5	334	7	57%	NA
Manganese	mg/Kg	460	521	1970	7	100%	NA
Nickel	mg/Kg	16	27.7	91.5	7	100%	NA
Silver	mg/Kg	1	ND	2.4	7	14%	NA
Zinc	mg/Kg	120	170	1240	7	100%	NA
TCLP METALS							
None	mg/L						
SOIL BORINGS (see Note 4)							
VOLATILES							
None	mg/Kg						
SEMIVOLATILES							
None	mg/Kg						
PESTICIDES/PCBs							
None	mg/Kg						
INORGANICS							
Aluminum	mg/Kg	SB	11800	17900	6	17%	16200
Antimony	mg/Kg	SB	0.55	2	6	67%	1.6
Arsenic	mg/Kg	7.5 or SB	6.6	10.6	6	50%	7.9

Table 2.1: Contaminants of Concern

	UNITS	CHEMICAL-SPECIFIC SCG VALUES	MIN DETECT	MAX DETECT	NO OF SAMPLES	FREQUENCY OF EXCEEDANCE	BACK-GROUND
Beryllium	mg/Kg	0.16 or SB	0.46	0.73	6	17%	0.6
Calcium	mg/Kg	SB	782	50300	6	83%	1135
Chromium	mg/Kg	10 or SB	15.8	24.1	6	17%	21.85
Iron	mg/Kg	2000 or SB	25300	40000	6	17%	33550
Lead	mg/Kg	SB	5.7	22.9	6	33%	14.3
Magnesium	mg/Kg	SB	4130	9070	6	50%	6085
Nickel	mg/Kg	13 or SB	25.4	37.6	6	17%	34.5
Potassium	mg/Kg	SB	1140	2220	6	83%	1270
Sodium	mg/Kg	SB	ND	298	6	33%	167
Thallium	mg/Kg	SB	ND	0.97	6	33%	ND
Zinc	mg/Kg	20 or SB	57.6	87.2	6	50%	69.25
Total Cyanide	mg/Kg	****	ND	2.23	6	17%	ND
GROUNDWATER (see Note 5)							
VOLATILES							
1,2-Dichloroethene (total)	µg/L	5	ND	56	7	29%	ND
Trichloroethene	µg/L	5	ND	540	7	29%	ND
SEMIVOLATILES							
None	µg/L						
PESTICIDES/PCBs							
None	µg/L						
METALS							
Aluminum	µg/L	2000	463	4490	6	67%	12850
Iron	µg/L	300	811	47600	6	133%	23150
Manganese	µg/L	300	25	622	6	50%	767
Sodium	µg/L	20000	1900	23600	6	33%	3880

Prepared/Date: RTB 10/20/2005
Checked/Date: MJS 10/20/2005

Notes:
1. Site-specific forms of cyanide should be evaluated in determining soil cleanup objective
2. Standard or guidance values for inorganics in surface water are dependent upon hardness. Refer to Table B.4 for more inf
3. Sediment Screening Values presented for organic contaminants in sediment calculated for organic content of 1%, and should be adjusted according to site-specific values.
4. Min and max detected values, number of samples, and frequency of detection do not include monitoring well data for back wells MW-1S and MW-1B
5. Min and max detected values, number of samples, and frequency of detection do not include data for samples MW1B and
*standard for beryllium is 11 ug/L for hardness less than or equal to 75 mg/L, 1100 ug/L for greater than 75 mg/L
**applies to ionic silver
***cyanide criteria for free cyanide, the sum of HCN and CN- expressed as CN.
****site-specific forms of cyanide should be evaluated in determining cleanup objective
MDL = method detection limit
µg/L = micrograms per liter
mg/kg = milligrams per kilogram
ND = non detect

Table 3.1: Remediation Goals

	UNITS	MAX DETECT	REMEDIATION GOAL
SURFACE SOIL			
No Data Available			
SOIL			
Chrysene	mg/Kg	0.81	0.4
Phenol	mg/Kg	1.4	0.03/MDL
SURFACE WATER			
Mercury	µg/L	2.8	0.0026
SEDIMENT (see Note 1)			
4,4'-DDT	mg/Kg	0.2	0.1
Antimony	mg/Kg	8.4	2
Arsenic	mg/Kg	7.3	6
Cadmium	mg/Kg	8.3	0.6
Chromium	mg/Kg	97.7	26
Copper	mg/Kg	60.5	16
Iron	mg/Kg	167000	20,000
Lead	mg/Kg	334	31
Manganese	mg/Kg	1970	460
Nickel	mg/Kg	91.5	16
Silver	mg/Kg	2.4	1
Zinc	mg/Kg	1240	120
GROUNDWATER			
None			

Prepared/Date: RTB 10/20/05
Checked/Date: MJS 10/20/05

Notes:
1. Sediment Screening Values presented for organic contaminants in sediment calculated for organic content of one percent, and should be adjusted according to site-specific values.
MDL = method detection limit
µg/L = micrograms per liter
mg/kg = milligrams per kilogram

Table 3.2: Contamination Requiring Remediation

LOCATION	DEPTH (FT) (see Note 1)	MATRIX	UNITS	COMPOUND (see Note 2)	CONCENTRATION (see Note 4)	REMEDIATION GOAL
TP-1	5	Soil	mg/Kg	chrysene	0.81	0.4
TP-11	12	Soil	mg/Kg	phenol	0.45	0.03/MDL
TP-18	8	Soil	mg/Kg	phenol	1.4	0.03/MDL
TP-38	2	Soil	mg/Kg	phenol	0.25	0.03/MDL
TP-39	1	Soil	mg/Kg	chrysene	0.58	0.4
SW002	NA	Surface water	µg/L	mercury	2.8	0.0026
SW003	NA	Surface water	µg/L	mercury	0.9	0.0026
SW004	NA	Surface water	µg/L	mercury	1	0.0026
SW005	NA	Surface water	µg/L	mercury	0.08	0.0026
SW006	NA	Surface water	µg/L	mercury	0.07	0.0026
SD001	NA	Sediment	mg/Kg	inorganics	-	-
SD002	NA	Sediment	mg/Kg	inorganics	-	-
SD003	NA	Sediment	mg/Kg	4,4'-DDT	0.2	0.1
SD003	NA	Sediment	mg/Kg	inorganics	-	-
SD004	NA	Sediment	mg/Kg	inorganics	-	-
SD005	NA	Sediment	mg/Kg	inorganics	-	-
SD006	NA	Sediment	mg/Kg	inorganics	-	-
SD007	NA	Sediment	mg/Kg	inorganics	-	-

Prepared/Date: RTB 10/20/05
Checked/Date: MJS 10/20/05

Notes:
1. MW-2B, MW-3B, and MW-4B are bedrock wells consisting of sealed open bore hole, no screen.
Depth listed is top of bedrock. Refer to Monitoring Well Construction Logs in Appendix C of the RI.
water SCG) values.
2. refer to Table B.5 for specific inorganic contaminants above RG (equivalent to sediment
SCG) values.
B2EHP = bis(2-ethylhexyl)phthalate

Table 4.1: Potential Remedial Technologies and Process Options

Environmental Media	General Response Action	Remedial Technology	Process Option	Description
Surface and Subsurface Soils	No Action	Not Applicable	Not Applicable	No actions implemented.
	Access Restriction	Land Use Restrictions	Not Applicable	Use of property within potentially contaminated areas would be restricted.
		Fencing	Not Applicable	Security fences installed around potentially contaminated areas to limit access.
	Containment	Surface Controls	Grading	Reshaping of topography to manage infiltration and control erosion.
			Revegetation	Seed, fertilize, and water until vegetation is established.
		Capping	Soil Cover	Soil cover placed over landfill.
			Low Permeability Cover System (single barrier)	Low permeability synthetic liner or soil over site. Usually protected with additional fill above, and topsoil.
Sediment	No Action	Not Applicable	Not Applicable	No actions implemented
	Removal	Excavation	Mechanical Excavation	Use of mechanical excavation equipment to remove and load contaminated sediments for disposal.
		Dewatering	Wells or Trenches	Temporary lowering of water table. Usually done in conjunction with sediment removal.
	Disposal	Off-Site Disposal/Discharge	RCRA Landfill	Transport of excavated sediment to a RCRA permitted landfill.
		On-site Disposal	Consolidation	Consolidation of excavated sediment material under a landfill cap.
	Treatment	Physical	Stabilization	Sediment mixed with stabilizing reagents (e.g., lime, fly ash) which can stabilize contaminants.
			Thermal Treatment	Contaminated sediments are thermally destroyed in a controlled oxygen-sufficient environment.
	Containment	Surface Controls	Grading	Reshaping of topography to control sediment erosion.
			Capping	Uncontaminated soil placed over sediment.

Table 4.1: Potential Remedial Technologies and Process Options

Environmental Media	General Response Action	Remedial Technology	Process Option	Description
Source Areas and Hot Spots	No Action	Not Applicable	Not Applicable	No actions implemented
	Access Restriction	Land Use Restrictions	Not Applicable	Use of property within potentially contaminated areas would be restricted.
		Fencing	Not Applicable	Security fences installed around potentially contaminated areas to limit access.
	Containment	Surface Controls	Grading	Reshaping of topography to manage infiltration and control erosion.
			Revegetation	Seed, fertilize, and water until vegetation is established.
		Capping	Soil Cover	Soil cover placed over landfill.
			Low Permeability Cover System (single barrier)	Low permeability synthetic liner or soil over site. Usually protected with additional fill above, and topsoil.
	Removal	Excavation	Mechanical Excavation	Use of mechanical excavation equipment to remove and load landfill wastes for disposal.
			Drum Removal	Excavation of subsurface drums applies to hot spot areas. A drum grappler, drum cradle, or sling attached to a backhoe, crane, or front-end loader can be used.
		Disposal On-site	Consolidation	Consolidation of excavated material from hot spot areas under a landfill cap.
		Disposal Off-site	RCRA Landfill	Transport excavated soil to a RCRA permitted landfill.
	Soil Treatment	Thermal Treatment	On-site Incineration	Landfill wastes are thermally destroyed in a controlled oxygen-sufficient environment.
			Low Temperature Thermal Volatilization	VOCs removed from soil in a drying unit.

Table 4.1: Potential Remedial Technologies and Process Options

Environmental Media	General Response Action	Remedial Technology	Process Option	Description
			Off-site Treatment in RCRA Incinerator	Incineration of contaminated soils at a RCRA-permitted facility.
	In-Situ Treatment	Biological Treatment	Biodegradation	Soils seeded with microorganisms and/or nutrients to allow biological degradation
		Physical Treatment	Vapor Extraction	Volatile organics stripped from soil and recovered in vapor form through extraction wells.
			Solidification/ Stabilization	Soils mixed with a pozzolanic/cement material which solidify and reduce contaminant mobility.

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to Site-Limiting Characteristics	Applicability to Waste-Limiting Characteristics	Screening Status	Comments
Surface and Subsurface Soils	No Action	Not Applicable	Not Applicable	Not Applicable	Retained.	Retained to be carried through detailed analysis of alternatives.
	Access Restriction	Land Use Restrictions	None, property owned by the Town/County.	Would provide human exposure control. Would not reduce toxicity, mobility, or volume of contaminants.	Retained.	Viable as a component of remedial actions which do not involve removal of contamination above RGs.
		Fencing	None, property owned by the Town/County.	Would provide human exposure control. Would not reduce toxicity, mobility, or volume of contaminants.	Retained.	Viable as a component of remedial actions which do not involve removal of contamination above RGs.
	Containment	Grading	Grading may alter elevation of ground surface in vicinity of swale area.	Would not reduce toxicity or volume of contaminants. Reduction in mobility would not be significant.	Eliminated.	Viable only as a component of an engineered low permeability cover system.
		Revegetation	Steep slopes would require hardy vegetation and significant temporary/permanent erosion controls.	Would not reduce toxicity, mobility, or volume of contaminants.	Eliminated.	Viable only as a component of an engineered low permeability cover system.

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to		Screening Status	Comments
			Site-Limiting Characteristics	Waste-Limiting Characteristics		
		Soil Cover	Installation of soil cover may alter elevation of ground surface in drainage ditch and/or swale area, a potential wetland. Steep slopes would require hardy vegetation, regrading of existing cover, and significant temporary/permanent erosion controls.	Would not reduce toxicity, mobility, or volume of contaminants. Would not result in significant reduction in infiltration. Would provide human exposure control.	Retained.	
		Low Permeability Cover System (single barrier)	Installation of cover system may alter elevation of ground surface in drainage ditch and/or swale area, a potential wetland. Steep slopes would require hardy vegetation and significant temporary/permanent erosion controls. Large debris would require removal/disposal off-site or consolidation in maximum fill locations.	Would reduce mobility by minimizing infiltration. Would not reduce toxicity or volume Would provide human exposure control.	Retained.	Viable in situations were it is not necessary to comply with RCRA Subtitle C. The Site is designated by NYSDEC as a Class 2 non-RCRA regulated site.
Sediment	No Action	Not Applicable	Not Applicable	Not Applicable	Retained.	Retained to be carried through detailed analysis of alternatives.
	Removal	Mechanical Excavation	Extent of contaminated sediments at Site appears limited, and outside of wetland areas. However, the drainage	Reduction in volume, toxicity, and mobility reliant upon final	Retained.	Excavated sediments could be consolidated under a low permeability cover system or treated/disposed off-site.

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to: Site-Limiting Characteristics	Applicability to: Waste-Limiting Characteristics	Screening Status	Comments
			swale area at the Site is a potential wetland. Potential for secondary migration of contaminants via surface water during excavation.	treatment or disposal option.		
		Dewatering with Wells or Trenches	Extent of contaminated sediments at Site appears limited, and surface water is intermittent at Site; dewatering would likely not be necessary.	Would reduce the risk of secondary migration of contaminants during excavation	Retained.	Would eliminate potential for secondary migration of contaminants via surface water during excavation of contaminated sediments.
	Disposal	Off-site disposal at RCRA Landfill	None.	Treatment may be based on the land disposal restrictions. Would reduce mobility of contamination. Would not reduce toxicity or volume of contamination. Would minimize human exposure.	Retained.	
		Consolidation	Extent of contaminated sediments at Site appears limited, and outside of wetland areas. Excavated sediments could be consolidated on-site under a low permeability cover system.	Would not reduce toxicity or volume of contaminants. Would reduce mobility of contaminants.	Retained.	Would minimize impacts to drainage swale and/or drainage ditch by removing only the contaminated sediments and eliminating need to extend cover system over drainage ditch.

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to: Site-Limiting Characteristics	Applicability to: Waste-Limiting Characteristics	Screening Status	Comments
	Treatment	Stabilization	None.	Generally not effective at reducing mobility of organic contaminants. Would not reduce volume or toxicity of contamination.	Eliminated.	
		Thermal Treatment	Extent of contaminated sediments at Site appears limited and, therefore, this process option would not be cost-effective.	Ash may require additional treatment for inorganics. Would reduce toxicity, mobility, and volume of contamination.	Eliminated.	
	Containment	Grading	Grading would alter the drainage ditch and/or swale area, a potential wetland.	Would not reduce toxicity, mobility, or volume of contaminants.	Eliminated.	
		Sediment Capping	Would require filling of drainage ditch and/or drainage swale, a potential wetland.	Would not reduce toxicity or volume of contaminants. Would provide human exposure control.	Eliminated.	

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to: Site-Limiting Characteristics	Applicability to: Waste-Limiting Characteristics	Screening Status	Comments
Source Areas and Hot Spots	No Action	Not Applicable	Not Applicable	Not Applicable	Retained.	Retained to be carried through detailed analysis of alternatives.
	Access Restriction	Land Use Restrictions	None, property owned by the Town/County.	Would provide human exposure control. Would not reduce toxicity, mobility, or volume of source contaminants.	Retained.	Viable as a component of remedial actions which do not involve removal of contamination above RGs.
		Fencing	None, property owned by the Town/County.	Would provide human exposure control. Would not reduce toxicity, mobility, or volume of source contaminants.	Retained.	Viable as a component of remedial actions which do not involve removal of contamination above RGs.
	Containment	Grading	Grading may alter elevation of ground surface in vicinity of swale area and could negatively impact the environment.	Would not reduce toxicity or volume of contaminants. Reduction in mobility would not be significant.	Eliminated.	Viable only as a component of remedial actions which minimize infiltration within the landfill area.

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to Site-Limiting Characteristics	Applicability to Waste-Limiting Characteristics	Screening Status	Comments
		Revegetation	Steep slopes would require hardy vegetation and significant temporary/permanent erosion controls.	Would not reduce toxicity, mobility, or volume of contaminants.	Eliminated.	Viable only as a component of an engineered low permeability cover system.
		Soil Cover	Installation of soil cover may alter elevation of ground surface in drainage ditch and/or swale area, a potential wetland. Steep slopes would require hardy vegetation, regrading of existing cover, and significant temporary/permanent erosion controls.	Would not reduce toxicity, mobility, or volume of contaminants. Would not minimize infiltration.	Eliminated.	
		Low Permeability Cover System (single barrier)	Installation of cover system may alter elevation of ground surface in drainage ditch and/or swale area, a potential wetland. Large debris would require removal/disposal off-site or consolidation in maximum fill locations.	Would reduce mobility by minimizing infiltration. Would not reduce toxicity or volume of contaminants.	Retained	Viable in situations were it is not necessary to comply with RCRA Subtitle C. The Site is designated by NYSDEC as a Class 2 non-RCRA regulated site.
	Removal	Mechanical Excavation	Steep slopes at the edge of the three landfill tiers hamper excavation.	May release VOCs to the atmosphere.	Retained.	
		Drum Removal	It is assumed that remaining drums are confined within the limit of landfill waste. Results of the RI Test Pit	Would reduce volume, mobility, and toxicity (provided contents are treated)	Retained.	

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to		Screening Status	Comments
			Site-Limiting Characteristics	Waste-Limiting Characteristics		
			Investigation indicate locations of drums left in-place. However, the actual number, location, and condition of remaining drums is not known. Steep slopes at the edge of the three landfill tiers hamper excavation.	Would minimize human exposure.		
		Consolidation	None. It is assumed that source areas are confined within the limit of landfill waste.	Would not reduce toxicity or volume of contamination. Would reduce mobility of contamination by consolidating under low permeability cover system.	Retained.	
		Off-site disposal at RCRA Landfill	None. Source areas assumed to be limited in volume.	Treatment may be based on the land disposal restrictions. Would reduce mobility of contamination. Would not reduce toxicity or volume of contamination. Would minimize human exposure.	Retained.	
	Soil Treatment	On-site Incineration	Would require pretreatment for	No effective on	Eliminated.	

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to Site-Limiting Characteristics	Applicability to Waste-Limiting Characteristics	Screening Status	Comments
			debris. Site relatively remote.	inorganics. Would reduce volume and mobility of contamination provide implemented with appropriate controls.		
		Low Temperature Thermal Volatilization	Would require pretreatment for debris. Site relatively remote.	Effectiveness limited by mixed nature of waste material including inorganics and non-volatile fraction of organics, and would likely require pretreatment of debris.	Eliminated.	
		Off-site Treatment in RCRA Incinerator	None.	Would be difficult due to debris mixed with waste material.	Eliminated.	Rarely viable for landfill waste due to unavailability and expense.
	In-Situ Treatment	Biodegradation	Would be limited by debris in landfill material.	Pilot testing is required to design the biodegradation process. Effectiveness is uncertain since results have not been demonstrated	Eliminated.	

Table 4.2: Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Applicability to: Site-Limiting Characteristics	Applicability to: Waste-Limiting Characteristics	Screening Status	Comments
				with diverse mixed wastes, such as those present at the Site.		
		Vapor Extraction	Site is relatively remote. Effectiveness would be limited by debris and void areas in landfill material.	Applicable for removal of VOCs; inorganic and semivolatile contamination would remain. Would not address remaining potential remaining drums containing contaminants.	Eliminated.	
		Solidification/ Stabilization	Would be limited by debris in landfill material.	More effective for soils contaminated with inorganics and low concentrations of organics than for hot-spots.	Eliminated.	

Table 4.3: Summary of Screening of Remedial Technologies and Process Options

Environmental Media	General Response Action	Process Option	Retained	Eliminated
Surface and Subsurface Soils	No Action	Not Applicable	X	
	Access Restriction	Land Use Restrictions	X	
		Fencing	X	
	Containment	Grading		X
		Revegetation		X
		Soil Cover	X	
		Low Permeability Cover, Single Barrier	X	
Sediment	No Action	Not Applicable	X	
	Removal	Mechanical Excavation	X	
		Dewatering with Wells or Trenches	X	
	Disposal	Off-site disposal at RCRA Landfill	X	
		Consolidation	X	
	Treatment	Stabilization		X
		Thermal Treatment		X
	Containment	Grading		X
		Sediment Capping		X
Source Areas and Hot Spots	No Action	Not Applicable	X	
	Access Restriction	Land Use Restrictions	X	
		Fencing	X	
	Containment	Grading		X
		Revegetation		X
		Soil Cover		X
		Low Permeability Cover, Single Barrier	X	
	Removal	Mechanical Excavation	X	
		Drum Removal	X	
		Consolidation	X	
		Off-site disposal at RCRA Landfill	X	
	Soil Treatment	On-site Incineration		X
		Low Temperature Thermal Volatilization		X
		Off-site Treatment in RCRA Incinerator		X
	In-Situ Treatment	Biodegradation		X
		Vapor Extraction		X
		Solidification/ Stabilization		X

TABLE 6.1: COST SUMMARY FOR ALTERNATIVE 2: LIMITED ACTION

Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

ITEM		COST
DIRECT CAPITAL COSTS		
Work Plan	$	12,000
Institutional Controls	$	70,000
Monitoring Well Installation	$	25,000
Site Closure Report	$	10,000
Direct Cost Subtotal	$	117,000
INDIRECT CAPITAL COSTS		
Engineering and Design (@ 10 Percent)	$	12,000
Health and Safety (@ 5 Percent)	$	6,000
Legal, Administration, and Permitting (@ 5 Percent)	$	6,000
Services During Construction (@ 10 Percent)	$	12,000
Contingency (@ 25 Percent)	$	29,000
Indirect Cost Subtotal	$	65,000
TOTAL CAPITAL COSTS	**$**	**182,000**
ANNUAL OPERATION AND MAINTENANCE COSTS*		
Quarterly Monitoring (years 1-5)	$	101,000
Semi-annual Monitoring (years 6-10)	$	50,000
Annual Monitoring (years 11-30)	$	25,000
Annual Reporting	$	13,000
PERIODIC COSTS*		
Maintenance of Fencing and Signs (every 5 Years)	$	4,000
Institutional Control Inspections (every 5 years)	$	4,000
PRESENT WORTH OF ANNUAL AND PERIODIC COSTS (30 yrs)	**$**	**1,209,000**
TOTAL PRESENT WORTH OF ALTERNATIVE 2 (30 yrs)	**$**	**1,391,000**
TOTAL NON-DISCOUNTED COST OF ALTERNATIVE 2 (30 yrs)	**$**	**1,875,000**

NOTES:
Costs have been rounded to the nearest thousand.

TABLE 6.2: COST SUMMARY FOR ALTERNATIVE 3: CONSTRUCTION OF LOW PERMEABILITY COVER SYSTEM

Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

ITEM		COST
DIRECT CAPITAL COSTS		
Pre-Design Investigation	$	32,000
Work Plan	$	12,000
Site Preparation/Mobilization	$	102,000
Construction of Low Permeability Cover System	$	705,000
Transportation and Off-Site Disposal of Hazardous Wastes	$	6,000
Institutional Controls	$	70,000
Monitoring Well Installation	$	25,000
Wetlands/Site Restoration	$	1,000
Site Closure Report	$	10,000
Direct Cost Subtotal	$	963,000
INDIRECT CAPITAL COSTS		
Engineering and Design (@ 10 Percent)	$	96,000
Health and Safety (@ 5 Percent)	$	48,000
Legal, Administration, and Permitting (@ 5 Percent)	$	48,000
Services During Construction (@ 10 Percent)	$	96,000
Contingency (@ 25 Percent)	$	241,000
Indirect Cost Subtotal	$	529,000
TOTAL CAPITAL COSTS	**$**	**1,492,000**
ANNUAL OPERATION AND MAINTENANCE COSTS*		
Quarterly Monitoring (years 1-5)	$	101,000
Semi-annual Monitoring (years 6-10)	$	50,000
Annual Monitoring (years 11-30)	$	25,000
Leachate Collection and Disposal/Treatment	$	23,000
Semi-annual Wetlands Restoration Monitoring	$	5,000
Annual Landfill Maintenance	$	5,000
Annual Reporting	$	13,000
PERIODIC COSTS*		
Maintenance of Fencing and Signs (every 5 Years)	$	4,000
Institutional Control Inspections (every 5 years)	$	3,000
PRESENT WORTH OF ANNUAL AND PERIODIC COSTS (30 yrs)	**$**	**1,655,000**
TOTAL PRESENT WORTH OF ALTERNATIVE 3 (30 yrs)	**$**	**3,147,000**
TOTAL NON-DISCOUNTED COST OF ALTERNATIVE 3 (30 yrs)	**$**	**3,794,000**

NOTES:
Costs have been rounded to the nearest thousand.
* - Costs include additional 5 percent for administrative support and 25 percent contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.

TABLE 6.3: COST SUMMARY FOR ALTERNATIVE 4: EXCAVATION AND OFF-SITE DISPOSAL OF SOURCE WASTES

Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

ITEM		COST
DIRECT CAPITAL COSTS		
Pre-Design Investigations	$	22,000
Work Plan	$	12,000
Site Preparation/Mobilization	$	102,000
Excavation of Contaminated Sediment and Source Areas	$	495,000
Transportation and Off-Site Disposal of Hazardous Wastes	$	304,000
Wetlands/Site Restoration	$	7,000
Institutional Controls	$	70,000
Monitoring Well Installation	$	25,000
Site Closure Report	$	10,000
Direct Cost Subtotal	$	1,047,000
INDIRECT CAPITAL COSTS		
Engineering and Design (@ 10 Percent)	$	105,000
Health and Safety (@ 5 Percent)	$	52,000
Legal, Administration, and Permitting (@ 5 Percent)	$	52,000
Services During Construction (@ 10 Percent)	$	105,000
Contingency (@ 25 Percent)	$	262,000
Indirect Cost Subtotal	$	576,000
TOTAL CAPITAL COSTS	**$**	**1,623,000**
ANNUAL OPERATION AND MAINTENANCE COSTS*		
Quarterly Monitoring (years 1-5)	$	101,000
Semi-annual Monitoring (years 6-10)	$	50,000
Annual Monitoring (years 11-30)	$	25,000
Semi-annual Wetlands Restoration Monitoring	$	5,000
Annual Reporting	$	13,000
PERIODIC COSTS*		
Maintenance of Fencing and Signs (every 5 Years)	$	4,000
Institutional Control Inspections (every 5 years)	$	4,000
PRESENT WORTH OF ANNUAL AND PERIODIC COSTS (30 yrs)	**$**	**1,117,000**
TOTAL PRESENT WORTH OF ALTERNATIVE 3 (30 yrs)	**$**	**2,740,000**
TOTAL NON-DISCOUNTED COST OF ALTERNATIVE 3 (30 yrs)	**$**	**3,091,000**

NOTES:
Costs have been rounded to the nearest thousand.
* - Costs include additional 5 percent for administrative support and 25 percent contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.

TABLE 6.4: COST SUMMARY FOR ALTERNATIVE 5: CONSOLIDATION AND CONSTRUCTION OF A LOW PERMEABILITY COVER SYSTEM

Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

ITEM		COST
DIRECT CAPITAL COSTS		
Pre-Design Investigations	$	39,000
Work Plan	$	12,000
Site Preparation/Mobilization	$	28,000
Excavation of Contaminated Sediment and Source Areas	$	491,000
Excavation and Consolidation of Landfill Material	$	100,000
Capping of Contaminated Sediment and Landfill Wastes	$	586,000
Transportation and Off-Site Disposal of Hazardous Wastes	$	324,000
Wetlands/Site Restoration	$	6,000
Institutional Controls	$	70,000
Monitoring Well Installation	$	25,000
Site Closure Report	$	10,000
Direct Cost Subtotal	$	1,691,000
INDIRECT CAPITAL COSTS		
Engineering and Design (@ 10 Percent)	$	169,000
Health and Safety (@ 5 Percent)	$	85,000
Legal, Administration, and Permitting (@ 5 Percent)	$	85,000
Services During Construction (@ 10 Percent)	$	169,000
Contingency (@ 25 Percent)	$	423,000
Indirect Cost Subtotal	$	931,000
TOTAL CAPITAL COSTS	**$**	**2,622,000**
ANNUAL OPERATION AND MAINTENANCE COSTS*		
Quarterly Monitoring (years 1-5)	$	101,000
Semi-annual Monitoring (years 6-10)	$	50,000
Annual Monitoring (years 11-30)	$	25,000
Leachate Collection and Disposal/Treatment	$	23,000
Semi-annual Wetlands Restoration Monitoring	$	5,000
Annual Landfill Maintenance	$	3,000
Annual Reporting	$	13,000
PERIODIC COSTS*		
Maintenance of Fencing and Signs (every 5 Years)	$	4,000
Institutional Control Inspections (every 5 years)	$	4,000
PRESENT WORTH OF ANNUAL AND PERIODIC COSTS (30 yrs)	**$**	**1,620,000**
TOTAL PRESENT WORTH OF ALTERNATIVE 5 (30 yrs)	**$**	**4,242,000**
TOTAL NON-DISCOUNTED COST OF ALTERNATIVE 5 (30 yrs)	**$**	**4,870,000**

NOTES:
Costs have been rounded to the nearest thousand.
* - Costs include additional 5 percent for administrative support and 25 percent contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.

TABLE 6.5: COST SUMMARY FOR ALTERNATIVE 6: EXCAVATION OF LANDFILL AND OFF-SITE DISPOSAL OF HAZARDOUS AND NON-HAZARDOUS WASTES

Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

ITEM		COST
DIRECT CAPITAL COSTS		
Pre-Design Investigations	$	22,000
Work Plan	$	12,000
Site Preparation/Mobilization	$	102,000
Excavation of Contaminated Sediment	$	3,000
Excavation of Landfill	$	331,000
Transportation and Off-Site Disposal of Hazardous Wastes	$	393,000
Transportation and Off-Site Disposal of Solid Wastes	$	2,152,000
Oversight	$	84,000
Wetlands/Site Restoration	$	14,000
Institutional Controls	$	70,000
Monitoring Well Installation	$	25,000
Site Closure Report	$	10,000
Direct Cost Subtotal	$	3,218,000
INDIRECT CAPITAL COSTS		
Engineering and Design (@ 10 Percent)	$	322,000
Health and Safety (@ 5 Percent)	$	161,000
Legal, Administration, and Permitting (@ 5 Percent)	$	161,000
Services During Construction (@ 10 Percent)	$	322,000
Contingency (@ 25 Percent)	$	805,000
Indirect Cost Subtotal	$	1,771,000
TOTAL CAPITAL COSTS	**$**	**4,989,000**
ANNUAL OPERATION AND MAINTENANCE COSTS*		
Quarterly Monitoring (years 1-5)	$	89,000
Semi-annual Monitoring (years 6-10)	$	-
Annual Monitoring (years 11-30)	$	-
Semi-annual Wetlands Restoration Monitoring	$	5,000
Annual Reporting	$	13,000
PERIODIC COSTS*		
Maintenance of Fencing and Signs (every 5 Years)	$	4,000
Institutional Control Inspections (every 5 years)	$	4,000
PRESENT WORTH OF ANNUAL AND PERIODIC COSTS (30 yrs)	**$**	**518,000**
TOTAL PRESENT WORTH OF ALTERNATIVE 6 (30 yrs)	**$**	**5,507,000**
TOTAL NON-DISCOUNTED COST OF ALTERNATIVE 3 (30 yrs)	**$**	**5,572,000**

NOTES:
Costs have been rounded to the nearest thousand.
* - Costs include additional 5 percent for administrative support and 25 percent contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.

TABLE 6.6: COST SUMMARY FOR ALTERNATIVE 7: CONSTRUCTION OF SOIL COVER

Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

ITEM		COST
DIRECT CAPITAL COSTS		
Pre-Design Investigation	$	32,000
Work Plan	$	12,000
Site Preparation/Mobilization	$	102,000
Construction of SoilCover	$	315,000
Transportation and Off-Site Disposal of Hazardous Wastes	$	6,000
Institutional Controls	$	70,000
Monitoring Well Installation	$	25,000
Wetlands/Site Restoration	$	1,000
Site Closure Report	$	10,000
Direct Cost Subtotal	$	573,000
INDIRECT CAPITAL COSTS		
Engineering and Design (@ 10 Percent)	$	57,000
Health and Safety (@ 5 Percent)	$	29,000
Legal, Administration, and Permitting (@ 5 Percent)	$	29,000
Services During Construction (@ 10 Percent)	$	57,000
Contingency (@ 25 Percent)	$	143,000
Indirect Cost Subtotal	$	315,000
TOTAL CAPITAL COSTS	**$**	**888,000**
ANNUAL OPERATION AND MAINTENANCE COSTS*		
Quarterly Monitoring (years 1-5)	$	101,000
Semi-annual Monitoring (years 6-10)	$	50,000
Annual Monitoring (years 11-30)	$	25,000
Leachate Collection and Disposal/Treatment	$	-
Semi-annual Wetlands Restoration Monitoring	$	5,000
Annual Landfill Maintenance	$	2,000
Annual Reporting	$	13,000
PERIODIC COSTS*		
Maintenance of Fencing and Signs (every 5 Years)	$	4,000
Institutional Control Inspections (every 5 years)	$	3,000
PRESENT WORTH OF ANNUAL AND PERIODIC COSTS (30 yrs)	**$**	**1,152,000**
TOTAL PRESENT WORTH OF ALTERNATIVE 7 (30 yrs)	**$**	**2,040,000**
TOTAL NON-DISCOUNTED COST OF ALTERNATIVE 3 (30 yrs)	**$**	**2,410,000**

NOTES:
Costs have been rounded to the nearest thousand.
* - Costs include additional 5 percent for administrative support and 25 percent contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.

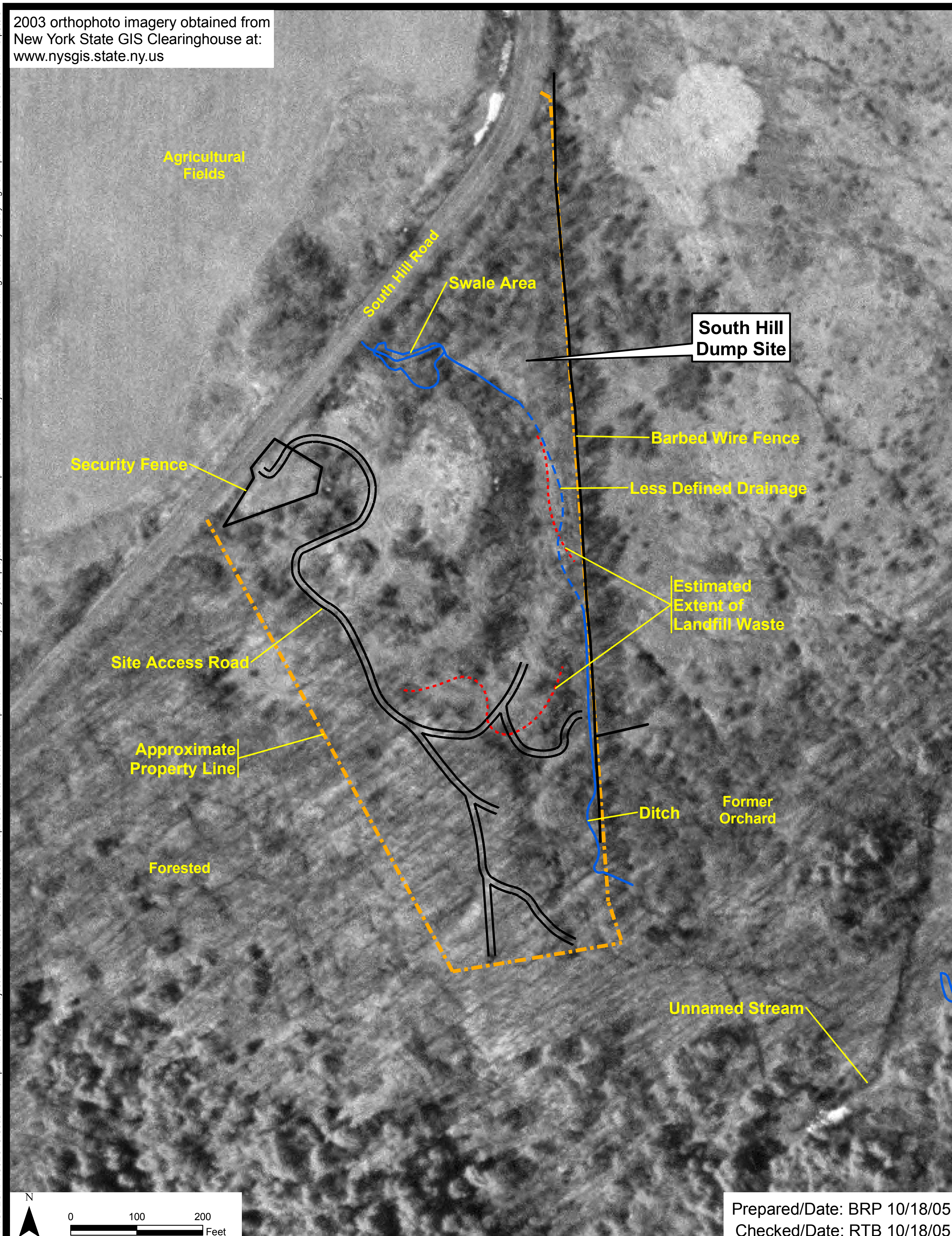
TABLE 6.7: SUMMARY OF COSTS
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Item	Description	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
1	Capital Costs	$ 182,000	$ 1,492,000	$ 1,623,000	$ 2,622,000	$ 4,989,000	$ 888,000
2	Present Worth of Annual and Periodic Costs	$ 1,209,000	$ 1,655,000	$ 1,117,000	$ 1,620,000	$ 518,000	$ 1,152,000
3	Total Present Worth (Item 1 plus 2)	$ 1,391,000	$ 3,147,000	$ 2,740,000	$ 4,242,000	$ 5,507,000	$ 2,040,000
4	Total Nondiscounted Cost	$ 1,875,000	$ 3,794,000	$ 3,091,000	$ 4,870,000	$ 5,572,000	$ 2,410,000
5	Evaluation Period (years)	30	30	30	30	30	30

FIGURES

NYSDEC South Hill Dump Site Cortland, NY	MACTEC	Site Location Project 3612-05-2032 Figure 1.1

Document: P:\Projects\NYSDEC1\PROJECTS\South Hill Dump 7-12-009\4.0 Project Deliverables\4.5 Databases\GIS\MapDocuments\SiteLocationMap.mxd PDF: P:\Projects\nysdec1\projects\South Hill Dump 7-12-009\4.0 Project Deliverables\4.3 Drawings\Feasibility Study\Figure1.1.pdf 10/18/2005 3:25 PM brpeters



NYSDEC South Hill Dump Site Cortland, NY	MACTEC	Site Features Project 3612-05-2032 Figure 1.2

Document: P:\Projects\NYSDEC1\PROJECTS\South Hill Dump 7-12-009\4.0 Project Deliverables\4.5 Databases\GIS\MapDocuments\SiteLocationMap.mxd PDF: P:\Projects\nysdec1\projects\South Hill Dump 7-12-009\4.0 Project Deliverables\4.3 Drawings\Feasibility Study\Figure1.2.pdf 10/18/2005 3:26 PM brpeters

LEGEND

- MONITORING WELL
- TREE
- FOUND IRON (PIPE OR REBAR)
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- TP20 — TEST PIT IDENTIFICATION NUMBER
- S — START OF TEST PIT
- E — END OF TEST PIT
- TELEPHONE RISER
- SITE BENCHMARKS
- TREE LINE/ EDGE OF WOODS
- FLOW LINE, CREEK OR DRAINAGE
- FLOW LINE, CREEK OR DRAINAGE LESS DEFINED
- BARBED WIRE FENCE
- CHAIN LINK FENCE
- UNDERGROUND TELEPHONE
- EXISTING 15" DIAMETER IRON CULVERT
- ESTIMATED EXTENT OF LANDFILL WASTE
- NS — NOT SAMPLED
- SECTION LINE
- POSSIBLE DRUMS REMAINING
- KNOWN DRUMS REMAINING
- (DRUMS, METAL) — SURFACE MATERIALS OR CONDITIONS AS OBSERVED DURING THE APRIL 28, 2005 SITE WALKOVER
- SWALE AREA (POTENTIAL WETLAND)

SAMPLE LOCATIONS IN BOLD RED (E.G. MW-4B) INDICATE ONE OR MORE SCG VALUE FOR ORGANIC CONTAMINANT IS EXCEEDED. AT LEAST ONE INORGANIC CONTAMINANT SCG VALUE WAS EXCEEDED AT ALL SAMPLE LOCATIONS PRESENTED ON THIS FIGURE. REFER TO THE DATA TABLES FOR FURTHUR INFORMATION.

SOURCE: BASE MAP FROM SPENCER F. THEW, PE-LS BASE MAP "FIGURE 1 SITE PLAN", DATED 9/20/01.

Prepared/Date: RHH 10/12/05
Checked/Date: RTB 10/14/05

South Hill Dump Site, NYSDEC Site No. 712009 County of Cortland, Courtlandville, NY	MACTEC	RI Sample Locations, Test Pit Investigation Results, and Summary of Contamination Project 3612-05-2032 Figure 1.3

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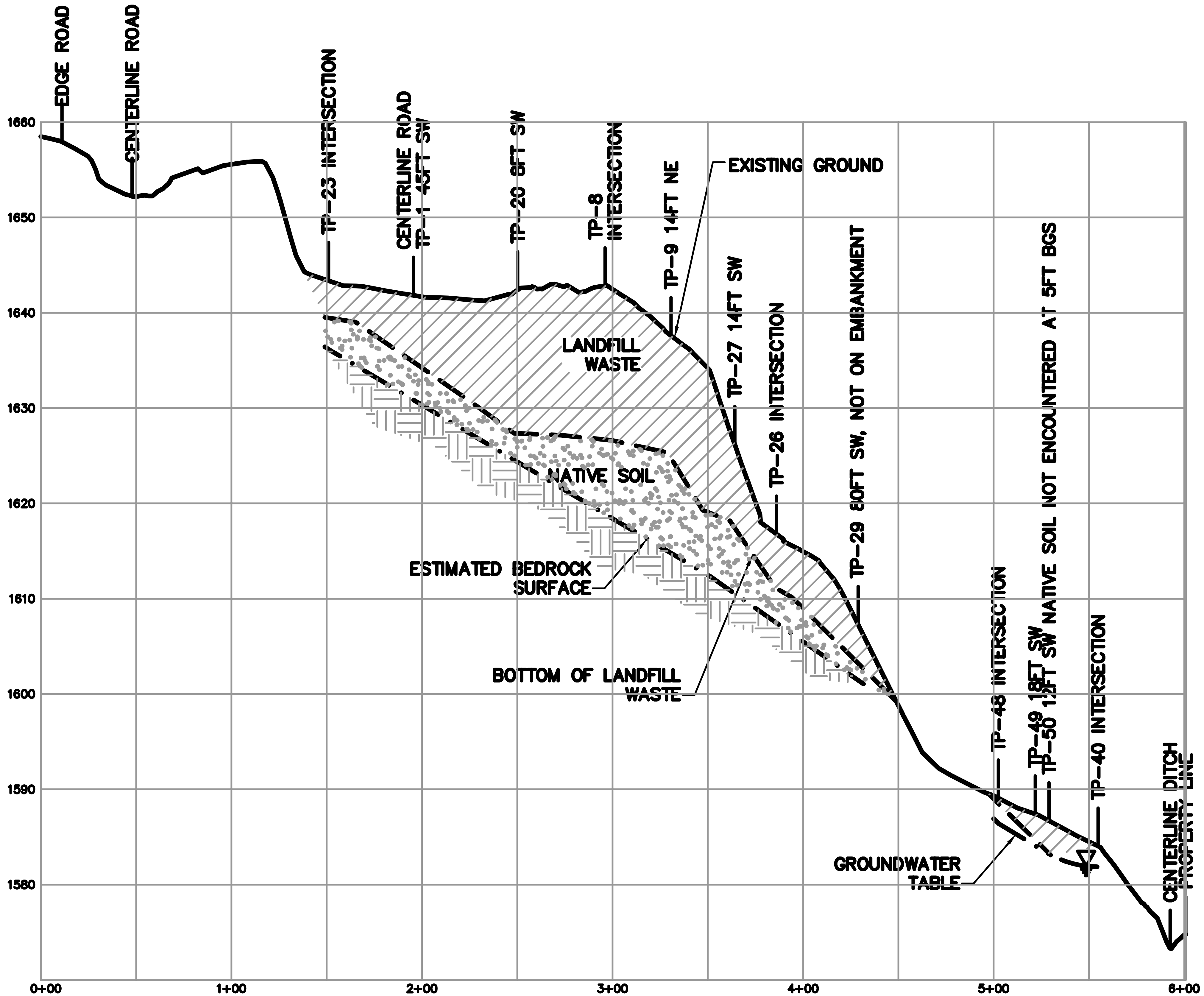
NOTE:

CROSS-SECTION INFORMATION DERIVED FROM REMEDIAL INVESTIGATION FOR THE SOUTH HILL DUMP (NYSDEC, 2003)



LEGEND

- EXISTING GROUND
- BOTTOM OF FILL
- BEDROCK SURFACE (ESTIMATED)
- GROUNDWATER TABLE

SCALE:

VERT: 1" = 12'
HORIZ: 1" = 60'

Prepared/Date: RHH 10/12/05
Checked/Date: RTB 10/14/05

South Hill Dump Site, NYSDEC Site No. 712009
County of Cortland, Courtlandville, NY

MACTEC

Cross Section of Site

Project 3612-05-2032
Figure 1.4

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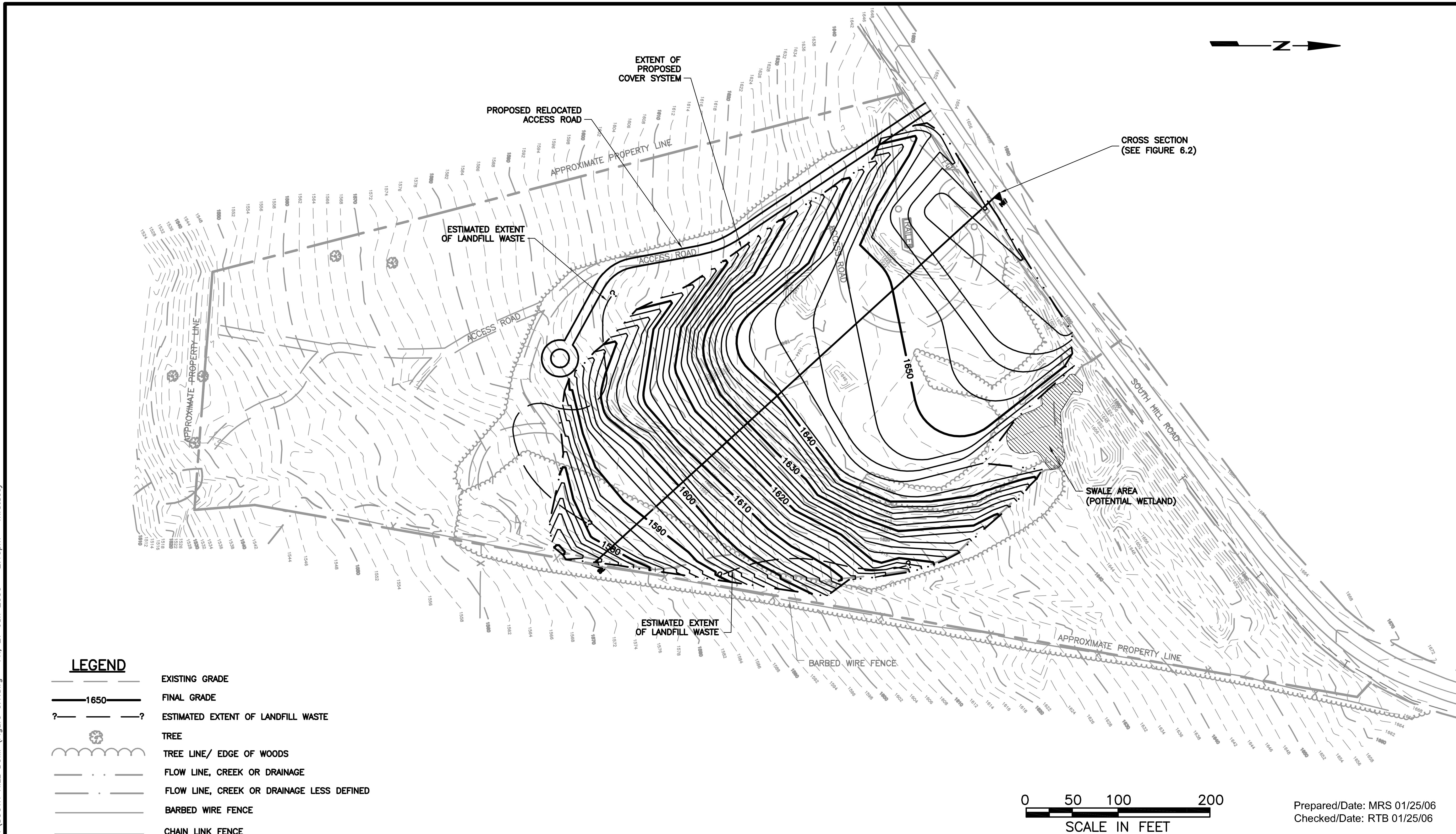

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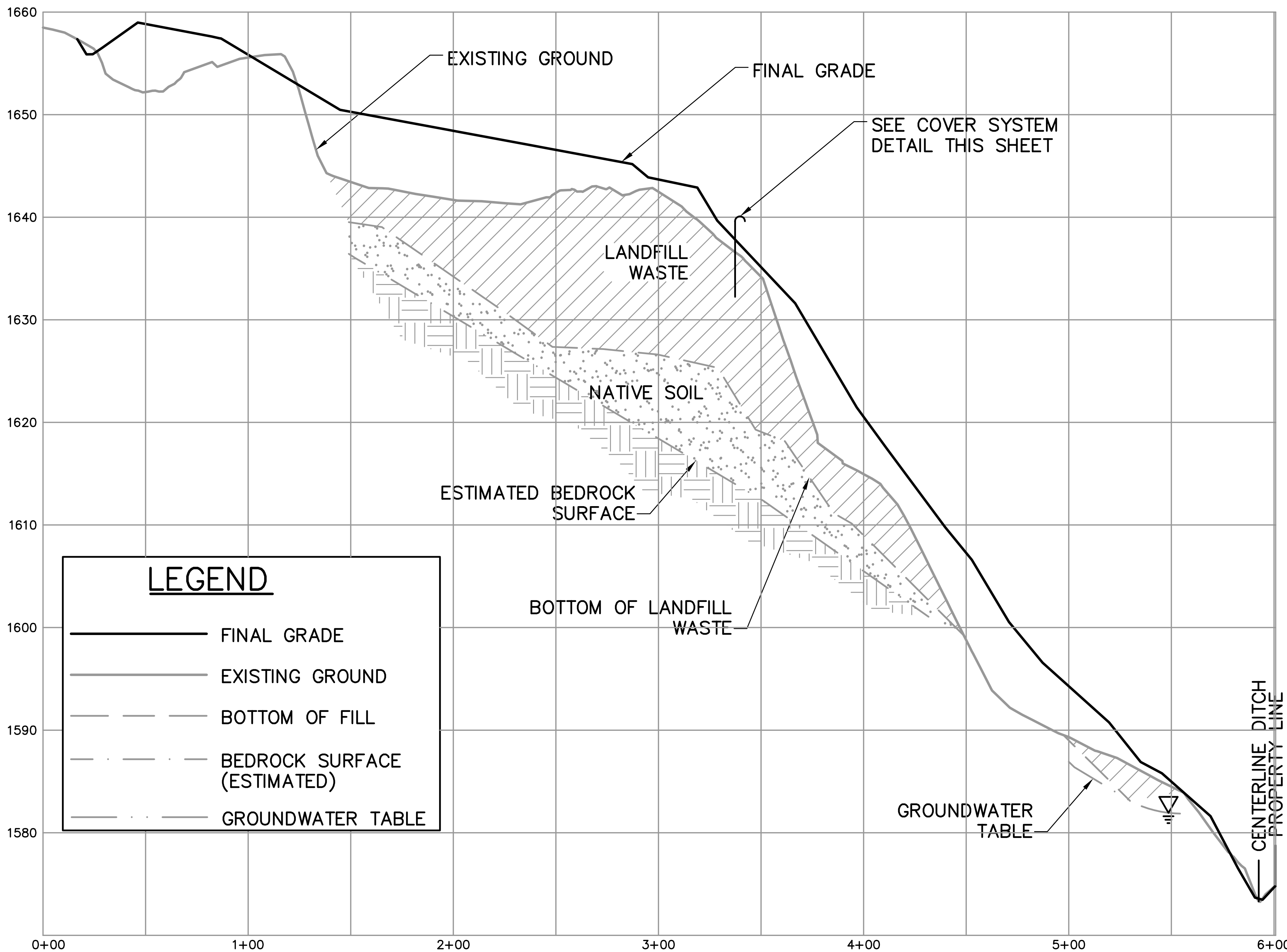
Prepared/Date: MRS 01/25/06
Checked/Date: RTB 01/25/06

South Hill Dump Site, NYSDEC Site No. 712009 County of Cortland, Courtlandville, NY	MACTEC	Proposed Extent of Low Permeability Cover System Project 3612-05-2032 Figure 6.1

NOTE:

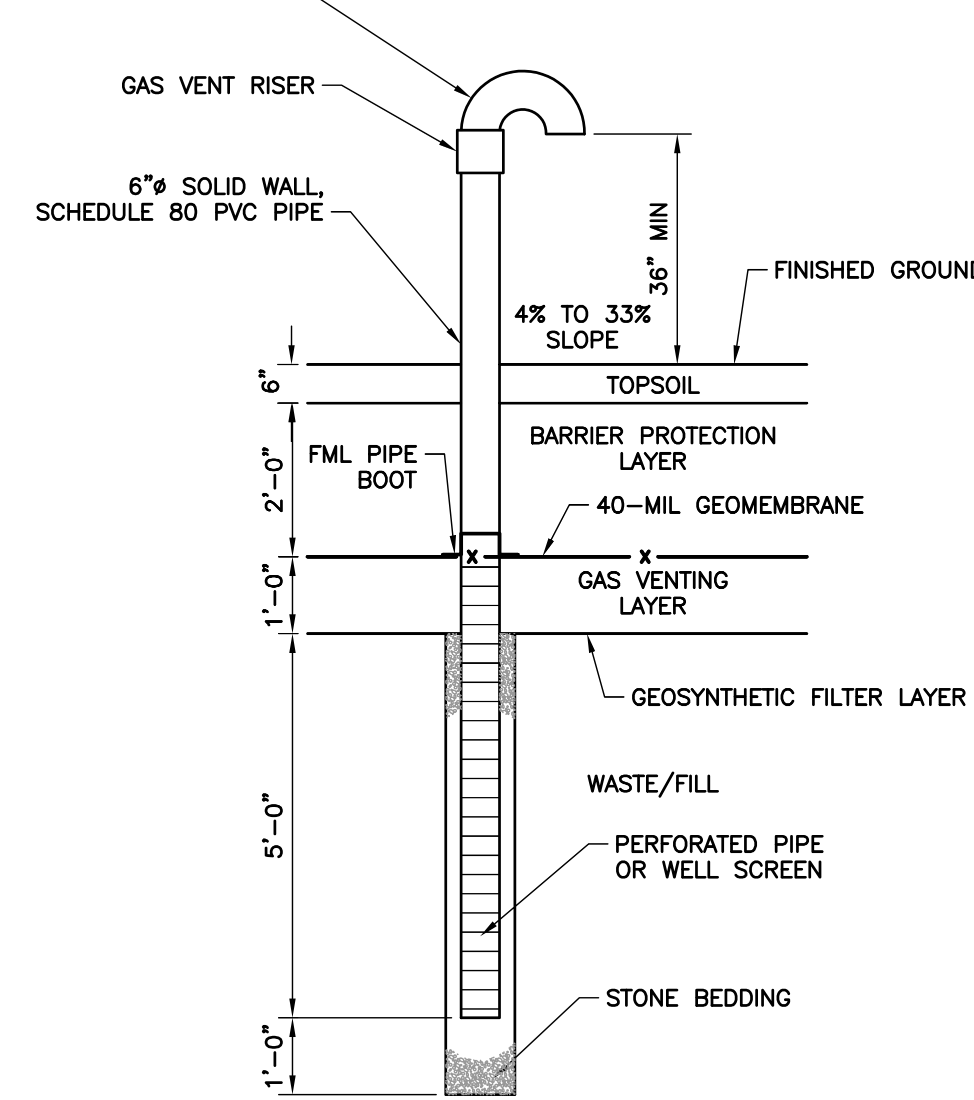
CROSS–SECTION INFORMATION DERIVED FROM REMEDIAL INVESTIGATION FOR THE SOUTH HILL DUMP (NYSDEC, 2003)



SCALE:

VERT: 1" = 12'
HORIZ: 1" = 60'

NOTE:
GAS VENTS WOULD BE PLACED ONE PER ACRE.

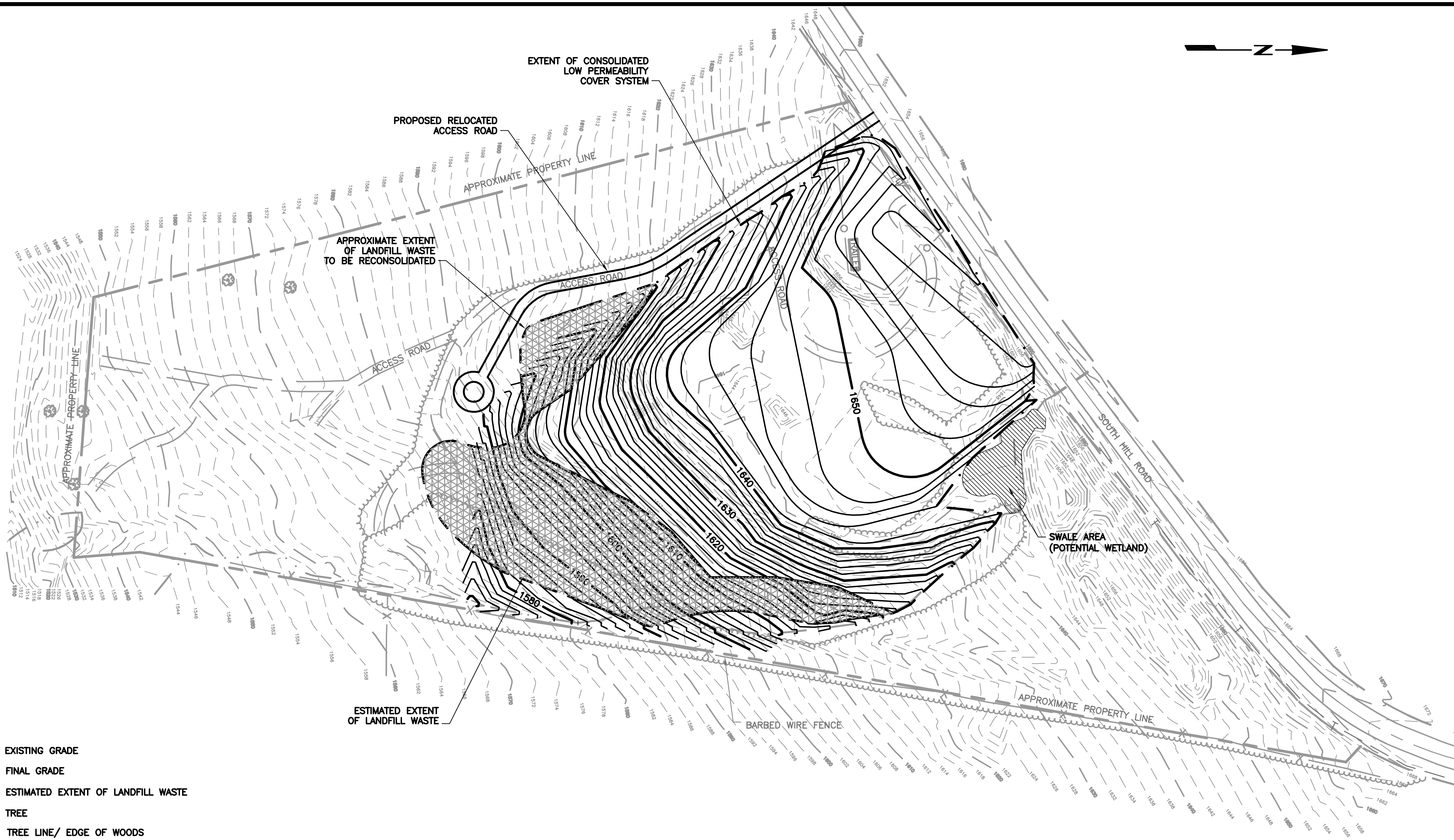


COVER SYSTEM DETAIL

NTS

Prepared/Date: MRS 12/06/06
Checked/Date: RTB 12/06/06

South Hill Dump Site, NYSDEC Site No. 712009 County of Cortland, Cortlandville, NY	MACTEC	Cross Section of Proposed Cover System Project 3612-05-2032 Figure 6.2



LEGEND

	EXISTING GRADE
1650	FINAL GRADE
? ?	ESTIMATED EXTENT OF LANDFILL WASTE
	TREE
	TREE LINE/ EDGE OF WOODS
	FLOW LINE, CREEK OR DRAINAGE
	FLOW LINE, CREEK OR DRAINAGE LESS DEFIN
	BARBED WIRE FENCE
	CHAIN LINK FENCE
	UNDERGROUND TELEPHONE
	EXISTING 15" DIAMETER IRON CULVERT
	SWALE AREA (POTENTIAL WETLAND)

0 50 100 200
SCALE IN FEET

Prepared/Date: MRS 01/25/06
Checked/Date: RTB 01/25/06

South Hill Dump Site, NYSDEC Site No. 712009 County of Cortland, Courtlandville, NY	MACTEC	Proposed Extent of Consolidated Low Permeability Cover System Project 3612-05-2032 Figure 6.3

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APPENDIX A

2005 SITE-WALKOVER PHOTOGRAPHIC LOG

Photo 37

Photo 38

Photo 39

Photo 40

Photo 41

Photo 42

Photo 43

Photo 44

Photo 45

Photo 46

Photo 47

Photo 48

Photo 49

Photo 50

Photo 51

Photo 52

Photo 53

Photo 54

Photo 55

Photo 56

Photo 57

Photo 58

Photo 59

Photo 60

Photo 61

Photo 62

Photo 63

Photo 64

Photo 65

Photo 66

Photo 67

Photo 68

Photo 69

Photo 70

Photo 71

Photo 72

Photo 73

Photo 74

Photo 75

Photo 76

Photo 77

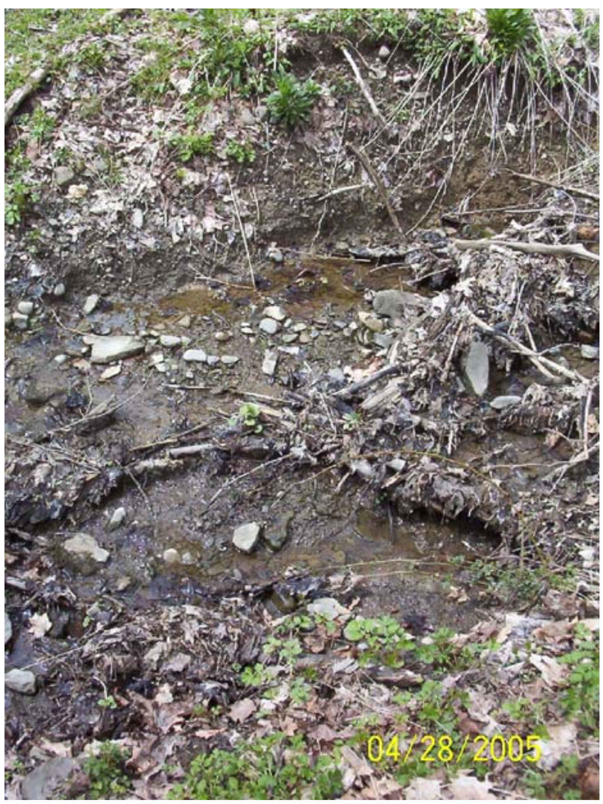

Photo 78

Photo 79

Photo 80

Photo 81

Photo 82

Photo 83

Photo 84

Photo 85

Photo 86

Photo 87

Photo 88

Photo 89

Photo 90

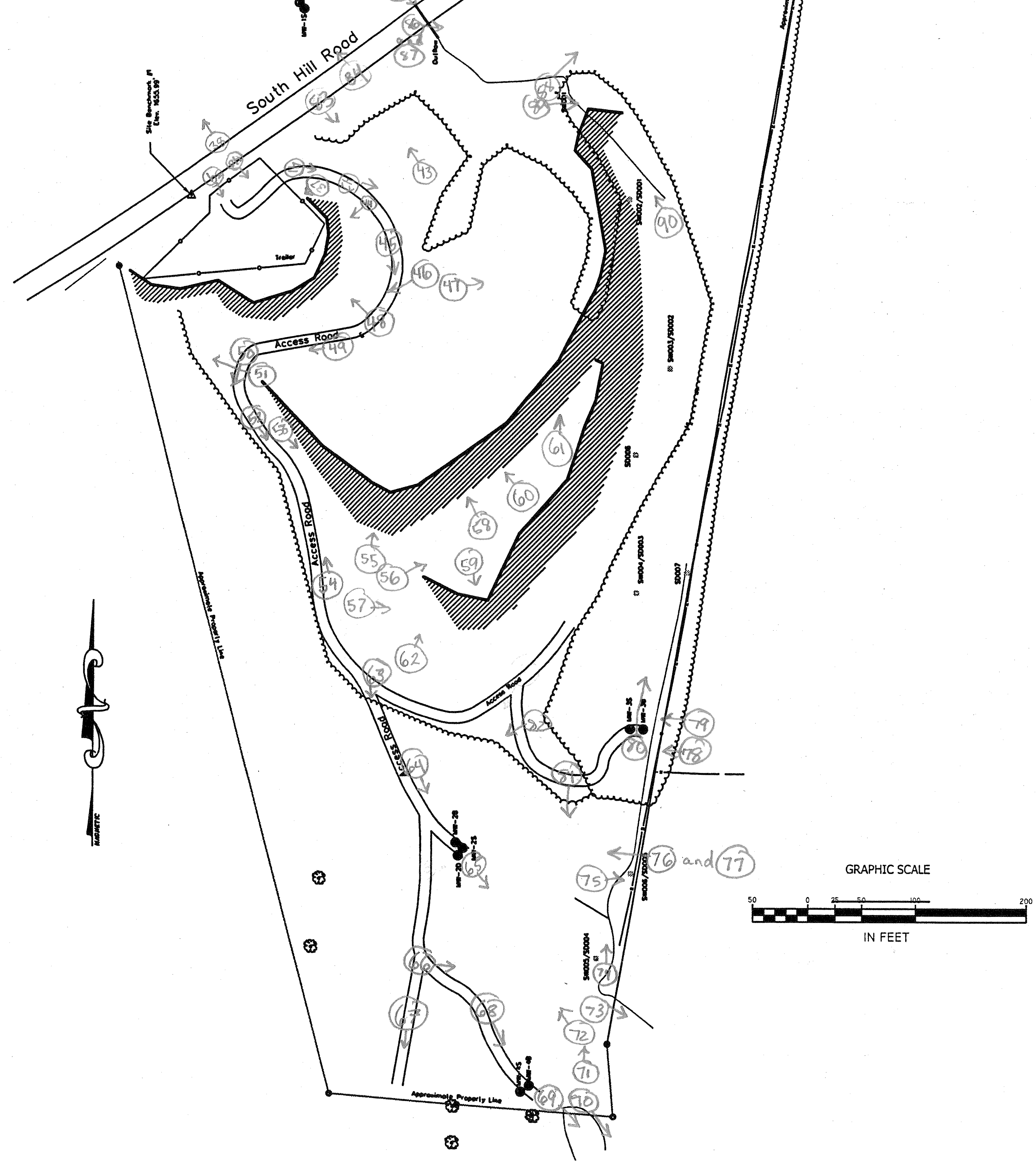

PHOTO LOG: SOUTH HILL DUMP

DATE: APRIL 28, 2005

○ LOCATION OF PHOTOGRAPHER

→ DIRECTION FACING

15 PICTURE NO., REFER TO SKETCH AND TABLE OF CONTENTS FILE.

SOUTH HILL DUMP
CORTLANDVILLE, CORTLAND COUNTY, NEW YORK
SITE No. 7-12-009

New York State Department of Environmental Conservation

FILE: | DRAWING: DRAWN FROM SPENCER F. THEW, PE - LS BASE MAP BY:BAB

MONITORING WELLS AND SAMPLE LOCATIONS

APPENDIX B

DATA TABLES

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP0101	TP0301	TP0501
	DEPTH:	SOIL CLEAN-UP	5'	3'	4'
	LAB ID:	OBJECTIVE	3066701	3066702	3066703
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD1	SHD1	SHD1
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		2/26/97	2/27/97	2/27/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	-	-	-
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	-	-	-
Ethylbenzene	mg/Kg	5.50	-	-	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	-	-	-
Tetrachloroethene	mg/Kg	1.40	-	-	-
Toluene	mg/Kg	1.50	-	-	-
Trichloroethene	mg/Kg	0.70	-	0.004 J	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	-	-	-
Total VOCs	mg/Kg	10.00	0.000	0.004	0.000
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	0.07 J	-
Acenaphthylene	mg/Kg	41.00	0.15 J	-	-
Anthracene	mg/Kg	50.00	0.20 J	0.23 J	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	0.76	0.40 J	-
Benzo(a)pyrene	mg/Kg	0.061/MDL	0.78	0.32 J	-
Benzo(b)fluoranthene	mg/Kg	1.10	0.84	0.30 J	-
Benzo(g,h,i)perylene	mg/Kg	50.00	0.16 J	0.06 J	-
Benzo(k)fluoranthene	mg/Kg	1.10	0.70	0.30 J	-
Butylbenzylphthalate	mg/Kg	50.00	-	-	-
Carbazole	mg/Kg	-	0.10 J	0.12 J	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	0.81	0.36 J	-
Di-n-butylphthalate	mg/Kg	8.10	-	-	-
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	2.20	1.20	-
Fluorene	mg/Kg	50.00	0.06 J	0.08 J	-
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	0.32 J	0.11 J	-
2-Methylnaphthalene	mg/Kg	36.40	-	-	-
4-Methylphenol	mg/Kg	0.90	-	-	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	-	-

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP0101		TP0301		TP0501	
	DEPTH:	SOIL CLEAN-UP	5'		3'		4'	
	LAB ID:	OBJECTIVE	3066701		3066702		3066703	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD1		SHD1		SHD1	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		2/26/97		2/27/97		2/27/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
Pentachlorophenol	mg/Kg	1.0/MDL	-		-		-	
Phenanthrene	mg/Kg	50.00	0.95		0.79		-	
Phenol	mg/Kg	0.03/MDL	-		-		-	
Pyrene	mg/Kg	50.00	1.00		0.52		-	
1,2,4-Trichlorobenzene	mg/Kg	-	-		-		-	
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	3.40		5.20		0.26	J
Total SVOCs	mg/Kg	500.00	12.43		10.06		0.26	
PESTICIDES/PCBs								
alpha-BHC	mg/Kg	0.11	-		-		-	
alpha-Chlordane	mg/Kg	0.54	-		-		-	
beta-BHC	mg/Kg	0.20	-		-		-	
delta-BHC	mg/Kg	0.30	-		-		-	
gamma-BHC (Lindane)	mg/Kg	0.06	-		-		-	
gamma-Chlordane	mg/Kg	0.54	-		-		-	
Aldrin	mg/Kg	0.041	-		-		-	
4,4'-DDD	mg/Kg	2.90	0.01		0.003	J	-	
4,4'-DDE	mg/Kg	2.10	0.005	J	-		0.01	JN
4,4'-DDT	mg/Kg	2.10	0.003	JN	0.002	JN	0.003	JN
Dieldrin	mg/Kg	0.044	-		-		-	
Endosulfan I	mg/Kg	0.90	-		-		0.002	JN
Endosulfan II	mg/Kg	0.90	-		-		0.07	
Endosulfan sulfate	mg/Kg	1.00	-		-		-	
Endrin	mg/Kg	0.10	-		-		-	
Endrin aldehyde	mg/Kg	-	-		-		0.01	JN
Endrin ketone	mg/Kg	N/A	-		-		-	
Heptachlor	mg/Kg	0.10	-		-		-	
Heptachlor epoxide	mg/Kg	0.02	-		-		-	
Methoxychlor	mg/Kg	N/A	0.03		-		0.03	
Toxaphene	mg/Kg	-	-		-		-	
Total Pesticides	mg/kg	10.00	0.05		0.00		0.12	
Aroclor-1016	mg/Kg	1, 10	-		-		-	
Aroclor-1221	mg/Kg	1, 10	-		-		-	
Aroclor-1232	mg/Kg	1, 10	-		-		-	
Aroclor-1242	mg/Kg	1, 10	-		-		-	
Aroclor-1248	mg/Kg	1, 10	-		-		-	
Aroclor-1254	mg/Kg	1, 10	-		-		-	
Aroclor-1260	mg/Kg	1, 10	-		-		2.80	
TCLP VOLATILES								
NONE	mg/L							
TCLP SEMIVOLATILES								
NONE	mg/L							
TCLP PESTICIDES								
NONE	mg/L							

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP0101	TP0301	TP0501
	DEPTH:	SOIL CLEAN-UP	5'	3'	4'
	LAB ID:	OBJECTIVE	3066701	3066702	3066703
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD1	SHD1	SHD1
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		2/26/97	2/27/97	2/27/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
TCLP HERBICIDES					
NONE	mg/L				
INORGANICS					
Aluminum	mg/Kg	16200	13500	12600	12100
Antimony	mg/Kg	1.6	2.10 J	17.20	2.20 J
Arsenic	mg/Kg	7.9	9.20	18.90	5.80
Barium	mg/Kg	300	181.00	528.00	138.00
Beryllium	mg/Kg	0.6	0.70 J	0.42 J	0.45 J
Cadmium	mg/Kg	1	1.70	49.80	6.30
Calcium	mg/Kg	1135	6520	15600	18700
Chromium	mg/Kg	21.85	25.10	75.20	27.20
Cobalt	mg/Kg	30	9.90	16.70	11.90
Copper	mg/Kg	25	52.00	396.00	65.50
Iron	mg/Kg	33550	28100	141000	28900
Lead	mg/Kg	14.3	180.00	814.00	140.00
Magnesium	mg/Kg	6085	3500	4830	4460
Manganese	mg/Kg	918	790.00	945.00	654.00
Mercury	mg/Kg	0.1	0.12 J	0.11 J	0.53
Nickel	mg/Kg	34.5	24.20	62.10	35.10
Potassium	mg/Kg	1270	1900.00	1330.00	1280.00
Selenium	mg/Kg	2	1.00	0.92	-
Silver	mg/Kg	N/A	0.49 J	7.00	1.00 J
Sodium	mg/Kg	167	389.00 J	611.00	374.00 J
Thallium	mg/Kg	ND	-	-	-
Vanadium	mg/Kg	150	21.80	25.10	54.80
Zinc	mg/Kg	69.25	396.00	1610.00	446.00
Total Cyanide	mg/Kg	ND	-	-	-
TCLP METALS					
Arsenic	mg/L	5			
Barium	mg/L	100			
Cadmium	mg/L	1			
Lead	mg/L	5			
Silver	mg/L	5			

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Objective

- = compound not detected
mg/L = milligrams per liter
J = Estimated value
N = tentatively identified compound
MDL = Method detection limit
R = Data Rejected
mg/kg = milligrams per kilogram
ND = not detected in background samples

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP0701	TP0801	TP1001
	DEPTH:	SOIL CLEAN-UP	8'	2'	15'
	LAB ID:	OBJECTIVE	3067401	3067402	3067403
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD1	SHD1	SHD1
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		2/28/97	2/28/97	2/28/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	-	-	-
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	-	-	-
Ethylbenzene	mg/Kg	5.50	-	0.006 J	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	-	-	-
Tetrachloroethene	mg/Kg	1.40	0.004 J	-	-
Toluene	mg/Kg	1.50	-	-	-
Trichloroethene	mg/Kg	0.70	-	-	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	-	0.002 J	-
Total VOCs	mg/Kg	10.00	0.004	0.008	0.000
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	-	-
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	-	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	0.10 J	-
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	-	-
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	-
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	-
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	-
Butylbenzylphthalate	mg/Kg	50.00	-	0.45 J	4.10 J
Carbazole	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	-	0.30 J	-
Di-n-butylphthalate	mg/Kg	8.10	-	1.00	0.41 J
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	0.31 J
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	0.05 J	0.90	0.10 J
Fluorene	mg/Kg	50.00	-	-	-
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	-	-
2-Methylnaphthalene	mg/Kg	36.40	-	0.66 J	-
4-Methylphenol	mg/Kg	0.90	-	-	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	0.32 J	-

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP0701		TP0801		TP1001	
	DEPTH:	SOIL CLEAN-UP	8'		2'		15'	
	LAB ID:	OBJECTIVE	3067401		3067402		3067403	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD1		SHD1		SHD1	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		2/28/97		2/28/97		2/28/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
Pentachlorophenol	mg/Kg	1.0/MDL	-		-		-	
Phenanthrene	mg/Kg	50.00	0.05	J	5.30		0.09	J
Phenol	mg/Kg	0.03/MDL	-		-		-	
Pyrene	mg/Kg	50.00	-		0.88		-	
1,2,4-Trichlorobenzene	mg/Kg	-	-		-		-	
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	0.29	J	2.80		1.30	J
Total SVOCs	mg/Kg	500.00	0.38		12.71		6.31	
PESTICIDES/PCBs								
alpha-BHC	mg/Kg	0.11	-		-		-	
alpha-Chlordane	mg/Kg	0.54	-		-		0.02	JN
beta-BHC	mg/Kg	0.20	-		-		-	
delta-BHC	mg/Kg	0.30	-		-		-	
gamma-BHC (Lindane)	mg/Kg	0.06	-		-		-	
gamma-Chlordane	mg/Kg	0.54	-		-		0.02	JN
Aldrin	mg/Kg	0.041	-		-		-	
4,4'-DDD	mg/Kg	2.90	-		-		0.06	JN
4,4'-DDE	mg/Kg	2.10	0.00	J	0.004	J	0.03	JN
4,4'-DDT	mg/Kg	2.10	-		0.005	JN	0.02	JN
Dieldrin	mg/Kg	0.044	-		-		-	
Endosulfan I	mg/Kg	0.90	-		-		-	
Endosulfan II	mg/Kg	0.90	-		0.004	J	0.01	JN
Endosulfan sulfate	mg/Kg	1.00	-		-		-	
Endrin	mg/Kg	0.10	-		-		0.01	JN
Endrin aldehyde	mg/Kg	-	-		-		-	
Endrin ketone	mg/Kg	N/A	-		-		-	
Heptachlor	mg/Kg	0.10	-		-		-	
Heptachlor epoxide	mg/Kg	0.02	-		-		-	
Methoxychlor	mg/Kg	N/A	0.02		0.01	JN	-	
Toxaphene	mg/Kg	-	-		-		-	
Total Pesticides	mg/kg	10.00	0.03		0.03		0.17	
Aroclor-1016	mg/Kg	1, 10	-		-		-	
Aroclor-1221	mg/Kg	1, 10	-		-		-	
Aroclor-1232	mg/Kg	1, 10	-		-		-	
Aroclor-1242	mg/Kg	1, 10	-		0.10		-	
Aroclor-1248	mg/Kg	1, 10	-		-		-	
Aroclor-1254	mg/Kg	1, 10	0.08		0.12		0.77	J
Aroclor-1260	mg/Kg	1, 10	-		-		0.57	J
TCLP VOLATILES								
NONE	mg/L							
TCLP SEMIVOLATILES								
NONE	mg/L							
TCLP PESTICIDES								
NONE	mg/L							

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP0701		TP0801		TP1001	
	DEPTH:	SOIL CLEAN-UP	8'		2'		15'	
	LAB ID:	OBJECTIVE	3067401		3067402		3067403	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD1		SHD1		SHD1	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		2/28/97		2/28/97		2/28/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
TCLP HERBICIDES								
NONE	mg/L							
INORGANICS								
Aluminum	mg/Kg	16200	13600		11200		8530	
Antimony	mg/Kg	1.6	2.60	J	2.80	J	21.90	
Arsenic	mg/Kg	7.9	8.00		6.50		40.70	
Barium	mg/Kg	300	137.00		69.50		146.00	
Beryllium	mg/Kg	0.6	0.54	J	0.58	J	0.26	J
Cadmium	mg/Kg	1	1.20		1.50		6.50	
Calcium	mg/Kg	1135	9630		18300		23100	
Chromium	mg/Kg	21.85	28.80		38.00		103.00	
Cobalt	mg/Kg	30	12.10		14.00		34.20	
Copper	mg/Kg	25	89.50		95.60		224.00	
Iron	mg/Kg	33550	43200		41200		569000	
Lead	mg/Kg	14.3	240.00		291.00		934.00	
Magnesium	mg/Kg	6085	5310		9510		4190	
Manganese	mg/Kg	918	672.00		888.00		3490.00	
Mercury	mg/Kg	0.1	-		-		0.79	
Nickel	mg/Kg	34.5	31.70		30.60		117.00	
Potassium	mg/Kg	1270	1180.00		1070.00		1020.00	J
Selenium	mg/Kg	2	-		-		1.10	J
Silver	mg/Kg	N/A	0.60	J	0.32	J	-	
Sodium	mg/Kg	167	361.00	J	355.00	J	963.00	J
Thallium	mg/Kg	ND	-		-		-	
Vanadium	mg/Kg	150	20.00		25.20		24.60	
Zinc	mg/Kg	69.25	281.00		216.00		2830.00	
Total Cyanide	mg/Kg	ND	-		-		-	
TCLP METALS								
Arsenic	mg/L	5						
Barium	mg/L	100						
Cadmium	mg/L	1						
Lead	mg/L	5						
Silver	mg/L	5						

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.
Highlighted values exceed Recommended Soil Cleanup Ob
- = compound not detected mg/L = milligrams pe
J = Estimated value N = tentatively identi
MDL = Method detection limit R = Data Rejected
mg/kg = milligrams per kilogram ND = not detected in

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP1101	TP1102	TP1201
	DEPTH:	SOIL CLEAN-UP	12'	4'	17'
	LAB ID:	OBJECTIVE	3067404	3067405	3069501
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD1	SHD1	SHD1
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		2/28/97	2/28/97	3/03/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	-	-	-
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	0.001 J	-	-
Ethylbenzene	mg/Kg	5.50	-	-	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	-	-	-
Tetrachloroethene	mg/Kg	1.40	-	-	-
Toluene	mg/Kg	1.50	-	-	-
Trichloroethene	mg/Kg	0.70	0.020	-	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	-	-	-
Total VOCs	mg/Kg	10.00	0.021	0.000	0.000
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	-	0.05 J
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	-	0.15 J
Benzo(a)anthracene	mg/Kg	0.224/MDL	0.12 J	-	0.19 J
Benzo(a)pyrene	mg/Kg	0.061/MDL	0.11 J	-	0.16 J
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	-
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	0.08 J
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	-
Butylbenzylphthalate	mg/Kg	50.00	-	-	0.05 J
Carbazole	mg/Kg	-	-	-	0.07 J
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	0.22 J	-	0.22 J
Di-n-butylphthalate	mg/Kg	8.10	-	-	-
Di-n-octylphthalate	mg/Kg	50.00	0.27 J	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	0.49 J	-	0.72 J
Fluorene	mg/Kg	50.00	-	-	0.11 J
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	-	0.10 J
2-Methylnaphthalene	mg/Kg	36.40	0.08 J	-	-
4-Methylphenol	mg/Kg	0.90	0.14 J	-	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	-	-

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP1101	TP1102	TP1201
	DEPTH:	SOIL CLEAN-UP	12'	4'	17'
	LAB ID:	OBJECTIVE	3067404	3067405	3069501
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD1	SHD1	SHD1
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		2/28/97	2/28/97	3/03/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
Pentachlorophenol	mg/Kg	1.0/MDL	-	-	-
Phenanthrene	mg/Kg	50.00	-	0.05 J	0.69 J
Phenol	mg/Kg	0.03/MDL	0.45 J	-	-
Pyrene	mg/Kg	50.00	0.50 J	-	0.46 J
1,2,4-Trichlorobenzene	mg/Kg	-	0.05 J	-	-
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	3.60	2.40	0.78 J
Total SVOCs	mg/Kg	500.00	6.03	2.45	3.83
PESTICIDES/PCBs					
alpha-BHC	mg/Kg	0.11	-	-	-
alpha-Chlordane	mg/Kg	0.54	-	0.001 JN	-
beta-BHC	mg/Kg	0.20	-	-	-
delta-BHC	mg/Kg	0.30	-	-	-
gamma-BHC (Lindane)	mg/Kg	0.06	-	-	-
gamma-Chlordane	mg/Kg	0.54	0.003 JN	0.003 JN	-
Aldrin	mg/Kg	0.041	-	-	-
4,4'-DDD	mg/Kg	2.90	-	0.03 J	-
4,4'-DDE	mg/Kg	2.10	0.03 J	0.02	-
4,4'-DDT	mg/Kg	2.10	0.03 JN	0.06 JN	-
Dieldrin	mg/Kg	0.044	-	0.00 J	-
Endosulfan I	mg/Kg	0.90	0.00 JN	-	-
Endosulfan II	mg/Kg	0.90	0.01 JN	0.01 JN	-
Endosulfan sulfate	mg/Kg	1.00	0.01 JN	-	-
Endrin	mg/Kg	0.10	-	0.003 JN	-
Endrin aldehyde	mg/Kg	-	-	0.02 J	0.01 JN
Endrin ketone	mg/Kg	N/A	-	-	-
Heptachlor	mg/Kg	0.10	-	-	-
Heptachlor epoxide	mg/Kg	0.02	-	-	-
Methoxychlor	mg/Kg	N/A	0.02 JN	-	-
Toxaphene	mg/Kg	-	-	-	-
Total Pesticides	mg/kg	10.00	0.11	0.15	0.01
Aroclor-1016	mg/Kg	1, 10	-	-	-
Aroclor-1221	mg/Kg	1, 10	-	-	-
Aroclor-1232	mg/Kg	1, 10	-	-	-
Aroclor-1242	mg/Kg	1, 10	-	-	-
Aroclor-1248	mg/Kg	1, 10	-	-	-
Aroclor-1254	mg/Kg	1, 10	0.85	-	0.04 JN
Aroclor-1260	mg/Kg	1, 10	-	0.44 J	-
TCLP VOLATILES					
NONE	mg/L		-		
TCLP SEMIVOLATILES					
NONE	mg/L		-		
TCLP PESTICIDES					
NONE	mg/L		-		

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP1101		TP1102		TP1201	
	DEPTH:	SOIL CLEAN-UP	12'		4'		17'	
	LAB ID:	OBJECTIVE	3067404		3067405		3069501	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD1		SHD1		SHD1	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		2/28/97		2/28/97		3/03/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
TCLP HERBICIDES								
NONE	mg/L		-					
INORGANICS								
Aluminum	mg/Kg	16200	11000		17200		32900	
Antimony	mg/Kg	1.6	5.40	J	2.00	J	24.00	J
Arsenic	mg/Kg	7.9	7.80		5.00		26.50	
Barium	mg/Kg	300	111.00		82.80		673.00	J
Beryllium	mg/Kg	0.6	0.41	J	0.69		0.23	J
Cadmium	mg/Kg	1	1.70		-		12.80	
Calcium	mg/Kg	1135	33400		1060		34600	
Chromium	mg/Kg	21.85	20.10		23.60		63.20	
Cobalt	mg/Kg	30	10.90		14.30		15.50	
Copper	mg/Kg	25	95.20		23.30		1250.00	
Iron	mg/Kg	33550	93000		31800		107000	J
Lead	mg/Kg	14.3	189.00		11.40		2910.00	J
Magnesium	mg/Kg	6085	3920		5450		5250	
Manganese	mg/Kg	918	740.00		527.00		588.00	
Mercury	mg/Kg	0.1	0.15	J	-		0.21	
Nickel	mg/Kg	34.5	27.40		185.00		178.00	J
Potassium	mg/Kg	1270	1180.00		2190.00		4240.00	J
Selenium	mg/Kg	2	1.50		-		-	
Silver	mg/Kg	N/A	0.81	J	0.46	J	6.80	
Sodium	mg/Kg	167	866.00		295.00	J	2270.00	
Thallium	mg/Kg	ND	-		-		-	
Vanadium	mg/Kg	150	19.10		22.90		27.30	
Zinc	mg/Kg	69.25	327.00		150.00		2380.00	
Total Cyanide	mg/Kg	ND	-		-		-	
TCLP METALS								
Arsenic	mg/L	5	0.31	J				
Barium	mg/L	100	1.80					
Cadmium	mg/L	1	0.05	J				
Lead	mg/L	5	1.10					
Silver	mg/L	5	0.06	J				

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Ol

- = compound not detected	mg/L = milligrams pe
J = Estimated value	N = tentatively identi
MDL = Method detection limit	R = Data Rejected
mg/kg = milligrams per kilogram	ND = not detected in

Table B.1: Test Pit Soil Sample Results

			DUP of TP1201		
	SAMPLE ID:	RECOMMENDED	TP1211	TP1601	TP1801
	DEPTH:	SOIL CLEAN-UP	17'	5'	8'
	LAB ID:	OBJECTIVE	3069504	3069505	3072001
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD1	SHD1	SHD2
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/03/97	3/04/97	3/05/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	-	-	0.032
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	0.023	-
Chlorobenzene	mg/Kg	1.70	-	-	0.012 J
1,2-Dichloroethene (total)	mg/Kg	0.30	-	-	-
Ethylbenzene	mg/Kg	5.50	-	0.28 J	0.071
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	-	-	0.003 J
Tetrachloroethene	mg/Kg	1.40	0.004 J	0.006 J	0.004 J
Toluene	mg/Kg	1.50	-	0.014	-
Trichloroethene	mg/Kg	0.70	0.002 J	-	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	0.001 J	0.21	0.270
Total VOCs	mg/Kg	10.00	0.007	0.53	0.392
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	2.20	-
Acenaphthylene	mg/Kg	41.00	-	-	0.05 J
Anthracene	mg/Kg	50.00	-	0.72	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	0.22 J	0.17 J
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	0.17 J	0.21 J
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	0.20 J
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	0.16 J
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	0.21 J
Butylbenzylphthalate	mg/Kg	50.00	-	1.10	1.20
Carbazole	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	-	0.31 J	0.31 J
Di-n-butylphthalate	mg/Kg	8.10	-	-	-
Di-n-octylphthalate	mg/Kg	50.00	-	0.22 J	-
Dibenzofuran	mg/Kg	6.20	-	1.60	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	0.33 J
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	0.10 J
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	0.07 J	0.67	-
Fluorene	mg/Kg	50.00	-	2.80	0.05 J
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	0.05 J	0.14 J
2-Methylnaphthalene	mg/Kg	36.40	-	34.00	0.30 J
4-Methylphenol	mg/Kg	0.90	-	0.68	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	7.00	0.40 J

Table B.1: Test Pit Soil Sample Results

			DUP of TP1201					
	SAMPLE ID:	RECOMMENDED	TP1211		TP1601		TP1801	
	DEPTH:	SOIL CLEAN-UP	17'		5'		8'	
	LAB ID:	OBJECTIVE	3069504		3069505		3072001	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD1		SHD1		SHD2	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/03/97		3/04/97		3/05/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
Pentachlorophenol	mg/Kg	1.0/MDL	-		-		-	
Phenanthrene	mg/Kg	50.00	0.05	J	6.90		-	
Phenol	mg/Kg	0.03/MDL	-		-		1.40	
Pyrene	mg/Kg	50.00	0.05	J	0.75		0.25	J
1,2,4-Trichlorobenzene	mg/Kg	-	-		-		-	
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	1.60	J	4.00	J	28.00	J
Total SVOCs	mg/Kg	500.00	1.78		63.39		33.49	
PESTICIDES/PCBs								
alpha-BHC	mg/Kg	0.11	-		-			R
alpha-Chlordane	mg/Kg	0.54	-		-		0.002	JN
beta-BHC	mg/Kg	0.20	-		-			R
delta-BHC	mg/Kg	0.30	-		-			R
gamma-BHC (Lindane)	mg/Kg	0.06	-		-			R
gamma-Chlordane	mg/Kg	0.54	-		-		0.002	JN
Aldrin	mg/Kg	0.041	-		-			R
4,4'-DDD	mg/Kg	2.90	0.01	JN	0.01		0.07	J
4,4'-DDE	mg/Kg	2.10	0.004	J	-			R
4,4'-DDT	mg/Kg	2.10	0.01	JN	0.003	JN		R
Dieldrin	mg/Kg	0.044	0.003	JN	0.002	JN		R
Endosulfan I	mg/Kg	0.90	-		-			R
Endosulfan II	mg/Kg	0.90	-		-			R
Endosulfan sulfate	mg/Kg	1.00	-		-			R
Endrin	mg/Kg	0.10	-		-			R
Endrin aldehyde	mg/Kg	-	0.004	JN	0.004	JN	0.004	JN
Endrin ketone	mg/Kg	N/A	-		-			R
Heptachlor	mg/Kg	0.10	-		-			R
Heptachlor epoxide	mg/Kg	0.02	0.002	J	-			R
Methoxychlor	mg/Kg	N/A	0.01	J	-			R
Toxaphene	mg/Kg	-	-		-			R
Total Pesticides	mg/kg	10.00	0.04		0.02		0.08	
Aroclor-1016	mg/Kg	1, 10	-		-			R
Aroclor-1221	mg/Kg	1, 10	-		-			R
Aroclor-1232	mg/Kg	1, 10	-		-			R
Aroclor-1242	mg/Kg	1, 10	-		0.35			R
Aroclor-1248	mg/Kg	1, 10	-		-			R
Aroclor-1254	mg/Kg	1, 10	0.13	J	0.09		0.05	J
Aroclor-1260	mg/Kg	1, 10	-		-			R
TCLP VOLATILES								
NONE	mg/L							
TCLP SEMIVOLATILES								
NONE	mg/L							
TCLP PESTICIDES								
NONE	mg/L							

Table B.1: Test Pit Soil Sample Results

			DUP of TP1201					
	SAMPLE ID:	RECOMMENDED	TP1211		TP1601		TP1801	
	DEPTH:	SOIL CLEAN-UP	17'		5'		8'	
	LAB ID:	OBJECTIVE	3069504		3069505		3072001	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD1		SHD1		SHD2	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/03/97		3/04/97		3/05/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
TCLP HERBICIDES								
NONE	mg/L							
INORGANICS								
Aluminum	mg/Kg	16200	26100		6610		14800	
Antimony	mg/Kg	1.6	16.40	J	5.90	J	3.10	J
Arsenic	mg/Kg	7.9	31.50		4.80		14.20	
Barium	mg/Kg	300	904.00	J	45.60	J	116.00	
Beryllium	mg/Kg	0.6	0.27	J	0.10	J	0.39	J
Cadmium	mg/Kg	1	18.10		0.26	J	1.60	
Calcium	mg/Kg	1135	55900		7280		8060	
Chromium	mg/Kg	21.85	102.00		11.80		38.20	
Cobalt	mg/Kg	30	17.20		6.00	J	12.00	
Copper	mg/Kg	25	1820.00		11.90		34.20	
Iron	mg/Kg	33550	105000	J	17100	J	44800	J
Lead	mg/Kg	14.3	1470.00	J	117.00	J	135.00	
Magnesium	mg/Kg	6085	6150		3090		5000	
Manganese	mg/Kg	918	777.00		304.00		533.00	
Mercury	mg/Kg	0.1	0.15		-		0.16	
Nickel	mg/Kg	34.5	249.00	J	15.30	J	31.80	
Potassium	mg/Kg	1270	4950.00	J	519.00	J	1530.00	
Selenium	mg/Kg	2	-		-		-	
Silver	mg/Kg	N/A	10.30		13.60		0.37	J
Sodium	mg/Kg	167	2440.00		608.00	J	315.00	J
Thallium	mg/Kg	ND	-		-		-	
Vanadium	mg/Kg	150	26.5		10.80		23.90	
Zinc	mg/Kg	69.25	2320.00		109.00		368.00	
Total Cyanide	mg/Kg	ND	-		-		-	
TCLP METALS								
Arsenic	mg/L	5						
Barium	mg/L	100						
Cadmium	mg/L	1						
Lead	mg/L	5						
Silver	mg/L	5						

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Ol

- = compound not detected	mg/L = milligrams pe
J = Estimated value	N = tentatively identi
MDL = Method detection limit	R = Data Rejected
mg/kg = milligrams per kilogram	ND = not detected in

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP1901	TP1902	TP2101
	DEPTH:	SOIL CLEAN-UP	10'	10'	3'
	LAB ID:	OBJECTIVE	3072002	3072003	3072006
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD2	SHD2	SHD2
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/05/97	3/05/97	3/06/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	-	0.020	-
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	-	0.006 J	-
Ethylbenzene	mg/Kg	5.50	0.004 J	0.011 J	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	0.004 J	0.003 J	-
Tetrachloroethene	mg/Kg	1.40	0.007 J	0.002 J	-
Toluene	mg/Kg	1.50	-	-	0.220 J
Trichloroethene	mg/Kg	0.70	0.002 J	0.040	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	0.020	0.031	-
Total VOCs	mg/Kg	10.00	0.037	0.113	0.220
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	-	-
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	-	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	-	-
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	-	-
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	-
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	-
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	-
Butylbenzylphthalate	mg/Kg	50.00	-	-	-
Carbazole	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	-	-	-
Di-n-butylphthalate	mg/Kg	8.10	-	-	0.26 J
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	-	-	0.18 J
Fluorene	mg/Kg	50.00	-	-	0.12 J
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	-	-
2-Methylnaphthalene	mg/Kg	36.40	-	-	0.07 J
4-Methylphenol	mg/Kg	0.90	-	-	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	-	0.16 J

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP1901		TP1902		TP2101	
	DEPTH:	SOIL CLEAN-UP	10'		10'		3'	
	LAB ID:	OBJECTIVE	3072002		3072003		3072006	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD2		SHD2		SHD2	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/05/97		3/05/97		3/06/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
Pentachlorophenol	mg/Kg	1.0/MDL	-		-		-	
Phenanthrene	mg/Kg	50.00	-		-		0.34	J
Phenol	mg/Kg	0.03/MDL	-		-		-	
Pyrene	mg/Kg	50.00	-		-		0.09	J
1,2,4-Trichlorobenzene	mg/Kg	-	-		-		-	
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	-		-		-	
Total SVOCs	mg/Kg	500.00	0.00		0.00		1.22	
PESTICIDES/PCBs								
alpha-BHC	mg/Kg	0.11	-		-		-	
alpha-Chlordane	mg/Kg	0.54	-		-		-	
beta-BHC	mg/Kg	0.20	-		-		-	
delta-BHC	mg/Kg	0.30	-		-		-	
gamma-BHC (Lindane)	mg/Kg	0.06	-		-		-	
gamma-Chlordane	mg/Kg	0.54	-		-		-	
Aldrin	mg/Kg	0.041	-		-		-	
4,4'-DDD	mg/Kg	2.90	-		0.005	JN	0.004	J
4,4'-DDE	mg/Kg	2.10	-		-		0.002	J
4,4'-DDT	mg/Kg	2.10	-		0.003	JN	-	
Dieldrin	mg/Kg	0.044	-		-		-	
Endosulfan I	mg/Kg	0.90	-		-		-	
Endosulfan II	mg/Kg	0.90	-		-		-	
Endosulfan sulfate	mg/Kg	1.00	-		-		-	
Endrin	mg/Kg	0.10	-		-		-	
Endrin aldehyde	mg/Kg	-	-		0.004	J	-	
Endrin ketone	mg/Kg	N/A	-		-		-	
Heptachlor	mg/Kg	0.10	-		-		-	
Heptachlor epoxide	mg/Kg	0.02	-		-		-	
Methoxychlor	mg/Kg	N/A	-		-		-	
Toxaphene	mg/Kg	-	-		-		-	
Total Pesticides	mg/kg	10.00	0.00		0.01		0.01	
Aroclor-1016	mg/Kg	1, 10	-		-		-	
Aroclor-1221	mg/Kg	1, 10	-		-		-	
Aroclor-1232	mg/Kg	1, 10	-		-		-	
Aroclor-1242	mg/Kg	1, 10	-		-		-	
Aroclor-1248	mg/Kg	1, 10	-		-		-	
Aroclor-1254	mg/Kg	1, 10	-		0.05		-	
Aroclor-1260	mg/Kg	1, 10	-		-		0.04	J
TCLP VOLATILES								
NONE	mg/L							
TCLP SEMIVOLATILES								
NONE	mg/L							
TCLP PESTICIDES								
NONE	mg/L							

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP1901		TP1902		TP2101	
	DEPTH:	SOIL CLEAN-UP	10'		10'		3'	
	LAB ID:	OBJECTIVE	3072002		3072003		3072006	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD2		SHD2		SHD2	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/05/97		3/05/97		3/06/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
TCLP HERBICIDES								
NONE	mg/L							
INORGANICS								
Aluminum	mg/Kg	16200	22000		17500		15800	
Antimony	mg/Kg	1.6	6.70	J	5.40	J	1.70	J
Arsenic	mg/Kg	7.9	16.20		11.70		7.70	
Barium	mg/Kg	300	424.00		214.00		81.60	
Beryllium	mg/Kg	0.6	0.42	J	0.32	J	0.35	J
Cadmium	mg/Kg	1	39.90		19.00		1.90	
Calcium	mg/Kg	1135	26900		14700		2010	
Chromium	mg/Kg	21.85	70.70		55.20		39.40	
Cobalt	mg/Kg	30	16.30		19.90		14.20	
Copper	mg/Kg	25	718.00		346.00		77.60	
Iron	mg/Kg	33550	112000	J	89200	J	37400	J
Lead	mg/Kg	14.3	1410.00		759.00		90.30	
Magnesium	mg/Kg	6085	9130		6410		4580	
Manganese	mg/Kg	918	931.00		917.00		601.00	
Mercury	mg/Kg	0.1	0.07	J	0.18		0.07	J
Nickel	mg/Kg	34.5	176.00		114.00		54.80	
Potassium	mg/Kg	1270	4850.00		2360.00		1780.00	
Selenium	mg/Kg	2	-		-		-	
Silver	mg/Kg	N/A	5.40		193.00		2.30	
Sodium	mg/Kg	167	1890.00		874.00		457.00	J
Thallium	mg/Kg	ND	-		-		-	
Vanadium	mg/Kg	150	33.40		24.20		22.90	
Zinc	mg/Kg	69.25	3590.00		1580.00		252.00	
Total Cyanide	mg/Kg	ND	0.73		-		-	
TCLP METALS								
Arsenic	mg/L	5						
Barium	mg/L	100						
Cadmium	mg/L	1						
Lead	mg/L	5						
Silver	mg/L	5						

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Ol

- = compound not detected	mg/L = milligrams pe
J = Estimated value	N = tentatively identi
MDL = Method detection limit	R = Data Rejected
mg/kg = milligrams per kilogram	ND = not detected in

Table B.1: Test Pit Soil Sample Results

				DUP of TP2701	
	SAMPLE ID:	RECOMMENDED	TP2701	TP2711	TP3001
	DEPTH:	SOIL CLEAN-UP	10'	10'	4'
	LAB ID:	OBJECTIVE	3076001	3076004	3076005
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD2	SHD2	SHD2
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/10/97	3/10/97	3/11/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	-	-	0.028 J
Benzene	mg/Kg	0.06	-	-	0.004 J
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	-	-	-
Ethylbenzene	mg/Kg	5.50	-	-	0.090 J
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	0.013	0.012 J	0.023 J
Tetrachloroethene	mg/Kg	1.40	-	-	0.008 J
Toluene	mg/Kg	1.50	-	-	-
Trichloroethene	mg/Kg	0.70	0.009 J	0.009 J	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	-	-	0.079 J
Total VOCs	mg/Kg	10.00	0.022	0.021	0.232
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	-	-
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	-	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	-	-
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	-	-
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	-
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	-
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	-
Butylbenzylphthalate	mg/Kg	50.00	-	-	-
Carbazole	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	-	-	0.27 J
Di-n-butylphthalate	mg/Kg	8.10	0.54 J	-	1.00 J
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	0.20 J
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	0.29 J
Fluoranthene	mg/Kg	50.00	-	-	1.50 J
Fluorene	mg/Kg	50.00	-	-	0.22 J
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	-	-
2-Methylnaphthalene	mg/Kg	36.40	-	-	1.20 J
4-Methylphenol	mg/Kg	0.90	-	-	0.21 J
N-Nitrosodiphenylamine	mg/Kg	-	-	-	0.72 J
Naphthalene	mg/Kg	13.00	-	-	1.10 J

Table B.1: Test Pit Soil Sample Results

				DUP of TP2701	
	SAMPLE ID:	RECOMMENDED	TP2701	TP2711	TP3001
	DEPTH:	SOIL CLEAN-UP	10'	10'	4'
	LAB ID:	OBJECTIVE	3076001	3076004	3076005
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD2	SHD2	SHD2
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/10/97	3/10/97	3/11/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
Pentachlorophenol	mg/Kg	1.0/MDL	-	-	-
Phenanthrene	mg/Kg	50.00	-	-	1.00 J
Phenol	mg/Kg	0.03/MDL	-	-	-
Pyrene	mg/Kg	50.00	-	-	0.58 J
1,2,4-Trichlorobenzene	mg/Kg	-	-	-	0.14 J
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	-	-	23.00 J
Total SVOCs	mg/Kg	500.00	0.54	0.00	31.43
PESTICIDES/PCBs					
alpha-BHC	mg/Kg	0.11	-	-	-
alpha-Chlordane	mg/Kg	0.54	-	-	0.01 JN
beta-BHC	mg/Kg	0.20	-	-	-
delta-BHC	mg/Kg	0.30	-	-	-
gamma-BHC (Lindane)	mg/Kg	0.06	-	-	-
gamma-Chlordane	mg/Kg	0.54	-	-	0.01 JN
Aldrin	mg/Kg	0.041	-	-	-
4,4'-DDD	mg/Kg	2.90	-	-	0.11 JN
4,4'-DDE	mg/Kg	2.10	-	-	0.03 J
4,4'-DDT	mg/Kg	2.10	0.003 JN	-	0.02 JN
Dieldrin	mg/Kg	0.044	0.004	-	0.01 J
Endosulfan I	mg/Kg	0.90	-	-	-
Endosulfan II	mg/Kg	0.90	-	-	-
Endosulfan sulfate	mg/Kg	1.00	-	-	0.01 J
Endrin	mg/Kg	0.10	-	-	-
Endrin aldehyde	mg/Kg	-	0.003 JN	-	-
Endrin ketone	mg/Kg	N/A	-	-	-
Heptachlor	mg/Kg	0.10	-	-	0.005 JN
Heptachlor epoxide	mg/Kg	0.02	-	-	-
Methoxychlor	mg/Kg	N/A	-	-	-
Toxaphene	mg/Kg	-	-	-	-
Total Pesticides	mg/kg	10.00	0.01	0.00	0.20
Aroclor-1016	mg/Kg	1, 10	-	-	0.71 J
Aroclor-1221	mg/Kg	1, 10	-	-	-
Aroclor-1232	mg/Kg	1, 10	-	-	-
Aroclor-1242	mg/Kg	1, 10	-	-	-
Aroclor-1248	mg/Kg	1, 10	-	-	-
Aroclor-1254	mg/Kg	1, 10	0.04 J	0.03 J	0.59 J
Aroclor-1260	mg/Kg	1, 10	-	-	0.67 J
TCLP VOLATILES					
NONE	mg/L				
TCLP SEMIVOLATILES					
NONE	mg/L				
TCLP PESTICIDES					
NONE	mg/L				

Table B.1: Test Pit Soil Sample Results

				DUP of TP2701	
	SAMPLE ID:	RECOMMENDED	TP2701	TP2711	TP3001
	DEPTH:	SOIL CLEAN-UP	10'	10'	4'
	LAB ID:	OBJECTIVE	3076001	3076004	3076005
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD2	SHD2	SHD2
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/10/97	3/10/97	3/11/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
TCLP HERBICIDES					
NONE	mg/L				
INORGANICS					
Aluminum	mg/Kg	16200	12900	13000	6990 J
Antimony	mg/Kg	1.6	4.50 J	1.90 J	9.00 J
Arsenic	mg/Kg	7.9	8.50	7.20	18.20 J
Barium	mg/Kg	300	83.90	84.20	270.00 J
Beryllium	mg/Kg	0.6	0.31 J	0.30 J	-
Cadmium	mg/Kg	1	6.10	3.10	4.70 J
Calcium	mg/Kg	1135	17900 J	61900 J	23200 J
Chromium	mg/Kg	21.85	114.00 J	52.90 J	121.00 J
Cobalt	mg/Kg	30	12.70	9.10	33.40 J
Copper	mg/Kg	25	227.00 J	114.00 J	134.00 J
Iron	mg/Kg	33550	71800 J	42600 J	298000 J
Lead	mg/Kg	14.3	801.00 J	371.00 J	417.00 J
Magnesium	mg/Kg	6085	5930	8520	1650 J
Manganese	mg/Kg	918	617.00	598.00	1850 J
Mercury	mg/Kg	0.1	0.11 J	-	0.24 J
Nickel	mg/Kg	34.5	63.60 J	35.90 J	218.00 J
Potassium	mg/Kg	1270	2020.00	2330.00	1140.00 J
Selenium	mg/Kg	2	-	-	-
Silver	mg/Kg	N/A	0.98 J	0.52 J	-
Sodium	mg/Kg	167	508.00 J	551.00 J	1690.00 J
Thallium	mg/Kg	ND	-	-	-
Vanadium	mg/Kg	150	23.80	22.60	19.00 J
Zinc	mg/Kg	69.25	683.00	488.00	4130.00 J
Total Cyanide	mg/Kg	ND	0.80 J	-	-
TCLP METALS					
Arsenic	mg/L	5			
Barium	mg/L	100			
Cadmium	mg/L	1			
Lead	mg/L	5			
Silver	mg/L	5			

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Ob

- = compound not detected	mg/L = milligrams pe
J = Estimated value	N = tentatively identi
MDL = Method detection limit	R = Data Rejected
mg/kg = milligrams per kilogram	ND = not detected in

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP3201	TP3601	TP3602
	DEPTH:	SOIL CLEAN-UP	1'	2'	3'
	LAB ID:	OBJECTIVE	3076006	3076801	3076802
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD2	SHD2	SHD2
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/11/97	3/12/97	3/12/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	0.008 J	-	-
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	-	-	-
Ethylbenzene	mg/Kg	5.50	0.002 J	-	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	0.010 J	0.007 J	0.007 J
Tetrachloroethene	mg/Kg	1.40	-	-	-
Toluene	mg/Kg	1.50	0.001 J	-	-
Trichloroethene	mg/Kg	0.70	-	-	-
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	0.005 J	-	-
Total VOCs	mg/Kg	10.00	0.026	0.007	0.007
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	-	-
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	-	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	-	-
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	-	-
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	-
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	-
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	-
Butylbenzylphthalate	mg/Kg	50.00	-	-	-
Carbazole	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	-
Chrysene	mg/Kg	0.40	-	-	-
Di-n-butylphthalate	mg/Kg	8.10	-	-	-
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	-	-	-
Fluorene	mg/Kg	50.00	-	-	-
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	-	-
2-Methylnaphthalene	mg/Kg	36.40	-	-	-
4-Methylphenol	mg/Kg	0.90	0.04 J	-	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	-	-

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP3201		TP3601	TP3602
	DEPTH:	SOIL CLEAN-UP	1'		2'	3'
	LAB ID:	OBJECTIVE	3076006		3076801	3076802
	SOURCE:	(see Note 1)	NYTEST		NYTEST	NYTEST
	SDG:		SHD2		SHD2	SHD2
	MATRIX:		SOIL		SOIL	SOIL
	SAMPLED:		3/11/97		3/12/97	3/12/97
	VALIDATED:		7/25/97		7/25/97	7/25/97
COMPOUND	UNITS:					
Pentachlorophenol	mg/Kg	1.0/MDL	-		-	-
Phenanthrene	mg/Kg	50.00	-		-	-
Phenol	mg/Kg	0.03/MDL	-		-	-
Pyrene	mg/Kg	50.00	-		-	-
1,2,4-Trichlorobenzene	mg/Kg	-	-		-	-
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	-		-	-
Total SVOCs	mg/Kg	500.00	0.04		0.00	0.00
PESTICIDES/PCBs						
alpha-BHC	mg/Kg	0.11	-		-	-
alpha-Chlordane	mg/Kg	0.54	-		-	-
beta-BHC	mg/Kg	0.20	-		-	-
delta-BHC	mg/Kg	0.30	-		-	-
gamma-BHC (Lindane)	mg/Kg	0.06	-		-	-
gamma-Chlordane	mg/Kg	0.54	0.01	J	-	-
Aldrin	mg/Kg	0.041	-		-	-
4,4'-DDD	mg/Kg	2.90	0.005	JN	-	-
4,4'-DDE	mg/Kg	2.10	0.01	JN	-	-
4,4'-DDT	mg/Kg	2.10	-		-	-
Dieldrin	mg/Kg	0.044	-		-	-
Endosulfan I	mg/Kg	0.90	0.003	JN	-	-
Endosulfan II	mg/Kg	0.90	-		-	-
Endosulfan sulfate	mg/Kg	1.00	0.01	JN	-	-
Endrin	mg/Kg	0.10	0.003	JN	-	-
Endrin aldehyde	mg/Kg	-	-		-	-
Endrin ketone	mg/Kg	N/A	-		-	-
Heptachlor	mg/Kg	0.10	0.01	JN	-	-
Heptachlor epoxide	mg/Kg	0.02	-		-	-
Methoxychlor	mg/Kg	N/A	-		-	-
Toxaphene	mg/Kg	-	-		-	-
Total Pesticides	mg/kg	10.00	0.06		0.00	0.00
Aroclor-1016	mg/Kg	1, 10	-		-	-
Aroclor-1221	mg/Kg	1, 10	-		-	-
Aroclor-1232	mg/Kg	1, 10	-		-	-
Aroclor-1242	mg/Kg	1, 10	-		-	-
Aroclor-1248	mg/Kg	1, 10	4.00		-	-
Aroclor-1254	mg/Kg	1, 10	-		-	-
Aroclor-1260	mg/Kg	1, 10	-		-	-
TCLP VOLATILES						
NONE	mg/L					
TCLP SEMIVOLATILES						
NONE	mg/L					
TCLP PESTICIDES						
NONE	mg/L					

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP3201		TP3601		TP3602	
	DEPTH:	SOIL CLEAN-UP	1'		2'		3'	
	LAB ID:	OBJECTIVE	3076006		3076801		3076802	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD2		SHD2		SHD2	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/11/97		3/12/97		3/12/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
TCLP HERBICIDES								
NONE	mg/L							
INORGANICS								
Aluminum	mg/Kg	16200	14600		15700		12800	
Antimony	mg/Kg	1.6	1.70	J	2.10	J	2.00	J
Arsenic	mg/Kg	7.9	5.80		7.80		7.10	
Barium	mg/Kg	300	96.50		77.70		83.30	
Beryllium	mg/Kg	0.6	0.37	J	0.46	J	0.41	J
Cadmium	mg/Kg	1	-		-		-	
Calcium	mg/Kg	1135	784		688		735	
Chromium	mg/Kg	21.85	19.60		21.20		18.00	
Cobalt	mg/Kg	30	11.70		13.00		10.30	
Copper	mg/Kg	25	19.70		17.60		17.60	
Iron	mg/Kg	33550	26000	J	85300	J	25800	J
Lead	mg/Kg	14.3	17.90		7.50		10.80	
Magnesium	mg/Kg	6085	4570		5600		4090	
Manganese	mg/Kg	918	336.00		529.00		493.00	
Mercury	mg/Kg	0.1	-		-		-	
Nickel	mg/Kg	34.5	29.10		30.10		23.70	
Potassium	mg/Kg	1270	1200.00		1780.00		1790.00	
Selenium	mg/Kg	2	-		-		-	
Silver	mg/Kg	N/A	0.29	J	-		-	
Sodium	mg/Kg	167	208.00	J	185.00	J	200.00	J
Thallium	mg/Kg	ND	-		-		-	
Vanadium	mg/Kg	150	19.20		20.30		18.00	
Zinc	mg/Kg	69.25	138.00		62.10		54.10	
Total Cyanide	mg/Kg	ND	-		-		-	
TCLP METALS								
Arsenic	mg/L	5						
Barium	mg/L	100						
Cadmium	mg/L	1						
Lead	mg/L	5						
Silver	mg/L	5						

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Ol

- = compound not detected	mg/L = milligrams pe
J = Estimated value	N = tentatively identi
MDL = Method detection limit	R = Data Rejected
mg/kg = milligrams per kilogram	ND = not detected in

Table B.1: Test Pit Soil Sample Results

					DUP of TP3901
	SAMPLE ID:	RECOMMENDED	TP3801	TP3901	TP3911
	DEPTH:	SOIL CLEAN-UP	2'	1'	1'
	LAB ID:	OBJECTIVE	3078701	3079701	3079704
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD3	SHD3	SHD3
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/13/97	3/17/97	3/17/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	0.005 J	-	0.003 J
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	-
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	-	-	-
Ethylbenzene	mg/Kg	5.50	-	-	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	-	-	-
Tetrachloroethene	mg/Kg	1.40	-	-	-
Toluene	mg/Kg	1.50	-	-	-
Trichloroethene	mg/Kg	0.70	0.002 J	0.017 J	0.006 J
Vinyl Chloride	mg/Kg	0.20	-	-	-
Xylene (total)	mg/Kg	1.20	-	-	-
Total VOCs	mg/Kg	10.00	0.007	0.017	0.009
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	0.07 J	-
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	0.09 J	0.05 J
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	0.40 J	0.19 J
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	0.30 J	0.16 J
Benzo(b)fluoranthene	mg/Kg	1.10	-	0.29 J	0.22 J
Benzo(g,h,i)perylene	mg/Kg	50.00	-	0.13 J	0.09 J
Benzo(k)fluoranthene	mg/Kg	1.10	-	0.29 J	0.14 J
Butylbenzylphthalate	mg/Kg	50.00	-	-	-
Carbazole	mg/Kg	-	-	0.09 J	-
4-Chloroaniline	mg/Kg	0.220/MDL	-	-	R
Chrysene	mg/Kg	0.40	-	0.58 J	0.26 J
Di-n-butylphthalate	mg/Kg	8.10	-	-	-
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	0.05 J	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	-	0.84 J	0.39 J
Fluorene	mg/Kg	50.00	-	0.06 J	-
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	0.15 J	0.09 J
2-Methylnaphthalene	mg/Kg	36.40	-	-	-
4-Methylphenol	mg/Kg	0.90	-	-	-
N-Nitrosodiphenylamine	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	13.00	-	0.05 J	-

Table B.1: Test Pit Soil Sample Results

					DUP of TP3901
	SAMPLE ID:	RECOMMENDED	TP3801	TP3901	TP3911
	DEPTH:	SOIL CLEAN-UP	2'	1'	1'
	LAB ID:	OBJECTIVE	3078701	3079701	3079704
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD3	SHD3	SHD3
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/13/97	3/17/97	3/17/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
Pentachlorophenol	mg/Kg	1.0/MDL	-	-	-
Phenanthrene	mg/Kg	50.00	-	0.65 J	0.32 J
Phenol	mg/Kg	0.03/MDL	0.25 J	-	-
Pyrene	mg/Kg	50.00	-	0.75 J	0.31 J
1,2,4-Trichlorobenzene	mg/Kg	-	-	-	-
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	1.50	-	-
Total SVOCs	mg/Kg	500.00	1.75	4.78	2.22
PESTICIDES/PCBs					
alpha-BHC	mg/Kg	0.11	-	-	-
alpha-Chlordane	mg/Kg	0.54	-	-	-
beta-BHC	mg/Kg	0.20	-	-	-
delta-BHC	mg/Kg	0.30	-	-	-
gamma-BHC (Lindane)	mg/Kg	0.06	-	-	-
gamma-Chlordane	mg/Kg	0.54	-	-	-
Aldrin	mg/Kg	0.041	-	-	-
4,4'-DDD	mg/Kg	2.90	-	-	-
4,4'-DDE	mg/Kg	2.10	-	0.004 JN	0.003 J
4,4'-DDT	mg/Kg	2.10	.0033 J	0.02 JN	0.02 J
Dieldrin	mg/Kg	0.044	-	-	-
Endosulfan I	mg/Kg	0.90	-	-	-
Endosulfan II	mg/Kg	0.90	-	-	-
Endosulfan sulfate	mg/Kg	1.00	-	-	-
Endrin	mg/Kg	0.10	-	-	-
Endrin aldehyde	mg/Kg	-	-	-	-
Endrin ketone	mg/Kg	N/A	-	0.004 J	-
Heptachlor	mg/Kg	0.10	-	-	-
Heptachlor epoxide	mg/Kg	0.02	-	-	-
Methoxychlor	mg/Kg	N/A	-	-	-
Toxaphene	mg/Kg	-	-	-	-
Total Pesticides	mg/kg	10.00	0.00	0.03	0.02
Aroclor-1016	mg/Kg	1, 10	-	-	-
Aroclor-1221	mg/Kg	1, 10	-	-	-
Aroclor-1232	mg/Kg	1, 10	-	-	-
Aroclor-1242	mg/Kg	1, 10	-	-	-
Aroclor-1248	mg/Kg	1, 10	-	-	-
Aroclor-1254	mg/Kg	1, 10	-	0.04	0.03 J
Aroclor-1260	mg/Kg	1, 10	0.03 J	-	-
TCLP VOLATILES					
NONE	mg/L				
TCLP SEMIVOLATILES					
NONE	mg/L				
TCLP PESTICIDES					
NONE	mg/L				

Table B.1: Test Pit Soil Sample Results

					DUP of TP3901
	SAMPLE ID:	RECOMMENDED	TP3801	TP3901	TP3911
	DEPTH:	SOIL CLEAN-UP	2'	1'	1'
	LAB ID:	OBJECTIVE	3078701	3079701	3079704
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD3	SHD3	SHD3
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/13/97	3/17/97	3/17/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
TCLP HERBICIDES					
NONE	mg/L				
INORGANICS					
Aluminum	mg/Kg	16200	9960	11500 J	395 J
Antimony	mg/Kg	1.6	1.70 J	1.80 J	21.90 J
Arsenic	mg/Kg	7.9	7.90 J	10.90 J	6.50
Barium	mg/Kg	300	155.00	298.00 J	12.70 J
Beryllium	mg/Kg	0.6	0.43 J	0.37 J	-
Cadmium	mg/Kg	1	-	1.80 J	-
Calcium	mg/Kg	1135	1220	11500 J	3900 J
Chromium	mg/Kg	21.85	13.40 J	19.00 J	435.00 J
Cobalt	mg/Kg	30	8.70 J	9.80 J	3.90 J
Copper	mg/Kg	25	17.30 J	87.00 J	12.50 J
Iron	mg/Kg	33550	22900	24900 J	6350 J
Lead	mg/Kg	14.3	9.30	700.00 J	14.60 J
Magnesium	mg/Kg	6085	3420	4070 J	461 J
Manganese	mg/Kg	918	692	646.00 J	2610 J
Mercury	mg/Kg	0.1	-	0.20	0.18
Nickel	mg/Kg	34.5	22.50	25.90 J	194.00 J
Potassium	mg/Kg	1270	1290.00	1190.00 J	535.00 J
Selenium	mg/Kg	2	-	-	-
Silver	mg/Kg	N/A	-	0.73 J	3.30 J
Sodium	mg/Kg	167	345.00 J	664.00 J	-
Thallium	mg/Kg	ND	0.72 J	0.84 J	-
Vanadium	mg/Kg	150	14.1	30.20 J	10.10 J
Zinc	mg/Kg	69.25	50.70	1060.00 J	28.10 J
Total Cyanide	mg/Kg	ND	-	3.01 J	0.84 J
TCLP METALS					
Arsenic	mg/L	5			
Barium	mg/L	100			
Cadmium	mg/L	1			
Lead	mg/L	5			
Silver	mg/L	5			

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.

Highlighted values exceed Recommended Soil Cleanup Ol

- = compound not detected	mg/L = milligrams pe
J = Estimated value	N = tentatively identi
MDL = Method detection limit	R = Data Rejected
mg/kg = milligrams per kilogram	ND = not detected in

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP4001	TP4301	TP4601
	DEPTH:	SOIL CLEAN-UP	4'	6'	2'
	LAB ID:	OBJECTIVE	3079705	3082302	3082303
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD3	SHD3	SHD3
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		3/17/97	3/18/97	3/19/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.20	0.019	0.014	0.016
Benzene	mg/Kg	0.06	-	-	-
2-Butanone	mg/Kg	0.30	-	-	0.004 J
Chlorobenzene	mg/Kg	1.70	-	-	-
1,2-Dichloroethene (total)	mg/Kg	0.30	0.130	-	-
Ethylbenzene	mg/Kg	5.50	0.006 J	-	-
4-Methyl-2-Pentanone	mg/Kg	1.00	-	-	-
Methylene Chloride	mg/Kg	0.10	-	-	-
Tetrachloroethene	mg/Kg	1.40	-	-	-
Toluene	mg/Kg	1.50	0.006 J	-	-
Trichloroethene	mg/Kg	0.70	0.028	-	-
Vinyl Chloride	mg/Kg	0.20	0.041 J	-	-
Xylene (total)	mg/Kg	1.20	0.003 J	-	-
Total VOCs	mg/Kg	10.00	0.233	0.014	0.020
SEMIVOLATILES					
Acenaphthene	mg/Kg	50.00	-	-	-
Acenaphthylene	mg/Kg	41.00	-	-	-
Anthracene	mg/Kg	50.00	-	-	-
Benzo(a)anthracene	mg/Kg	0.224/MDL	-	-	-
Benzo(a)pyrene	mg/Kg	0.061/MDL	-	-	-
Benzo(b)fluoranthene	mg/Kg	1.10	-	-	-
Benzo(g,h,i)perylene	mg/Kg	50.00	-	-	-
Benzo(k)fluoranthene	mg/Kg	1.10	-	-	-
Butylbenzylphthalate	mg/Kg	50.00	0.08 JN	-	-
Carbazole	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	0.220/MDL	R	R	R
Chrysene	mg/Kg	0.40	0.12 J	-	-
Di-n-butylphthalate	mg/Kg	8.10	0.18 J	-	-
Di-n-octylphthalate	mg/Kg	50.00	-	-	-
Dibenzofuran	mg/Kg	6.20	-	-	-
1,4-Dichlorobenzene	mg/Kg	-	-	-	-
Diethylphthalate	mg/Kg	7.10	-	-	-
Dimethylphthalate	mg/Kg	2.00	-	-	-
2,6-Dinitrotoluene	mg/Kg	1.00	-	-	-
Fluoranthene	mg/Kg	50.00	0.15 J	-	-
Fluorene	mg/Kg	50.00	-	-	-
Hexachlorocyclopentadiene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	3.20	-	-	-
2-Methylnaphthalene	mg/Kg	36.40	-	-	-
4-Methylphenol	mg/Kg	0.90	-	-	-
N-Nitrosodiphenylamine	mg/Kg	-	1.40	-	-
Naphthalene	mg/Kg	13.00	-	-	-

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP4001		TP4301	TP4601
	DEPTH:	SOIL CLEAN-UP	4'		6'	2'
	LAB ID:	OBJECTIVE	3079705		3082302	3082303
	SOURCE:	(see Note 1)	NYTEST		NYTEST	NYTEST
	SDG:		SHD3		SHD3	SHD3
	MATRIX:		SOIL		SOIL	SOIL
	SAMPLED:		3/17/97		3/18/97	3/19/97
	VALIDATED:		7/25/97		7/25/97	7/25/97
COMPOUND	UNITS:					
Pentachlorophenol	mg/Kg	1.0/MDL	-		-	-
Phenanthrene	mg/Kg	50.00	0.54		-	-
Phenol	mg/Kg	0.03/MDL	-		-	-
Pyrene	mg/Kg	50.00	0.16	J	-	-
1,2,4-Trichlorobenzene	mg/Kg	-	-		-	-
bis(2-Ethylhexyl)phthalate	mg/Kg	50.00	1.30		-	-
Total SVOCs	mg/Kg	500.00	3.93		0.00	0.00
PESTICIDES/PCBs						
alpha-BHC	mg/Kg	0.11	-		-	-
alpha-Chlordane	mg/Kg	0.54	-		-	-
beta-BHC	mg/Kg	0.20	-		-	-
delta-BHC	mg/Kg	0.30	-		-	-
gamma-BHC (Lindane)	mg/Kg	0.06	-		-	-
gamma-Chlordane	mg/Kg	0.54	-		-	-
Aldrin	mg/Kg	0.041	-		-	-
4,4'-DDD	mg/Kg	2.90	-		-	-
4,4'-DDE	mg/Kg	2.10	-		-	-
4,4'-DDT	mg/Kg	2.10	0.01	J	-	-
Dieldrin	mg/Kg	0.044	-		-	-
Endosulfan I	mg/Kg	0.90	-		-	-
Endosulfan II	mg/Kg	0.90	-		-	-
Endosulfan sulfate	mg/Kg	1.00	-		-	-
Endrin	mg/Kg	0.10	-		-	-
Endrin aldehyde	mg/Kg	-	-		-	-
Endrin ketone	mg/Kg	N/A	-		-	-
Heptachlor	mg/Kg	0.10	0.001	J	-	-
Heptachlor epoxide	mg/Kg	0.02	-		-	-
Methoxychlor	mg/Kg	N/A	-		-	-
Toxaphene	mg/Kg	-	-		-	-
Total Pesticides	mg/kg	10.00	0.01		0.00	0.00
Aroclor-1016	mg/Kg	1, 10	-		-	-
Aroclor-1221	mg/Kg	1, 10	-		-	-
Aroclor-1232	mg/Kg	1, 10	-		-	-
Aroclor-1242	mg/Kg	1, 10	-		-	-
Aroclor-1248	mg/Kg	1, 10	-		-	-
Aroclor-1254	mg/Kg	1, 10	-		-	-
Aroclor-1260	mg/Kg	1, 10	-		-	-
TCLP VOLATILES						
NONE	mg/L					
TCLP SEMIVOLATILES						
NONE	mg/L					
TCLP PESTICIDES						
NONE	mg/L					

Table B.1: Test Pit Soil Sample Results

	SAMPLE ID:	RECOMMENDED	TP4001		TP4301		TP4601	
	DEPTH:	SOIL CLEAN-UP	4'		6'		2'	
	LAB ID:	OBJECTIVE	3079705		3082302		3082303	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD3		SHD3		SHD3	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/17/97		3/18/97		3/19/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
TCLP HERBICIDES								
NONE	mg/L							
INORGANICS								
Aluminum	mg/Kg	16200	10500		14500		16200	
Antimony	mg/Kg	1.6	2.60	J	2.00	J	2.50	J
Arsenic	mg/Kg	7.9	8.20		6.00		6.70	
Barium	mg/Kg	300	109.00		117.00		131.00	
Beryllium	mg/Kg	0.6	0.32	J	0.45	J	0.50	J
Cadmium	mg/Kg	1	0.39	J	-		-	
Calcium	mg/Kg	1135	1250		924		1030	
Chromium	mg/Kg	21.85	15.20	J	27.30	J	30.50	J
Cobalt	mg/Kg	30	9.60	J	12.60	J	14.00	J
Copper	mg/Kg	25	24.20	J	11.80	J	13.30	J
Iron	mg/Kg	33550	27900		26800		29900	
Lead	mg/Kg	14.3	52.10		8.40		9.50	
Magnesium	mg/Kg	6085	3270		3910		4360	
Manganese	mg/Kg	918	477.00		1330	J	1480	
Mercury	mg/Kg	0.1	-		-		-	
Nickel	mg/Kg	34.5	36.40		24.60		27.30	
Potassium	mg/Kg	1270	1260.00		1320.00		1470.00	
Selenium	mg/Kg	2	-		-		-	
Silver	mg/Kg	N/A	-		-		-	
Sodium	mg/Kg	167	684.00	J	457.00	J	475.00	J
Thallium	mg/Kg	ND	-		2.10	J	1.40	J
Vanadium	mg/Kg	150	16.00		21.10		23.60	
Zinc	mg/Kg	69.25	1270.00		70.50		78.60	
Total Cyanide	mg/Kg	ND	1.34		-		-	
TCLP METALS								
Arsenic	mg/L	5						
Barium	mg/L	100						
Cadmium	mg/L	1						
Lead	mg/L	5						
Silver	mg/L	5						

Prepared/Date: RTB 10/20 05
Checked/Date: MJS 10/20 05

Notes:
1. See Tables 1.2 and 1.3 regarding how recommended cleanup objectives were derived.
Highlighted values exceed Recommended Soil Cleanup Ob
- = compound not detected mg/L = milligrams pe
J = Estimated value N = tentatively identi
MDL = Method detection limit R = Data Rejected
mg/kg = milligrams per kilogram ND = not detected in

Table B.2: TP-40 Aqueous Sample Results

	SAMPLE ID:	TP40W	40SEEP
	LAB ID:	3080901	3082304
	SOURCE:	NYTEST	NYTEST
	SDG:	30809	SHD3
	MATRIX:	WATER	WATER
	SAMPLED:	3/17/97	3/19/97
	VALIDATED:	7/25/97	7/25/97
COMPOUND	UNITS:		
VOLATILES			
Acetone	µg/L	33	8 J
Benzene	µg/L	2 J	-
1,2-Dichloroethene (total)	µg/L	1,400	540
Toluene	µg/L	4 J	-
Trichloroethene	µg/L	560	420
Vinyl Chloride	µg/L	190	58
SEMIVOLATILES			
4-Methylphenol	µg/L		24
2,4,5-Trichlorophenol	µg/L		2 J
PESTICIDES/PCBs			
NONE	µg/L		-
INORGANICS			
Aluminum	µg/L		4,530 J
Barium	µg/L		196 J
Cadmium	µg/L		1 J
Calcium	µg/L		70,800
Chromium	µg/L		5 J
Cobalt	µg/L		3 J
Copper	µg/L		16 J
Iron	µg/L		8,680
Lead	µg/L		36 J
Magnesium	µg/L		17,700
Manganese	µg/L		756
Nickel	µg/L		17 J
Potassium	µg/L		14,000
Sodium	µg/L		25,000
Vanadium	µg/L		7 J
Zinc	µg/L		361
Total Cyanide	µg/L		30

Notes: Prepared/Date: RTB 10/20/05
ug/L = micrograms per liter Checked/Date: MJS 10/20/05
J = estimated value

Table B.3: Drum Sample Results

	SAMPLE ID:	DS2001	DS2002	TP21D1	TP38D1
	LAB ID:	3072004	3072005	3129001	3083505
	SOURCE:	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	SHD2	SHD2	SHD4	SHD4
	MATRIX:	SOIL	SOIL	SOIL	SOIL
	SAMPLED:	3/05/97	3/05/97	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	-	1.1 J	-	-
Benzene	mg/Kg	-	0.01 J	-	-
2-Butanone	mg/Kg	-	0.15 J	-	-
Carbon Disulfide	mg/Kg	-	0.002 J	-	-
Ethylbenzene	mg/Kg	-	0.06 J	0.36 J	1.9
4-Methyl-2-Pentanone	mg/Kg	-	-	-	5.8
Methylene Chloride	mg/Kg	-	0.007 J	8.2	0.65 J
Styrene	mg/Kg	-	-	0.29 J	-
Tetrachloroethene	mg/Kg	-	-	0.24 J	-
Toluene	mg/Kg	-	0.041 J	1.2	-
Trichloroethene	mg/Kg	-	-	5.8	-
Xylene (total)	mg/Kg	-	0.013 J	1.4	24
SEMIVOLATILES					
Benzo(a)pyrene	mg/Kg	0.1 J	-	-	-
Benzo(b)fluoranthene	mg/Kg	-	-	-	-
Benzo(g,h,i)perylene	mg/Kg	-	-	-	-
Benzo(k)fluoranthene	mg/Kg	-	-	-	-
Benzoic Acid	mg/Kg			-	21 J
Benzyl Alcohol	mg/Kg			-	-
Butylbenzylphthalate	mg/Kg	-	7.6	-	-
4-Chloroaniline	mg/Kg	-	-	R	-
Di-n-butylphthalate	mg/Kg	-	-	-	-
Di-n-octylphthalate	mg/Kg	0.18 J	-	-	-
Dibenz(a,h)anthracene	mg/Kg	-	-	-	-
2,4-Dimethylphenol	mg/Kg	-	-	-	3.3 J
Fluoranthene	mg/Kg	0.42 J	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	-	-	-	-
2-Methylnaphthalene	mg/Kg	0.25 J	1.9 J	-	-
4-Methylphenol	mg/Kg	-	0.31 J	-	-
Naphthalene	mg/Kg	-	0.5 J	-	-
4-Nitroaniline	mg/Kg	-	-	R	-
Phenanthrene	mg/Kg	3.5	-	100	-
Pyrene	mg/Kg	0.58 J	-	14 J	-
2,4,5-Trichlorophenol	mg/Kg	-	-	350	-
bis(2-Ethylhexyl)phthalate	mg/Kg	-	-	200	60000
PESTICIDES/PCBs					
alpha-BHC	mg/Kg	-	-	-	-
alpha-Chlordane	mg/Kg	-	0.011 J	-	-
beta-BHC	mg/Kg	-	-	-	-
delta-BHC	mg/Kg	-	-	-	-
gamma-BHC (Lindane)	mg/Kg	-	-	-	-
gamma-Chlordane	mg/Kg	-	0.007 JN	-	-
Aldrin	mg/Kg	-	-	-	-

Table B.3: Drum Sample Results

	SAMPLE ID:	DS2001	DS2002	TP21D1	TP38D1
	LAB ID:	3072004	3072005	3129001	3083505
	SOURCE:	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	SHD2	SHD2	SHD4	SHD4
	MATRIX:	SOIL	SOIL	SOIL	SOIL
	SAMPLED:	3/05/97	3/05/97	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
4,4'-DDD	mg/Kg	-	-	-	-
4,4'-DDE	mg/Kg	-	0.019 J	-	-
4,4'-DDT	mg/Kg	0.0079 JN	-	-	-
Dieldrin	mg/Kg	-	-	-	-
Endosulfan I	mg/Kg	-	0.0026 JN	-	-
Endosulfan II	mg/Kg	0.0062 J	-	-	-
Endosulfan sulfate	mg/Kg	-	-	-	-
Endrin	mg/Kg	-	0.0072 JN	-	-
Endrin aldehyde	mg/Kg	-	0.063 JN	-	-
Endrin ketone	mg/Kg	-	-	-	-
Heptachlor	mg/Kg	-	-	-	-
Heptachlor epoxide	mg/Kg	-	0.0013 JN	-	-
Methoxychlor	mg/Kg	-	-	-	-
Toxaphene	mg/Kg	-	-	-	-
Aroclor-1016	mg/Kg	-	-	-	-
Aroclor-1221	mg/Kg	-	-	-	-
Aroclor-1232	mg/Kg	-	-	-	-
Aroclor-1242	mg/Kg	-	-	-	-
Aroclor-1248	mg/Kg	-	-	-	-
Aroclor-1254	mg/Kg	0.047 J	0.35 J	-	-
Aroclor-1260	mg/Kg	-	-	-	-
INORGANICS					
Aluminum	mg/Kg	2650	22600	1960	549
Antimony	mg/Kg	11.1 J	36.4 J	11.1 J	1.3 J
Arsenic	mg/Kg	26.7	47.8	0.76 J	-
Barium	mg/Kg	40.4	46.3	343	6.6 J
Beryllium	mg/Kg	-	-	-	0.05 J
Cadmium	mg/Kg	-	-	1.2	0.06 J
Calcium	mg/Kg	5240	688	3660	497 J
Chromium	mg/Kg	75.5	5560	6.2	5.9
Cobalt	mg/Kg	22.8	1210	1.1 J	1.2 J
Copper	mg/Kg	626	2260	84.4	19.6
Iron	mg/Kg	193000 J	622000 J	9510 J	14000 J
Lead	mg/Kg	1580	1340	116 J	11.2 J
Magnesium	mg/Kg	1000	201 J	304 J	350 J
Manganese	mg/Kg	2910	4170	76.8	54.5
Nickel	mg/Kg	109	908	5.3	4.2 J
Potassium	mg/Kg	307 J	734	248 J	509 J
Selenium	mg/Kg	-	-	0.95	0.61
Silver	mg/Kg	1.4	17.8	0.51 J	-
Sodium	mg/Kg	186 J	898	440 J	445 J
Thallium	mg/Kg	-	-	-	-
Vanadium	mg/Kg	11	430	1.9 J	0.75 J
Zinc	mg/Kg	303	448	826 J	987 J

Table B.3: Drum Sample Results

	SAMPLE ID:	DS2001	DS2002	TP21D1	TP38D1
	LAB ID:	3072004	3072005	3129001	3083505
	SOURCE:	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	SHD2	SHD2	SHD4	SHD4
	MATRIX:	SOIL	SOIL	SOIL	SOIL
	SAMPLED:	3/05/97	3/05/97	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
Total Cyanide	mg/Kg	1.55	-	1.58	1.88
TCLP VOLATILES					
Benzene	mg/L			R	
2-Butanone	mg/L			0.03 J	
Carbon Tetrachloride	mg/L			R	
Chlorobenzene	mg/L			R	
Chloroform	mg/L			R	
1,2-Dichloroethane	mg/L			R	
1,1-Dichloroethene	mg/L			R	
Tetrachloroethene	mg/L			R	
Trichloroethene	mg/L			0.01 J	
Vinyl Chloride	mg/L			R	
TCLP SEMIVOLATILES					
1,4-Dichlorobenzene	mg/L			R	
2,4-Dinitrotoluene	mg/L			R	
Hexachlorobenzene	mg/L			R	
Hexachlorobutadiene	mg/L			R	
Hexachloroethane	mg/L			R	
2-Methylphenol	mg/L			R	
3+4-Methylphenol	mg/L			0.06 J	
Nitrobenzene	mg/L			R	
Pentachlorophenol	mg/L			R	
Pyridine	mg/L			R	
2,4,5-Trichlorophenol	mg/L			0.23 J	
2,4,6-Trichlorophenol	mg/L			0.25 J	
TCLP METALS					
Arsenic	mg/L			0.0721	
Cadmium	mg/L			-	
Lead	mg/L			-	
Mercury	mg/L			0.00013 J	
Selenium	mg/L			-	
Silver	mg/L			0.0182 J	

Notes:
- = compound not detected
J = Estimated value
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
N = tentatively identified compound
R = Data rejected

Table B.3: Drum Sample Results

				DUP of TP41D1	
	SAMPLE ID:	TP4101	TP41D1	TP41DR1	TP45D1
	LAB ID:	3082301	3083501	3129003	3083507
	SOURCE:	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	SHD3	SHD4	SHD4	SHD4
	MATRIX:	SOIL	SOIL	SOIL	SOIL
	SAMPLED:	3/18/97	3/20/97	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
Acetone	mg/Kg	0.011 J	-	-	-
Benzene	mg/Kg	-	-	-	-
2-Butanone	mg/Kg	-	-	0.006 J	-
Carbon Disulfide	mg/Kg	-	-	-	-
Ethylbenzene	mg/Kg	-	-	-	-
4-Methyl-2-Pentanone	mg/Kg	-	-	-	-
Methylene Chloride	mg/Kg	-	-	0.032 J	0.34 J
Styrene	mg/Kg	-	-	-	-
Tetrachloroethene	mg/Kg	-	-	-	-
Toluene	mg/Kg	-	-	0.003 J	-
Trichloroethene	mg/Kg	0.002 J	-	-	-
Xylene (total)	mg/Kg	-	-	-	-
SEMIVOLATILES					
Benzo(a)pyrene	mg/Kg	-	-	-	R
Benzo(b)fluoranthene	mg/Kg	-	-	-	R
Benzo(g,h,i)perylene	mg/Kg	-	-	-	R
Benzo(k)fluoranthene	mg/Kg	-	-	-	R
Benzoic Acid	mg/Kg		-	-	R
Benzyl Alcohol	mg/Kg		-	-	R
Butylbenzylphthalate	mg/Kg	-	-	-	-
4-Chloroaniline	mg/Kg	R	-	R	-
Di-n-butylphthalate	mg/Kg	-	-	-	6.2 J
Di-n-octylphthalate	mg/Kg	-	-	-	R
Dibenz(a,h)anthracene	mg/Kg	-	-	-	R
2,4-Dimethylphenol	mg/Kg	-	-	-	-
Fluoranthene	mg/Kg	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/Kg	-	-	-	R
2-Methylnaphthalene	mg/Kg	-	-	-	-
4-Methylphenol	mg/Kg	-	-	-	-
Naphthalene	mg/Kg	-	-	-	-
4-Nitroaniline	mg/Kg	-	-	R	-
Phenanthrene	mg/Kg	-	13 J	17 J	-
Pyrene	mg/Kg	-	-	-	-
2,4,5-Trichlorophenol	mg/Kg	-	46 J	47 J	-
bis(2-Ethylhexyl)phthalate	mg/Kg	-	13 J	20 J	24 J
PESTICIDES/PCBs					
alpha-BHC	mg/Kg	-	-	-	R
alpha-Chlordane	mg/Kg	-	-	-	R
beta-BHC	mg/Kg	-	-	-	R
delta-BHC	mg/Kg	-	-	-	R
gamma-BHC (Lindane)	mg/Kg	-	-	-	R
gamma-Chlordane	mg/Kg	-	-	-	R
Aldrin	mg/Kg	-	-	-	R

Table B.3: Drum Sample Results

				DUP of TP41D1	
	SAMPLE ID:	TP4101	TP41D1	TP41DR1	TP45D1
	LAB ID:	3082301	3083501	3129003	3083507
	SOURCE:	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	SHD3	SHD4	SHD4	SHD4
	MATRIX:	SOIL	SOIL	SOIL	SOIL
	SAMPLED:	3/18/97	3/20/97	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
4,4'-DDD	mg/Kg	-	-	-	R
4,4'-DDE	mg/Kg	-	-	-	R
4,4'-DDT	mg/Kg	-	-	-	R
Dieldrin	mg/Kg	-	-	-	R
Endosulfan I	mg/Kg	-	-	-	R
Endosulfan II	mg/Kg	-	-	-	R
Endosulfan sulfate	mg/Kg	-	-	-	R
Endrin	mg/Kg	-	-	-	R
Endrin aldehyde	mg/Kg	-	-	-	R
Endrin ketone	mg/Kg	-	-	-	R
Heptachlor	mg/Kg	-	-	-	R
Heptachlor epoxide	mg/Kg	-	-	-	R
Methoxychlor	mg/Kg	-	-	-	R
Toxaphene	mg/Kg	-	-	-	R
Aroclor-1016	mg/Kg	-	-	-	R
Aroclor-1221	mg/Kg	-	-	-	R
Aroclor-1232	mg/Kg	-	-	-	R
Aroclor-1242	mg/Kg	-	-	-	R
Aroclor-1248	mg/Kg	-	-	-	R
Aroclor-1254	mg/Kg	-	-	-	R
Aroclor-1260	mg/Kg	-	-	-	R
INORGANICS					
Aluminum	mg/Kg	21800	-	-	43.6
Antimony	mg/Kg	2.7 J	18.6 J	23.9 J	-
Arsenic	mg/Kg	15.5	23.3 J	26.3 J	-
Barium	mg/Kg	114	10.2 J	11.1 J	47.4
Beryllium	mg/Kg	0.87	-	-	-
Cadmium	mg/Kg	-	26	12.2	0.52
Calcium	mg/Kg	1140	368 J	427 J	30.4 J
Chromium	mg/Kg	28 J	212	205	0.29 J
Cobalt	mg/Kg	16.9 J	15.9	16.1	-
Copper	mg/Kg	24 J	6090	5120	7.3
Iron	mg/Kg	326000	310000 J	302000 J	161 J
Lead	mg/Kg	15.2	292 J	321 J	5.8 J
Magnesium	mg/Kg	7830	1120	1290	-
Manganese	mg/Kg	310	2270	2300	1.6
Nickel	mg/Kg	51.4	240	160	0.27 J
Potassium	mg/Kg	2000	153 J	134 J	-
Selenium	mg/Kg	-	-	-	-
Silver	mg/Kg	-	2.3	1.9	-
Sodium	mg/Kg	522 J	631	493 J	-
Thallium	mg/Kg	-	-	-	0.75 J
Vanadium	mg/Kg	26	40.3	43.5	-
Zinc	mg/Kg	182	1680 J	1410 J	206 J

Table B.3: Drum Sample Results

				DUP of TP41D1	
	SAMPLE ID:	TP4101	TP41D1	TP41DR1	TP45D1
	LAB ID:	3082301	3083501	3129003	3083507
	SOURCE:	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	SHD3	SHD4	SHD4	SHD4
	MATRIX:	SOIL	SOIL	SOIL	SOIL
	SAMPLED:	3/18/97	3/20/97	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
Total Cyanide	mg/Kg	2.12	1.9 J	-	-
TCLP VOLATILES					
Benzene	mg/L				
2-Butanone	mg/L				
Carbon Tetrachloride	mg/L				
Chlorobenzene	mg/L				
Chloroform	mg/L				
1,2-Dichloroethane	mg/L				
1,1-Dichloroethene	mg/L				
Tetrachloroethene	mg/L				
Trichloroethene	mg/L				
Vinyl Chloride	mg/L				
TCLP SEMIVOLATILES					
1,4-Dichlorobenzene	mg/L				
2,4-Dinitrotoluene	mg/L				
Hexachlorobenzene	mg/L				
Hexachlorobutadiene	mg/L				
Hexachloroethane	mg/L				
2-Methylphenol	mg/L				
3+4-Methylphenol	mg/L				
Nitrobenzene	mg/L				
Pentachlorophenol	mg/L				
Pyridine	mg/L				
2,4,5-Trichlorophenol	mg/L				
2,4,6-Trichlorophenol	mg/L				
TCLP METALS					
Arsenic	mg/L		0.4	0.408	
Cadmium	mg/L		0.0521 J	0.0608 J	
Lead	mg/L		0.117	0.128	
Mercury	mg/L		0.0002 J	0.00007 J	
Selenium	mg/L		0.374	0.336	
Silver	mg/L		0.105 J	0.117 J	

Notes:
- = compound not detected
J = Estimated value
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
N = tentatively identified compound
R = Data rejected

Table B.3: Drum Sample Results

COMPOUND		TP45D2	TP45D2 ACID
	SAMPLE ID:	TP45D2	TP45D2 ACID
	LAB ID:	3083508	3083508
	SOURCE:	NYTEST	NYTEST
	SDG:	SHD4	SHD4
	MATRIX:	SOIL	SOIL
	SAMPLED:	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97
COMPOUND	UNITS:		
VOLATILES			
Acetone	mg/Kg	-	
Benzene	mg/Kg	-	
2-Butanone	mg/Kg	-	
Carbon Disulfide	mg/Kg	-	
Ethylbenzene	mg/Kg	0.15 J	
4-Methyl-2-Pentanone	mg/Kg	-	
Methylene Chloride	mg/Kg	0.33 J	
Styrene	mg/Kg	-	
Tetrachloroethene	mg/Kg	-	
Toluene	mg/Kg	0.82 J	
Trichloroethene	mg/Kg	-	
Xylene (total)	mg/Kg	2.8	
SEMIVOLATILES			
Benzo(a)pyrene	mg/Kg	-	
Benzo(b)fluoranthene	mg/Kg	-	
Benzo(g,h,i)perylene	mg/Kg	-	
Benzo(k)fluoranthene	mg/Kg	-	
Benzoic Acid	mg/Kg	-	
Benzyl Alcohol	mg/Kg	-	
Butylbenzylphthalate	mg/Kg	-	
4-Chloroaniline	mg/Kg	R	
Di-n-butylphthalate	mg/Kg	-	
Di-n-octylphthalate	mg/Kg	11 J	
Dibenz(a,h)anthracene	mg/Kg	-	
2,4-Dimethylphenol	mg/Kg	-	
Fluoranthene	mg/Kg	-	
Indeno(1,2,3-cd)pyrene	mg/Kg	-	
2-Methylnaphthalene	mg/Kg	-	
4-Methylphenol	mg/Kg	-	
Naphthalene	mg/Kg	35 J	
4-Nitroaniline	mg/Kg	R	
Phenanthrene	mg/Kg	15 J	
Pyrene	mg/Kg	-	
2,4,5-Trichlorophenol	mg/Kg	-	
bis(2-Ethylhexyl)phthalate	mg/Kg	-	
PESTICIDES/PCBs			
alpha-BHC	mg/Kg	-	
alpha-Chlordane	mg/Kg	-	
beta-BHC	mg/Kg	-	
delta-BHC	mg/Kg	-	
gamma-BHC (Lindane)	mg/Kg	-	
gamma-Chlordane	mg/Kg	-	
Aldrin	mg/Kg	-	

Table B.3: Drum Sample Results

	SAMPLE ID:	TP45D2	TP45D2 ACID
	LAB ID:	3083508	3083508
	SOURCE:	NYTEST	NYTEST
	SDG:	SHD4	SHD4
	MATRIX:	SOIL	SOIL
	SAMPLED:	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97
COMPOUND	UNITS:		
4,4'-DDD	mg/Kg	-	
4,4'-DDE	mg/Kg	-	
4,4'-DDT	mg/Kg	-	
Dieldrin	mg/Kg	-	
Endosulfan I	mg/Kg	-	
Endosulfan II	mg/Kg	-	
Endosulfan sulfate	mg/Kg	-	
Endrin	mg/Kg	-	
Endrin aldehyde	mg/Kg	-	
Endrin ketone	mg/Kg	-	
Heptachlor	mg/Kg	-	
Heptachlor epoxide	mg/Kg	-	
Methoxychlor	mg/Kg	-	
Toxaphene	mg/Kg	-	
Aroclor-1016	mg/Kg	-	-
Aroclor-1221	mg/Kg	-	-
Aroclor-1232	mg/Kg	-	-
Aroclor-1242	mg/Kg	-	-
Aroclor-1248	mg/Kg	-	-
Aroclor-1254	mg/Kg	-	7100
Aroclor-1260	mg/Kg	-	-
INORGANICS			
Aluminum	mg/Kg	2300	
Antimony	mg/Kg	1 J	
Arsenic	mg/Kg	0.89 J	
Barium	mg/Kg	74.3	
Beryllium	mg/Kg	-	
Cadmium	mg/Kg	58	
Calcium	mg/Kg	420 J	
Chromium	mg/Kg	11.5	
Cobalt	mg/Kg	0.53 J	
Copper	mg/Kg	249	
Iron	mg/Kg	16300 J	
Lead	mg/Kg	86.7 J	
Magnesium	mg/Kg	161 J	
Manganese	mg/Kg	317	
Nickel	mg/Kg	11.9	
Potassium	mg/Kg	249 J	
Selenium	mg/Kg	0.45 J	
Silver	mg/Kg	0.52 J	
Sodium	mg/Kg	733	
Thallium	mg/Kg	-	
Vanadium	mg/Kg	2.2 J	
Zinc	mg/Kg	181 J	

Table B.3: Drum Sample Results

	SAMPLE ID:	TP45D2	TP45D2 ACID
	LAB ID:	3083508	3083508
	SOURCE:	NYTEST	NYTEST
	SDG:	SHD4	SHD4
	MATRIX:	SOIL	SOIL
	SAMPLED:	3/20/97	3/20/97
	VALIDATED:	7/25/97	7/25/97
COMPOUND	UNITS:		
Total Cyanide	mg/Kg	-	
TCLP VOLATILES			
Benzene	mg/L		
2-Butanone	mg/L		
Carbon Tetrachloride	mg/L		
Chlorobenzene	mg/L		
Chloroform	mg/L		
1,2-Dichloroethane	mg/L		
1,1-Dichloroethene	mg/L		
Tetrachloroethene	mg/L		
Trichloroethene	mg/L		
Vinyl Chloride	mg/L		
TCLP SEMIVOLATILES			
1,4-Dichlorobenzene	mg/L		
2,4-Dinitrotoluene	mg/L		
Hexachlorobenzene	mg/L		
Hexachlorobutadiene	mg/L		
Hexachloroethane	mg/L		
2-Methylphenol	mg/L		
3+4-Methylphenol	mg/L		
Nitrobenzene	mg/L		
Pentachlorophenol	mg/L		
Pyridine	mg/L		
2,4,5-Trichlorophenol	mg/L		
2,4,6-Trichlorophenol	mg/L		
TCLP METALS			
Arsenic	mg/L	-	
Cadmium	mg/L	2.14 J	
Lead	mg/L	0.264	
Mercury	mg/L	-	
Selenium	mg/L	-	
Silver	mg/L	0.0095 J	

Notes:
- = compound not detected
J = Estimated value
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
N = tentatively identified compound
R = Data rejected

Prepare/Date: RTB 10/20/05
Checked/Date: MJS 10/20/05

Table B.4: Surface Water Sample Results

	SAMPLE ID:	AMBIENT WATER	SW001	SW002	SW003	SW004	SW005	SW006
	LAB ID:	QUALITY STANDARD	3134512	3134513	3134514	3134515	3134516	3134517
	SOURCE:	OR GUIDANCE	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	VALUE	SHD8	SHD8	SHD8	SHD8	SHD8	SHD8
	MATRIX:	(see Note 1)	WATER	WATER	WATER	WATER	WATER	WATER
	SAMPLED:		5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97
	VALIDATED:		7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:							
VOLATILES								
1,2-Dichloroethene (total)	ug/L	5 (E)	-	-	2 J	180	-	-
Trichloroethene	ug/L	40	-	-	-	530	4 J	7 J
Vinyl Chloride	ug/L	2 (E)	-	-	-	32	-	-
SEMIVOLATILES								
4-Chloroaniline	ug/L	5(E)	-	R	-	-	-	-
Di-n-butylphthalate	ug/L	50(E)	-	-	-	-	-	4 J
1,4-Dichlorobenzene	ug/L	5*	-	1 J	1 J	-	-	-
Diethylphthalate	ug/L	50(E)	-	6 J	-	-	3 J	-
Fluoranthene	ug/L	50(E)	-	-	-	-	2 J	-
N-Nitrosodiphenylamine	ug/L	50(E)	-	-	-	2 J	-	-
Pyrene	ug/L	4.6 (G)	-	-	-	-	2 J	-
bis(2-Ethylhexyl)phthalate	ug/L	0.6	-	2 J	4 J	5 J	18 J	14 J
PESTICIDES/PCBs								
NONE	ug/L		-	-	-	-	-	R
INORGANICS								
Aluminum	ug/L	100	137 J	283000 J	14500 J	81200 J	11100 J	12900 J
Antimony	ug/L	6(E)	-	105	-	11.6 J	-	-
Arsenic	ug/L	150**	-	85.9	-	51.1	-	7.8 J
Barium	ug/L	2000(E)	19.9 J	4830	304	2820	236	217
Beryllium	ug/L	11, 1100***	-	12.6	.55 J	3.4 J	0.48 J	0.49 J
Cadmium	ug/L	(see Note 2)	-	12.5	-	16.2	1.3 J	-
Calcium	ug/L	NL	18100 J	230000 J	92000 J	117000 J	60500 J	52200 J
Chromium	ug/L	(see Note 3)	-	457	18.9	152	21.5	18.4
Cobalt	ug/L	5	-	237	16.3 J	80.4	10.8 J	8.2 J
Copper	ug/L	(see Note 4)	2.9 J	590	30.8	595	33.2	26
Iron	ug/L	300	105	2420000	91100	286000	20700	21300
Lead	ug/L	(see Note 5)	-	1040 J	27.7 J	2970 J	69.9 J	36.4 J
Magnesium	ug/L	35,000(E)	3710 J	102000	15800	45500	12700	14100
Manganese	ug/L	600(E)	4.9 J	11000 J	2130 J	7990 J	1900 J	1130 J
Mercury	ug/L	0.0007	-	2.8	0.09 J	1	0.08 J	0.07 J
Nickel	ug/L	(see Note 6)	-	819	70.1	291	37.9 J	29.3 J
Potassium	ug/L	NL	-	12900	7170	17700	4300 J	6550
Silver	ug/L	0.1****	-	11	-	6.8 J	-	-
Sodium	ug/L	(see Note 7)(E)	8690	13000	14200	26700	12200	17100
Vanadium	ug/L	14	-	405	19.4 J	201	16.2 J	17.6 J
Zinc	ug/L	(see Note 8)	9.4 J	9470 J	413 J	14500 J	581 J	323 J
Total Cyanide	ug/L	5.2*****	-	32 J	-	-	-	-

Notes

1. Cleanup objectives from TOGS 1.1.1, Class C surface water standard or guidance value (G). Where numbers were not available, NYSDEC Div. of Water "Generic Effluent Criteria for Surface Water Discharges" (E) was utilized
2. Cadmium criteria lesser of (0.85)exp(0.7852[ln(ppm hardness)]-2.715) or (0.85)exp(1.128[ln(ppm hardness)]-3.6867)
3. Chromium criteria lesser of (0.86)exp(0.819[ln(ppm hardness)]+0.6848) or (0.316)exp(0.819[ln(ppm hardness)]+3.7256)
4. Copper criteria lesser of (0.96)exp(0.8545[ln(ppm hardness)]-1.702) or (0.96)exp(0.9422[ln(ppm hardness)]-1.7)
5. Lead criteria lesser of {1.46203-[ln (hardness) (0.145712)]}exp(1.273[ln(hardness)]-4.297) or {1.46203-[ln(hardness) (0.145712)]}exp(1.273[ln(hardness)]-1.502)
6. Nickel criteria lesser of (0.997)exp(0.846[ln(hardness)]+0.0584) or (0.998)exp(0.846[ln(hardness)]+ 2.255)
7. Sodium criteria to be determined on a case-by-case basis.
8. Zinc criteria lesser of exp(0.85[ln(ppm hardness)]+0.5) or 0.978exp(0.8473[ln(ppm hardness)]+0.884)

Highlighted values greater than standard or guidance value

* applies to sum of 1,2-, 1,3-, and 1,4-dichlorobenzene

**applies to dissolved form of arsenic

***standard for beryllium is 11 ug/L for hardness less than or equal to 75 mg/L, 1100 ug/L for

****applies to ionic silver

*****cyanide criteria for free cyanide, the sum of HCN and CN^- expressed as CN.

ug/L = micrograms per liter

J = estimated value

NL = not listed

Prepared/Date: RTB 10/20/05
Checked/Date: MJS 10/20/05

Table B.5: Sediment Sample Results

					DUP of SD001						
	SAMPLE ID:	SEDIMENT	SEVERE	SD001	SD008	SD002	SD003	SD004	SD005	SD006	SD007
	LAB ID:	SCREENING	EFFECT	3134101	3134108	3134104	3134109	3134105	3134106	3134110	3134107
	SOURCE:	VALUE	LEVEL	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	mg/kg		SHD7	SHD7	SHD7	SHD7	SHD7	SHD7	SHD7	SHD7
	MATRIX:	(see Note 1)		SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	SAMPLED:			5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97
	VALIDATED:			7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:										
VOLATILES											
1,2-Dichloroethene (total)	mg/Kg	NL		-	-	-	0.009 J	-	-	-	-
Trichloroethene	mg/Kg	20		-	-	-	0.017	-	-	-	-
SEMIVOLATILES											
Acenaphthene	mg/Kg	1400		-	-	-	0.32 J	-	-	-	-
Anthracene	mg/Kg	1070		-	-	-	0.36 J	0.089 J	-	-	-
Benzo(a)anthracene	mg/Kg	13		-	-	-	0.93 J	0.35 J	-	-	-
Benzo(a)pyrene	mg/Kg	13		-	-	-	0.59 J	0.15 J	-	-	-
Benzo(b)fluoranthene	mg/Kg	13		-	-	-	0.62 J	0.32 J	-	-	-
Benzo(k)fluoranthene	mg/Kg	13		-	-	-	0.79 J	0.25 J	-	-	-
Carbazole	mg/Kg	NL		-	-	-	0.26 J	-	-	-	-
Chrysene	mg/Kg	13		-	-	-	0.96 J	0.39 J	-	-	-
Fluoranthene	mg/Kg	10200		-	-	-	2.2	0.75 J	-	-	-
Fluorene	mg/Kg	80		-	-	-	0.26 J	-	-	-	-
Naphthalene	mg/Kg	300		-	-	-	0.23 J	-	-	-	-
Phenanthrene	mg/Kg	1200		-	-	-	1.9	0.12 J	-	-	-
Pyrene	mg/Kg	9610		-	-	-	1.2 J	0.78 J	-	-	-
bis(2-Ethylhexyl)phthalate	mg/Kg	1995		0.2 J	0.2 J	0.13 J	4.9	2.2 J	0.75 J	0.1 J	0.53
PESTICIDES/PCBs											
4,4'-DDD	mg/Kg	0.1		-	-	-	0.012 JN	-	-	-	-
4,4'-DDE	mg/Kg	0.1		-	-	-	0.055	-	0.0057 J	-	-
4,4'-DDT	mg/Kg	0.1		-	-	-	0.2	0.0073 J	0.0048 JN	-	-
Endosulfan II	mg/Kg	0.3		-	-	-	0.0053 J	0.0044 JN	-	-	-
Endrin	mg/Kg	8		-	-	-	-	0.015 J	-	-	-
alpha-Chlordane	mg/Kg	0.01		-	-	-	0.0017 J	-	-	-	-
INORGANICS											
Aluminum	mg/Kg	NL	NL	10200 J	9770 J	15200 J	11100 J	14700 J	13200 J	843 J	13400 J
Antimony	mg/Kg	2	25	6.6 J	6.2 J	-	2.8 J	-	-	8.4 J	1.3 J
Arsenic	mg/Kg	6	33	3.9 J	3.6 J	4	7.3	7.3 J	5.5 J	-	6.1
Barium	mg/Kg	NL	NL	207 J	180 J	128 J	411 J	141 J	180 J	147 J	130 J
Beryllium	mg/Kg	NL	NL	0.42 J	0.4 J	0.54 J	0.42 J	0.57 J	0.53 J	-	0.51 J

Table B.5: Sediment Sample Results

					DUP of SD001						
	SAMPLE ID:	SEDIMENT	SEVERE	SD001	SD008	SD002	SD003	SD004	SD005	SD006	SD007
	LAB ID:	SCREENING	EFFECT	3134101	3134108	3134104	3134109	3134105	3134106	3134110	3134107
	SOURCE:	VALUE	LEVEL	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST
	SDG:	mg/kg		SHD7	SHD7	SHD7	SHD7	SHD7	SHD7	SHD7	SHD7
	MATRIX:	(see Note 1)		SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
	SAMPLED:			5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97	5/22/97
	VALIDATED:			7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:										
Cadmium	mg/Kg	0.6	9	-	-	0.08 J	1.4	1.1 J	0.6 J	8.3	0.13 J
Calcium	mg/Kg	NL	NL	6010 J	5390 J	2060 J	8150 J	5200 J	5660 J	267000 J	2750 J
Chromium	mg/Kg	26	110	15.4 J	16.4 J	18.6	23.8	33.2 J	19.2 J	97.7	19.8
Cobalt	mg/Kg	NL	NL	12.7 J	11.5 J	10.2	11.1	10.6 J	11.8 J	3.5 J	11.7
Copper	mg/Kg	16	110	22 J	19.4 J	13.6 J	60.5 J	26.9 J	19.8 J	37 J	15.9 J
Iron	mg/Kg	20,000	40000	167000 J	136000 J	44600 J	29700 J	26900 J	26100 J	148000 J	28300 J
Lead	mg/Kg	31	110	33 J	28.2 J	15.5 J	334 J	75.4 J	28.9 J	20.3 J	31.8 J
Magnesium	mg/Kg	NL	NL	3410 J	3160 J	3740 J	3760 J	4140 J	4030 J	16200 J	4080 J
Manganese	mg/Kg	460	1100	927 J	913 J	521 J	876 J	733 J	1970 J	1010 J	1290 J
Mercury	mg/Kg	0.15	1.3	0.08 J	0.08 J	0.05 J	0.08 J	0.11 J	0.06 J	-	0.07 J
Nickel	mg/Kg	16	50	33.9 J	30.9 J	35 J	31 J	34.3 J	33 J	91.5 J	27.7 J
Potassium	mg/Kg	NL	NL	957 J	1040 J	1210	1230	1230 J	1210 J	143 J	1080
Silver	mg/Kg	1	2.2	-	-	-	-	-	-	2.4 J	-
Sodium	mg/Kg	NL	NL	186 J	182 J	142 J	349 J	250 J	162 J	1280	123 J
Vanadium	mg/Kg	NL	NL	18.4 J	17.2 J	21.6	24.1	23.5 J	20.9 J	3.8 J	19.3
Zinc	mg/Kg	120	270	581 J	500 J	290 J	1240 J	403 J	271 J	170 J	172 J
Total Cyanide	mg/Kg	NL	NL	-	-	-	0.71	-	-	3.8	-
TCLP METALS											
Barium	mg/L	100					1.8			0.63	
Cadmium	mg/L	1					0.013			0.0081	
Lead	mg/L	5					0.25			-	

Notes:
1. Lowest Effect Level (Sediment Screening Value for inorganics) and Severe Effect Level as published for inorganics in Table 2 of NYSDEC Department of Fish and Wildlife Technical Guidance for Screening Contaminated Sediments, 1999. TCLP criteria values from STARS Memo #1, 1992. See Table 1.4 for information on how Sediment Screening Values for organic contaminants were derived.

Highlighted values greater than screening value
mg/kg =milligrams per kilogram
mg/L = milligrams per liter
N = tentatively identified compound
NL = not listed
J = Estimated value
- = compound not detected

Prepared/Date:RTB 10/20/05
Checked/Date: MJS 10/20 05

Table B.6: Soil Boring Sample Results

	SAMPLE ID:	RECOMMENDED	MW1B		MW1E		MW2B	
	DEPTH:	SOIL CLEAN-UP	2-4'		6-10'		2-4'	
	LAB ID:	OBJECTIVE	3090501		3090502		3090503	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD5		SHD5		SHD5	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/26/97		3/26/97		3/27/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
VOLATILES								
1,2-Dichloroethene (total)	mg/Kg	0.3	-		-		-	
Methylene Chloride	mg/Kg	0.1	0.004	J	0.004	J	0.004	J
Trichloroethene	mg/Kg	0.7	-		-		-	
Total VOCs*	mg/Kg	10	0.004		0.004		0.004	
SEMIVOLATILES								
bis(2-Ethylhexyl)phthalate	mg/Kg	50	0.23	J	0.077	J	-	
Total SVOCs*	mg/Kg	500	0.23		0.077		-	
PESTICIDES/PCBs								
Methoxychlor	mg/Kg	10	-		0.014	J	-	
Total Pesticides*	mg/Kg	10						
INORGANICS								
Aluminum	mg/Kg	16200	17400		15000		15000	
Antimony	mg/Kg	1.6	1.7	J	1.5	J	1.7	J
Arsenic	mg/Kg	7.9	8.9		6.9		8	
Barium	mg/Kg	300	46.6	J	133	J	59.6	J
Beryllium	mg/Kg	0.6	0.65		0.55		0.56	
Calcium	mg/Kg	1135	1000	J	1270	J	782	J
Chromium	mg/Kg	21.85	22.3	J	21.4	J	20.5	J
Cobalt	mg/Kg	30	15.5	J	16	J	13.6	J
Copper	mg/Kg	25	20		18.2		19	
Iron	mg/Kg	33550	33900	J	33200	J	29400	J
Lead	mg/Kg	14.3	22.9		5.7		9.2	
Magnesium	mg/Kg	6085	6020	J	6150	J	5490	J
Manganese	mg/Kg	918	836	J	1000	J	547	J
Mercury	mg/Kg	0.1	-		-		-	
Nickel	mg/Kg	34.5	35.5	J	33.5	J	31.4	J
Potassium	mg/Kg	1270	1290		1250		1140	
Sodium	mg/Kg	167	167	J	-		121	J
Thallium	mg/Kg	ND	-		-		0.97	J
Vanadium	mg/Kg	150	21.3	J	19.4	J	19.4	J
Zinc	mg/Kg	69.25	73.5	J	65	J	68.1	J
Total Cyanide	mg/Kg	***	-		-		-	

Notes:
1. See Tables 1.2 and 1.3 for information on how recommended cleanup objectives were derived.
Highlighted values exceed Recommended Soil Cleanup Objective
- = compound not detected
J = Estimated value
mg/kg = milligrams per kilogram
ND = not detected in background samples
R = Data Rejected

Table B.6: Soil Boring Sample Results

	SAMPLE ID:	RECOMMENDED	MW2G		MW2N		MW3E	
	DEPTH:	SOIL CLEAN-UP	10-14'		20-28'		2-8'	
	LAB ID:	OBJECTIVE	3090504		3091101		3096801	
	SOURCE:	(see Note 1)	NYTEST		NYTEST		NYTEST	
	SDG:		SHD5		SHD5		SHD6	
	MATRIX:		SOIL		SOIL		SOIL	
	SAMPLED:		3/27/97		3/28/97		4/03/97	
	VALIDATED:		7/25/97		7/25/97		7/25/97	
COMPOUND	UNITS:							
VOLATILES								
1,2-Dichloroethene (total)	mg/Kg	0.3	-		-		0.002	J
Methylene Chloride	mg/Kg	0.1	0.004	J	-		-	
Trichloroethene	mg/Kg	0.7	-		-		0.028	J
Total VOCs*	mg/Kg	10	0.004		0		0.03	
SEMIVOLATILES								
bis(2-Ethylhexyl)phthalate	mg/Kg	50	-		0.079	J	0.1	J
Total SVOCs*	mg/Kg	500	-		0.079		0.1	
PESTICIDES/PCBs								
Methoxychlor	mg/Kg	10	-		-		-	
Total Pesticides*	mg/Kg	10						
INORGANICS								
Aluminum	mg/Kg	16200	13100		17900		12600	J
Antimony	mg/Kg	1.6	0.98	J	1.8	J	2	J
Arsenic	mg/Kg	7.9	7.9		10.6	J	7.8	J
Barium	mg/Kg	300	99.2	J	163	J	160	J
Beryllium	mg/Kg	0.6	0.55		0.73		0.47	J
Calcium	mg/Kg	1135	50300	J	5510	J	1590	J
Chromium	mg/Kg	21.85	17.6	J	24.1	J	17.2	J
Cobalt	mg/Kg	30	11.3	J	16.8	J	10.8	J
Copper	mg/Kg	25	18.3		23.2		20	J
Iron	mg/Kg	33550	29200	J	40000	J	27200	
Lead	mg/Kg	14.3	9.5		16.6		17.3	J
Magnesium	mg/Kg	6085	9070	J	7000	J	4130	J
Manganese	mg/Kg	918	675	J	584	J	616	J
Mercury	mg/Kg	0.1	-		-		-	
Nickel	mg/Kg	34.5	26.6	J	37.6	J	25.4	J
Potassium	mg/Kg	1270	1970		2220		1720	
Sodium	mg/Kg	167	181	J	146	J	298	J
Thallium	mg/Kg	ND	-		-		-	
Vanadium	mg/Kg	150	18.2	J	24	J	18.4	J
Zinc	mg/Kg	69.25	57.7	J	83.9	J	87.2	J
Total Cyanide	mg/Kg	***	-		-		-	

Notes:
1. See Tables 1.2 and 1.3 for information on how recommended cleanup objectives were derived.
Highlighted values exceed Recommended Soil Cleanup Objectiv
- = compound not detected
J = Estimated value
mg/kg = milligrams per kilogram
ND = not detected in background samples
R = Data Rejected

Table B.6: Soil Boring Sample Results

			DUP of MW3E		
	SAMPLE ID:	RECOMMENDED	MW3D	MW4C	MW4J
	DEPTH:	SOIL CLEAN-UP	2-8'	4-6'	16-20'
	LAB ID:	OBJECTIVE	3096804	3093901	3093902
	SOURCE:	(see Note 1)	NYTEST	NYTEST	NYTEST
	SDG:		SHD6	SHD5	SHD5
	MATRIX:		SOIL	SOIL	SOIL
	SAMPLED:		4/03/97	3/31/97	3/31/97
	VALIDATED:		7/25/97	7/25/97	7/25/97
COMPOUND	UNITS:				
VOLATILES					
1,2-Dichloroethene (total)	mg/Kg	0.3	0.002 J	-	-
Methylene Chloride	mg/Kg	0.1	-	0.007 J	0.008 J
Trichloroethene	mg/Kg	0.7	0.021 J	-	-
Total VOCs*	mg/Kg	10	0.023	0.007	0.008
SEMIVOLATILES					
bis(2-Ethylhexyl)phthalate	mg/Kg	50	0.058 J	R	R
Total SVOCs*	mg/Kg	500	0.058	0	0
PESTICIDES/PCBs					
Methoxychlor	mg/Kg	10	-	-	-
Total Pesticides*	mg/Kg	10			
INORGANICS					
Aluminum	mg/Kg	16200	4880 J	14400	11800
Antimony	mg/Kg	1.6	1.6 J	2 J	0.55 J
Arsenic	mg/Kg	7.9	1.9 J	9.6 J	6.6 J
Barium	mg/Kg	300	24.9 J	95.8 J	87 J
Beryllium	mg/Kg	0.6	0.38 J	0.57	0.46 J
Calcium	mg/Kg	1135	1540 J	1490 J	22200 J
Chromium	mg/Kg	21.85	11.2 J	19.4 J	15.8 J
Cobalt	mg/Kg	30	4.3 J	13.1 J	10.8 J
Copper	mg/Kg	25	7.9 J	20.2	17.9
Iron	mg/Kg	33550	19500	31100 J	25300 J
Lead	mg/Kg	14.3	4.1 J	10.8	9.4
Magnesium	mg/Kg	6085	2040 J	5140 J	7650 J
Manganese	mg/Kg	918	97.3 J	586 J	504 J
Mercury	mg/Kg	0.1	0.05 J	-	0.06 J
Nickel	mg/Kg	34.5	7.9 J	31.3 J	25.5 J
Potassium	mg/Kg	1270	1130	1470	1550
Sodium	mg/Kg	167	293 J	77.5 J	145 J
Thallium	mg/Kg	ND	-	0.77 J	-
Vanadium	mg/Kg	150	20.2 J	19.5 J	16.1 J
Zinc	mg/Kg	69.25	24.6 J	70 J	57.6 J
Total Cyanide	mg/Kg	***	-	2.23	-

Notes:
1. See Tables 1.2 and 1.3 for information on how recommended cleanup objectives were derived.

Prepared/Date: RTB 10/20/05
Checled/Date: MJS 10/20/05

Highlighted values exceed Recommended Soil Cleanup Objectiv
- = compound not detected
J = Estimated value
mg/kg = milligrams per kilogram
ND = not detected in background samples
R = Data Rejected

Table B.7: 1997 Groundwater Sample Results

	SAMPLE ID:	AMBIENT WATER	MW001S	MW001B
	LAB ID:	QUALITY STANDARD	3134501	3134502
	SOURCE:	OR GUIDANCE	NYTEST	NYTEST
	SDG:	VALUE	SHD8	SHD8
	MATRIX:	(see Note 1)	WATER	WATER
	SAMPLED:		5/22/97	5/22/97
	VALIDATED:		7/25/97	7/25/97
COMPOUND	UNITS:			
VOLATILES				
1,2-Dichloroethene (total)	µg/L	5	-	-
Trichloroethene	µg/L	5	-	-
SEMIVOLATILES				
4-Chloroaniline	µg/L	5	-	-
bis(2-Ethylhexyl)phthalate	µg/L	5	3 J	2 J
PESTICIDES/PCBs				
NONE			-	-
METALS				
Aluminum	µg/L	2000(E)	11500 J	11400 J
Arsenic	µg/L	25	-	7.1 J
Barium	µg/L	1000	97.6 J	132 J
Beryllium	µg/L	3(G)	0.32 J	0.33 J
Cadmium	µg/L	5	-	-
Calcium	µg/L	NL	20700 J	22900 J
Chromium	µg/L	50	19.2	24.7
Cobalt	µg/L	NL	8 J	8.5 J
Copper	µg/L	200	21.9 J	25.5 J
Iron	µg/L	300	21000	21400
Lead	µg/L	25	6.8 J	11.3 J
Magnesium	µg/L	35000(G)	8120	8220
Manganese	µg/L	300	658 J	784 J
Mercury	µg/L	0.7	-	0.12 J
Nickel	µg/L	100	23.1 J	35.9 J
Potassium	µg/L	NL	4010 J	2760 J
Sodium	µg/L	20000	3580 J	4140 J
Vanadium	µg/L	NL	13.7 J	14.2 J
Zinc	µg/L	2000(G)	167 J	88.4 J

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standard or guidance value (G). Where numbers were not available, NYSDEC Div. of Water "Generic Effluent Criteria for Surface Water Discharges" (E) was utilized.
Highlighted values greater than standard or guidance value
NL = no groundwater criteria listed
µg/L = micrograms per liter
J = estimated value
R = Data Rejected

Table B.7: 1997 Groundwater Sample Results

			DUP of MW001B	
	SAMPLE ID:	AMBIENT WATER	MW005	MW002S
	LAB ID:	QUALITY STANDARD	3134505	3134518
	SOURCE:	OR GUIDANCE	NYTEST	NYTEST
	SDG:	VALUE	SHD8	SHD8
	MATRIX:	(see Note 1)	WATER	WATER
	SAMPLED:		5/22/97	5/22/97
	VALIDATED:		7/25/97	7/25/97
COMPOUND	UNITS:			
VOLATILES				
1,2-Dichloroethene (total)	µg/L	5	-	-
Trichloroethene	µg/L	5	-	-
SEMIVOLATILES				
4-Chloroaniline	µg/L	5	-	
bis(2-Ethylhexyl)phthalate	µg/L	5	2 J	
PESTICIDES/PCBs				
NONE			-	
METALS				
Aluminum	µg/L	2000(E)	14200 J	
Arsenic	µg/L	25	11.4	
Barium	µg/L	1000	151 J	
Beryllium	µg/L	3(G)	0.39 J	
Cadmium	µg/L	5	-	
Calcium	µg/L	NL	23600 J	
Chromium	µg/L	50	22.7	
Cobalt	µg/L	NL	10.2 J	
Copper	µg/L	200	25.5	
Iron	µg/L	300	25300	
Lead	µg/L	25	11.4 J	
Magnesium	µg/L	35000(G)	9110	
Manganese	µg/L	300	876 J	
Mercury	µg/L	0.7	0.09 J	
Nickel	µg/L	100	30.1 J	
Potassium	µg/L	NL	3330 J	
Sodium	µg/L	20000	4180 J	
Vanadium	µg/L	NL	17.7 J	
Zinc	µg/L	2000(G)	72.6 J	

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standar
value (G). Where numbers were not available, NYSDEC Div. of Water
Effluent Criteria for Surface Water Discharges" (E) was utilized.
Highlighted values greater than standard or guidance value
NL = no groundwater criteria listed
µg/L = micrograms per liter
J = estimated value
R = Data Rejected

Table B.7: 1997 Groundwater Sample Results

	SAMPLE ID:	AMBIENT WATER	MW002D	MW002B
	LAB ID:	QUALITY STANDARD	3134508	3134509
	SOURCE:	OR GUIDANCE	NYTEST	NYTEST
	SDG:	VALUE	SHD8	SHD8
	MATRIX:	(see Note 1)	WATER	WATER
	SAMPLED:		5/22/97	5/22/97
	VALIDATED:		7/25/97	7/25/97
COMPOUND	UNITS:			
VOLATILES				
1,2-Dichloroethene (total)	µg/L	5	-	-
Trichloroethene	µg/L	5	-	4 J
SEMIVOLATILES				
4-Chloroaniline	µg/L	5	R	R
bis(2-Ethylhexyl)phthalate	µg/L	5	1 J	-
PESTICIDES/PCBs				
NONE			-	-
METALS				
Aluminum	µg/L	2000(E)	4490 J	4270 J
Arsenic	µg/L	25	-	5.5 J
Barium	µg/L	1000	70.7 J	135 J
Beryllium	µg/L	3(G)	-	-
Cadmium	µg/L	5	-	-
Calcium	µg/L	NL	46300 J	43900 J
Chromium	µg/L	50	7.6 J	27.6
Cobalt	µg/L	NL	2.8 J	7.1 J
Copper	µg/L	200	7.4 J	43.4
Iron	µg/L	300	8620	47600
Lead	µg/L	25	3.1 J	12.6 J
Magnesium	µg/L	35000(G)	12400	8690
Manganese	µg/L	300	200 J	622 J
Mercury	µg/L	0.7	-	-
Nickel	µg/L	100	8.6 J	45
Potassium	µg/L	NL	2830 J	-
Sodium	µg/L	20000	4300 J	3230 J
Vanadium	µg/L	NL	5.2 J	6.2 J
Zinc	µg/L	2000(G)	37 J	40.2 J

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standar
value (G). Where numbers were not available, NYSDEC Div. of Water
Effluent Criteria for Surface Water Discharges" (E) was utilized.
Highlighted values greater than standard or guidance value
NL = no groundwater criteria listed
µg/L = micrograms per liter
J = estimated value
R = Data Rejected

Table B.7: 1997 Groundwater Sample Results

	SAMPLE ID:	AMBIENT WATER	MW003S	MW003B
	LAB ID:	QUALITY STANDARD	3134510	3134511
	SOURCE:	OR GUIDANCE	NYTEST	NYTEST
	SDG:	VALUE	SHD8	SHD8
	MATRIX:	(see Note 1)	WATER	WATER
	SAMPLED:		5/22/97	5/22/97
	VALIDATED:		7/25/97	7/25/97
COMPOUND	UNITS:			
VOLATILES				
1,2-Dichloroethene (total)	µg/L	5	18	56
Trichloroethene	µg/L	5	80	540
SEMIVOLATILES				
4-Chloroaniline	µg/L	5	R	R
bis(2-Ethylhexyl)phthalate	µg/L	5	2 J	1 J
PESTICIDES/PCBs				
NONE			-	-
METALS				
Aluminum	µg/L	2000(E)	948 J	936 J
Arsenic	µg/L	25	-	-
Barium	µg/L	1000	48.3 J	121 J
Beryllium	µg/L	3(G)	-	-
Cadmium	µg/L	5	-	-
Calcium	µg/L	NL	57800 J	75200 J
Chromium	µg/L	50	-	-
Cobalt	µg/L	NL	-	-
Copper	µg/L	200	3 J	3.9 J
Iron	µg/L	300	2000	3850
Lead	µg/L	25	-	-
Magnesium	µg/L	35000(G)	13700	14900
Manganese	µg/L	300	46.8 J	231 J
Mercury	µg/L	0.7	-	-
Nickel	µg/L	100	-	6.4 J
Potassium	µg/L	NL	9140	1980 J
Sodium	µg/L	20000	20900	23600
Vanadium	µg/L	NL	-	-
Zinc	µg/L	2000(G)	34.3 J	23.9 J

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standar
value (G). Where numbers were not available, NYSDEC Div. of Water
Effluent Criteria for Surface Water Discharges" (E) was utilized.
Highlighted values greater than standard or guidance value
NL = no groundwater criteria listed
µg/L = micrograms per liter
J = estimated value
R = Data Rejected

Table B.7: 1997 Groundwater Sample Results

	SAMPLE ID:	AMBIENT WATER	MW004S	MW004B
	LAB ID:	QUALITY STANDARD	3134506	3134507
	SOURCE:	OR GUIDANCE	NYTEST	NYTEST
	SDG:	VALUE	SHD8	SHD8
	MATRIX:	(see Note 1)	WATER	WATER
	SAMPLED:		5/22/97	5/22/97
	VALIDATED:		7/25/97	7/25/97
COMPOUND	UNITS:			
VOLATILES				
1,2-Dichloroethene (total)	µg/L	5	-	-
Trichloroethene	µg/L	5	-	4 J
SEMIVOLATILES				
4-Chloroaniline	µg/L	5	R	R
bis(2-Ethylhexyl)phthalate	µg/L	5	2 J	2 J
PESTICIDES/PCBs				
NONE			-	-
METALS				
Aluminum	µg/L	2000(E)	463 J	1180 J
Arsenic	µg/L	25	-	-
Barium	µg/L	1000	27 J	86.8 J
Beryllium	µg/L	3(G)	-	-
Cadmium	µg/L	5	-	2.6 J
Calcium	µg/L	NL	22200 J	39200 J
Chromium	µg/L	50	-	-
Cobalt	µg/L	NL	-	-
Copper	µg/L	200	2.3 J	4.8 J
Iron	µg/L	300	811	3160
Lead	µg/L	25	-	1.8 J
Magnesium	µg/L	35000(G)	3450 J	8630
Manganese	µg/L	300	25 J	46.3 J
Mercury	µg/L	0.7	-	-
Nickel	µg/L	100	-	4.5 J
Potassium	µg/L	NL	-	-
Sodium	µg/L	20000	1900 J	3690 J
Vanadium	µg/L	NL	-	-
Zinc	µg/L	2000(G)	62.6 J	19.9 J

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standar
value (G). Where numbers were not available, NYSDEC Div. of Water
Effluent Criteria for Surface Water Discharges" (E) was utilized.
Highlighted values greater than standard or guidance value
NL = no groundwater criteria listed
µg/L = micrograms per liter
J = estimated value
R = Data Rejected

Prepared/Date: RTB 10/17/2005
Checked/Date: MJS 10/20/05

Table B.8: 2001 Groundwater Sample Results

	SAMPLE ID:	AMBIENT WATER	MW001S	MW001B	MW002S	MW002B	MW002D
	LAB ID:	QUALITY STANDARD	L77138-1	L77138-2	L77138-3	L77138-4	L77138-5
	SOURCE:	OR GUIDANCE					
	SDG:	VALUE					
	MATRIX:	(see Note 1)	WATER	WATER	WATER	WATER	WATER
	SAMPLED:		9/27/2001	9/27/2001	9/27/2001	9/27/2001	9/27/2001
	VALIDATED:						
COMPOUND	UNITS:						
VOLATILES							
cis-1,2-Dichloroethene	µg/L	5	-	-	-	-	-
Trichloroethene	µg/L	5	-	-	-	-	-

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standard
Highlighted values greater than standard or guidance value
µg/L = micrograms per liter
J = estimated value

Table B.8: 2001 Groundwater Sample Results

COMPOUND	SAMPLE ID: / LAB ID: / SOURCE: / SDG: / MATRIX: / SAMPLED: / VALIDATED: / UNITS:	AMBIENT WATER QUALITY STANDARD OR GUIDANCE VALUE (see Note 1)	MW003S L77138-6 WATER 9/27/2001	MW003B L77138-7 WATER 9/27/2001	MW004S L77138-10 WATER 9/27/2001	MW004B L77138-11 WATER 9/27/2001
VOLATILES						
cis-1,2-Dichloroethene	µg/L	5	264	97	-	-
Trichloroethene	µg/L	5	200	360	-	7 J

Notes:
1. Cleanup objectives from TOGS 1.1.1, Class GA groundwater standard
Highlighted values greater than standard or guidance value
µg/L = micrograms per liter
J = estimated value

Prepared/Date: RTB 10/17/05
Checked/Date: MJS 10/20/05

APPENDIX C

COST BACKUP AND CALCULATIONS

APPENDIX C-1

COST BACKUP TABLES

Alternative 2: Limited Action
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE CAPITAL COSTS								
Work Plan								
95010101	Work Plan	1.00	LS	$ -	$ 12,195.12	$ -	$ 12,195.12	
	Task Subtotal						**$ 12,195.12**	
Institutional Controls								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99040401	Construction Signs	96.00	SF	$ 12.67	$ -	$ -	$ 1,216.32	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
Fencing Installation								
18040107	6' Galvanized Chain-link Fence	2728.25	LF	$ 21.87	$ 1.47	$ -	$ 63,677.36	
18040117	6' Swing Gate, 12' Double	1.00	EA	$ 621.88	$ 106.67	$ 53.44	$ 781.99	
Signage Installation								
18040501	Hazardous Waste Signing	14.00	EA	$ 18.35	$ 33.00	$ -	$ 718.90	Every 200 LF of fence
	Task Subtotal						**$ 69,809.90**	

Alternative 2: Limited Action
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Monitoring Well Installation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2.00	LS	0.00	1,358.40	969.76	$ 4,656.32	
33231178	Move Rig/Equipment Around Site	6.00	EA	58.75	195.27	139.40	$ 2,360.52	
33231504	Surface Pad, Concrete, 2' x 2' x 4"	8.00	EA	38.33	17.87	1.76	$ 463.68	
33232301	5' Guard Posts, Cast Iron, Concrete Fill	32.00	EA	30.51	84.00	0.06	$ 3,666.24	
33231186	Well Development Equipment Rental (weekly)	1.00	WK	456.14	64.76	0.00	$ 520.90	
Shallow Wells 5-15 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	121.08	0.00	0.00	$ 121.08	
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	17.64	530.10	0.00	$ 547.74	
33220112	Field Technician	16.00	HR	0.00	39.13	0.00	$ 626.08	
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.19	3.81	7.14	$ 242.80	
33230201	2" PVC, Schedule 40, Well Screen	20.00	LF	2.75	4.92	9.21	$ 337.60	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 88.84	
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	44.00	LF	0.00	10.45	19.57	$ 1,320.88	
33231401	2" Screen, Filter Pack	28.00	LF	3.09	3.24	6.07	$ 347.20	
33231811	2" Well, Portland Cement Grout	8.00	LF	1.15	0.00	0.00	$ 9.20	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 184.52	

Alternative 2: Limited Action
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Deep Wells 15-25 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	2.00	DAY	121.08	0.00	0.00	$ 242.16	
33170808	Decontaminate Rig, Augers,	2.00	DAY	17.64	530.10	0.00	$ 1,095.48	
33220112	Field Technician	29.00	HR	0.00	39.13	0.00	$ 1,134.77	
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.19	3.81	7.14	$ 728.40	
33230201	2" PVC, Schedule 40, Well Screen	40.00	LF	2.75	4.92	9.21	$ 675.20	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 88.84	
33231126	Air Rotary, 6" Dia Borehole (Consolidated), Depth <= 100 ft	104.00	LF	0.00	15.68	29.35	$ 4,683.12	
33231401	2" Screen, Filter Pack	48.00	LF	3.09	3.24	6.07	$ 595.20	
33231811	2" Well, Portland Cement Grout	48.00	LF	1.15	0.00	0.00	$ 55.20	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 184.52	
	Task Subtotal						**$24,976.49**	
<u>Site Closure Report</u>								
95010102	Site Closure Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756.10	
	Task Subtotal						$ 9,756.10	

ALTERNATIVE ANNUAL AND PERIODIC COSTS

Alternative 2: Limited Action
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Annual Monitoring								
Groundwater Sampling								
33020401	Disposable Materials per Sample	14.00	EA	8.80	0.00	0.00	$ 123.20	
33020402	Decontamination Materials per Sample	14.00	EA	7.84	0.00	0.00	$ 109.76	
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	246.30	0.00	0.00	$ 246.30	
33022131	Testing, purgeable halocarbons (SW5030/8010)	16.00	EA	154.18	0.00	0.00	$ 2,466.88	
33022132	Testing, purgeable aromatics (SW5030/8020)	16.00	EA	122.50	0.00	0.00	$ 1,960.00	
33021603	Testing, dissolved solids	16.00	EA	14.95	0.00	0.00	$ 239.20	
33021604	Testing, suspended solids	16.00	EA	13.13	0.00	0.00	$ 210.08	
33021620	Testing, TAL metals (6010/7000s)	16.00	EA	367.07	0.00	0.00	$ 5,873.12	
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.00/SM 4110B)	16.00	EA	32.82	-	-	$ 525.12	
33021667	Sulfate (EPA 300.0)	16.00	EA	17.40	-	-	$ 278.40	
	Field Parameters	14.00	EA	-	-	-	$ -	
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	6.00	EA	6.35	0.00	0.00	$ 38.10	

Alternative 2: Limited Action
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Surface Water Sampling								
33020520	Hip Waders	1.00	EA	109.57	0.00	0.00	$ 109.57	
33020524	Field sampling equipment, coliwasas, glass, disposable, 200 mL, case of 12, 7/8" x 42" testing parameter device rental	2.00	EA	109.64	0.00	0.00	$ 219.28	
33022131	Testing, purgeable halocarbons (SW5030/8010)	3.00	EA	154.18	0.00	0.00	$ 462.54	
33022132	Testing, purgeable aromatics (SW5030/8020)	3.00	EA	122.50	0.00	0.00	$ 367.50	
33021603	Testing, dissolved solids	3.00	EA	14.95	0.00	0.00	$ 44.85	
33021604	Testing, suspended solids	3.00	EA	13.13	0.00	0.00	$ 39.39	
33021620	Testing, TAL metals (6010/7000s)	3.00	EA	367.07	0.00	0.00	$ 1,101.21	
Labor and ODCs								
33010107	Van or Pickup Rental	5	DAY	$ 37.00	$ -	$ -	$ 185.00	
33010202	Per Diem	10	DAY	$ 89.40	$ -	$ -	$ 894.00	
33220112	Field Technician	100.00	HR	0.00	39.13	0.00	$ 3,913.00	Assume 2 Field Techs
	Task Subtotal						**$ 19,406.50**	
<u>Annual Reporting</u>								
95010102	Annual Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756.10	
	Task Subtotal						$ 9,756.10	
<u>Periodic Fence and Sign Maintenance</u>								
5% of Capital Costs for Fence and Signs							$ 3,258.91	
	Task Subtotal						**$ 3,258.91**	

Alternative 2: Limited Action
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Institutional Control Inspections								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
	Task Subtotal						**$ 3,415.33**	

PRESENT VALUE OF ANNUAL AND PERIODIC COSTS FOR ALTERNATIVE 2
Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Year	Cost*	Number of Annual Periods	Annual Discount Rate	Number of 5-Year Periods	5-Year Discount Rate	Number of 10-Year Periods	10-Year Discount Rate	Total Non-Discounted Cost	Present Value Cost
Capital (Year 0)	$ 182,000	1	0	NA	NA			$ 182,000	$ 182,000
Quarterly Groundwater Monitoring (Years 1-5)	$ 101,000	5	0.031	NA	NA			$ 505,000	$ 461,233
Semi-annual Groundwater Monitoring (Years 6-10)	$ 50,000	5	0.031	1	0.165			$ 250,000	$ 196,009
Annual Groundwater Monitoring (Years 11-30)	$ 25,000	20	0.031	NA	NA	1.000	0.357	$ 500,000	$ 271,566
Annual Reporting (Years 1-30)	$ 13,000	30	0.031	NA	NA			$ 390,000	$ 251,543
Maintenance of Fencing and Signs (every 5 Years)	$ 4,000	NA	NA	6	0.165			$ 24,000	$ 14,549
Institutional Control Inspections (every 5 years)	$ 4,000	NA	NA	6	0.165			$ 24,000	$ 14,549
Totals								**$ 1,875,000**	**$ 1,391,449**

*Annual and periodic costs include 5 % for administrative support and 25% contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.
Capital costs include 25% contingency, 10% engineering and design, 5% health and safety, 5% administrative, and 10% construction services.

Discount rate based on OMB Circular No. A-94 App. C (Revised Jan. 2005)

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE CAPITAL COSTS								
Pre-Design Investigation								
Site Inspection/Planning								
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	$ 0.49	$ -	$ -	$ 29	
33220102	Project Manager	17.00	HR	$ -	$ 63.14	$ -	$ 1,073	
33220109	Staff Scientist	159.00	HR	$ -	$ 52.53	$ -	$ 8,352	
33220110	QA/QC Officer	13.00	HR	$ -	$ 51.64	$ -	$ 671	
33220111	Certified Industrial Hygienist	24.00	HR	$ -	$ 65.52	$ -	$ 1,572	
33220114	Word Processing/Clerical	40.00	HR	$ -	$ 27.26	$ -	$ 1,090	
33220115	Draftsman/CADD	34.00	HR	$ -	$ 35.64	$ -	$ 1,212	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
Site Investigation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	$ -	$ 1,358.40	$ 969.76	$ 2,328	
33020664	Drilling 4" Diameter Soil Borings, No Sampling,11-20 Feet Deep	200.00	LF	$ 18.77	$ -	$ -	$ 3,754	
33170811	Decontaminate Trenching/Drilling Equipment	2.00	EA	$ -	$ 192.59	$ -	$ 385	
33220102	Project Manager	22.00	HR	$ -	$ 63.14	$ -	$ 1,389	
33220109	Staff Scientist	146.00	HR	$ -	$ 52.53	$ -	$ 7,669	
33220110	QA/QC Officer	8.00	HR	$ -	$ 51.64	$ -	$ 413	
33220111	Certified Industrial Hygienist	2.00	HR	$ -	$ 65.52	$ -	$ 131	
33220114	Word Processing/Clerical	20.00	HR	$ -	$ 27.26	$ -	$ 545	
33220115	Draftsman/CADD	12.00	HR	$ -	$ 35.64	$ -	$ 428	
33240101	Other Direct Costs	1.00	LS	$ 211.49	$ -	$ -	$ 211	
	Task Subtotal						**$ 31,535**	

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Work Plan								
95010101	Work Plan	1.00	LS	$ -	$ 12,195.12	$ -	$ 12,195	
	Task Subtotal						**$ 12,195**	
Site Preparation/Mobilization								
Clearing and Grubbing								
17010107	Medium Brush, Medium Trees, Clear, Grub, Haul	4.35	ACR	**$ -**	$ 3,327.00	$ 2,852.00	$ 26,879	
Site Trailer and Utilities								
99040101	Temporary Office 20' x 8'	3.00	MO	$ 206.42	$ -	$ -	$ 619	
99140201	Temporary Storage Trailer 16' x 8'	3.00	MO	$ 80.72	$ -	$ -	$ 242	
99040501	Portable Toilets	3.00	MO	$ 82.65	$ -	$ -	$ 248	
99040801	Temporary Electrical Power - Avg	1.60	CSF	$ 90.53	$ -	$ -	$ 145	
Minor regrading								
17030101	Rough Grading, D6 Dozer	21,054.00	SY	$ -	$ 0.95	$ 2.55	$ 73,689	
	Task Subtotal						**$ 101,822**	
Construct Low Permeability Cover System								
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	12,245.00	CY	$ 6.25	$ 2.00	$ 1.91	$ 124,409	Soil Protective Layer
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	2300.0	CY	$ 6.25	$ 2.00	$ 1.91	$ 23,368	Subgrade fill
17030426	Sand, 6" Lifts, Off-Site	6,937.00	CY	$ 8.19	$ 2.17	$ 1.92	$ 85,186	Gas Venting Layer
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	4,620.00	LCY	$ 21.33	$ 5.45	$ 1.50	$ 130,654	Topsoil
18050402	Seeding, Vegetative Cover	4.30	ACR	$ 1,737.99	$ 109.66	$ 53.43	$ 8,175	Seeding
33070201	6" Inside Diameter (Vertical Pipe Spaced @ one acre), Gas Vent	34.00	LF	$ 12.72	$ 9.36	$ 1.79	$ 812	

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	Piping System							
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,926.82	LF	$ 0.04	$ 1.95	$ 0.26	$ 4,335	
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	22,893.00	SY	$ 0.75	$ 0.69	$ 0.03	$ 33,653	Filter Fabric
17030419	Crushed Stone, 1/2" to 3/4"	900.00	CY	$ 19.21	$ 2.85	$ 0.89	$ 20,655	Toe drain
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	1,800.00	SY	$ 0.75	$ 0.69	$ 0.03	$ 2,646	Toe drain
19040627	10,000 gallon Horizontal Plastic Sump	1.00	EA	$ 5,800.00	$ 853.69	$ 123.26	$ 6,777	Leachate storage
33260902	6" Diameter Perforated PVC Pipe	2,700.00	LF	$ 2.99	$ 3.59	$ 2.18	$ 23,652	Toe drain
33080543	40 Mil Polymeric Liner, Very Low Density Polyethylene	206,037.00	SF	$ 0.26	$ 0.13	$ 0.01	$ 82,415	Geomembrane
33430201	Miscellaneous Minor Field Installation	1.00	LS	$ 109,276.16	$ -	$ -	$ 109,276	
Permanent Access Road								
18010102	Gravel, Delivered and Dumped	166.7	CY	$ 21.11	$ 1.78	$ 1.62	$ 4,085	750 LF, 6", 12' wide
17030101	Rough Grading, D6 Dozer	1,000.00	SY	$ -	$ 0.95	$ 2.55	$ 3,500	
Oversight								
33220110	QA/QC Officer	650.00	HR	$ -	$ 51.64	$ -	$ 33,566	
33010107	Van or Pickup Rental	65	DAY	$ 37.00	$ -	$ -	$ 2,405.00	
33010202	Per Diem	65	DAY	$ 89.40	$ -	$ -	$ 5,811.00	
	Task Subtotal						**$ 705,379**	

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
<u>Transportation and Off-Site Disposal of Hazardous Wastes</u>								
Off-site Transportation and Waste Disposal								
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	6.00	EA	$ 617.40	$ -	$ -	$ 3,704	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	6.00	EA	$ 181.61	$ -	$ -	$ 1,090	
33190103	Secondary containment and storage, storage systems, loading hazardous waste for shipment, load drums on disposal truck	0.00	EA	$ -	$ 4.74	$ 1.13	$ -	
33190204	Subcontracted shipping of hazardous waste, transport drums of solid hazardous waste, 80 55 gal. drums	0.00	MI	$ 2.99	$ -	$ -	$ -	
33190303	Commercial RCRA landfills, drummed waste disposal, min charges for drummed shipments	0.00	EA	$ 556.89	$ -	$ -	$ -	
33190311	Commercial RCRA landfills, truck washout	0.00	EA	$ 167.07	$ -	$ -	$ -	
33197202	Commercial RCRA landfills, drummed waste disposal, solid, 55 gal drums, incl. non-hazardous	0.00	EA	$ 87.37	$ -	$ -	$ -	

Source: Corbett Management Services, LLC, March 30, 2006

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
EQ-Belleville, MI								
	Disposal Bulk Solvent Contaminated	-	TON	$ 185.00			$ -	
	Transportation to EQ-Belleville, MI	-	TON	$ 105.84			$ -	
to EQ-Belleville, MI								
	Transportation and Disposal Drumme direct to Landfill EQ-Belleville	6.00	DRUM	$ 145.00			$ 870	Assume 6 drums
	Task Subtotal						**$ 5,664**	
<u>Institutional Controls</u>								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 104	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 112	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5	
99040401	Construction Signs	96.00	SF	$ 12.67	$ -	$ -	$ 1,216	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200	
Fencing Installation								
18040107	6' Galvanized Chain-link Fence	2728.25	LF	$ 21.87	$ 1.47	$ -	$ 63,677	
18040117	6' Swing Gate, 12' Double	1.00	EA	$ 621.88	$ 106.67	$ 53.44	$ 782	
Signage Installation								
18040501	Hazardous Waste Signing	14.00	EA	$ 18.35	$ 33.00	$ -	$ 719	Every 200 LF of fence
	Task Subtotal						**$ 69,809.90**	

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Monitoring Well Installation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2.00	LS	0.00	1,358.40	969.76	$ 4,656	
33231178	Move Rig/Equipment Around Site	6.00	EA	58.75	195.27	139.40	$ 2,361	
33231504	Surface Pad, Concrete, 2' x 2' x 4"	8.00	EA	38.33	17.87	1.76	$ 464	
33232301	5' Guard Posts, Cast Iron, Concrete Fill	32.00	EA	30.51	84.00	0.06	$ 3,666	
33231186	Well Development Equipment Rental (weekly)	1.00	WK	456.14	64.76	0.00	$ 521	
Shallow Wells 5-15 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	121.08	0.00	0.00	$ 121	
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	17.64	530.10	0.00	$ 548	
33220112	Field Technician	16.00	HR	0.00	39.13	0.00	$ 626	
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.19	3.81	7.14	$ 243	
33230201	2" PVC, Schedule 40, Well Screen	20.00	LF	2.75	4.92	9.21	$ 338	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	44.00	LF	0.00	10.45	19.57	$ 1,321	
33231401	2" Screen, Filter Pack	28.00	LF	3.09	3.24	6.07	$ 347	
33231811	2" Well, Portland Cement Grout	8.00	LF	1.15	0.00	0.00	$ 9	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
Deep Wells 15-25 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	2.00	DAY	121.08	0.00	0.00	$ 242	
33170808	Decontaminate Rig, Augers,	2.00	DAY	17.64	530.10	0.00	$ 1,095	
33220112	Field Technician	29.00	HR	0.00	39.13	0.00	$ 1,135	
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.19	3.81	7.14	$ 728	

Alternative 3: Low Permeability Cover System
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Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
33230201	2" PVC, Schedule 40, Well Screen	40.00	LF	2.75	4.92	9.21	$ 675	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231126	Air Rotary, 6" Dia Borehole (Consolidated), Depth <= 100 ft	104.00	LF	0.00	15.68	29.35	$ 4,683	
33231401	2" Screen, Filter Pack	48.00	LF	3.09	3.24	6.07	$ 595	
33231811	2" Well, Portland Cement Grout	48.00	LF	1.15	0.00	0.00	$ 55	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
	Task Subtotal						**$24,976.49**	
Site Restoration								
17040101	Cleaning Up, site debris clean up and removal	0.20	ACR	0.00	466.99	28.58	$ 99	
18050101	Area Preparation, 67% Level & 33% Slope	0.10	ACR	0.00	42.48	46.62	$ 9	
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	0.10	ACR	4,468.51	0.00	0.00	$ 447	
18050408	Fertilizer, Hydro Spread	0.20	ACR	97.52	74.63	20.16	$ 38	
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	0.20	ACR	0.92	36.63	34.33	$ 14	
18050415	Mowing	0.00	ACR	0.00	271.96	0.00	$ -	
	Task Subtotal						**$ 608**	
Site Closure Report								
95010102	Site Closure Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756	
	Task Subtotal						**$ 9,756**	

ALTERNATIVE ANNUAL AND PERIODIC COSTS

Annual Monitoring

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Groundwater Sampling								
33020401	Disposable Materials per Sample	14.00	EA	8.80	0.00	0.00	$ 123.20	
33020402	Decontamination Materials per Sample	14.00	EA	7.84	0.00	0.00	$ 109.76	
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	246.30	0.00	0.00	$ 246.30	
33022131	Testing, purgeable halocarbons (SW5030/8010)	16.00	EA	154.18	0.00	0.00	$ 2,466.88	
33022132	Testing, purgeable aromatics (SW5030/8020)	16.00	EA	122.50	0.00	0.00	$ 1,960.00	
33021603	Testing, dissolved solids	16.00	EA	14.95	0.00	0.00	$ 239.20	
33021604	Testing, suspended solids	16.00	EA	13.13	0.00	0.00	$ 210.08	
33021620	Testing, TAL metals (6010/7000s)	16.00	EA	367.07	0.00	0.00	$ 5,873.12	
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.00/SM 4110B)	16.00	EA	32.82	-	-	$ 525.12	
33021667	Sulfate (EPA 300.0)	16.00	EA	17.40	-	-	$ 278.40	
	Field Parameters	14.00	EA	-	-	-	$ -	
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	6.00	EA	6.35	0.00	0.00	$ 38.10	
Surface Water Sampling								
33020520	Hip Waders	1.00	EA	109.57	0.00	0.00	$ 109.57	
33020524	Field sampling equipment, coliwasas, glass, disposable, 200 mL, case of 12, 7/8" x 42" testing parameter device rental	2.00	EA	109.64	0.00	0.00	$ 219.28	
33022131	Testing, purgeable halocarbons (SW5030/8010)	3.00	EA	154.18	0.00	0.00	$ 462.54	
33022132	Testing, purgeable aromatics (SW5030/8020)	3.00	EA	122.50	0.00	0.00	$ 367.50	
33021603	Testing, dissolved solids	3.00	EA	14.95	0.00	0.00	$ 44.85	
33021604	Testing, suspended solids	3.00	EA	13.13	0.00	0.00	$ 39.39	

Alternative 3: Low Permeability Cover System
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Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
33021620	Testing, TAL metals (6010/7000s)	3.00	EA	367.07	0.00	0.00	$ 1,101.21	
Labor and ODCs								
33010107	Van or Pickup Rental	5	DAY	$ 37.00	$ -	$ -	$ 185.00	
33010202	Per Diem	10	DAY	$ 89.40	$ -	$ -	$ 894.00	
33220112	Field Technician	100.00	HR	0.00	39.13	0.00	$ 3,913.00	Assume 2 Field Techs
	Task Subtotal						**$ 19,406.50**	
Annual Reporting								
95010102	Annual Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756.10	
	Task Subtotal						**$ 9,756.10**	
Leachate Collection and Disposal/Treatment								
33197103	Process Water Hauling Fee, Subcontracted	60000	GAL	$ 0.29	$ -	$ -	$ 17,400	
33197102	Wastewater Disposal Fee	60	KGAL	$ 1.76	$ -	$ -	$ 106	
	Task Subtotal						**$ 17,506**	

Alternative 3: Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Semi-annual Wetlands Restoration Monitoring								
Site Inspection/Planning								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220102	Project Manager	2.00	HR	$ -	$ 63.14	$ -	$ 126	
33220109	Staff Scientist	24.00	HR	$ -	$ 52.53	$ -	$ 1,261	
33220114	Word Processing/Clerical	8.00	HR	$ -	$ 27.26	$ -	$ 218	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
	Task Subtotal						**$ 2,011**	
Annual Landfill Maintenance								
0.5% of Capital Costs for Cover System								
	Task Subtotal						**$ 3,527**	
Periodic Fence and Sign Maintenance								
5% of Capital Costs for Fence and Signs							$ 3,258.91	
	Task Subtotal						**$ 3,258.91**	
Institutional Control Inspections								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00 $ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
	Task Subtotal						**$ 3,415.33**	

PRESENT VALUE OF ANNUAL AND PERIODIC COSTS FOR ALTERNATIVE 3
Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Year	Cost*	Number of Annual Periods	Annual Discount Rate	Number of 5-Year Periods	5-Year Discount Rate	Number of 10-Year Periods	10-Year Discount Rate	Total Non-Discounted Cost	Present Value Cost
Capital (Year 0)	$ 1,492,000	1	0	NA	NA	NA	NA	$ 1,492,000	$ 1,492,000
Quarterly Groundwater Monitoring (Years 1-5)	$ 101,000	5	0.031	NA	NA	NA	NA	$ 505,000	$ 461,233
Semi-Annual Groundwater Monitoring (Years 6-10)	$ 50,000	5	0.031	1	0.165	NA	NA	$ 250,000	$ 196,009
Annual Groundwater Monitoring (Years 11-30)	$ 25,000	10	0.031	NA	NA	1	0.357	$ 250,000	$ 156,350
Leachate Collection and Disposal/Treatment (Years 1-30)	$ 23,000	30	0.031	NA	NA	NA	NA	$ 690,000	$ 445,038
Semi-annual Wetlands Restoration Monitoring (Years 1-5)	$ 5,000	5	0.031	NA	NA	NA	NA	$ 25,000	$ 22,833
Annual Landfill Maintenance (Years 1-30)	$ 5,000	30	0.031	NA	NA	NA	NA	$ 150,000	$ 96,747
Annual Reporting (Years 1-30)	$ 13,000	30	0.031	NA	NA	NA	NA	$ 390,000	$ 251,543
Maintenance of Fencing and Signs (every 5 Years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Institutional Control Inspections (every 5 years)	$ 3,000	NA	NA	6	0.165	NA	NA	$ 18,000	$ 10,912
Totals								**$ 3,794,000**	**$ 3,147,215**

*Annual and periodic costs include 5 % for administrative support and 25% contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.
Capital costs include 25% contingency, 10% engineering and design, 5% health and safety, 5% administrative, and 10% construction services.

Discount rate based on OMB Circular No. A-94 App. C (Revised Jan. 2005)

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE CAPITAL COSTS								
Pre-Design Investigation								
Site Inspection/Planning								
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	$ 0.49	$ -	$ -	$ 29	
33220102	Project Manager	17.00	HR	$ -	$ 63.14	$ -	$ 1,073	
33220109	Staff Scientist	159.00	HR	$ -	$ 52.53	$ -	$ 8,352	
33220110	QA/QC Officer	13.00	HR	$ -	$ 51.64	$ -	$ 671	
33220111	Certified Industrial Hygienist	24.00	HR	$ -	$ 65.52	$ -	$ 1,572	
33220114	Word Processing/Clerical	40.00	HR	$ -	$ 27.26	$ -	$ 1,090	
33220115	Draftsman/CADD	34.00	HR	$ -	$ 35.64	$ -	$ 1,212	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
Sediment Sampling								
33020634	Sludge sampler, stainless steel, thread on, 3.25" x 12"	1.00	EA	$ 544.90	$ -	$ -	$ 545	
33021720	Testing, purgeable organics (624, 8260)	8.00	EA	$ 176.28	$ -	$ -	$ 1,410	
33021102	Testing, moisture content (209a)	8.00	EA	$ 29.49	$ -	$ -	$ 236	
33021709	Testing, TAL metals	8.00	EA	$ 367.07	$ -	$ -	$ 2,937	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis (6010/7000s)	8.00	EA	$ 217.94	$ -	$ -	$ 1,744	
Labor and ODCs								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220112	Field Technician	10.00	HR	0.00	39.13	0.00	$ 391.30	Assume 2 Field Techs
	Task Subtotal						**$ 21,670**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Work Plan								
95010101	Work Plan	1.00	LS	$ -	$ 12,195.12	$ -	$ 12,195	
	Task Subtotal						**$ 12,195**	
Site Preparation/Mobilization								
Clearing and Grubbing								
17010107	Medium Brush, Medium Trees, Clear, Grub, Haul	4.35	ACR	**$ -**	$ 3,327.00	$ 2,852.00	$ 26,879	
Site Trailer and Utilities								
99040101	Temporary Office 20' x 8'	3.00	MO	$ 206.42	$ -	$ -	$ 619	
99140201	Temporary Storage Trailer 16' x 8'	3.00	MO	$ 80.72	$ -	$ -	$ 242	
99040501	Portable Toilets	3.00	MO	$ 82.65	$ -	$ -	$ 248	
99040801	Temporary Electrical Power - Average	1.60	CSF	$ 90.53	$ -	$ -	$ 145	
Minor regrading								
17030101	Rough Grading, D6 Dozer	21,054.00	SY	$ -	$ 0.95	$ 2.55	$ 73,689	
	Task Subtotal						**$ 101,822**	
Excavation of Contaminated Sediment								
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	100.00	BCY	0.00	3.18	0.84	$ 402	
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	100.00	CY	6.25	2.00	1.91	$ 1,016	
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 471	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	6.00	EA	181.61	0.00	0.00	$ 1,090	
	Task Subtotal						**$ 2,979**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Excavation of Contaminated Soil								
17030212	Excavating, trench, sand and gravel, to 2' - 6' deep, excavate by hand, piled only, excludes sheeting or dewatering	760.00	BCY	0.00	63.67	0.00	$ 48,389	Assumes 10%
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	7,600.00	BCY	0.00	3.18	0.84	$ 30,552	
17030415	Backfill with Excavated Material	7,000.00	CY	0.22	7.64	0.63	$ 59,430	
17030418	Delivered & Dumped, Backfill with Stone	350.00	BCY	26.12	0.87	0.93	$ 9,772	Assumes 5%
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	600.00	CY	6.25	2.00	1.91	$ 6,096	
33020401	Disposable Materials per Sample	15.00	EA	8.80	0.00	0.00	$ 132	
33021721	Testing, semi-volatile organics (625, 8270)	15.00	EA	261.47	0.00	0.00	$ 3,922	
33080584	Landfill gas and leachate control systems, synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength	18,000.00	SF	0.13	0.04	0.00	$ 3,060	Assume 60' x 60' per TP
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	5.00	EA	0.00	470.93	0.00	$ 2,355	
	Task Subtotal						**$ 163,708**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Excavation of Drums								
17030212	Excavating, trench, sand and gravel, to 2' - 6' deep, excavate by hand, piled only, excludes sheeting or dewatering	1340.00	BCY	0.00	63.67	0.00	$ 85,318	Assumes 10%
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	13,400.00	BCY	0.00	3.18	0.84	$ 53,868	
17030415	Backfill with Excavated Material	13,400.00	CY	0.22	7.64	0.63	$ 113,766	
17030418	Delivered & Dumped, Backfill with Stone	670.00	BCY	26.12	0.87	0.93	$ 18,706	Assumes 5%
33020401	Disposable Materials per Sample	33.00	EA	8.80	0.00	0.00	$ 290	
33021720	Testing, purgeable organics (624, 8260)	33.00	EA	146.90	0.00	0.00	$ 4,848	
33080584	Landfill gas and leachate control systems, synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength	39,600.00	SF	0.13	0.04	0.00	$ 6,732	Assume 60' x 60' per TP
33100101	Transfer Drums to Staging Area with Grappler	22.00	EA	-	13.61	15.68	$ 644	
33100104	Drum Crushing, per Individual Drum	22.00	EA	-	0.99	0.45	$ 32	
33199925	DOT Steel Salvage Drum Composite Overpack, 85 Gallon, 16 Gauge	22.00	EA	105.00	-	-	$ 2,310	
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 471	
	Task Subtotal						**$286,985**	
Oversight								
33220110	QA/QC Officer	650.00	HR	$ -	$ 51.64	$ -	$ 33,566	
33010107	Van or Pickup Rental	65	DAY	$ 37.00	$ -	$ -	$ 2,405.00	
33010202	Per Diem	65	DAY	$ 89.40	$ -	$ -	$ 5,811.00	
	Task Subtotal						**$41,782**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Transportation and Off-Site Disposal of Hazardous Wastes								
Off-site Transportation and Waste Disposal								
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	35.00	EA	617.40	0.00	0.00	$ 21,609	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	35.00	EA	181.61	0.00	0.00	$ 6,356	
33190102	Bulk Solid Hazardous Waste Loading Into Truck	0.00	CY	0.00	1.06	1.61	$ -	
33190103	Secondary containment and storage, storage systems, loading hazardous waste for shipment, load drums on disposal truck	0.00	EA	0.00	4.74	1.13	$ -	
33190204	Subcontracted shipping of hazardous waste, transport drums of solid hazardous waste, 80 55 gal. drums	0.00	MI	2.99	0.00	0.00	$ -	
33190205	Subcontracted shipping of hazardous waste, transport bulk solid hazardous waste, 20 C.Y.	0.00	MI	2.99	0.00	0.00	$ -	
33190317	Commercial RCRA landfills, additional landfill disposal costs, waste stream evaluation, 50% rebate on first	0.00	EA	470.61	0.00	0.00	$ -	
33197202	Commercial RCRA landfills, drummed waste disposal, solid, 55 gal drums, incl. non-hazardous	0.00	EA	$ 87.37	$ -	$ -	$ -	
33197264	Commercial RCRA landfills, bulk waste, solid, less than 2,000 lb/CY	0.00	CY	61.65	0.00	0.00	$ -	

Source: Corbett Management Services, LLC, March 30, 2006

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
EQ-Belleville, MI								
	Disposal Bulk Solvent Contaminated So	933.10	TON	$ 185.00			$ 172,624	700 cy, 1.33 ton/cy
	Transportation to EQ-Belleville, MI	933.10	TON	$ 105.84			$ 98,759	
to EQ-Belleville, MI								
	Transportation and Disposal Drummed \ direct to Landfill EQ-Belleville	34.00	DRUM	$ 145.00			$ 4,930	Assume 34 drums
	Task Subtotal						**$ 304,278**	
<u>Site Restoration</u>								
17040101	Cleaning Up, site debris clean up and removal	1.00	ACR	0.00	466.99	28.58	$ 496	
18050101	Area Preparation, 67% Level & 33% Slope	1.00	ACR	0.00	42.48	46.62	$ 89	
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	1.00	ACR	4,468.51	0.00	0.00	$ 4,469	
18050408	Fertilizer, Hydro Spread	2.00	ACR	97.52	74.63	20.16	$ 385	
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	8.00	ACR	0.92	36.63	34.33	$ 575	
18050415	Mowing	2.00	ACR	0.00	271.96	0.00	$ 544	
	Task Subtotal						**$ 6,557**	
<u>Institutional Controls</u>								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 104	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 112	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400 $ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5	
99040401	Construction Signs	96.00	SF	$ 12.67	$ -	$ -	$ 1,216	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200	
Fencing Installation								
18040107	6' Galvanized Chain-link Fence	2728.25	LF	$ 21.87	$ 1.47	$ -	$ 63,677.36	
18040117	6' Swing Gate, 12' Double	1.00	EA	$ 621.88	$ 106.67	$ 53.44	$ 781.99	
Signage Installation								
18040501	Hazardous Waste Signing	14.00	EA	$ 18.35	$ 33.00	$ -	$ 718.90	Every 200 LF of fence
	Task Subtotal						**$ 69,809.90**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Monitoring Well Installation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2.00	LS	0.00	1,358.40	969.76	$ 4,656	
33231178	Move Rig/Equipment Around Site	6.00	EA	58.75	195.27	139.40	$ 2,361	
33231504	Surface Pad, Concrete, 2' x 2' x 4"	8.00	EA	38.33	17.87	1.76	$ 464	
33232301	5' Guard Posts, Cast Iron, Concrete Fill	32.00	EA	30.51	84.00	0.06	$ 3,666	
33231186	Well Development Equipment Rental (weekly)	1.00	WK	456.14	64.76	0.00	$ 521	
Shallow Wells 5-15 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	121.08	0.00	0.00	$ 121	
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	17.64	530.10	0.00	$ 548	
33220112	Field Technician	16.00	HR	0.00	39.13	0.00	$ 626	
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.19	3.81	7.14	$ 243	
33230201	2" PVC, Schedule 40, Well Screen	20.00	LF	2.75	4.92	9.21	$ 338	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	44.00	LF	0.00	10.45	19.57	$ 1,321	
33231401	2" Screen, Filter Pack	28.00	LF	3.09	3.24	6.07	$ 347	
33231811	2" Well, Portland Cement Grout	8.00	LF	1.15	0.00	0.00	$ 9	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
Deep Wells 15-25 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	2.00	DAY	121.08	0.00	0.00	$ 242	
33170808	Decontaminate Rig, Augers,	2.00	DAY	17.64	530.10	0.00	$ 1,095	
33220112	Field Technician	29.00	HR	0.00	39.13	0.00	$ 1,135	
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.19	3.81	7.14	$ 728	
33230201	2" PVC, Schedule 40, Well Screen	40.00	LF	2.75	4.92	9.21	$ 675	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231126	Air Rotary, 6" Dia Borehole (Consolidated), Depth <= 100 ft	104.00	LF	0.00	15.68	29.35	$ 4,683	
33231401	2" Screen, Filter Pack	48.00	LF	3.09	3.24	6.07	$ 595	
33231811	2" Well, Portland Cement Grout	48.00	LF	1.15	0.00	0.00	$ 55	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
	Task Subtotal						**$24,976.49**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Site Closure Report								
95010102	Site Closure Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756	
	Task Subtotal						**$ 9,756**	
ALTERNATIVE ANNUAL AND PERIODIC COSTS								
Annual Monitoring								
Groundwater Sampling								
33020401	Disposable Materials per Sample	14.00	EA	8.80	0.00	0.00	$ 123.20	
33020402	Decontamination Materials per Sample	14.00	EA	7.84	0.00	0.00	$ 109.76	
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	246.30	0.00	0.00	$ 246.30	
33022131	Testing, purgeable halocarbons (SW5030/8010)	16.00	EA	154.18	0.00	0.00	$ 2,466.88	
33022132	Testing, purgeable aromatics (SW5030/8020)	16.00	EA	122.50	0.00	0.00	$ 1,960.00	
33021603	Testing, dissolved solids	16.00	EA	14.95	0.00	0.00	$ 239.20	
33021604	Testing, suspended solids	16.00	EA	13.13	0.00	0.00	$ 210.08	
33021620	Testing, TAL metals (6010/7000s)	16.00	EA	367.07	0.00	0.00	$ 5,873.12	
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.00/SM 4110B)	16.00	EA	32.82	-	-	$ 525.12	
33021667	Sulfate (EPA 300.0)	16.00	EA	17.40	-	-	$ 278.40	
	Field Parameters	14.00	EA	-	-	-	$ -	
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	6.00	EA	6.35	0.00	0.00	$ 38.10	
Surface Water Sampling								
33020520	Hip Waders	1.00	EA	109.57	0.00	0.00	$ 109.57	
33020524	Field sampling equipment, coliwasas, glass, disposable, 200 mL, case of 12, 7/8" x 42" testing parameter device rental	2.00	EA	109.64	0.00	0.00	$ 219.28	
33022131	Testing, purgeable halocarbons (SW5030/8010)	3.00	EA	154.18	0.00	0.00	$ 462.54	
33022132	Testing, purgeable aromatics (SW5030/8020)	3.00	EA	122.50	0.00	0.00	$ 367.50	
33021603	Testing, dissolved solids	3.00	EA	14.95	0.00	0.00	$ 44.85	
33021604	Testing, suspended solids	3.00	EA	13.13	0.00	0.00	$ 39.39	
33021620	Testing, TAL metals (6010/7000s)	3.00	EA	367.07	0.00	0.00	$ 1,101.21	
Labor and ODCs								
33010107	Van or Pickup Rental	5	DAY	$ 37.00	$ -	$ -	$ 185.00	
33010202	Per Diem	10	DAY	$ 89.40	$ -	$ -	$ 894.00	
33220112	Field Technician	100.00	HR	0.00	39.13	0.00	$ 3,913.00	Assume 2 Field Techs
	Task Subtotal						**$ 19,406.50**	

Alternative 4: Excavation and Off-site Disposal of Source Wastes
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Annual Reporting								
95010102	Annual Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756.10	
	Task Subtotal						**$ 9,756.10**	
Semi-annual Wetlands Restoration Monitoring								
Site Inspection/Planning								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220102	Project Manager	2.00	HR	$ -	$ 63.14	$ -	$ 126	
33220109	Staff Scientist	24.00	HR	$ -	$ 52.53	$ -	$ 1,261	
33220114	Word Processing/Clerical	8.00	HR	$ -	$ 27.26	$ -	$ 218	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
	Task Subtotal						**$ 2,011**	
Periodic Fence and Sign Maintenance								
	5% of Capital Costs for Fence and Signs						$ 3,258.91	
	Task Subtotal						**$ 3,258.91**	
Institutional Control Inspections								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
	Task Subtotal						**$ 3,415.33**	

PRESENT VALUE OF ANNUAL AND PERIODIC COSTS FOR ALTERNATIVE 4
Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Year	Cost*	Number of Annual Periods	Annual Discount Rate	Number of 5-Year Periods	5-Year Discount Rate	Number of 10-Year Periods	10-Year Discount Rate	Total Non-Discounted Cost	Present Value Cost
Capital (Year 0)	$ 1,623,000	1	0	NA	NA	NA	NA	$ 1,623,000	$ 1,623,000
Quarterly Groundwater Monitoring (Years 1-5)	$ 101,000	5	0.031	NA	NA	NA	NA	$ 505,000	$ 461,233
Semi-Annual Groundwater Monitoring (Years 6-10)	$ 50,000	5	0.031	1	0.165	NA	NA	$ 250,000	$ 196,009
Annual Groundwater Monitoring (Years 11-30)	$ 25,000	10	0.031	NA	NA	1	0.357	$ 250,000	$ 156,350
Semi-annual Wetlands Restoration Monitoring (1-5)	$ 5,000	5	0.031	NA	NA	NA	NA	$ 25,000	$ 22,833
Annual Reporting (Years 1-30)	$ 13,000	30	0.031	NA	NA	NA	NA	$ 390,000	$ 251,543
Maintenance of Fencing and Signs (every 5 Years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Institutional Control Inspections (every 5 years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Totals								**$ 3,091,000**	**$ 2,740,067**

*Annual and periodic costs include 5 % for administrative support and 25% contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.
Capital costs include 25% contingency, 10% engineering and design, 5% health and safety, 5% administrative, and 10% construction services.

Discount rate based on OMB Circular No. A-94 App. C (Revised Jan. 2005)

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE CAPITAL COSTS								
Pre-Design Investigation								
Site Inspection/Planning								
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	$ 0.49	$ -	$ -	$ 29	
33220102	Project Manager	17.00	HR	$ -	$ 63.14	$ -	$ 1,073	
33220109	Staff Scientist	159.00	HR	$ -	$ 52.53	$ -	$ 8,352	
33220110	QA/QC Officer	13.00	HR	$ -	$ 51.64	$ -	$ 671	
33220111	Certified Industrial Hygienist	24.00	HR	$ -	$ 65.52	$ -	$ 1,572	
33220114	Word Processing/Clerical	40.00	HR	$ -	$ 27.26	$ -	$ 1,090	
33220115	Draftsman/CADD	34.00	HR	$ -	$ 35.64	$ -	$ 1,212	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
Site Investigation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	$ -	$ 1,358.40	$ 969.76	$ 2,328	
33020664	Drilling 4" Diameter Soil Borings, No Sampling,11-20 Feet Deep	200.00	LF	$ 18.77	$ -	$ -	$ 3,754	
33170811	Decontaminate Trenching/Drilling Equipment	2.00	EA	$ -	$ 192.59	$ -	$ 385	
33220102	Project Manager	22.00	HR	$ -	$ 63.14	$ -	$ 1,389	
33220109	Staff Scientist	146.00	HR	$ -	$ 52.53	$ -	$ 7,669	
33220110	QA/QC Officer	8.00	HR	$ -	$ 51.64	$ -	$ 413	
33220111	Certified Industrial Hygienist	2.00	HR	$ -	$ 65.52	$ -	$ 131	
33220114	Word Processing/Clerical	20.00	HR	$ -	$ 27.26	$ -	$ 545	
33220115	Draftsman/CADD	12.00	HR	$ -	$ 35.64	$ -	$ 428	
33240101	Other Direct Costs	1.00	LS	$ 211.49	$ -	$ -	$ 211	
Sediment Sampling								
33020634	Sludge sampler, stainless steel, thread on, 3.25" x 12"	1.00	EA	$ 544.90	$ -	$ -	$ 545	
33021720	Testing, purgeable organics (624, 8260)	8.00	EA	$ 176.28	$ -	$ -	$ 1,410	
33021102	Testing, moisture content (209a)	8.00	EA	$ 29.49	$ -	$ -	$ 236	
33021709	Testing, TAL metals	8.00	EA	$ 367.07	$ -	$ -	$ 2,937	
33021717	Pesticides/PCBs (SW	8.00	EA	$ 217.94	$ -	$ -	$ 1,744	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	3550B/SW 8081/8082), Soil Analysis (6010/7000s)							
Labor and ODCs								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220112	Field Technician	10.00	HR	0.00	39.13	0.00	$ 391.30	Assume 2 Field Techs
	Task Subtotal						**$ 38,924**	
Work Plan								
95010101	Work Plan	1.00	LS	$ -	$ 12,195.12	$ -	$ 12,195	
	Task Subtotal						**$ 12,195**	
Site Preparation/Mobilization								
Clearing and Grubbing								
17010107	Medium Brush, Medium Trees, Clear, Grub, Haul	4.35	ACR	**$ -**	$ 3,327.00	$ 2,852.00	$ 26,879	
Site Trailer and Utilities								
99040101	Temporary Office 20' x 8'	3.00	MO	$ 206.42	$ -	$ -	$ 619	
99140201	Temporary Storage Trailer 16' x 8'	3.00	MO	$ 80.72	$ -	$ -	$ 242	
99040501	Portable Toilets	3.00	MO	$ 82.65	$ -	$ -	$ 248	
99040801	Temporary Electrical Power - Averag	1.60	CSF	$ 90.53	$ -	$ -	$ 145	
Minor regrading								
17030101	Rough Grading, D6 Dozer		SY	$ -	$ 0.95	$ 2.55	$ -	
	Task Subtotal						**$ 28,133**	
Excavation of Contaminated Sediment								
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	100.00	BCY	0.00	3.18	0.84	$ 402	
17030423	Unclassified Fill, 6" Lifts,	100.00	CY	6.25	2.00	1.91	$ 1,016	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
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Date: January 13, 2006
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Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	Off-Site, Includes Delivery, Spreading, and Compaction							
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 471	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	6.00	EA	181.61	0.00	0.00	$ 1,090	
	Task Subtotal						**$ 2,979**	
Excavation of Contaminated Soil								
17030212	Excavating, trench, sand and gravel, to 2' - 6' deep, excavate by hand, piled only, excludes sheeting or dewatering	760.00	BCY	0.00	63.67	0.00	$ 48,389	Assumes 10%
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	7,600.00	BCY	0.00	3.18	0.84	$ 30,552	
17030415	Backfill with Excavated Material	7,000.00	CY	0.22	7.64	0.63	$ 59,430	
17030418	Delivered & Dumped, Backfill with Stone	350.00	BCY	26.12	0.87	0.93	$ 9,772	Assumes 5%
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	100.00	CY	6.25	2.00	1.91	$ 1,016	
33020401	Disposable Materials per Sample	18.00	EA	8.80	0.00	0.00	$ 158	
33021721	Testing, semi-volatile organics (625, 8270)	18.00	EA	261.47	0.00	0.00	$ 4,706	
33080584	Landfill gas and leachate control systems, synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength	18,000.00	SF	0.13	0.04	0.00	$ 3,060	Assume 60' x 60' per TP
33170803	Spray washing, decontaminate	5.00	EA	0.00	470.93	0.00	$ 2,355	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
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Date: January 13, 2006
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Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	heavy equipment, decontaminate heavy equipment							
	Task Subtotal						**$ 159,439**	
Excavation of Drums								
17030212	Excavating, trench, sand and gravel, to 2' - 6' deep, excavate by hand, piled only, excludes sheeting or dewatering	1340.00	BCY	0.00	63.67	0.00	$ 85,318	Assumes 10%
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	13,400.00	BCY	0.00	3.18	0.84	$ 53,868	
17030415	Backfill with Excavated Material	13,400.00	CY	0.22	7.64	0.63	$ 113,766	
17030418	Delivered & Dumped, Backfill with Stone	670.00	BCY	26.12	0.87	0.93	$ 18,706	Assumes 5%
33020401	Disposable Materials per Sample	33.00	EA	8.80	0.00	0.00	$ 290	
33021720	Testing, purgeable organics (624, 8260)	33.00	EA	146.90	0.00	0.00	$ 4,848	
33080584	Landfill gas and leachate control systems, synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength	39,600.00	SF	0.13	0.04	0.00	$ 6,732	Assume 60' x 60' per TP
33100101	Transfer Drums to Staging Area with Grappler	22.00	EA	-	13.61	15.68	$ 644	
33100104	Drum Crushing, per Individual Drum	22.00	EA	-	0.99	0.45	$ 32	
33199925	DOT Steel Salvage Drum Composite Overpack, 85 Gallon, 16 Gauge	22.00	EA	105.00	-	-	$ 2,310	
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 471	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
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Date: January 13, 2006
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Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	Task Subtotal						**$286,985**	
Oversight								
33220110	QA/QC Officer	650.00	HR	$ -	$ 51.64	$ -	$ 33,566	
33010107	Van or Pickup Rental	65	DAY	$ 37.00	$ -	$ -	$ 2,405.00	
33010202	Per Diem	65	DAY	$ 89.40	$ -	$ -	$ 5,811.00	
	Task Subtotal						**$41,782**	
<u>Transportation and Off-Site Disposal of Hazardous Wastes</u>								
Off-site Transportation and Waste Disposal								
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	35.00	EA	617.40	0.00	0.00	$ 21,609	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	35.00	EA	181.61	0.00	0.00	$ 6,356	
33190102	Bulk Solid Hazardous Waste Loading Into Truck	0.00	CY	0.00	1.06	1.61	$ -	
33190103	Secondary containment and storage, storage systems,	0.00	EA	0.00	4.74	1.13	$ -	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	loading hazardous waste for shipment, load drums on disposal truck							
33190204	Subcontracted shipping of hazardous waste, transport drums of solid hazardous waste, 80 55 gal. drums	0.00	MI	2.99	0.00	0.00	$ -	
33190205	Subcontracted shipping of hazardous waste, transport bulk solid hazardous waste, 20 C.Y.	0.00	MI	2.99	0.00	0.00	$ -	
33190317	Commercial RCRA landfills, additional landfill disposal costs, waste stream evaluation, 50% rebate on first	0.00	EA	470.61	0.00	0.00	$ -	
33197202	Commercial RCRA landfills, drummed waste disposal, solid, 55 gal drums, incl. non-hazardous	0.00	EA	$ 87.37	$ -	$ -	$ -	
33197264	Commercial RCRA landfills, bulk waste, solid, less than 2,000 lb/CY	0.00	CY	61.65	0.00	0.00	$ -	
Source: Corbett Management Services, LLC, March 30, 2006								
EQ-Belleville, MI								
	Disposal Bulk Solvent Contaminated	999.75	TON	$ 185.00			$ 184,954	750 cy, 1.33 ton/cy
	Transportation to EQ-Belleville, MI	999.75	TON	$ 105.84			$ 105,814	
to EQ-Belleville, MI								
	Transportation and Disposal Drumme direct to Landfill EQ-Belleville	34.00	DRUM	$ 145.00			$ 4,930	Assume 34 drums
	Task Subtotal						**$ 323,663**	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Consolidation of Landfill								
17030212	Excavating, trench, sand and gravel, to 2' - 6' deep, excavate by hand, piled only, excludes sheeting or dewatering	200.00	BCY	0.00	63.67	0.00	$ 12,734	
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	2,000.00	BCY	0.00	3.18	0.84	$ 8,040	
17030415	Backfill with Excavated Material	-	CY	0.22	7.64	0.63	$ -	
17030418	Delivered & Dumped, Backfill with Stone	0.00	BCY	26.12	0.87	0.93	$ -	
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	2300.00	CY	6.25	2.00	1.91	$ 23,368	includes 15% swell
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	1,074.00	LCY	$ 21.33	$ 5.45	$ 1.50	$ 30,373	Topsoil
18050402	Seeding, Vegetative Cover	1.00	ACR	$ 1,737.99	$ 109.66	$ 53.43	$ 1,901	Seeding
17030422	Unclassified Fill, 6" Lifts, On-Site, Includes Spreading and Compaction	2300.00	CY	6.25	2.00	1.91	$ 23,368	includes 15% swell
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 471	
	Task Subtotal						**$ 100,255**	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Construct Low Permeability Cover System								
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	12,060.00	CY	$ 6.25	$ 2.00	$ 1.91	$ 122,530	Soil Protective Layer
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	0	CY	$ 6.25	$ 2.00	$ 1.91	$ -	Covered above
17030426	Sand, 6" Lifts, Off-Site	5,324.00	CY	$ 8.19	$ 2.17	$ 1.92	$ 65,379	Gas Venting Layer
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	3,546.00	LCY	$ 21.33	$ 5.45	$ 1.50	$ 100,281	Topsoil
18050402	Seeding, Vegetative Cover	3.30	ACR	$ 1,737.99	$ 109.66	$ 53.43	$ 6,274	Seeding
33070201	6" Inside Diameter (Vertical Pipe Spaced @ one acre), Gas Vent Piping System	25.50	LF	$ 12.72	$ 9.36	$ 1.79	$ 609	
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	1,445.12	LF	$ 0.04	$ 1.95	$ 0.26	$ 3,252	
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	17,569.00	SY	$ 0.75	$ 0.69	$ 0.03	$ 25,826	Filter Fabric
17030419	Crushed Stone, 1/2" to 3/4"	667.00	CY	$ 19.21	$ 2.85	$ 0.89	$ 15,308	Toe drain
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	1,333.00	SY	$ 0.75	$ 0.69	$ 0.03	$ 1,960	Toe drain
19040627	10,000 gallon Horizontal Plastic Sump	1.00	EA	$ 5,800.00	$ 853.69	$ 123.26	$ 6,777	Leachate storage
33260902	6" Diameter Perforated PVC Pipe	2,000.00	LF	$ 2.99	$ 3.59	$ 2.18	$ 17,520	Toe drain
33080543	40 Mil Polymeric Liner, Very Low Density Polyethylene	158,121.00	SF	$ 0.26	$ 0.13	$ 0.01	$ 63,248	Geomembrane
33430201	Miscellaneous Minor Field Installation	1.00	LS	$ 109,276.16	$ -	$ -	$ 109,276	
Permanent Access Road								
18010102	Gravel, Delivered and Dumped	133.3	CY	$ 21.11	$ 1.78	$ 1.62	$ 3,268	600 LF, 6", 12' wide
17030101	Rough Grading, D6 Dozer	800.00	SY	$ -	$ 0.95	$ 2.55	$ 2,800	
Oversight								

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
33220110	QA/QC Officer	650.00	HR	$ -	$ 51.64	$ -	$ 33,566	
33010107	Van or Pickup Rental	65	DAY	$ 37.00	$ -	$ -	$ 2,405.00	
33010202	Per Diem	65	DAY	$ 89.40	$ -	$ -	$ 5,811.00	
	Task Subtotal						**$ 586,088**	
<u>Site Restoration</u>								
17040101	Cleaning Up, site debris clean up and removal	1.00	ACR	0.00	466.99	28.58	$ 496	
18050101	Area Preparation, 67% Level & 33% Slope	1.00	ACR	0.00	42.48	46.62	$ 89	
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	1.00	ACR	4,468.51	0.00	0.00	$ 4,469	
18050408	Fertilizer, Hydro Spread	2.00	ACR	97.52	74.63	20.16	$ 385	
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	8.00	ACR	0.92	36.63	34.33	$ 575	
18050415	Mowing	2.00	ACR	0.00	271.96	0.00	$ 544	
	Task Subtotal						**$ 6,013**	
<u>Institutional Controls</u>								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 104	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 112	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5	
99040401	Construction Signs	96.00	SF	$ 12.67	$ -	$ -	$ 1,216	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Fencing Installation								
18040107	6' Galvanized Chain-link Fence	2728.25	LF	$ 21.87	$ 1.47	$ -	$ 63,677.36	
18040117	6' Swing Gate, 12' Double	1.00	EA	$ 621.88	$ 106.67	$ 53.44	$ 781.99	
Signage Installation								
18040501	Hazardous Waste Signing	14.00	EA	$ 18.35	$ 33.00	$ -	$ 718.90	Every 200 LF of fence
	Task Subtotal						**$ 69,809.90**	

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
<u>Monitoring Well Installation</u>								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2.00	LS	0.00	1,358.40	969.76	$ 4,656	
33231178	Move Rig/Equipment Around Site	6.00	EA	58.75	195.27	139.40	$ 2,361	
33231504	Surface Pad, Concrete, 2' x 2' x 4"	8.00	EA	38.33	17.87	1.76	$ 464	
33232301	5' Guard Posts, Cast Iron, Concrete Fill	32.00	EA	30.51	84.00	0.06	$ 3,666	
33231186	Well Development Equipment Rental (weekly)	1.00	WK	456.14	64.76	0.00	$ 521	
Shallow Wells 5-15 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	121.08	0.00	0.00	$ 121	
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	17.64	530.10	0.00	$ 548	
33220112	Field Technician	16.00	HR	0.00	39.13	0.00	$ 626	
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.19	3.81	7.14	$ 243	
33230201	2" PVC, Schedule 40, Well Screen	20.00	LF	2.75	4.92	9.21	$ 338	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	44.00	LF	0.00	10.45	19.57	$ 1,321	
33231401	2" Screen, Filter Pack	28.00	LF	3.09	3.24	6.07	$ 347	
33231811	2" Well, Portland Cement Grout	8.00	LF	1.15	0.00	0.00	$ 9	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
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Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
Deep Wells 15-25 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	2.00	DAY	121.08	0.00	0.00	$ 242	
33170808	Decontaminate Rig, Augers,	2.00	DAY	17.64	530.10	0.00	$ 1,095	
33220112	Field Technician	29.00	HR	0.00	39.13	0.00	$ 1,135	
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.19	3.81	7.14	$ 728	
33230201	2" PVC, Schedule 40, Well Screen	40.00	LF	2.75	4.92	9.21	$ 675	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231126	Air Rotary, 6" Dia Borehole (Consolidated), Depth <= 100 ft	104.00	LF	0.00	15.68	29.35	$ 4,683	
33231401	2" Screen, Filter Pack	48.00	LF	3.09	3.24	6.07	$ 595	
33231811	2" Well, Portland Cement Grout	48.00	LF	1.15	0.00	0.00	$ 55	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
	Task Subtotal						**$24,976.49**	
<u>Site Closure Report</u>								
95010102	Site Closure Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756	
	Task Subtotal						**$ 9,756**	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE ANNUAL AND PERIODIC COSTS								
Annual Monitoring								
Groundwater Sampling								
33020401	Disposable Materials per Sample	14.00	EA	8.80	0.00	0.00	$ 123.20	
33020402	Decontamination Materials per Sample	14.00	EA	7.84	0.00	0.00	$ 109.76	
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	246.30	0.00	0.00	$ 246.30	
33022131	Testing, purgeable halocarbons (SW5030/8010)	16.00	EA	154.18	0.00	0.00	$ 2,466.88	
33022132	Testing, purgeable aromatics (SW5030/8020)	16.00	EA	122.50	0.00	0.00	$ 1,960.00	
33021603	Testing, dissolved solids	16.00	EA	14.95	0.00	0.00	$ 239.20	
33021604	Testing, suspended solids	16.00	EA	13.13	0.00	0.00	$ 210.08	
33021620	Testing, TAL metals (6010/7000s)	16.00	EA	367.07	0.00	0.00	$ 5,873.12	
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.00/SM 4110B)	16.00	EA	32.82	-	-	$ 525.12	
33021667	Sulfate (EPA 300.0)	16.00	EA	17.40	-	-	$ 278.40	
	Field Parameters	14.00	EA	-	-	-	$ -	
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	6.00	EA	6.35	0.00	0.00	$ 38.10	
Surface Water Sampling								
33020520	Hip Waders	1.00	EA	109.57	0.00	0.00	$ 109.57	
33020524	Field sampling equipment, coliwasas, glass, disposable, 200 mL, case of 12, 7/8" x 42" testing parameter device rental	2.00	EA	109.64	0.00	0.00	$ 219.28	
33022131	Testing, purgeable halocarbons (SW5030/8010)	3.00	EA	154.18	0.00	0.00	$ 462.54	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
33022132	Testing, purgeable aromatics (SW5030/8020)	3.00	EA	122.50	0.00	0.00	$ 367.50	
33021603	Testing, dissolved solids	3.00	EA	14.95	0.00	0.00	$ 44.85	
33021604	Testing, suspended solids	3.00	EA	13.13	0.00	0.00	$ 39.39	
33021620	Testing, TAL metals (6010/7000s)	3.00	EA	367.07	0.00	0.00	$ 1,101.21	
Labor and ODCs								
33010107	Van or Pickup Rental	5	DAY	$ 37.00	$ -	$ -	$ 185.00	
33010202	Per Diem	10	DAY	$ 89.40	$ -	$ -	$ 894.00	
33220112	Field Technician	100.00	HR	0.00	39.13	0.00	$ 3,913.00	Assume 2 Field Techs
	Task Subtotal						**$ 19,406.50**	
<u>**Annual Reporting**</u>								
95010102	Annual Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756.10	
	Task Subtotal						$ 9,756.10	
<u>**Leachate Collection and Disposal/Treatment**</u>								
33197103	Process Water Hauling Fee, Subcontracted	60000	GAL	$ 0.29	$ -	$ -	$ 17,400	
33197102	Wastewater Disposal Fee	60	KGAL	$ 1.76	$ -	$ -	$ 106	
	Task Subtotal						**$ 17,506**	
<u>**Semi-annual Wetlands Restoration Monitoring**</u>								
Site Inspection/Planning								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220102	Project Manager	2.00	HR	$ -	$ 63.14	$ -	$ 126	
33220109	Staff Scientist	24.00	HR	$ -	$ 52.53	$ -	$ 1,261	
33220114	Word Processing/Clerical	8.00	HR	$ -	$ 27.26	$ -	$ 218	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
	Task Subtotal						$ 2,011	

Alternative 5: Consolidation and Construction of Low Permeability Cover System
Prepared By: RTB/KAW
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Annual Landfill Maintenance								
0.5% of Capital Costs for Cover System								
	Task Subtotal						**$ 2,930**	
Periodic Fence and Sign Maintenance								
5% of Capital Costs for Fence and Signs							$ 3,258.91	
	Task Subtotal						**$ 3,258.91**	
Institutional Control Inspections								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
	Task Subtotal						**$ 3,415.33**	

PRESENT VALUE OF ANNUAL AND PERIODIC COSTS FOR ALTERNATIVE 5
Prepared By: RTB
Date: January 13, 2006
Checked By: MJS
Date: January 27,2006

Year	Cost*	Number of Annual Periods	Annual Discount Rate	Number of 5-Year Periods	5-Year Discount Rate	Number of 10-Year Periods	10-Year Discount Rate	Total Non-Discounted Cost	Present Value Cost
Capital (Year 0)	$ 2,622,000	1	0	NA	NA	NA	NA	$ 2,622,000	$ 2,622,000
Quarterly Monitoring (years 1-5)	$ 101,000	5	0.031	NA	NA	NA	NA	$ 505,000	$ 461,233
Semi-annual Monitoring (years 6-10)	$ 50,000	5	0.031	1	0.165	NA	NA	$ 250,000	$ 196,009
Annual Monitoring (years 11-30)	$ 25,000	10	0.031	NA	NA	1	0.357	$ 250,000	$ 156,350
Leachate Collection and Disposal/Treatment (Years 1-30)	$ 23,000	30	0.031	NA	NA	NA	NA	$ 690,000	$ 445,038
Semi-annual Wetlands Restoration Monitoring (Years 1-5)	$ 5,000	5	0.031	NA	NA	NA	NA	$ 25,000	$ 22,833
Annual Landfill Maintenance (Years 1-30)	$ 3,000	30	0.031	NA	NA	NA	NA	$ 90,000	$ 58,048
Annual Reporting (Years 1-30)	$ 13,000	30	0.031	NA	NA	NA	NA	$ 390,000	$ 251,543
Maintenance of Fencing and Signs (every 5 Years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Institutional Control Inspections (every 5 years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Totals								**$ 4,870,000**	**$ 4,242,153**

*Annual and periodic costs include 5 % for administrative support and 25% contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.
Capital costs include 25% contingency, 10% engineering and design, 5% health and safety, 5% administrative, and 10% construction services.

Discount rate based on OMB Circular No. A-94 App. C (Revised Jan. 2005)

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE CAPITAL COSTS								
Pre-Design Investigation								
Site Inspection/Planning								
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	$ 0.49	$ -	$ -	$ 29	
33220102	Project Manager	17.00	HR	$ -	$ 63.14	$ -	$ 1,073	
33220109	Staff Scientist	159.00	HR	$ -	$ 52.53	$ -	$ 8,352	
33220110	QA/QC Officer	13.00	HR	$ -	$ 51.64	$ -	$ 671	
33220111	Certified Industrial Hygienist	24.00	HR	$ -	$ 65.52	$ -	$ 1,572	
33220114	Word Processing/Clerical	40.00	HR	$ -	$ 27.26	$ -	$ 1,090	
33220115	Draftsman/CADD	34.00	HR	$ -	$ 35.64	$ -	$ 1,212	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
Sediment Sampling								
33020634	Sludge sampler, stainless steel, thread on, 3.25" x 12"	1.00	EA	$ 544.90	$ -	$ -	$ 545	
33021720	Testing, purgeable organics (624, 8260)	8.00	EA	$ 176.28	$ -	$ -	$ 1,410	
33021102	Testing, moisture content (209a)	8.00	EA	$ 29.49	$ -	$ -	$ 236	
33021709	Testing, TAL metals	8.00	EA	$ 367.07	$ -	$ -	$ 2,937	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis (6010/7000s)	8.00	EA	$ 217.94	$ -	$ -	$ 1,744	
Labor and ODCs								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220112	Field Technician	10.00	HR	0.00	39.13	0.00	$ 391.30	Assume 2 Field Techs
	Task Subtotal						**$ 21,670**	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Work Plan								
95010101	Work Plan	1.00	LS	$ -	$ 12,195.12	$ -	$ 12,195	
	Task Subtotal						**$ 12,195**	
Site Preparation/Mobilization								
Clearing and Grubbing								
17010107	Medium Brush, Medium Trees, Clear, Grub, Haul	4.35	ACR	**$ -**	$ 3,327.00	$ 2,852.00	$ 26,879	
Site Trailer and Utilities								
99040101	Temporary Office 20' x 8'	3.00	MO	$ 206.42	$ -	$ -	$ 619	
99140201	Temporary Storage Trailer 16' x 8'	3.00	MO	$ 80.72	$ -	$ -	$ 242	
99040501	Portable Toilets	3.00	MO	$ 82.65	$ -	$ -	$ 248	
99040801	Temporary Electrical Power - Average	1.60	CSF	$ 90.53	$ -	$ -	$ 145	
Minor regrading								
17030101	Rough Grading, D6 Dozer	21,054.00	SY	$ -	$ 0.95	$ 2.55	$ 73,689	
	Task Subtotal						**$ 101,822**	
Excavation of Contaminated Sediment								
17030276	Excavate and load, bank measure, medium material, 3/4 C.Y. bucket, hydraulic excavator	100.00	BCY	0.00	3.18	0.84	$ 402	
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	100.00	CY	6.25	2.00	1.91	$ 1,016	
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 471	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	6.00	EA	181.61	0.00	0.00	$ 1,090	
	Task Subtotal						**$ 2,979**	
Excavation of Landfill								
17030212	Excavating, trench, sand and gravel, to 2' - 6' deep, excavate by hand, piled only, excludes sheeting or dewatering	30.37	BCY	0.00	63.67	0.00	$1,933.66	
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	39,600.00	CY	0.00	1.00	2.18	$125,928.00	36,000 + 10% for sideslopes
17030418	Delivered & Dumped, Backfill with Stone	0.00	BCY	26.12	0.87	0.93	$ 0.00	
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	0.00	CY	6.25	2.00	1.91	$ 0.00	Assume 2 lifts over 4.33 acres
17030101	Rough Grading, D6 Dozer	20,957.20	SY	$ -	$ 0.95	$ 2.55	$ 73,350	
33080584	Landfill gas and leachate control	348,838.10	SF	0.13	0.04	0.00	$59,302.48	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	systems, synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength							
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	72.00	EA	617.40	0.00	0.00	$ 44,453	per 500 cubic yards
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	72.00	EA	181.61	0.00	0.00	$ 13,076	per 500 cubic yards
33021720	Testing, purgeable organics (624, 8260)	72.00	EA	$ 176.28	$ -	$ -	$ 12,692	per 500 cubic yards
33170803	Spray washing, decontaminate heavy equipment, decontaminate heavy equipment	1.00	EA	0.00	470.93	0.00	$ 470.93	
						Subtotal	**$331,206**	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Transportation and Off-Site Disposal of Hazardous Wastes								
Source: Corbett Management Services, LLC, March 30, 2006								
EQ-Belleville, MI								
	Disposal Bulk Solvent Contaminated Soil	1,333.00	TON	$ 185.00			$ 246,605	1000 cy, 1.33 ton/cy
	Transportation to EQ-Belleville, MI	1,333.00	TON	$ 105.84			$ 141,085	
to EQ-Belleville, MI								
	Transportation and Disposal Drummed Waste, direct to Landfill EQ-Belleville	34.00	DRUM	$ 145.00			$ 4,930	Assume 34 drums
	Task Subtotal						**$ 392,620**	
Transportation and Off-Site Disposal of Solid Wastes								
Source: Corbett Management Services, LLC, March 30, 2006								
Solid Waste Non-Hazardous								
	Disposal	32,400.00	TON	$ 45.00			$ 1,458,000	36000 cy, 1800 lbs/cy
	Transportation	32,400.00	TON	$ 21.42			$ 694,008	
	Task Subtotal						**$2,152,008**	
Site Restoration								
17040101	Cleaning Up, site debris clean up and removal	4.00	ACR	0.00	466.99	28.58	$ 1,982	
18050101	Area Preparation, 67% Level & 33% Slope	2.00	ACR	0.00	42.48	46.62	$ 178	
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	2.00	ACR	4,468.51	0.00	0.00	$ 8,937	
18050408	Fertilizer, Hydro Spread	4.00	ACR	97.52	74.63	20.16	$ 769	
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	8.00	ACR	0.92	36.63	34.33	$ 575	
18050415	Mowing	4.00	ACR	0.00	271.96	0.00	$ 1,088	
	Task Subtotal						**$ 13,530**	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Oversight								
33220110	QA/QC Officer	1299.00	HR	$ -	$ 51.64	$ -	$ 67,080	
33010107	Van or Pickup Rental	130	DAY	$ 37.00	$ -	$ -	$ 4,810.00	
33010202	Per Diem	130	DAY	$ 89.40	$ -	$ -	$ 11,622.00	
	Task Subtotal						**$83,512**	
<u>Institutional Controls</u>								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 104	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 112	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5	
99040401	Construction Signs	96.00	SF	$ 12.67	$ -	$ -	$ 1,216	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200	
Fencing Installation								
18040107	6' Galvanized Chain-link Fence	2728.25	LF	$ 21.87	$ 1.47	$ -	$ 63,677.36	
18040117	6' Swing Gate, 12' Double	1.00	EA	$ 621.88	$ 106.67	$ 53.44	$ 781.99	
Signage Installation								
18040501	Hazardous Waste Signing	14.00	EA	$ 18.35	$ 33.00	$ -	$ 718.90	Every 200 LF of fence
	Task Subtotal						**$ 69,809.90**	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Monitoring Well Installation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2.00	LS	0.00	1,358.40	969.76	$ 4,656	
33231178	Move Rig/Equipment Around Site	6.00	EA	58.75	195.27	139.40	$ 2,361	
33231504	Surface Pad, Concrete, 2' x 2' x 4"	8.00	EA	38.33	17.87	1.76	$ 464	
33232301	5' Guard Posts, Cast Iron, Concrete Fill	32.00	EA	30.51	84.00	0.06	$ 3,666	
33231186	Well Development Equipment Rental (weekly)	1.00	WK	456.14	64.76	0.00	$ 521	
Shallow Wells 5-15 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	121.08	0.00	0.00	$ 121	
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	17.64	530.10	0.00	$ 548	
33220112	Field Technician	16.00	HR	0.00	39.13	0.00	$ 626	
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.19	3.81	7.14	$ 243	
33230201	2" PVC, Schedule 40, Well Screen	20.00	LF	2.75	4.92	9.21	$ 338	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	44.00	LF	0.00	10.45	19.57	$ 1,321	
33231401	2" Screen, Filter Pack	28.00	LF	3.09	3.24	6.07	$ 347	
33231811	2" Well, Portland Cement Grout	8.00	LF	1.15	0.00	0.00	$ 9	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
Deep Wells 15-25 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	2.00	DAY	121.08	0.00	0.00	$ 242	
33170808	Decontaminate Rig, Augers,	2.00	DAY	17.64	530.10	0.00	$ 1,095	
33220112	Field Technician	29.00	HR	0.00	39.13	0.00	$ 1,135	
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.19	3.81	7.14	$ 728	
33230201	2" PVC, Schedule 40, Well Screen	40.00	LF	2.75	4.92	9.21	$ 675	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231126	Air Rotary, 6" Dia Borehole (Consolidated), Depth <= 100 ft	104.00	LF	0.00	15.68	29.35	$ 4,683	
33231401	2" Screen, Filter Pack	48.00	LF	3.09	3.24	6.07	$ 595	
33231811	2" Well, Portland Cement Grout	48.00	LF	1.15	0.00	0.00	$ 55	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
	Task Subtotal						**$24,976.49**	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Site Closure Report								
95010102	Site Closure Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756	
	Task Subtotal						**$ 9,756**	
ALTERNATIVE ANNUAL AND PERIODIC COSTS								
Annual Monitoring								
Groundwater Sampling								
33020401	Disposable Materials per Sample	14.00	EA	8.80	0.00	0.00	$ 123.20	
33020402	Decontamination Materials per Sample	14.00	EA	7.84	0.00	0.00	$ 109.76	
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	246.30	0.00	0.00	$ 246.30	
33022131	Testing, purgeable halocarbons (SW5030/8010)	16.00	EA	154.18	0.00	0.00	$ 2,466.88	
33022132	Testing, purgeable aromatics (SW5030/8020)	16.00	EA	122.50	0.00	0.00	$ 1,960.00	
33021603	Testing, dissolved solids	16.00	EA	14.95	0.00	0.00	$ 239.20	
33021604	Testing, suspended solids	16.00	EA	13.13	0.00	0.00	$ 210.08	
33021620	Testing, TAL metals (6010/7000s)	16.00	EA	367.07	0.00	0.00	$ 5,873.12	
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.00/SM 4110B)	16.00	EA	32.82	-	-	$ 525.12	
33021667	Sulfate (EPA 300.0)	16.00	EA	17.40	-	-	$ 278.40	
	Field Parameters	14.00	EA	-	-	-	$ -	
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	6.00	EA	6.35	0.00	0.00	$ 38.10	
Surface Water Sampling								
33020520	Hip Waders	0.00	EA	109.57	0.00	0.00	$ -	
33020524	Field sampling equipment, coliwasas, glass, disposable, 200 mL, case of 12, 7/8" x 42" testing parameter device rental	0.00	EA	109.64	0.00	0.00	$ -	
33022131	Testing, purgeable halocarbons (SW5030/8010)	0.00	EA	154.18	0.00	0.00	$ -	
33022132	Testing, purgeable aromatics (SW5030/8020)	0.00	EA	122.50	0.00	0.00	$ -	

Alternative 6: Excavation of Landfill and Off-site Disposal of Hazardous and Non-Hazardous Wastes
Prepared By: RTB/KAW
Date: March 31, 2006
Checked By: KAW
Date: March 31, 2006

Task Subtask Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
33021603	Testing, dissolved solids	0.00	EA	14.95	0.00	0.00	$ -	
33021604	Testing, suspended solids	0.00	EA	13.13	0.00	0.00	$ -	
33021620	Testing, TAL metals (6010/7000s)	0.00	EA	367.07	0.00	0.00	$ -	
Labor and ODCs								
33010107	Van or Pickup Rental	5	DAY	$ 37.00	$ -	$ -	$ 185.00	
33010202	Per Diem	10	DAY	$ 89.40	$ -	$ -	$ 894.00	
33220112	Field Technician	100.00	HR	0.00	39.13	0.00	$ 3,913.00	Assume 2 Field Techs
	Task Subtotal						**$ 17,062.16**	
<u>Annual Reporting</u>								
95010102	Annual Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756.10	
	Task Subtotal						**$ 9,756.10**	
<u>Semi-annual Wetlands Restoration Monitoring</u>								
Site Inspection/Planning								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220102	Project Manager	2.00	HR	$ -	$ 63.14	$ -	$ 126	
33220109	Staff Scientist	24.00	HR	$ -	$ 52.53	$ -	$ 1,261	
33220114	Word Processing/Clerical	8.00	HR	$ -	$ 27.26	$ -	$ 218	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
	Task Subtotal						**$ 2,011**	
<u>Periodic Fence and Sign Maintenance</u>								
	5% of Capital Costs for Fence and Signs						$ 3,258.91	
	Task Subtotal						**$ 3,258.91**	
<u>Institutional Control Inspections</u>								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
	Task Subtotal						**$ 3,415.33**	

PRESENT VALUE OF ANNUAL AND PERIODIC COSTS FOR ALTERNATIVE 6
Prepared By: RTB
Date: March 31, 2006
Checked By: MJS
Date: November 29, 2006

Year	Cost*	Number of Annual Periods	Annual Discount Rate	Number of 5-Year Periods	5-Year Discount Rate	Number of 10-Year Periods	10-Year Discount Rate	Total Non-Discounted Cost	Present Value Cost
Capital (Year 0)	$ 4,989,000	1	0	NA	NA	NA	NA	$ 4,989,000	$ 4,989,000
Quarterly Groundwater Monitoring (Years 1-5)	$ 89,000	5	0.031	NA	NA	NA	NA	$ 445,000	$ 406,433
Semi-Annual Groundwater Monitoring (Years 6-10)	$ -	5	0.031	1	0.165	NA	NA	$ -	$ -
Annual Groundwater Monitoring (Years 11-30)	$ -	10	0.031	NA	NA	1	0.357	$ -	$ -
Semi-annual Wetlands Restoration Monitoring (1-5)	$ 5,000	5	0.031	NA	NA	NA	NA	$ 25,000	$ 22,833
Annual Reporting (Years 5)	$ 13,000	5	0.031	NA	NA	NA	NA	$ 65,000	$ 59,367
Maintenance of Fencing and Signs (every 5 Years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Institutional Control Inspections (every 5 years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Totals								**$ 5,572,000**	**$ 5,506,731**

*Annual and periodic costs include 5 % for administrative support and 25% contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.
Capital costs include 25% contingency, 10% engineering and design, 5% health and safety, 5% administrative, and 10% construction services.

Discount rate based on OMB Circular No. A-94 App. C (Revised Jan. 2005)

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE CAPITAL COSTS								
Pre-Design Investigation								
Site Inspection/Planning								
33010104	Sample collection, vehicle mileage charge, car or van	60.00	MI	$ 0.49	$ -	$ -	$ 29	
33220102	Project Manager	17.00	HR	$ -	$ 63.14	$ -	$ 1,073	
33220109	Staff Scientist	159.00	HR	$ -	$ 52.53	$ -	$ 8,352	
33220110	QA/QC Officer	13.00	HR	$ -	$ 51.64	$ -	$ 671	
33220111	Certified Industrial Hygienist	24.00	HR	$ -	$ 65.52	$ -	$ 1,572	
33220114	Word Processing/Clerical	40.00	HR	$ -	$ 27.26	$ -	$ 1,090	
33220115	Draftsman/CADD	34.00	HR	$ -	$ 35.64	$ -	$ 1,212	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
Site Investigation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	$ -	$ 1,358.40	$ 969.76	$ 2,328	
33020664	Drilling 4" Diameter Soil Borings, No Sampling,11-20 Feet Deep	200.00	LF	$ 18.77	$ -	$ -	$ 3,754	
33170811	Decontaminate Trenching/Drilling Equipment	2.00	EA	$ -	$ 192.59	$ -	$ 385	
33220102	Project Manager	22.00	HR	$ -	$ 63.14	$ -	$ 1,389	
33220109	Staff Scientist	146.00	HR	$ -	$ 52.53	$ -	$ 7,669	
33220110	QA/QC Officer	8.00	HR	$ -	$ 51.64	$ -	$ 413	
33220111	Certified Industrial Hygienist	2.00	HR	$ -	$ 65.52	$ -	$ 131	
33220114	Word Processing/Clerical	20.00	HR	$ -	$ 27.26	$ -	$ 545	
33220115	Draftsman/CADD	12.00	HR	$ -	$ 35.64	$ -	$ 428	
33240101	Other Direct Costs	1.00	LS	$ 211.49	$ -	$ -	$ 211	
	Task Subtotal						**$ 31,535**	

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Work Plan								
95010101	Work Plan	1.00	LS	$ -	$ 12,195.12	$ -	$ 12,195	
	Task Subtotal						**$ 12,195**	
Site Preparation/Mobilization								
Clearing and Grubbing								
17010107	Medium Brush, Medium Trees, Clear, Grub, Haul	4.35	ACR	**$ -**	$ 3,327.00	$ 2,852.00	$ 26,879	
Site Trailer and Utilities								
99040101	Temporary Office 20' x 8'	3.00	MO	$ 206.42	$ -	$ -	$ 619	
99140201	Temporary Storage Trailer 16' x 8'	3.00	MO	$ 80.72	$ -	$ -	$ 242	
99040501	Portable Toilets	3.00	MO	$ 82.65	$ -	$ -	$ 248	
99040801	Temporary Electrical Power - Avg	1.60	CSF	$ 90.53	$ -	$ -	$ 145	
Minor regrading								
17030101	Rough Grading, D6 Dozer	21,054.00	SY	$ -	$ 0.95	$ 2.55	$ 73,689	
	Task Subtotal						**$ 101,822**	
Construct Soil Cover System								
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	12,245.00	CY	$ 6.25	$ 2.00	$ 1.91	$ 124,409	2-ft Soil Cover
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	2300.0	CY	$ 6.25	$ 2.00	$ 1.91	$ 23,368	Subgrade fill
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	4,620.00	LCY	$ 21.33	$ 5.45	$ 1.50	$ 130,654	Topsoil
18050402	Seeding, Vegetative Cover	4.30	ACR	$ 1,737.99	$ 109.66	$ 53.43	$ 8,175	Seeding
Permanent Access Road								
18010102	Gravel, Delivered and Dumped	166.7	CY	$ 21.11	$ 1.78	$ 1.62	$ 4,085	750 LF, 6", 12' wide
17030101	Rough Grading, D6 Dozer	1,000.00	SY	$ -	$ 0.95	$ 2.55	$ 3,500	
Oversight								
33220110	QA/QC Officer	325.00	HR	$ -	$ 51.64	$ -	$ 16,783	
33010107	Van or Pickup Rental	32	DAY	$ 37.00	$ -	$ -	$ 1,184.00	
33010202	Per Diem	32	DAY	$ 89.40	$ -	$ -	$ 2,860.80	
	Task Subtotal						**$ 315,018**	

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Transportation and Off-Site Disposal of Hazardous Wastes								
Off-site Transportation and Waste Disposal								
33021705	Targeted TCLP (Metals, Volatiles, Semi-Volatiles only), Soil Analysis	6.00	EA	$ 617.40	$ -	$ -	$ 3,704	
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	6.00	EA	$ 181.61	$ -	$ -	$ 1,090	
33190103	Secondary containment and storage, storage systems, loading hazardous waste for shipment, load drums on disposal truck	0.00	EA	$ -	$ 4.74	$ 1.13	$ -	
33190204	Subcontracted shipping of hazardous waste, transport drums of solid hazardous waste, 80 55 gal. drums	0.00	MI	$ 2.99	$ -	$ -	$ -	
33190303	Commercial RCRA landfills, drummed waste disposal, min charges for drummed shipments	0.00	EA	$ 556.89	$ -	$ -	$ -	
33190311	Commercial RCRA landfills, truck washout	0.00	EA	$ 167.07	$ -	$ -	$ -	
33197202	Commercial RCRA landfills, drummed waste disposal, solid, 55 gal drums, incl. non-hazardous	0.00	EA	$ 87.37	$ -	$ -	$ -	
Transportation and Off-Site Disposal of Hazardous Wastes								
Source: Corbett Management Services, LLC, March 30, 2006								
EQ-Belleville, MI								
	Disposal Bulk Solvent Contaminated	-	TON	$ 185.00			$ -	
	Transportation to EQ-Belleville, MI	-	TON	$ 105.84			$ -	
to EQ-Belleville, MI								
	Transportation and Disposal Drumm direct to Landfill EQ-Belleville	6.00	DRUM	$ 145.00			$ 870	Assume 6 drums
	Task Subtotal						**$ 5,664**	

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Institutional Controls								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 104	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 112	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400	
							$ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5	
99040401	Construction Signs	96.00	SF	$ 12.67	$ -	$ -	$ 1,216	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200	
Fencing Installation								
18040107	6' Galvanized Chain-link Fence	2728.25	LF	$ 21.87	$ 1.47	$ -	$ 63,677	
18040117	6' Swing Gate, 12' Double	1.00	EA	$ 621.88	$ 106.67	$ 53.44	$ 782	
Signage Installation								
18040501	Hazardous Waste Signing	14.00	EA	$ 18.35	$ 33.00	$ -	$ 719	Every 200 LF of fence
	Task Subtotal						**$ 69,809.90**	
Monitoring Well Installation								
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2.00	LS	0.00	1,358.40	969.76	$ 4,656	
33231178	Move Rig/Equipment Around Site	6.00	EA	58.75	195.27	139.40	$ 2,361	
33231504	Surface Pad, Concrete, 2' x 2' x 4"	8.00	EA	38.33	17.87	1.76	$ 464	
33232301	5' Guard Posts, Cast Iron, Concrete Fill	32.00	EA	30.51	84.00	0.06	$ 3,666	
33231186	Well Development Equipment Rental (weekly)	1.00	WK	456.14	64.76	0.00	$ 521	
Shallow Wells 5-15 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	1.00	DAY	121.08	0.00	0.00	$ 121	
33170808	Decontaminate Rig, Augers, Screen (Rental Equipment)	1.00	DAY	17.64	530.10	0.00	$ 548	
33220112	Field Technician	16.00	HR	0.00	39.13	0.00	$ 626	
33230101	2" PVC, Schedule 40, Well Casing	20.00	LF	1.19	3.81	7.14	$ 243	
33230201	2" PVC, Schedule 40, Well	20.00	LF	2.75	4.92	9.21	$ 338	

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
	Screen							
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231101	Hollow Stem Auger, 8" Dia Borehole, Depth <= 100 ft	44.00	LF	0.00	10.45	19.57	$ 1,321	
33231401	2" Screen, Filter Pack	28.00	LF	3.09	3.24	6.07	$ 347	
33231811	2" Well, Portland Cement Grout	8.00	LF	1.15	0.00	0.00	$ 9	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
Deep Wells 15-25 bgs								
33020303	Organic Vapor Analyzer Rental, per Day	2.00	DAY	121.08	0.00	0.00	$ 242	
33170808	Decontaminate Rig, Augers,	2.00	DAY	17.64	530.10	0.00	$ 1,095	
33220112	Field Technician	29.00	HR	0.00	39.13	0.00	$ 1,135	
33230101	2" PVC, Schedule 40, Well Casing	60.00	LF	1.19	3.81	7.14	$ 728	
33230201	2" PVC, Schedule 40, Well Screen	40.00	LF	2.75	4.92	9.21	$ 675	
33230301	2" PVC, Well Plug	4.00	EA	5.79	5.72	10.70	$ 89	
33231126	Air Rotary, 6" Dia Borehole (Consolidated), Depth <= 100 ft	104.00	LF	0.00	15.68	29.35	$ 4,683	
33231401	2" Screen, Filter Pack	48.00	LF	3.09	3.24	6.07	$ 595	
33231811	2" Well, Portland Cement Grout	48.00	LF	1.15	0.00	0.00	$ 55	
33232101	2" Well, Bentonite Seal	4.00	EA	9.18	12.87	24.08	$ 185	
	Task Subtotal						**$24,976.49**	
Site Restoration								
17040101	Cleaning Up, site debris clean up and removal	0.20	ACR	0.00	466.99	28.58	$ 99	
18050101	Area Preparation, 67% Level & 33% Slope	0.10	ACR	0.00	42.48	46.62	$ 9	
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	0.10	ACR	4,468.51	0.00	0.00	$ 447	
18050408	Fertilizer, Hydro Spread	0.20	ACR	97.52	74.63	20.16	$ 38	
18050413	Watering with 3,000-Gallon Tank Truck, per Pass	0.20	ACR	0.92	36.63	34.33	$ 14	
18050415	Mowing	0.00	ACR	0.00	271.96	0.00	$ -	
	Task Subtotal						**$ 608**	
Site Closure Report								
95010102	Site Closure Report	1.00	LS	$ -	$ 9,756.10	$ -	$ 9,756	
	Task Subtotal						**$ 9,756**	

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task / Subtask / Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
ALTERNATIVE ANNUAL AND PERIODIC COSTS								
Annual Monitoring								
Groundwater Sampling								
33020401	Disposable Materials per Sample	14.00	EA	8.80	0.00	0.00	$ 123.20	
33020402	Decontamination Materials per Sample	14.00	EA	7.84	0.00	0.00	$ 109.76	
33021509	Monitor well sampling equipment, rental, water quality testing parameter device rental	1.00	WK	246.30	0.00	0.00	$ 246.30	
33022131	Testing, purgeable halocarbons (SW5030/8010)	16.00	EA	154.18	0.00	0.00	$ 2,466.88	
33022132	Testing, purgeable aromatics (SW5030/8020)	16.00	EA	122.50	0.00	0.00	$ 1,960.00	
33021603	Testing, dissolved solids	16.00	EA	14.95	0.00	0.00	$ 239.20	
33021604	Testing, suspended solids	16.00	EA	13.13	0.00	0.00	$ 210.08	
33021620	Testing, TAL metals (6010/7000s)	16.00	EA	367.07	0.00	0.00	$ 5,873.12	
33021608	Nitrogen/Nitrite/Nitrate (EPA 300.00/SM 4110B)	16.00	EA	32.82	-	-	$ 525.12	
33021667	Sulfate (EPA 300.0)	16.00	EA	17.40	-	-	$ 278.40	
	Field Parameters	14.00	EA	-	-	-	$ -	
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 36"	6.00	EA	6.35	0.00	0.00	$ 38.10	
Surface Water Sampling								
33020520	Hip Waders	1.00	EA	109.57	0.00	0.00	$ 109.57	
33020524	Field sampling equipment, coliwasas, glass, disposable, 200 mL, case of 12, 7/8" x 42" testing parameter device rental	2.00	EA	109.64	0.00	0.00	$ 219.28	
33022131	Testing, purgeable halocarbons (SW5030/8010)	3.00	EA	154.18	0.00	0.00	$ 462.54	
33022132	Testing, purgeable aromatics (SW5030/8020)	3.00	EA	122.50	0.00	0.00	$ 367.50	
33021603	Testing, dissolved solids	3.00	EA	14.95	0.00	0.00	$ 44.85	
33021604	Testing, suspended solids	3.00	EA	13.13	0.00	0.00	$ 39.39	
33021620	Testing, TAL metals (6010/7000s)	3.00	EA	367.07	0.00	0.00	$ 1,101.21	
Labor and ODCs								
33010107	Van or Pickup Rental	5	DAY	$ 37.00	$ -	$ -	$ 185.00	
	Task Subtotal						**$ 9,756.10**	

Alternative 7: Construction of Soil Cover System
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Task Subtask Assembly (1)	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Comments/ Assumptions
Leachate Collection and Disposal/Treatment								
33197103	Process Water Hauling Fee, Subcontracted	0	GAL	$ 0.29	$ -	$ -	$ -	
33197102	Wastewater Disposal Fee	0	KGAL	$ 1.76	$ -	$ -	$ -	
	Task Subtotal						**$ -**	
Semi-annual Wetlands Restoration Monitoring								
Site Inspection/Planning								
33010107	Van or Pickup Rental	1	DAY	$ 37.00	$ -	$ -	$ 37.00	
33010202	Per Diem	1	DAY	$ 89.40	$ -	$ -	$ 89.40	
33220102	Project Manager	2.00	HR	$ -	$ 63.14	$ -	$ 126	
33220109	Staff Scientist	24.00	HR	$ -	$ 52.53	$ -	$ 1,261	
33220114	Word Processing/Clerical	8.00	HR	$ -	$ 27.26	$ -	$ 218	
33240101	Other Direct Costs	1.00	LS	$ 279.99	$ -	$ -	$ 280	
	Task Subtotal						**$ 2,011**	
Annual Landfill Maintenance								
0.5% of Capital Costs for Cover System								
	Task Subtotal						**$ 1,575**	
Periodic Fence and Sign Maintenance								
5% of Capital Costs for Fence and Signs							$ 3,258.91	
	Task Subtotal						**$ 3,258.91**	
Institutional Control Inspections								
Land Use Restrictions								
33022037	Overnight Delivery, 8 oz Letter	8.00	EA	$ 13.18	$ -	$ -	$ 105.44	
33220102	Project Manager	2.00	HR	$ -	$ 51.77	$ -	$ 103.54	
33220114	Word Processing/Clerical	5.00	HR	$ -	$ 22.35	$ -	$ 111.75	
33220505	Attorney, Senior Associate, Real Estate	8.00	HR	$ -	$ 175.00	$ -	$ 1,400.00 $ -	
33220509	Paralegal, Real Estate	8.00	HR	$ -	$ 100.00	$ -	$ 800.00	
33240101	Other Direct Costs	1.00	LS	$ 5.38	$ -	$ -	$ 5.38	
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	$ 689.22	$ -	$ -	$ 689.22	
99130602	Local Fees	1.00	LS	$ 200.00	$ -	$ -	$ 200.00	
	Task Subtotal						**$ 3,415.33**	

PRESENT VALUE OF ANNUAL AND PERIODIC COSTS FOR ALTERNATIVE 7
Prepared By: RTB
Date: November 15, 2006
Checked By: MJS
Date: November 29, 2006

Year	Cost*	Number of Annual Periods	Annual Discount Rate	Number of 5-Year Periods	5-Year Discount Rate	Number of 10-Year Periods	10-Year Discount Rate	Total Non-Discounted Cost	Present Value Cost
Capital (Year 0)	$ 888,000	1	0	NA	NA	NA	NA	$ 888,000	$ 888,000
Quarterly Groundwater Monitoring (Years 1-5)	$ 101,000	5	0.031	NA	NA	NA	NA	$ 505,000	$ 461,233
Semi-Annual Groundwater Monitoring (Years 6-10)	$ 50,000	5	0.031	1	0.165	NA	NA	$ 250,000	$ 196,009
Annual Groundwater Monitoring (Years 11-30)	$ 25,000	10	0.031	NA	NA	1	0.357	$ 250,000	$ 156,350
Leachate Collection and Disposal/Treatment (Years 1-30)	$ -	30	0.031	NA	NA	NA	NA	$ -	$ -
Semi-annual Wetlands Restoration Monitoring (Years 1-5)	$ 5,000	5	0.031	NA	NA	NA	NA	$ 25,000	$ 22,833
Annual Landfill Maintenance (Years 1-30)	$ 2,000	30	0.031	NA	NA	NA	NA	$ 60,000	$ 38,699
Annual Reporting (Years 1-30)	$ 13,000	30	0.031	NA	NA	NA	NA	$ 390,000	$ 251,543
Maintenance of Fencing and Signs (every 5 Years)	$ 4,000	NA	NA	6	0.165	NA	NA	$ 24,000	$ 14,549
Institutional Control Inspections (every 5 years)	$ 3,000	NA	NA	6	0.165	NA	NA	$ 18,000	$ 10,912
Totals								**$ 2,410,000**	**$ 2,040,128**

*Annual and periodic costs include 5 % for administrative support and 25% contingency for unforeseen project complexities, including insurance, taxes, and licensing costs.
Capital costs include 25% contingency, 10% engineering and design, 5% health and safety, 5% administrative, and 10% construction services.

Discount rate based on OMB Circular No. A-94 App. C (Revised Jan. 2005)

APPENDIX C-2

CALCULATIONS

Excavation Quantities, Alternative 3 and 5

Description of Item	Qty	Units	Assumptions/Reference
Sediment Excavation	100	cy	1 foot depth over drainage ditch surface area (see following line items)
Drainage swale surface area	0	sy	surface area 3901 sf, CAD
Drainage ditch surface area	299	sy	896.3 ft length from CAD, assume width of 3 feet
Soil Exc Vol (Cont. Soil Locs)			
Test Pit			Original Test Pit Dimensions L x W x D
TP-1	13266	cf	32 x 5 x 9
TP-11	64736	cf	34 x 5 x 17
TP-18	94316	cf	42 x 6 x 19
TP-38	16540	cf	18 x 13 x 10
TP-39	17398.5	cf	17 x 11 x 10.5
Total	**7600**	**cy**	
Contaminated Soil Volume			
Test Pit			Original Test Pit Dimensions L x W x D
TP-1	2720	cf	32 x 5 x 9
TP-11	2890	cf	34 x 5 x 17
TP-18	4788	cf	42 x 6 x 19
TP-38	2340	cf	18 x 13 x 10
TP-39	1963.5	cf	17 x 11 x 10.5
Total	**500**	**cy**	
Drum Removal Excavation			
Test Pit			Original Test Pit Dimensions L x W x D
TP-5	26466	cf	40 x 9 x 11
TP-10	54270	cf	36 x 13 x 15
TP-11	64736	cf	34 x 5 x 17
TP-12	70142	cf	32 x 11 x 17
TP-13	56400	cf	29 x 9 x 16
TP-20	23700	cf	50 x 6 x 15
TP-21	47700	cf	30 x 8 x 15
TP-40	9750	cf	28 x 10 x 7.5
TP-45	3200	cf	17x 10 x 0, assume need to excavate 5 feet
TP-49	3058	cf	18 x 4 x 5.5
TP-50	1900	cf	10 x 4 x 5
Total	**13400**	**cy**	

Prepared/Date: RTB 1/27/2006
Checked/Date: MJS 1/27/006

Notes:
Excavation volumes assume 2:1 sideslopes
Soil excavation volume = (L*W*D)+((L+2*D+2*D)*(2*D*D))+(W*2D*D)
Contaminated soil volume assume test pit dimensions

Landfill Cover Quantities, Alternative 3

Description of Item	Qty	Units	Assumptions/Reference
Surface Area of Landfill	**4.3**	**ac**	surface area, actual, CAD
Landfill extent	187308	sf	calculated
Landfill extent	20812	sy	calculated
Common borrow/clean fill	2300	cy	surface comparison, CAD, assume 15% swell
Gas venting layer	6937.3	cy	surface area x 12 inches thick
perforated gas pipe	4	ea	
perforated gas pipe	4	lf	one per acre, vertical extent of gas vent layer (12 inches)
solid gas pipe (see below)	34	lf	one per acre of cover system, min 5 ft into waste up to 3 ft above final grade (minus vent layer)
Filter Fabric	22893	sy	surface area + 10% for overlap and waste
Geomembrane	22893	sy	surface area + 10% for overlap and waste
Soil barrier protection layer	15956	cy	surface area x 24 inches thick, assume 15% swell
Topsoil	4620.3	cy	surface area x 8 inches thick placed
Toe drain stone	900	cy	3 ft x 3 ft x 2700 lf
Toe drain geotextile	1800	sy	(3 ft + 3 ft)x 2700 lf

Solid gas pipe calculation details

solid gas pipe length per location = thickness of cover system + fill thickness + vent pipe stickup + five feet into waste

assume min fill thickness of one foot	1	ft
Soil barrier protection layer	2	ft
Topsoil	0.5	ft
Five feet into waste	5	ft
Total solid pipe length	**8.5**	**ft**

Prepared/Date: RTB 1/27/2006
Checked/Date: MJS 1/27/2006

Consolidated Landfill Cover Quantities, Alternative 5

Description of Item	Qty	Units	Assumptions/Reference
Surface Area of Consolidated Landfill	**3.3**	**ac**	surface area, CAD
Area reconsolidated	**1**	**ac**	surface area, CAD
Landfill extent	143748	sf	calculated
Landfill extent	15972	sy	calculated
Common borrow/clean fill	2000	cy	for Landfill waste relocated
Gas venting layer	5324	cy	surface area x 12 inches thick
perforated gas pipe	3	ea	
perforated gas pipe	3	lf	one per acre, vertical extent of gas vent layer (12 inches)
solid gas pipe (see below)	25.5	lf	one per acre of cover system, min 5 ft into waste up to 3 ft above final grade (minus vent layer)
Filter Fabric	17569	sy	surface area + 10% for overlap and waste
Geomembrane	17569	sy	surface area + 10% for overlap and waste
Soil barrier protection layer	12245	cy	surface area x 24 inches thick, assume 15% swell
Topsoil	3546	cy	surface area x 8 inches thick placed
Topsoil excavated area	1074	cy	surface area x 8 inches thick placed
Toe drain stone	667	cy	3 ft x 3 ft x 2000 lf
Toe drain geotextile	1333	sy	(3 ft + 3 ft)x 2000 lf

Solid gas pipe calculation details

solid gas pipe length per location =	thickness of cover system + fill thickness + vent pipe stickup + five feet into waste	
assume min fill thickness of one foot	1	ft
Soil barrier protection layer	2	ft
Topsoil	0.5	ft
Five feet into waste	5	ft
Total solid pipe length	**8.5**	**ft**

Prepared/Date: RTB 01/27/2006
Checked/Date: MJS 01/27/2006

APPENDIX C-3

HELP MODEL RESULTS

TECHNICAL MEMORANDUM

PROJECT NUMBER: 3612052032

FROM: Ryan Belcher

Checked By: Mark Stelmack Date: 11/29/2006

DATE: November 20, 2006

PROJECT: South Hill Dump
Feasibility Study
Cortlandville, New York

SUBJECT: Landfill Cover System Infiltration Evaluation

INTRODUCTION

This memorandum presents an evaluation of the proposed low permeability cover system, designed in accordance with 6 NYCRR 360-2, and the proposed soil cover system, designed in accordance with New York State Sanitary Code Part 19.2(4) (NYS, 1962), for the South Hill Dump, Cortlandville, New York (Site). This evaluation has been conducted to determine the approximate reduction in infiltration over existing conditions resulting from construction of these cover systems. Two proposed conditions were evaluated, a soil cover system and a low-permeability cover system utilizing a geomembrane.

EVALUATION

The approximate infiltration rates for both the proposed and existing conditions were calculated using the Hydrogeologic Evaluation of Landfill Performance (HELP) Model (USEPA, 1997, Version 3.07). The HELP Model was used to evaluate water movement (percolation/leakage) into the landfill both under the existing and the final condition, and determine the reduction in infiltration resulting from implementation of the various proposed cover systems at the Site. Site-specific precipitation, evapotranspiration, and temperature were generated from the HELP Model internal database.

Existing Conditions. The existing condition was modeled as a single layer, Layer 1 - 6” growing medium (see Attachment 1 – South Hill Dump Existing Conditions). The SCS runoff curve number (CN) was estimated using the “HELP Model Computed Curve Number” option, which requires the input of values for soil texture, vegetation (value of 1 to 5, 5 indicating excellent), surface slope, and slope length. A soil texture value of 6 (for 6” growing medium) and a vegetation value of 4 (good grass cover) were used. The surface slope of 14% (average) and slope length of 600 feet were based the cross-section presented on Figure 1.4. The HELP Model results indicate that the average annual percolation/leakage through Layer 1 would be 172,887 cubic feet. The existing condition was also modeled using the minimum surface slope (2 to 3%), with no significant change in the resulting average annual percolation/leakage volume.

Proposed Conditions. HELP Models for the proposed conditions are presented in the following paragraphs. A SCS runoff curve number (CN) of 74 was chosen based on a final condition of good grass cover (>75% cover) and hydrologic soil group (HSG) of C (APM, 2001).

The HELP Model developed for the proposed soil cover system included the following landfill cover layers:

Layer 1 - 6” growing medium (topsoil)
Layer 2 - 24” soil cover (bottom 6 inches reasonably free of stones)

The specific characteristics of these layers are presented in Attachment 2 – South Hill Dump Proposed Soil Cover. The HELP Model results indicate that the average annual percolation/leakage through Layer 2 (soil cover) would be 164,626 cubic feet.

The HELP Model developed for the proposed cover system with the geomembrane included the following landfill cover layers:

Layer 1 - 6” growing medium (topsoil)
Layer 2 - 24” barrier protection layer (bottom 6 inches reasonably free of stones)
Layer 3 - 40 mil LLDPE geomembrane

The specific characteristics of these layers are presented in Attachment 3 – South Hill Dump Final Conditions. The HELP Model results indicate that the average annual percolation/leakage through Layer 3 (geomembrane) would be 52,566 cubic feet.

CONCLUSION

The evaluation of final and existing conditions, based upon the assumptions made, indicates a reduction of approximately 70% (120,321 cubic feet) in the average annual percolation/leakage (infiltration) as a result of implementation of the low-permeability cover system. The soil cover provided only a 5% reduction in the average annual infiltration.

REFERENCES

Applied Microcomputer Systems (APM), HydroCAD Stormwater Modeling System Owner's Manual, Version 6, revision 7/23/01.

USEPA Risk Reduction Engineering Laboratory, (USEPA) 1 November 1997. Hydrogeologic Evaluation of Landfill Performance, HELP Model Version 3.07.

ATTACHMENTS

ATTACHMENT 1 – SOUTH HILL DUMP EXISTING CONDITIONS

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:    C:\PROGRA~1\HELP3\SHDEXIST.D4
TEMPERATURE DATA FILE:      C:\PROGRA~1\HELP3\SHDEXIST.D7
SOLAR RADIATION DATA FILE:  C:\PROGRA~1\HELP3\SHDEXIST.D13
EVAPOTRANSPIRATION DATA:    C:\PROGRA~1\HELP3\SHDEXIST.D11
SOIL AND DESIGN DATA FILE:  C:\PROGRA~1\HELP3\SHDEXIST.D10
OUTPUT DATA FILE:           C:\PROGRA~1\HELP3\SHDEXIST.OUT


TIME:  14:19     DATE:  12/28/2005


******************************************************************************

     TITLE:  SOUTH HILL DUMP EXISTING CONDITIONS

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                    TYPE 1 - VERTICAL PERCOLATION LAYER
                        MATERIAL TEXTURE NUMBER   6
           THICKNESS                 =      6.00   INCHES
           POROSITY                  =      0.4530 VOL/VOL
           FIELD CAPACITY            =      0.1900 VOL/VOL
           WILTING POINT             =      0.0850 VOL/VOL
           INITIAL SOIL WATER CONTENT  =    0.4029 VOL/VOL
           EFFECTIVE SAT. HYD. COND.   =  0.720000011000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.90
```

FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 6 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 14.% AND A SLOPE LENGTH OF 600. FEET.

SCS RUNOFF CURVE NUMBER	=	61.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	4.300	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.417	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.718	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.510	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	2.417	INCHES
TOTAL INITIAL WATER	=	2.417	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM ITHACA NEW YORK

STATION LATITUDE	=	42.40	DEGREES
MAXIMUM LEAF AREA INDEX	=	4.00	
START OF GROWING SEASON (JULIAN DATE)	=	130	
END OF GROWING SEASON (JULIAN DATE)	=	279	
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	10.30	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	74.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	69.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	75.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	76.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR SYRACUSE NEW YORK

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.61	2.65	3.11	3.34	3.16	3.63
3.76	3.77	3.29	3.14	3.45	3.20

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ITHACA NEW YORK

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
22.20	22.70	32.20	44.50	54.80	64.30
68.80	67.10	60.20	49.60	39.30	27.60

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ITHACA NEW YORK
AND STATION LATITUDE = 42.40 DEGREES

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.79	2.62	4.55	1.98	3.52	3.58
	3.10	3.58	2.97	4.42	5.08	4.31
RUNOFF	1.132	1.291	4.910	1.150	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	1.097
EVAPOTRANSPIRATION	0.467	0.464	0.429	0.803	3.457	3.392
	2.478	2.537	2.005	1.758	1.264	0.328
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	1.6725	0.3298	0.4294
LAYER 1	0.6410	1.0466	0.2225	2.8343	3.6669	1.6959

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.50	647773.187	100.00
RUNOFF	9.580	149531.641	23.08

EVAPOTRANSPIRATION	19.380	302496.437	46.70
PERC./LEAKAGE THROUGH LAYER 1	12.538958	195720.594	30.21
CHANGE IN WATER STORAGE	0.002	25.053	0.00
SOIL WATER AT START OF YEAR	2.417	37732.992	
SOIL WATER AT END OF YEAR	2.419	37758.043	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.551	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	3.60	3.96	2.64	2.55	3.25	2.61
	2.19	9.84	3.89	3.08	2.54	3.38
RUNOFF	0.000	0.000	8.734	1.798	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.471	0.360	0.368	0.944	2.236	2.784
	1.032	5.149	1.898	1.773	1.092	0.478
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	1.6894	0.5353	0.5409
LAYER 1	0.0001	5.2880	1.9936	1.4284	0.7569	0.8511

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.53	679459.687	100.00
RUNOFF	10.531	164383.828	24.19

EVAPOTRANSPIRATION	18.586	290105.937	42.70
PERC./LEAKAGE THROUGH LAYER 1	13.083802	204225.078	30.06
CHANGE IN WATER STORAGE	1.329	20744.793	3.05
SOIL WATER AT START OF YEAR	2.419	37758.043	
SOIL WATER AT END OF YEAR	1.250	19516.559	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.498	38986.277	5.74
ANNUAL WATER BUDGET BALANCE	0.0000	0.060	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	4.25	3.12	1.57	2.72	3.61	3.58
	2.91	4.62	2.38	3.60	2.29	1.88
RUNOFF	0.000	0.005	1.041	9.905	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.002
EVAPOTRANSPIRATION	0.551	0.414	0.662	0.671	2.858	2.828
	2.513	4.285	1.857	1.252	0.953	0.428
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	1.6483	0.4802	0.7910
LAYER 1	0.6282	0.2728	0.5864	1.5912	1.3732	0.0930

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.53	570197.000	100.00
RUNOFF	10.954	170977.172	29.99

EVAPOTRANSPIRATION	19.273	300830.250	52.76
PERC./LEAKAGE THROUGH LAYER 1	7.464234	116509.242	20.43
CHANGE IN WATER STORAGE	-1.161	-18119.947	-3.18
SOIL WATER AT START OF YEAR	1.250	19516.559	
SOIL WATER AT END OF YEAR	1.559	24335.576	
SNOW WATER AT START OF YEAR	2.498	38986.277	6.84
SNOW WATER AT END OF YEAR	1.028	16047.313	2.81
ANNUAL WATER BUDGET BALANCE	0.0000	0.335	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.37	2.70	1.75	2.95	4.29	3.10
	4.63	3.07	2.33	4.46	4.86	4.11
RUNOFF	0.255	1.834	3.290	2.747	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	1.717
EVAPOTRANSPIRATION	0.442	0.528	0.479	0.133	3.486	3.538
	3.149	2.433	1.069	1.694	1.038	0.442
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	1.6071	0.7126	0.0311
LAYER 1	1.1524	1.1192	0.7165	2.3021	3.7138	0.2573

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.62	634037.500	100.00
RUNOFF	9.844	153649.484	24.23

EVAPOTRANSPIRATION	18.431	287694.437	45.37
PERC./LEAKAGE THROUGH LAYER 1	11.612098	181253.234	28.59
CHANGE IN WATER STORAGE	0.733	11440.575	1.80
SOIL WATER AT START OF YEAR	1.559	24335.576	
SOIL WATER AT END OF YEAR	2.356	36770.000	
SNOW WATER AT START OF YEAR	1.028	16047.313	2.53
SNOW WATER AT END OF YEAR	0.964	15053.464	2.37
ANNUAL WATER BUDGET BALANCE	0.0000	-0.253	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.28	1.28	3.56	2.71	3.86	4.87
	3.73	4.68	4.68	2.16	3.83	3.23
RUNOFF	1.858	0.745	2.347	3.665	1.676	0.000
	0.000	0.000	0.000	0.000	0.000	0.006
EVAPOTRANSPIRATION	0.462	0.454	0.354	0.567	2.359	2.623
	3.142	3.602	2.981	1.653	1.234	0.620
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	1.6978	2.1933
LAYER 1	0.4968	1.1915	1.4522	0.9396	2.1376	0.5727

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.87	637939.812	100.00
RUNOFF	10.296	160704.797	25.19

EVAPOTRANSPIRATION	20.052	312990.062	49.06
PERC./LEAKAGE THROUGH LAYER 1	10.681539	166728.141	26.14
CHANGE IN WATER STORAGE	-0.159	-2483.085	-0.39
SOIL WATER AT START OF YEAR	2.356	36770.000	
SOIL WATER AT END OF YEAR	1.604	25037.238	
SNOW WATER AT START OF YEAR	0.964	15053.464	2.36
SNOW WATER AT END OF YEAR	1.557	24303.141	3.81
ANNUAL WATER BUDGET BALANCE	0.0000	-0.104	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.86	2.74	2.81	2.58	3.71	3.55
	3.31	5.16	3.25	3.54	3.72	3.38
STD. DEVIATIONS	1.02	0.97	1.25	0.37	0.39	0.84
	0.92	2.71	1.02	0.97	1.28	0.96
RUNOFF						
TOTALS	0.649	0.775	4.064	3.853	0.335	0.000
	0.000	0.000	0.000	0.000	0.000	0.564
STD. DEVIATIONS	0.820	0.803	2.967	3.515	0.749	0.000
	0.000	0.000	0.000	0.000	0.000	0.800
EVAPOTRANSPIRATION						
TOTALS	0.479	0.444	0.458	0.624	2.879	3.033
	2.463	3.601	1.962	1.626	1.116	0.459
STD. DEVIATIONS	0.042	0.062	0.124	0.309	0.589	0.405
	0.863	1.158	0.681	0.214	0.131	0.106

PERCOLATION/LEAKAGE THROUGH LAYER 1

TOTALS	0.0000	0.0000	0.0000	1.3235	0.7511	0.7971
	0.5837	1.7836	0.9942	1.8191	2.3297	0.6940
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.7405	0.5466	0.8272
	0.4114	1.9937	0.7154	0.7487	1.3350	0.6315

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	40.61	(2.551)	633881.4	100.00
RUNOFF	10.241	(0.5455)	159849.37	25.218
EVAPOTRANSPIRATION	19.144	(0.6550)	298823.41	47.142
PERCOLATION/LEAKAGE THROUGH LAYER 1	11.07613	(2.21694)	172887.266	27.27439
CHANGE IN WATER STORAGE	0.149	(0.9442)	2321.48	0.366

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.01	31374.092
RUNOFF	1.694	26434.9062
PERCOLATION/LEAKAGE THROUGH LAYER 1	1.726264	26945.26370
SNOW WATER	8.53	133215.7340
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4505	
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0850	

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	1.6040	0.2673

SNOW WATER 1.557

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ATTACHMENT 2 – SOUTH HILL DUMP SOIL COVER

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:    C:\PROGRA~1\HELP3\SHDEXIST.D4
TEMPERATURE DATA FILE:      C:\PROGRA~1\HELP3\SHDEXIST.D7
SOLAR RADIATION DATA FILE:  C:\PROGRA~1\HELP3\SHDEXIST.D13
EVAPOTRANSPIRATION DATA:    C:\PROGRA~1\HELP3\SHDEXIST.D11
SOIL AND DESIGN DATA FILE:  C:\PROGRA~1\HELP3\SHD2FT.D10
OUTPUT DATA FILE:           C:\PROGRA~1\HELP3\SHD2ft.OUT


TIME:  14:26     DATE:  11/20/2006


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     TITLE:  SOUTH HILL DUMP

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                   LAYER  1
                                   --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   6
           THICKNESS                 =      6.00   INCHES
           POROSITY                  =      0.4530 VOL/VOL
           FIELD CAPACITY            =      0.1900 VOL/VOL
           WILTING POINT             =      0.0850 VOL/VOL
           INITIAL SOIL WATER CONTENT  =    0.4259 VOL/VOL
           EFFECTIVE SAT. HYD. COND.   =  0.720000011000E-03 CM/SEC
         NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.90
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 4

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1860	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	74.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	4.300	ACRES
EVAPORATIVE ZONE DEPTH	=	8.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.989	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	3.592	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.604	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	7.020	INCHES
TOTAL INITIAL WATER	=	7.020	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
ITHACA NEW YORK

STATION LATITUDE	=	42.40	DEGREES
MAXIMUM LEAF AREA INDEX	=	4.00	
START OF GROWING SEASON (JULIAN DATE)	=	130	
END OF GROWING SEASON (JULIAN DATE)	=	279	
EVAPORATIVE ZONE DEPTH	=	8.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	10.30	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	74.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	69.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	75.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	76.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR SYRACUSE NEW YORK

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.61	2.65	3.11	3.34	3.16	3.63
3.76	3.77	3.29	3.14	3.45	3.20

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR ITHACA NEW YORK

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
22.20	22.70	32.20	44.50	54.80	64.30
68.80	67.10	60.20	49.60	39.30	27.60

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR ITHACA NEW YORK AND STATION LATITUDE = 42.40 DEGREES

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.79	2.62	4.55	1.98	3.52	3.58
	3.10	3.58	2.97	4.42	5.08	4.31
RUNOFF	1.047	1.242	4.805	1.132	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.932
EVAPOTRANSPIRATION	0.468	0.464	0.432	0.954	3.692	3.648
	2.880	2.675	1.891	1.687	1.242	0.330
PERCOLATION/LEAKAGE THROUGH	0.4678	0.1781	0.1242	1.4216	0.4858	0.1778
LAYER 2	0.1713	0.6153	0.4807	2.0686	3.2750	2.5120

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.50	647773.187	100.00
RUNOFF	9.158	142945.750	22.07
EVAPOTRANSPIRATION	20.363	317841.000	49.07
PERC./LEAKAGE THROUGH LAYER 2	11.978133	186966.687	28.86
CHANGE IN WATER STORAGE	0.001	20.051	0.00
SOIL WATER AT START OF YEAR	7.020	109573.125	
SOIL WATER AT END OF YEAR	7.021	109593.172	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.283	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	3.60	3.96	2.64	2.55	3.25	2.61
	2.19	9.84	3.89	3.08	2.54	3.38
RUNOFF	0.000	0.000	8.523	1.767	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.471	0.360	0.370	1.134	2.422	3.006
	1.131	5.290	2.052	1.737	1.081	0.476
PERCOLATION/LEAKAGE THROUGH	0.4678	0.1781	0.1242	1.5295	0.3636	0.4423
LAYER 2	0.2879	3.8061	1.9275	1.4403	0.8134	1.4383

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.53	679459.687	100.00
RUNOFF	10.290	160614.266	23.64
EVAPOTRANSPIRATION	19.532	304874.219	44.87
PERC./LEAKAGE THROUGH LAYER 2	12.818929	200090.672	29.45
CHANGE IN WATER STORAGE	0.889	13880.547	2.04
SOIL WATER AT START OF YEAR	7.021	109593.172	
SOIL WATER AT END OF YEAR	5.413	84487.445	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.498	38986.277	5.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.045	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	4.25	3.12	1.57	2.72	3.61	3.58
	2.91	4.62	2.38	3.60	2.29	1.88
RUNOFF	0.000	0.003	0.841	9.667	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.001
EVAPOTRANSPIRATION	0.551	0.414	0.662	0.870	3.113	3.033
	2.936	4.458	2.086	1.188	0.918	0.426
PERCOLATION/LEAKAGE THROUGH	0.3349	0.1525	0.1119	0.6532	1.0138	0.3048
LAYER 2	0.5306	0.3452	0.1676	0.3374	1.8233	0.8557

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.53	570197.000	100.00
RUNOFF	10.511	164072.297	28.77
EVAPOTRANSPIRATION	20.655	322404.312	56.54
PERC./LEAKAGE THROUGH LAYER 2	6.630856	103501.031	18.15
CHANGE IN WATER STORAGE	-1.267	-19780.816	-3.47
SOIL WATER AT START OF YEAR	5.413	84487.445	
SOIL WATER AT END OF YEAR	5.615	87645.594	
SNOW WATER AT START OF YEAR	2.498	38986.277	6.84
SNOW WATER AT END OF YEAR	1.028	16047.313	2.81
ANNUAL WATER BUDGET BALANCE	0.0000	0.208	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.37	2.70	1.75	2.95	4.29	3.10
	4.63	3.07	2.33	4.46	4.86	4.11
RUNOFF	0.212	1.697	3.140	2.663	0.000	0.000
	0.000	0.000	0.000	0.000	0.136	1.606
EVAPOTRANSPIRATION	0.442	0.528	0.479	0.137	3.842	3.667
	3.324	2.715	1.031	1.651	1.026	0.443
PERCOLATION/LEAKAGE THROUGH	0.2727	0.1400	0.1022	0.0735	1.4738	0.4641
LAYER 2	0.2185	1.5242	0.2864	2.2975	2.9011	1.1991

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.62	634037.500	100.00
RUNOFF	9.455	147582.344	23.28
EVAPOTRANSPIRATION	19.284	301007.281	47.47
PERC./LEAKAGE THROUGH LAYER 2	10.953121	170967.281	26.96
CHANGE IN WATER STORAGE	0.928	14480.718	2.28
SOIL WATER AT START OF YEAR	5.615	87645.594	
SOIL WATER AT END OF YEAR	6.606	103120.156	
SNOW WATER AT START OF YEAR	1.028	16047.313	2.53
SNOW WATER AT END OF YEAR	0.964	15053.464	2.37
ANNUAL WATER BUDGET BALANCE	0.0000	-0.149	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.28	1.28	3.56	2.71	3.86	4.87
	3.73	4.68	4.68	2.16	3.83	3.23
RUNOFF	1.706	0.682	2.264	3.610	1.651	0.000
	0.000	0.000	0.000	0.000	0.000	0.006
EVAPOTRANSPIRATION	0.462	0.454	0.356	0.569	2.499	2.682
	3.501	3.762	3.027	1.595	1.213	0.615
PERCOLATION/LEAKAGE THROUGH	0.3095	0.1461	0.1086	0.0776	1.5252	0.9477
LAYER 2	1.2898	1.0208	0.8988	1.2672	1.9324	0.8295

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.87	637939.812	100.00
RUNOFF	9.919	154830.062	24.27
EVAPOTRANSPIRATION	20.736	323668.406	50.74
PERC./LEAKAGE THROUGH LAYER 2	10.353269	161604.172	25.33
CHANGE IN WATER STORAGE	-0.139	-2162.690	-0.34
SOIL WATER AT START OF YEAR	6.606	103120.156	
SOIL WATER AT END OF YEAR	5.875	91707.789	
SNOW WATER AT START OF YEAR	0.964	15053.464	2.36
SNOW WATER AT END OF YEAR	1.557	24303.141	3.81
ANNUAL WATER BUDGET BALANCE	0.0000	-0.149	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.86	2.74	2.81	2.58	3.71	3.55
	3.31	5.16	3.25	3.54	3.72	3.38
STD. DEVIATIONS	1.02	0.97	1.25	0.37	0.39	0.84
	0.92	2.71	1.02	0.97	1.28	0.96
RUNOFF						
TOTALS	0.593	0.725	3.915	3.768	0.330	0.000
	0.000	0.000	0.000	0.000	0.027	0.509
STD. DEVIATIONS	0.757	0.752	2.950	3.428	0.738	0.000
	0.000	0.000	0.000	0.000	0.061	0.734

EVAPOTRANSPIRATION

TOTALS	0.479	0.444	0.460	0.733	3.114	3.207
	2.755	3.780	2.017	1.572	1.096	0.458
STD. DEVIATIONS	0.042	0.062	0.123	0.391	0.656	0.434
	0.944	1.129	0.710	0.221	0.134	0.103

PERCOLATION/LEAKAGE THROUGH LAYER 2

TOTALS	0.3705	0.1590	0.1142	0.7511	0.9724	0.4674
	0.4996	1.4623	0.7522	1.4822	2.1490	1.3669
STD. DEVIATIONS	0.0915	0.0180	0.0098	0.7032	0.5400	0.2923
	0.4629	1.3836	0.7133	0.7693	0.9709	0.6882

****

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.61 (2.551)	633881.4	100.00
RUNOFF	9.867 (0.5633)	154008.94	24.296
EVAPOTRANSPIRATION	20.114 (0.6650)	313959.03	49.530
PERCOLATION/LEAKAGE THROUGH LAYER 2	10.54686 (2.38477)	164625.969	25.97110
CHANGE IN WATER STORAGE	0.082 (0.9004)	1287.56	0.203

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.01	31374.092
RUNOFF	1.683	26270.8965
PERCOLATION/LEAKAGE THROUGH LAYER 2	1.061937	16575.77340
SNOW WATER	8.53	133215.7340
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4416	
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0755	

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	1.5857	0.2643
2	4.2897	0.1787
SNOW WATER	1.557	

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ATTACHMENT 3 – SOUTH HILL DUMP FINAL CONDITIONS

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WARNING:  TEMPERATURE FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR    1


WARNING:  SOLAR RADIATION FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR    1


******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:    C:\PROGRA~1\HELP3\SHD.D4
TEMPERATURE DATA FILE:      C:\PROGRA~1\HELP3\SHD.D7
SOLAR RADIATION DATA FILE:  C:\PROGRA~1\HELP3\SHD.D13
EVAPOTRANSPIRATION DATA:    C:\PROGRA~1\HELP3\SHD.D11
SOIL AND DESIGN DATA FILE:  C:\PROGRA~1\HELP3\SHD.D10
OUTPUT DATA FILE:           C:\PROGRA~1\HELP3\SHD.OUT


TIME:  13:47     DATE:  12/28/2005


******************************************************************************

     TITLE:  SOUTH HILL DUMP

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                   LAYER  1
                                   --------

                      TYPE 1 - VERTICAL PERCOLATION LAYER
                          MATERIAL TEXTURE NUMBER   6
           THICKNESS                    =     6.00   INCHES
```

```
   POROSITY                     =      0.4530 VOL/VOL
   FIELD CAPACITY               =      0.1900 VOL/VOL
   WILTING POINT                =      0.0850 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.4142 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.720000011000E-03 CM/SEC
 NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.90
        FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                              LAYER  2
                              --------

              TYPE 1 - VERTICAL PERCOLATION LAYER
                  MATERIAL TEXTURE NUMBER   4
   THICKNESS                    =     24.00   INCHES
   POROSITY                     =      0.4370 VOL/VOL
   FIELD CAPACITY               =      0.1050 VOL/VOL
   WILTING POINT                =      0.0470 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.4349 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.170000002000E-02 CM/SEC


                              LAYER  3
                              --------

                TYPE 4 - FLEXIBLE MEMBRANE LINER
                  MATERIAL TEXTURE NUMBER  36
   THICKNESS                    =      0.04   INCHES
   POROSITY                     =      0.0000 VOL/VOL
   FIELD CAPACITY               =      0.0000 VOL/VOL
   WILTING POINT                =      0.0000 VOL/VOL
   INITIAL SOIL WATER CONTENT   =      0.0000 VOL/VOL
   EFFECTIVE SAT. HYD. COND.    =  0.399999993000E-12 CM/SEC
   FML PINHOLE DENSITY          =      3.00   HOLES/ACRE
   FML INSTALLATION DEFECTS     =      2.00   HOLES/ACRE
   FML PLACEMENT QUALITY        =  3 - GOOD


            GENERAL DESIGN AND EVAPORATIVE ZONE DATA
            ----------------------------------------

 NOTE:  SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER              =     74.00
FRACTION OF AREA ALLOWING RUNOFF     =    100.0    PERCENT
AREA PROJECTED ON HORIZONTAL PLANE   =      4.300  ACRES
EVAPORATIVE ZONE DEPTH               =     30.0    INCHES
INITIAL WATER IN EVAPORATIVE ZONE    =     12.923  INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE   =     13.206  INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE   =      1.638  INCHES
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INITIAL SNOW WATER                  =      0.000  INCHES
INITIAL WATER IN LAYER MATERIALS    =     12.923  INCHES
TOTAL INITIAL WATER                 =     12.923  INCHES
TOTAL SUBSURFACE INFLOW             =      0.00   INCHES/YEAR
```

EVAPOTRANSPIRATION AND WEATHER DATA

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NOTE:  EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
         ITHACA                NEW YORK

     STATION LATITUDE                         =  42.40 DEGREES
     MAXIMUM LEAF AREA INDEX                  =   4.00
     START OF GROWING SEASON (JULIAN DATE)    =    130
     END OF GROWING SEASON (JULIAN DATE)      =    279
     EVAPORATIVE ZONE DEPTH                   =  30.0  INCHES
     AVERAGE ANNUAL WIND SPEED                =  10.30 MPH
     AVERAGE 1ST QUARTER RELATIVE HUMIDITY    =  74.00 %
     AVERAGE 2ND QUARTER RELATIVE HUMIDITY    =  69.00 %
     AVERAGE 3RD QUARTER RELATIVE HUMIDITY    =  75.00 %
     AVERAGE 4TH QUARTER RELATIVE HUMIDITY    =  76.00 %


NOTE:  PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    SYRACUSE            NEW YORK
```

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
2.61	2.65	3.11	3.34	3.16	3.63
3.76	3.77	3.29	3.14	3.45	3.20

```
NOTE:  TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    ITHACA              NEW YORK
```

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
22.20	22.70	32.20	44.50	54.80	64.30
68.80	67.10	60.20	49.60	39.30	27.60

```
NOTE:  SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
         COEFFICIENTS FOR    ITHACA              NEW YORK
           AND STATION LATITUDE  =  42.40 DEGREES
```

WARNING: TEMPERATURE FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR 1

WARNING: SOLAR RADIATION FOR YEAR 1974 USED WITH PRECIPITATION FOR YEAR 1

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.79	2.62	4.55	1.98	3.52	3.58
	3.10	3.58	2.97	4.42	5.08	4.31
RUNOFF	1.120	1.535	4.585	0.921	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	1.623
EVAPOTRANSPIRATION	0.446	0.520	0.504	1.782	3.865	5.056
	6.404	4.482	2.437	1.190	1.077	0.341
PERCOLATION/LEAKAGE THROUGH	0.1324	0.1114	0.1155	0.4572	0.6228	0.4940
LAYER 3	0.3128	0.1890	0.1198	0.1236	0.3328	0.4577

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.610	4.243	3.931	17.333	23.238	19.270
TOP OF LAYER 3	11.824	6.906	4.265	4.261	12.901	16.835
STD. DEVIATION OF DAILY	0.117	0.099	0.071	10.591	0.586	1.508
HEAD ON TOP OF LAYER 3	2.633	0.658	0.665	1.314	5.608	10.049

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.50	647773.187	100.00
RUNOFF	9.783	152701.531	23.57
EVAPOTRANSPIRATION	28.104	438680.625	67.72

PERC./LEAKAGE THROUGH LAYER 3	3.469066	54148.660	8.36
AVG. HEAD ON TOP OF LAYER 3	10.8014		
CHANGE IN WATER STORAGE	0.144	2242.800	0.35
SOIL WATER AT START OF YEAR	13.448	209914.000	
SOIL WATER AT END OF YEAR	13.592	212156.797	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.413	0.00

****

WARNING: TEMPERATURE FOR YEAR 1975 USED WITH PRECIPITATION FOR YEAR 2

WARNING: SOLAR RADIATION FOR YEAR 1975 USED WITH PRECIPITATION FOR YEAR 2

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	3.60	3.96	2.64	2.55	3.25	2.61
	2.19	9.84	3.89	3.08	2.54	3.38
RUNOFF	0.000	0.000	8.846	1.450	0.000	0.000
	0.000	0.000	0.000	0.000	0.001	0.000
EVAPOTRANSPIRATION	0.473	0.362	0.367	2.025	2.771	4.559
	6.784	5.452	3.097	1.147	0.905	0.430
PERCOLATION/LEAKAGE THROUGH	0.1324	0.1114	0.1173	0.5327	0.6276	0.5290
LAYER 3	0.2454	0.1602	0.2675	0.4089	0.4814	0.4140

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.609	4.242	4.003	20.267	23.402	20.554
TOP OF LAYER 3	9.120	5.756	10.419	15.517	18.813	15.295

STD. DEVIATION OF DAILY	0.117	0.099	0.028	9.297	0.702	1.986
HEAD ON TOP OF LAYER 3	4.523	2.942	0.947	2.251	0.182	9.329

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.53	679459.687	100.00
RUNOFF	10.297	160719.469	23.65
EVAPOTRANSPIRATION	28.373	442878.656	65.18
PERC./LEAKAGE THROUGH LAYER 3	4.027785	62869.703	9.25
AVG. HEAD ON TOP OF LAYER 3	12.6664		
CHANGE IN WATER STORAGE	0.832	12992.022	1.91
SOIL WATER AT START OF YEAR	13.592	212156.797	
SOIL WATER AT END OF YEAR	11.947	186478.391	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.477	38670.430	5.69
ANNUAL WATER BUDGET BALANCE	0.0000	-0.156	0.00

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WARNING: TEMPERATURE FOR YEAR 1976 USED WITH PRECIPITATION FOR YEAR 3

WARNING: SOLAR RADIATION FOR YEAR 1976 USED WITH PRECIPITATION FOR YEAR 3

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MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC

PRECIPITATION	4.25	3.12	1.57	2.72	3.61	3.58
	2.91	4.62	2.38	3.60	2.29	1.88
RUNOFF	0.000	0.059	0.917	9.545	0.002	0.000
	0.000	0.000	0.000	0.000	0.000	0.001
EVAPOTRANSPIRATION	0.547	0.411	0.662	1.334	3.530	4.829
	6.317	5.031	2.830	1.558	0.764	0.394
PERCOLATION/LEAKAGE THROUGH	0.1321	0.1111	0.1146	0.2551	0.6329	0.5030
LAYER 3	0.3693	0.2068	0.1439	0.1332	0.1441	0.1563

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.599	4.233	3.892	9.459	23.584	19.598
TOP OF LAYER 3	14.013	7.631	5.269	4.643	5.277	5.580
STD. DEVIATION OF DAILY	0.117	0.098	0.101	9.849	0.485	1.933
HEAD ON TOP OF LAYER 3	2.344	0.539	0.638	0.063	0.994	1.233

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	36.53	570197.000	100.00
RUNOFF	10.524	164275.016	28.81
EVAPOTRANSPIRATION	28.207	440283.875	77.22
PERC./LEAKAGE THROUGH LAYER 3	2.902428	45303.996	7.95
AVG. HEAD ON TOP OF LAYER 3	8.9814		
CHANGE IN WATER STORAGE	-5.104	-79666.031	-13.97
SOIL WATER AT START OF YEAR	11.947	186478.391	
SOIL WATER AT END OF YEAR	8.270	129093.305	
SNOW WATER AT START OF YEAR	2.477	38670.430	6.78
SNOW WATER AT END OF YEAR	1.050	16389.484	2.87
ANNUAL WATER BUDGET BALANCE	0.0000	0.171	0.00

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WARNING: TEMPERATURE FOR YEAR 1977 USED WITH PRECIPITATION FOR YEAR 4

WARNING: SOLAR RADIATION FOR YEAR 1977 USED WITH PRECIPITATION FOR YEAR 4

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.37	2.70	1.75	2.95	4.29	3.10
	4.63	3.07	2.33	4.46	4.86	4.11
RUNOFF	0.153	0.206	2.493	2.403	0.000	0.000
	0.000	0.000	0.000	0.000	0.131	1.145
EVAPOTRANSPIRATION	0.433	0.490	0.491	0.981	4.116	6.315
	5.751	4.717	1.839	1.211	0.878	0.457
PERCOLATION/LEAKAGE THROUGH	0.1295	0.1127	0.1120	0.1725	0.5071	0.4040
LAYER 3	0.1750	0.1342	0.0571	0.0642	0.2020	0.2647

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.493	4.129	3.790	6.321	19.158	15.841
TOP OF LAYER 3	6.335	4.681	1.779	1.971	7.631	9.739
STD. DEVIATION OF DAILY	0.114	0.100	0.099	6.559	0.702	2.146
HEAD ON TOP OF LAYER 3	2.062	0.113	1.059	1.063	4.594	6.977

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.62	634037.500	100.00
RUNOFF	6.531	101942.852	16.08

EVAPOTRANSPIRATION	27.679	432046.406	68.14
PERC./LEAKAGE THROUGH LAYER 3	2.334985	36446.773	5.75
AVG. HEAD ON TOP OF LAYER 3	7.1557		
CHANGE IN WATER STORAGE	4.075	63601.684	10.03
SOIL WATER AT START OF YEAR	8.270	129093.305	
SOIL WATER AT END OF YEAR	12.329	192444.156	
SNOW WATER AT START OF YEAR	1.050	16389.484	2.58
SNOW WATER AT END OF YEAR	1.066	16640.320	2.62
ANNUAL WATER BUDGET BALANCE	0.0000	-0.227	0.00

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WARNING: TEMPERATURE FOR YEAR 1978 USED WITH PRECIPITATION FOR YEAR 5

WARNING: SOLAR RADIATION FOR YEAR 1978 USED WITH PRECIPITATION FOR YEAR 5

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.28	1.28	3.56	2.71	3.86	4.87
	3.73	4.68	4.68	2.16	3.83	3.23
RUNOFF	1.317	0.544	2.223	3.560	1.347	0.006
	0.000	0.000	0.003	0.000	0.000	0.046
EVAPOTRANSPIRATION	0.444	0.456	0.432	0.615	3.429	4.029
	6.988	5.439	2.842	1.097	1.003	0.509
PERCOLATION/LEAKAGE THROUGH	0.1300	0.1093	0.1127	0.1012	0.6207	0.5488
LAYER 3	0.4898	0.3275	0.2546	0.3496	0.4924	0.5676

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 3	4.512	4.152	3.817	3.495	22.930	21.283
	18.489	12.428	9.890	13.274	19.153	21.131
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 3	0.115	0.097	0.100	0.090	6.729	1.728
	2.925	0.603	0.335	1.667	3.580	5.937

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.87	637939.812	100.00
RUNOFF	9.048	141225.687	22.14
EVAPOTRANSPIRATION	27.285	425885.312	66.76
PERC./LEAKAGE THROUGH LAYER 3	4.104239	64063.070	10.04
AVG. HEAD ON TOP OF LAYER 3	12.8794		
CHANGE IN WATER STORAGE	0.433	6765.703	1.06
SOIL WATER AT START OF YEAR	12.329	192444.156	
SOIL WATER AT END OF YEAR	12.280	191686.078	
SNOW WATER AT START OF YEAR	1.066	16640.320	2.61
SNOW WATER AT END OF YEAR	1.548	24164.104	3.79
ANNUAL WATER BUDGET BALANCE	0.0000	0.022	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.86	2.74	2.81	2.58	3.71	3.55
	3.31	5.16	3.25	3.54	3.72	3.38

STD. DEVIATIONS	1.02	0.97	1.25	0.37	0.39	0.84
	0.92	2.71	1.02	0.97	1.28	0.96

RUNOFF

TOTALS	0.518	0.469	3.813	3.576	0.270	0.001
	0.000	0.000	0.001	0.000	0.026	0.563
STD. DEVIATIONS	0.646	0.632	3.106	3.485	0.602	0.003
	0.000	0.000	0.001	0.000	0.058	0.768

EVAPOTRANSPIRATION

TOTALS	0.469	0.448	0.491	1.347	3.542	4.958
	6.449	5.024	2.609	1.241	0.925	0.426
STD. DEVIATIONS	0.046	0.063	0.109	0.574	0.510	0.850
	0.477	0.431	0.491	0.183	0.120	0.063

PERCOLATION/LEAKAGE THROUGH LAYER 3

TOTALS	0.1313	0.1112	0.1144	0.3037	0.6022	0.4958
	0.3185	0.2035	0.1686	0.2159	0.3305	0.3721
STD. DEVIATIONS	0.0014	0.0012	0.0022	0.1848	0.0534	0.0557
	0.1203	0.0746	0.0903	0.1529	0.1583	0.1623

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	4.5645	4.1998	3.8867	11.3751	22.4623	19.3091
	11.9560	7.4802	6.3246	7.9331	12.7550	13.7161
STD. DEVIATIONS	0.0570	0.0549	0.0861	7.1743	1.8629	2.0951
	4.6519	2.9849	3.7248	6.0392	6.3209	6.1077

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	40.61	(2.551)	633881.4	100.00
RUNOFF	9.237	(1.6153)	144172.91	22.744
EVAPOTRANSPIRATION	27.930	(0.4423)	435955.00	68.775

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 PERCOLATION/LEAKAGE THROUGH     3.36770 (  0.75357)     52566.441     8.29279
   LAYER  3

 AVERAGE HEAD ON TOP            10.497 (    2.446)
   OF LAYER  3

 CHANGE IN WATER STORAGE         0.076   (  3.2987)       1187.24      0.187

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              PEAK DAILY VALUES FOR YEARS    1 THROUGH    5
   ------------------------------------------------------------------------
                                                      (INCHES)      (CU. FT.)
                                                     ----------    -------------
       PRECIPITATION                                   2.01         31374.092

       RUNOFF                                          1.626        25379.4414

       PERCOLATION/LEAKAGE THROUGH LAYER  3            0.024929       389.12021

       AVERAGE HEAD ON TOP OF LAYER  3                28.262

       SNOW WATER                                      8.41        131298.8750

       MAXIMUM VEG. SOIL WATER (VOL/VOL)                       0.4356

       MINIMUM VEG. SOIL WATER (VOL/VOL)                       0.0771

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                 FINAL WATER STORAGE AT END OF YEAR    5
    ----------------------------------------------------------------------
                 LAYER        (INCHES)       (VOL/VOL)
                 -----        --------       ---------
                   1            1.6824         0.2804

                   2           10.0731         0.4197

                   3            0.0000         0.0000

               SNOW WATER       1.548
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