Superfund Proposed Plan U.S. Environmental Protection Agency, Region II

Ellenville Scrap Iron and Metal Superfund Site

Ulster County, New York

July 2010

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the contaminated soils and groundwater at the Ellenville Scrap Iron and Metal Superfund site (Site) and identifies the preferred remedy with the rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA), in consultation with the New York State Department of Environmental Protection (NYSDEC). EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the soil contamination at the Site and the associated human health and ecological risks that are summarized in this Proposed Plan are described in the July 2010 Remedial Investigation Report (RI Report) and July 2010 Human Health Risk Assessment Report (HHRA Report), respectively, and the remedial alternatives summarized in this Proposed Plan are described in the July 2010 Feasibility Study Report (FS). EPA and NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted.

This Proposed Plan is being provided as a supplement to the above-noted documents to inform the public of EPA and NYSDEC's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred alternative. EPA and NYSDEC's preferred alternative consists of the following: 1) excavation of contaminated soils throughout six Areas of Concern (AOCs), which include some adjacent residential properties, where contaminants in the surface soils exceed the cleanup criteria, 2) backfilling the excavated areas with clean fill, 3) consolidating all excavated soils in the upper and central portion of the Site, 4) installing a landfill cap system which meets the substantive requirements of NYS Part 360 over the existing landfill and the relocated contaminated soils and 5) development of a site management plan to include long-term groundwater monitoring and engineering and institutional controls, incorporating periodic reviews and certifications.

MARK YOUR CALENDAR

July 29, 2010 – August 28, 2010: Public comment period related to this Proposed Plan.

August 18, 2010 at 7:00 P.M.: Public meeting at the Ellenville Government Center, 2 Elting Court, Village of Ellenville.

The remedy described in this Proposed Plan is the preferred remedy for the Site. Changes to the preferred alternative or a change from the preferred alternative to another alternative may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis section of the FS report, since EPA and NYSDEC may select a remedy other than the preferred alternative.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS reports and this Proposed Plan have been made available to the public for a public comment period which begins on July 29, 2010.

INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following Information repositories:

Ellenville Public Library
40 Center Street
Village of Ellenville, New York 12428
Telephone: (845) 647-5530

Hours:Monday – Thursday : 9:30 AM to 8 PM
Friday : 9:30 AM to 3:00 PM
Saturday : 9:30 A.M. to 5:00 PM

USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308

Hours:Monday – Friday : 9:00 AM to 5:00 PM

The Proposed Plan can also be found under "Additional Documents" on EPA's Ellenville Scrap Iron and Metal website:
www.epa.gov/region02/superfund/npl/ellenville

A public meeting will be held during the public comment period at the Ellenville Government Center on August 18, 2010 at 7:00 P.M. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedy and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

Written comments on the Proposed Plan should be addressed to:

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SCOPE AND ROLE OF ACTION

This Proposed Plan presents a long-term remedial action, focusing on the cleanup of the entire Site. The primary objectives of this action are to remediate the contaminated soils at the Site which could potentially come in contact with human and ecological receptors and to minimize any impacts to the groundwater.

SITE BACKGROUND

Site Description

The Ellenville Scrap Iron and Metal Site (the Site) [see Figure 1] is a 24-acre, former scrap iron and metal reclamation facility, located at 34 Cape Road in the Village of Ellenville, Town of Wawarsing, Ulster County, New York. Approximately 10 acres of the Site were used for a variety of scrap metal operations and battery reclamation. The Site is bound to the north by Cape Road; to the south and west by Beer Kill Creek; and to the east by residential homes. The Site consisted of an office building, a truck scale, a hydraulic baling machine used for metal cans and other small parts, abandoned automobiles and trucks, scrap metal piles, railroad ties, storage of automobile batteries and emptied casings and assorted brush piles. The Cape Road residential property, directly east of the entrance to the Site, was formerly part of the facility and was used for the storage and disposal of heavy equipment, as well as automobile batteries. Deteriorated drums were found scattered throughout the property. An existing landfill embankment, approximately 40 feet in height, runs in a crescent along a northwesterly to southeasterly axis bisecting and dividing the Site into two portions, upper and lower. The landfill is composed of construction and demolition debris, including a variety of finely shredded wastes, scrap brick, concrete, wood and other metal-type debris.

Approximately 4000 people relying on both public and private drinking water supplies live in the area surrounding the Site.

All buildings and facilities associated with previous Site operations have been demolished and removed. All other debris piles and other assorted Site debris have also been removed. A fence is located along some of the perimeter of the property.

In order to delineate the Site contaminants more clearly, the Site is divided into six AOCs which are defined as follows:

- AOC 1 - Landfill Area – This AOC is the upgradient plateau area of the Site adjacent to Cape Road where a majority of Site operations were conducted.
- AOC 2 - Debris Piles Area – This AOC is adjacent to the southern boundary on the landfill area on the lower plateau area of the Site. This area was used for storing large debris piles (scrap metal, pallets, rail road ties, tires, transite and battery casings). In 2005, EPA removed the debris piles.
- AOC 3 - Dumpster Staging Area – This AOC is located adjacent to and south of the landfill area. The area was used for the storage of solid waste dumpsters and was isolated from the debris piles area (AOC 2) because of the amounts of the surficial debris observed in the area.
- AOC 4 - Scattered Debris Area – This AOC is located along the southern boundary of the Site, extends along the Beer Kill and to the north of the landfill area, contains older growth trees and was scattered with a variety of smaller debris piles (drums, scrap metal, etc.). In 2005, EPA also removed this debris material.
- AOC 5 - Battery Disposal Area – This AOC is located adjacent to and east of the landfill (the Cape Road residential property). Battery casings were disposed on this property and on the hillside behind the residence.
- AOC 6 - Off-Property Residential Area – This AOC is located on the eastern part of the Site and includes several residential properties.

Site History

From 1950 to 1997, the Site was owned and operated by Albert and Patricia Koplik, who used the Site for recycling scrap metal and waste handling, including reclaiming wet cell automobile batteries, old barrels, metal trimmings with oil residue, automotive parts, oil burners and electronic circuit board components.

During 1987-88, NYSDEC inspected the Site several times. During this period, NYSDEC directed the operators to remediate conditions at the Site. As a result of its efforts, NYSDEC accepted the Ellenville Scrap Iron and Metal Settlement of Claim on January 15, 1988. As part of this settlement, the operators agreed to close and cover the area of construction and demolition debris.

From 1990-1992, NYSDEC performed numerous inspection and investigations to evaluate the potential for listing the Site on the NYS Registry of Inactive Hazardous Waste Disposal Sites. Soil investigations at the Site showed that numerous waste oil discharges were observed from drum crushing and hydraulic baling operations.

In January 1995, the Kopliks and Ellenville Scrap Iron and Metal entered into a Consent Order with the NYSDEC in which they agreed to prepare and implement a Preliminary Site Assessment. In addition, they were ordered to perform an Interim Remedial Measure on a portion of the Site surrounding the baling machine. These activities never occurred.

In late 1997, the facility was purchased by John C. Bruno and was used for landfill purposes and as a tire dump. Neither the Kopliks nor Mr. Bruno received a NYSDEC permit to operate as a solid waste management facility or to store tires on the Site. From 1987 to 1998, the NYSDEC conducted numerous inspections and sampled soils both on-site and at adjacent residential properties. Once again, NYSDEC directed the owners to remediate conditions on the Site. The Site was abandoned in the 1998-1999 time frame.

In June 2000, at the request of NYS, U.S. Environmental Protection Agency (EPA) Region II and its Superfund Technical Assessment and Response Team (START) contractors conducted a sampling event at the Site and adjacent residential properties as part of EPA's Integrated Site Assessment process. Surface soil samples were collected throughout the Site and at several adjacent residential properties. Sediments and surface water samples were also collected along Beer Kill Creek. Samples were also collected from the ponded leachate emanating from the landfill embankment.

Analytical results from the June 2000 samples indicated contamination in surface soils, as well as in Beer Kill Creek. Because the creek is used by recreational fishermen and also discharges into two fisheries, a Hazard Ranking System evaluation resulted in the Site's being listed on the National Priorities List on October 7, 2002.

Prior to EPA's involvement, the Village of Ellenville, in response to public concerns, arranged for the disposal of approximately 3000 tires being stored at the Site.

Prior to collecting samples during the RI, EPA's Removal program performed some necessary actions at the Site in order to excavate some contaminated soils and to clear the site of excessive debris and assorted on-site structures. Accordingly, from October to December 2004, EPA performed sampling and conducted a Removal Action at the Site. At this time, the Site buildings were demolished. Waste oils in aboveground tanks, approximately twenty drums containing various hazardous materials and excavated lead-contaminated residential soils were all disposed of at permitted off-site facilities. As a result of prior operations conducted at the Cape Road residential property, the property was subject to an EPA Removal action where soils contaminated with elevated levels of lead and polychlorinated biphenyls (PCBs) were removed and disposed off-site.

During Summer and Fall 2005, EPA performed further Removal cleanup actions to prepare the Site for RI/FS activities. These actions included the following 1) clearing, grading and stabilizing the Site support area; 2) characterization and off-site disposal of the various debris piles, located throughout the Site property, including tires, battery casings, wood pallets and concrete and construction debris; 3) characterization for recycle and/or sale of the various scrap iron and steel, as well as the baling units, located on the Site; 4) dismantling and preparing the abandoned dumpsters, cars, trucks and other heavy equipment for recycle and/or sale as scrap; and, 5) testing and disposal at approved, regulated facilities of any localized contaminated soils, associated with the cleanup of the various debris piles and the metal-processing equipment.

Completion of the Site clearing activities enabled the initiation of the RI sampling program, which began in 2007. The RI sampling was completed in 2008. Additional groundwater sampling was conducted by EPA in 2009 and 2010.

Site Geology/Hydrogeology

The Site is located on the eastern edge of the Appalachian Plateau and is approximately one mile west of the Valley and Ridge physiographic province. Post glacial alluvium deposits are present on the flat terrain adjacent to Beer Kill, which represents the southern boundary of the Site. The stratified drift deposits of sand and gravel comprise the overburden aquifer. The bedrock formation produces groundwater primarily through fractures or its secondary permeability.

The Site is underlain by the unconfined Sandburg Creek Valley Aquifer, which lies within the surficial deposits of glacial till and deposited as ground moraine. The Sandburg Creek Valley Aquifer consists of poorly sorted sand and gravel of variable texture in association with clay, silty clay, boulder clay and relatively impermeable loam. The thickness of these deposits ranges from 3 to 150 feet. The overlying stratified-drift deposits of sand and gravel comprise the aquifer that sustains Sandburg Creek in Ellenville. Groundwater flows southeast and discharges to the Sandburg Creek during low flow. The Sandburg Creek Valley Aquifer extends from Phillipsport in Sullivan County to Wawarsing in Ulster County, encompassing the valleys of Homowack Kill, Sandburg Creek and a segment of the Rondout Creek.

The bedrock aquifers supply water to individual homes or farms. The consolidated rock in the Site area has virtually no porosity for groundwater storage or transmittal, but there are isolated zones of high porosity and permeability. These bedrock aquifers are usually recharged from unconsolidated overburden from above.

Public water supply wells in Ellenville, completed in this aquifer, include a 39-ft well, an 87-ft well and the other at 51 ft. The depth to water at the Site ranges from under 10 feet below ground surface (bgs) near the Beer Kill on the lower plateau of the Site to approximately 25 feet bgs on the upper plateau of the Site. The bedrock formation produces groundwater primarily through fractures or its secondary permeability. Wells completed in sedimentary bedrock formations in this area have reported yields typically 0.15 gpm/ft.

RESULTS OF THE REMEDIAL INVESTIGATION

The RI sampling was conducted from 2007-2008. From 1990 until 2006 (prior to the RI), as discussed above, EPA and NYSDEC conducted various sampling and cleanup up efforts at the Site and discovered a variety of contaminants. During the RI, affected media were investigated: surface and subsurface soils, groundwater [including installation of new monitoring wells], surface water, sediments, landfill leachate and soil gas.

<u>Background Soils</u>

Off-site soils were sampled to determine background concentrations in native soils not impacted by Site operations. Analytical results were compared to the NYS Part 375 Soil Cleanup Objectives (SCOs) for Unrestricted Use SCOs (USCOs).

Background soil sample results for metals and pesticides exceeded USCOs in several instances. For the metals analyses, lead (in 5 of 10 samples ranged from 79.6 milligrams per kilogram (mg/kg) to 677 mg/kg), mercury (in two samples), and zinc in two samples) were reported at concentrations exceeding USCOs. In 8 of the 10 background samples, the concentrations of pesticides exceeded USCOs. Based on their widespread distribution, the presence of pesticide compounds indicates historical residential use. PCBs were not detected in any of the background samples.

Site Soils

In general, soils at the Ellenville Scrap Metal Site have been impacted by historic Site operations as evidenced by the type and distribution of contaminants in the area of the landfill, in the area of the former large debris piles at the base of the landfill and along a drainage channel to the southeast of the landfill.

Both on-site surface and subsurface [test pit and direct-push borings] soil samples show concentrations of Semi-Volatile Organic Compounds (SVOCs), pesticides, PCBs and metal concentrations above USCOs. In addition, VOC concentrations above USCOs are present in the subsurface soils of the landfill. The highest results for PCBs and several poly-aromatic hydrocarbons (PAHs) (SVOCs) detected during the RI were on the lower plateau of the Site.

Surface soils were sampled throughout the Site area. Ten landfill test pits were excavated and 30 direct-push soil borings were conducted.

During the test pit excavation of the landfill area, the observed thickness of fill ranged from 2 feet bgs at the eastern part, to 8 feet bgs in the western part, to 12 feet bgs in the central part. All test pits exhibited varying amounts and types of debris and staining. Stained layers were observed in test pits between 2 and 6 feet bgs.

In general, the direct-push borings were at depths between 7 to 10 feet bgs. The material encountered in the direct-push borings generally consisted of sand and gravel. Other materials include ash, slag, brick, metal, glass and plastics at various intervals. These materials are consistent with material observed in the test pits.

With respect to metals in surface soils, 11 metals exceeded USCOs with arsenic and manganese at the lowest levels. Zinc, lead, copper, chromium, cadmium, mercury and nickel exceeded their USCOs by a wider margin. The highest concentrations for lead were reported for samples collected 1) near the battery casing wall area, located on the slope behind the Cape Road residential property, 2) on the landfill and 3) on the lower plateau of the Site along a drainage channel to the southeast of the landfill.

With respect to metals in subsurface soils, at the direct-push locations, eight of the 30 locations had metal concentrations exceeding USCOs, particularly at DP-025 and DP-029, located around the perimeter of the former compactor area. Concentrations for organic compounds, including total PCBs, also exceeded USCOs at these locations. The test pit locations with the highest metal concentrations were TP-04 and TP-08, in the central portion of the on-site landfill. Both locations exceeded USCOs for total PCBs and TP-04 for several VOCs.

In general, the metals detected above USCOs with the highest frequencies and magnitude in both on- and off-site soils include lead, chromium, mercury, zinc and copper. Additional metals detected were arsenic, cadmium, nickel and silver.

Nine VOCs were detected in on-site surface soils. 2-butanone and acetone were found at a few locations at 0.12 mg/kg exceeding USCOs. The highest acetone concentration was 0.8 mg/kg.

With respect to surface soils, VOC concentrations above USCOs were found in three direct-push borings and six test pits. In the borings, seven VOCs were reported exceeding USCOs: 2-butanone, acetone, benzene, ethylbenzene, methylene chloride, toluene and total xylenes. The six test pits exceeded USCOs for acetone, ethylbenzene and toluene.

PCB concentrations above the USCO are mostly confined to the Site. In surface soils, the concentration of total PCBs were above the USCO of 0.1 mg/kg in 28 of the 58 surface soil samples collected on-site (on the landfill, in the area of the former large debris pile at the base of the landfill and the southeast portion of the lower plateau of the Site). The highest PCB concentration was 43 mg/kg (SS-014) (lower plateau along a drainage channel to the southeast). This sample also had some of the highest SVOC (PAH) concentrations encountered in surface soils. The second highest total PCB concentration of 12.5 mg/kg was found in DP-026, collected on the edge of the former compactor excavation. Total PCB concentrations in 12 samples exceeded USCOs (seven locations on the upper plateau and five on the lower plateau).

In subsurface soils, PCB concentrations exceeded the USCO of 0.1 mg/kg at five of the ten test pits and at seven direct-push locations. The highest concentrations of total PCBs in on-Site subsurface soils were TP-08 at 55 mg/kg and DP-25 at 20 mg/kg, both collected between 4 to 6 feet bgs on the upper plateau. Two PCB samples taken on the lower plateau exceeded the USCO at 0.18 mg/kg and 0.3 mg/kg, respectively. Of the seven direct-push samples above the USCO, four are located around the former compactor excavation area where PCB-contaminated oil and soils were removed by EPA during cleanup activities in 2005.

Eighteen pesticides were detected in Site surface soils, including seven at concentrations above USCOs. The most frequently detected pesticides were 4,4-DDT and dieldrin in six samples. One sample (DP-026) had the most pesticides above USCOs and also the highest concentrations for the detected compounds. In general, the distribution of these compounds appears to be along roadways and near residences where the pesticides may have been applied. On-site, these compounds appear to be isolated to one sample near the Beer Kill. As part of a pre-design investigation, additional samples would be proposed for this location to delineate the extent of the impacted area followed by excavation to remove the impacted material.

With respect to subsurface soils, four borings showed pesticide concentrations above USCOs: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, beta-BHC, endrin and heptachlor. The ten test pit samples had pesticide concentrations above USCOs: 4,4'-DDD,4,4'-DDE, 4,4'-DDT, aldrin, dieldrin, and endrin. Pesticide concentrations above USCOs appear to be pervasive to the area.

With respect to SVOCs, one boring detected six SVOCs above USCOs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene and phenol. Five test pits had SVOC concentrations above USCOs, similar to DP-25 although dibenzo(a,h)anthracene, dibenzofuran and fluoranthene were also detected above USCOs in one or more test pit samples.

Thirty SVOCs were detected in on-site surface soil samples. Concentrations of seven SVOCs (all PAHs) exceeded USCOs between 10 and 25 locations. The widespread presence of the PAHs is consistent with the historic Site operations, which included extensive burning of debris and spreading of ash on the ground.

<u>Residential Soils</u>

During the RI, 24 shallow (0 to 6") surface soil samples plus one duplicate sample were collected from locations on several residential properties to the south and southeast of the Site. Additional soil samples from the 6 to 24-inch interval were collected at five of the 24 locations to determine the vertical extent of metals contamination at the residential properties. These soils were also compared to USCOs, as well as the NYS Part 375 Restricted Use SCOs - Residential (RRSCOs).

With the exception of PCB concentrations detected in the residential area samples RSS-02 (1.04 mg/kg at 0-24" bgs), RSS-04 (0.13 mg/kg at 0-6" bgs) and RSS-05 (0.11 mg/kg at 6-24" bgs), only the subsurface sample from location RSS-02 exceeded the USCO of 0.1 mg/kg for PCBs and the RRSCO of 1.0 mg/kg. Samples RSS-02 through RSS-05 were collected from the Cape Road residential property which was the subject of an EPA removal action in November 2004.

The concentrations of the four VOCs that were detected in residential surface soils were below USCOs. Most of the 16 SVOCs that were detected were PAHs, and only one of these, benzo(b)fluoranthene at 1.3 mg/kg, slightly exceeded the NYSDEC USCOs of 1.0 mg/kg. Of the 11 detected pesticides, four (4,4'-DDD, 4,4'-DDE, 4,4'-DDT (22 of 28 samples).

Of the five metals, lead had the largest number of concentrations above the USCO of 63 mg/kg (21 of 28 samples). Lead concentrations ranged from 17.4 mg/kg to 8,970 mg/kg and exceeded the RRSCO in seven samples. The other metals which exceeded USCOs were zinc, mercury, silver and copper; only one, copper, exceeded the RRSCO.

Previous EPA residential investigations documented the presence of high lead concentrations in deeper surface soils (> 12") at the Cape Road residential property. After EPA's excavation and removal of the lead-contaminated soils, post-excavation samples collected at depths of 12-18 inches bgs indicated lead levels from 160 mg/kg and 170 mg/kg in the southeastern portion of the property to as high as 45,000 mg/kg at one location to the northwest of the residence. Seven other locations to the north and west of the residence had concentrations between 1,300 and 5,100 mg/kg. In June 2005, EPA sampled the three residences to the south of the Site showing lead concentrations in surface soils (0-3 inches) between 36 mg/kg and 700 mg/kg.

<u>Beer Kill Sediments</u>

Three sediment samples were collected from the Beer Kill, upstream to downstream. With the exception of acetone at 0.016 mg/kg, no VOCs were detected in the three Beer Kill sediment samples. Several SVOCs were detected, with the highest concentrations of individual compounds generally detected in the most upgradient sample. The highest concentrations of metals were detected in the most downstream sample although the concentrations detected are generally similar to the detected concentrations in midstream and upstream.

On-Site Surface Water

Two surface water samples were collected from on-site locations. One sampling location was on the upper plateau of the Site, northwest of the former compactor location. The second location was on the lower plateau of the Site. The results for the on-site surface water samples indicate the presence of the following VOCs: chloroform at an estimated concentration of 0.45 micrograms per liter (ug/l) and chloromethane at an estimated 0.12 ug/l. SVOCs, pesticides and PCBs were not reported above detection limits. The lead concentrations found in the lower plateau were 108 ug/l and above the NYS surface water standard of 50 ug/l. No other concentrations exceeded NYS standards. The presence of several of the metals in the on-site surface water samples corresponds to their elevated concentrations in Site soils.

Beer Kill Surface Water

Three surface water samples were collected from the Beer Kill. The stations were selected to characterize water quality upstream from the Site, adjacent to the Site and downstream of the Site. The results indicated the presence of one VOC, chloromethane, at an estimated concentration of 0.19 ug/l, and two SVOCs, butylbenzylphthalate at an estimated 0.82 ug/l and diethylphthalate at an estimated 0.25 ug/l at station SWSD-07, the most downstream surface sampling location. Both butylbenzylphthalate and diethylphthalate were also detected in Site soil samples. Pesticides or PCBs were not detected in the three surface water samples from Beer Kill. Four metals were reported above detection limits: calcium, iron, manganese and sodium; however, calcium and sodium concentrations are significantly more elevated in the on-site surface water. The metals concentrations found in the Beer Kill did not exhibit a discernible trend from upstream to downstream locations.

Comparing the on-site surface water results with the Beer Kill results, the past Site usage as a scrap metal facility does not appear to have impacted the Beer Kill with metals.

Leachate

The leachate samples contained two VOCs, several SVOCs (PAHs), one pesticide and several metals. Neither the VOCs nor the pesticide exceeded the respective Class GA standards. The detection of the SVOCs (PAHs) is consistent with their widespread presence in Site soils by Site usage, which included the burning of large amounts of debris and spreading the ashes on the lower plateau. Benzo(a)pyrene at 0.52 ug/l was the only SVOC that exceeded its Class GA standard of non-detect. Iron, lead and manganese exceeded the Glass GA standards in one sample LH-01 and manganese only in one sample. The metals concentrations in the leachate samples are generally higher than in on-site surface water samples.

Groundwater

The most recent groundwater sampling results are discussed here in order to reflect the current conditions with respect to any groundwater contamination. In May 2008, October 2008, October 2009 and January 2010, the EPA monitoring wells were sampled for a variety of parameters and compared to NYS Class GA standards.

With respect to VOCs, in May 2008, carbon disulfide was detected in EPA-01 at 1.0 ug/l. Carbon disulfide was not detected in EPA-04 and EPA-05 but, in October 2008, was detected at 0.18 ug/l and 0.11 ug/l, respectively. In May 2008, chloromethane was detected in EPA-01, EPA-02 and EPA-07 (1.7 ug/l in EPA-07). In October 2008, chloromethane was not detected in EPA-02 nor EPA-07. In October 2009, three compounds were detected: acetone, toluene and m/p-xylene. Acetone was detected in EPA-03, EPA-05 and EPA-07 with highest concentration of 9.2 ug/l in EPA-03. Estimated values of toluene (0.1 ug/l) and m/p-xylene (0.056 ug/l) were detected in EPA-03 only. All concentrations were below Class GA standards. VOCs were not detected during the January 2010 event.

With respect to the SVOCs, in May 2008, caprolactam (used to make artificial fibers) was detected in four wells with a concentration of 150 ug/l in EPA-07, 7.4 ug/l in EPA-03, 56 ug/l in EPA-04 and in a duplicate from EPA-05. In October 2008, caprolactam was found at 0.63 ug/l in EPA-04. In May and October 2008, it was not detected in EPA-05. Caprolactam is covered under NYSDOH Part 5 level of 50 µg/L for unspecified organic contaminants. In October 2008, diethylphthalate concentrations were estimated in three wells: EPA-03, EPA-05 and EPA-06. The highest concentration was reported at 0.2 ug/l in EPA-05 and EPA-06 and 0.19 ug/l in EPA-03.

Pesticides and PCBs were not detected during the May and October 2008 events.

With respect to metals, the data showed antimony, chromium, lead, nickel and sodium with concentrations exceeding the Class GA standards on a relatively limited basis. The elevated concentrations of iron and manganese appeared to be related to local conditions, since these metals were detected in concentrations exceeding the Class GA standards in the upgradient well EPA-07 and were also detected at elevated concentrations in the NYSDEC upgradient well MW-6. The concentrations of iron and manganese also exceeded the Class GA standards in some of the perimeter wells (EPA-03, EPA-04 and EPA-05. During May 2008, a lead concentration of 29 ug/l was detected (above the Class GA standard of 15ug/l) in EPA-04; however, in October 2008, lead was not detected in EPA-04. In October 2009, EPA-03, EPA-04 and EPA-05 exceeded Class GA standards for manganese with the highest concentration (4,500 ug/l) in EPA-03. Antimony (3.6 ug/l), arsenic (95.5 ug/l) and chromium (90 ug/l) were also detected above the Class GA standard in EPA-03 only. In January 2010, manganese concentrations exceeded the Class GA standard in EPA-03, EPA-04, EPA-05 and EPA-06 with the highest concentration (10,000 ug/l) in EPA-03. Chromium (280 ug/l) and nickel (180 ug/l) were also detected above the Class GA standard in EPA-03. In January 2010, antimony was not detected in EPA-03, and the arsenic concentration was 22 ug/l, below the Class GA standard of 25 ug/l. Based on the concentrations detected in EPA-03, there appears to be a historical Site operation impact on the groundwater conditions at this well location.

RISK SUMMARY

The purpose of the risk assessment is to identify potential cancer risks and noncancer health hazards at the site assuming that no further remedial action is taken. A baseline human health risk assessment was performed to evaluate current and future cancer risks and noncancer health hazards based on the results of the RI.

A screening-level ecological risk assessment (SLERA) was also conducted to assess the risk posed to ecological receptors due to site-related contamination.

Human Health Risk Assessment

As part of the RI/FS, a baseline human health risk assessment was conducted to estimate the risks and hazards associated with the current and future effects of contaminants on human health and the environment. A baseline human health risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these under current and future land uses.

A four-step human health risk assessment process was used for assessing site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Potential Concern (COPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization (see adjoining box "What is Risk and How is it Calculated").

The baseline human health risk assessment began with selecting COPCs in the various media, *i.e.*, soils, groundwater, surface water and sediments, that could potentially cause adverse health effects in exposed populations. The current and future land use scenarios included the following exposure pathways and populations:

- On-site Trespassers and Recreational Users: ingestion, dermal contact and inhalation of surface soils and ingestion and dermal contact with leachate for adults and children.
- Recreational users in Beer Kill: ingestion and dermal contact with surface water and sediments for adults and children.
- On-site Residents: ingestion, dermal contact and inhalation of surface soils, ingestion and dermal contact with leachate and ingestion and dermal contact with groundwater for adults and children.
- On-site Commercial/Industrial Workers: ingestion, dermal contact and inhalation of surface soils and ingestion and dermal contact with leachate for adults.
- On-site Construction/Utility Workers: ingestion, dermal contact, and inhalation of subsurface soils (0-10 feet) and dermal contact with leachate and shallow groundwater for adults.
- Off-property Residents: ingestion, dermal contact, and inhalation of surface soils for adults and children.

WHAT IS RISK AND HOW IS IT CALCULATED?

Human Health Risk Assessment: A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as Chemicals of Concern or COCs in the final remedial decision or Record of Decision.

In this assessment, exposure point concentrations were estimated using either the maximum detected concentration of a contaminant or the 95% upper-confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures. Central tendency exposure (CTE) assumptions, which represent typical average exposures, were also developed. A complete summary of all exposure scenarios can be found in the baseline human health risk assessment.

Surface Soils

Risks and hazards were evaluated for current and future exposure to surface soils on-site and off-site. The populations of interest included adult and child trespassers and recreational users, adult and child residents and adult commercial workers. The hazard index for on-site child residents and off-site adult and child residents were above the EPA acceptable value of 1. The cancer risks for all of the populations evaluated exceeded or were at the upper-bound of the acceptable EPA risk range of 1.0E-06 to 1.0E-04. The contaminants of concern (COCs) that were identified for soils include PAHs, PCBs and metals (Table 1).

Table 1. Summary of hazards and risks associated with surface soils.

Receptor	Hazard Index	Cancer Risk
On-site Trespasser - Adult	0.1	**7.2E-04**
On-site Trespasser - Child	1	
On-site Recreational user - Adult	0.1	**7.3E-04**
On-site Recreational user - Child	1	
On-site Resident - Adult	1	**6.5E-03**
On-site Resident - Child	**9**	
On-site Commercial/ Industrial Worker	0.7	**3.7E-04**
Off-site Resident - Adult	**2**	**1.0E-04**
Off-site Resident - Child	**19**	
COCs include: benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, Arolcor-1254, Aroclor-1260, arsenic, chromium VI, copper, iron and lead		

Subsurface Soils

Risks and hazards were evaluated for the potential future exposure to subsurface soils. The population of interest included adult construction/utility workers. Both the hazard index and cancer risk exceeded the EPA acceptable hazard and risk values. The COCs that were identified include PAHs and metals (Table 2).

Table 2. Summary of hazards and risks associated with subsurface soils.

Receptor	Hazard Index	Cancer Risk
On-site Construction/Utility Worker	**5**	**2.1E-04**
COCs include: benzo[a]pyrene, chromium VI, arsenic, manganese, and lead		

Leachate

Risks and hazards were evaluated for current and future exposure to leachate on-site. The populations of interest included adult and child trespassers, recreational users, and adult construction/utility workers. The hazard indexes for the populations of interest were below EPA's acceptable value of 1. The cancer risks for all of the populations evaluated exceeded EPA's acceptable risk range of 1.0E-06 to 1.0E-04. The COCs, identified for soils, include PAHs, pesticides, PCBs and metals (Table 3).

Table 3. Summary of hazards and risks associated with leachate.

Receptor	Hazard Index	Cancer Risk
On-site Trespasser – Adult	0.05	**3.5E-03**
On-site Trespasser – Child	0.1	
On-site Recreational user – Adult	0.05	**2.8E-03**
On-site Recreational user – Child	0.1	
On-site Commercial/ Industrial Worker	0.2	**2.1E-03**
COCs include: benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, dieldrin, Aroclor-1260, arsenic, and chromium VI		

Groundwater

Risks and hazards were evaluated for current and future exposure to groundwater on Site. The populations of interest included on-site adult and child residents and adult construction/utility workers. The hazard indexes for the on-site adult and child resident exceeded the EPA acceptable value of 1. The cancer risk for adult and child on-site residents also exceeded the acceptable EPA risk range of 1.0E-06 to 1.0E-04. The COCs, identified for groundwater, include a variety of metals (Table 4).

Table 4. Summary of hazards and risks associated with groundwater.

Receptor	Hazard Index	Cancer Risk
On-site Residents - Adult	**8**	**3.6E-03**
On-site Residents - Child	**28**	
On-site Construction/ Utility Worker	0.07	4.8E-06
COCs include: aluminum, arsenic, chromium IV, cobalt, lead, and manganese		

Surface Water and Sediments

Risks and hazards were evaluated for current and future exposure to surface water and sediments from Beer Kill. The populations of interest included on-site adult and child recreational users. The hazard indexes and cancer risks for all of the populations evaluated were below or within the EPA acceptable values. There were no COCs identified for surface water or sediments (Table 5).

Table 5. Summary of hazards and risks associated with sediments and surface water.

Receptor	Hazard Index	Cancer Risk
On-site Recreational user - Adult	0.02	6.4E-06
On-site Recreational user - Child	0.2	
There were no COCs identified in surface water or sediments.		

Sitewide Summary

The risks and hazards for the populations of interest were also summed across all exposure pathways and media to obtain an estimate of the site-wide risks and hazards for the site. The hazard indexes for on-site residents, both adult and child, on-site construction/utility workers and off-site residents, both adult and child, exceed the EPA acceptable value of 1. The cancer risk fro all of the populations evaluated also exceed the EPA acceptable risk range of 1.0E-06 to 1.0E-04 (Table 6).

Table 6. Summary of hazards and risks for all receptors summed across all pathways and media.

Receptor	Hazard Index	Cancer Risk
On-site Trespasser - Adult	0.2	**3.5E-03**
On-site Trespasser - Child	1	
On-site Recreational user – Adult	0.2	**3.6E-03**
On-site Recreational user – Child	1	
On-site Resident - Adult	**10**	**3.5E-02**
On-site Resident - Child	**38**	
On-site Commercial/ Industrial Worker	0.9	**2.3E-03**
On-site Construction/Utility Worker	**5**	**2.1E-04**
Off-site Resident - Adult	**2**	**1.0E-04**
Off-site Resident - Child	**19**	

Areas of Concern (AOCs)

Additionally, exposure to smaller units of the Site were also evaluated for on-site adult and child residents and adult construction/utility workers (Table 7). The AOCs evaluation indicates that each AOC has non-cancer hazards for at least one population and elevated cancer risks for all evaluated populations.

Table 7. Summary of hazards and risks associated with soils, leachate, groundwater, sediments, and surface water exposure from all pathways from AOC 1 through 6.

AOC	Receptor	Hazard Index	Cancer Risk
1	On-site Resident - Adult	**4**	**8.0E-02**
	On-site Resident - Child	**31**	
	On-site Construction/ Utility Worker	**7**	**8.8E-04**
2	On-site Resident - Adult	0.5	**2.7E-03**
	On-site Resident - Child	**4**	
	On-site Construction/ Utility Worker	0.4	**3.9E-05**
3	On-site Resident - Adult	**2**	**1.0E-03**
	On-site Resident - Child	**13**	
3	On-site Construction/ Utility Worker	**2**	**2.2E-05**
4	On-site Resident - Adult	0.3	**2.6E-04**
	On-site Resident - Child	**3**	
	On-site Construction/ Utility Worker	0.8	**4.2E-06**
5	On-site Resident - Adult	0.5	**1.9E-04**
	On-site Resident - Child	**4**	
	On-site Construction/ Utility Worker	0.7	**2.4E-04**
6	Off-site Resident - Adult	**2**	**1.0E-04**
	Off-site Resident - Child	**19**	

Based on the results of the human health risk assessment, a remedial action is necessary to protect public health, welfare and the environment from actual or threatened releases of hazardous substances.

Ecological Risk Assessment

A SLERA was conducted to evaluate the potential for ecological effects from exposure to surface soils, leachate, groundwater discharging to sediments and surface water, and surface water and sediments from Beer Kill creek. Surface soils, leachate, groundwater, surface water, and sediment concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors by habitat type. Exposure to terrestrial wildlife via the ingestion of prey and direct soil ingestion to chemicals was also evaluated. A complete summary of all exposure scenarios can be found in the SLERA. Habitat types were identified as upper plateau/landfill, flood plain, forested wetland, residential area and Beer Kill creek.

Upper Plateau/Landfill: There is a potential for adverse effects to terrestrial plants/soil invertebrates from direct exposure to chemicals within the upper plateau/landfill area. The soil screening criteria were exceeded for 22 chemicals and the wildlife screening criteria was exceeded for 13 chemicals.

Flood Plain: There is a potential for adverse effects to terrestrial plants/soil invertebrates from direct exposure to chemicals from migration from the upper plateau/landfill area. The soil screening criteria were exceeded for 24 chemicals and the wildlife screening criteria was exceeded for 16 chemicals.

Forested Wetland: There is a potential for adverse effects to terrestrial plants/soil invertebrates from direct exposure to chemicals within the forested wetland area.
The soil screening criteria were exceeded for 22 chemicals and the wildlife screening criteria was exceeded for 16 chemicals.

Residential Area: There is a potential for adverse effects to terrestrial plants/soil invertebrates from direct exposure to chemicals within the residential area. The soil screening criteria were exceeded for 19 chemicals and the wildlife screening criteria was exceeded for 10 chemicals.

Beer Kill Creek: Available data indicates minimal potential for adverse effect to aquatic life from direct exposure to chemicals in the Beer Kill sediments and/or surface water. Three inorganic chemicals (lead, manganese, and nickel) and the PAH indeno(1,2,3-cd) pyrene were detected at maximum concentrations exceeding sediment screening values; however, these chemicals only marginally exceeded their screening values (HQs < 5), suggesting a minimal potential for adverse effects. There were no chemicals detected in surface water above screening criteria which indicates there is no potential for adverse effects to aquatic life. In addition, there was no potential for adverse effects indicated to aquatic-based wildlife from exposure via the ingestion of prey and direct ingestion to chemicals in the Beer Kill.

Based on the results of the ecological risk assessment, a remedial action is necessary to protect the environment from actual or threatened releases of hazardous substances.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) have been developed for the Site for the protection of public health and the environment based on findings of the RI. The RAOs are organized by media of concern and specify contaminant type, exposure pathways and preliminary remediation goals based on chemical specific Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBC) criteria. The ARAR preliminary remediation goals (PRGs) identify Standards, Criteria, and Guidances (SCGs) that will be utilized to establish soil and groundwater cleanup objectives that eliminate or mitigate the significant threat to the public health and environment. The Site-specific RAOs are below.

Groundwater

- Prevent ingestion of water with contaminant concentrations greater than NYSDEC Technical & Operational Guidance Series (TOGS) groundwater (Class GA) water quality standards.
- To the extent practicable, restore groundwater contaminant concentrations to less than the NYSDEC TOGS groundwater (Class GA) water quality standards
- Prevent discharge of groundwater with contaminant concentrations greater than the NYSDEC TOGS groundwater (Class GA) water quality standards to adjacent surface water (Beer Kill).
- Prevent discharge of groundwater with contaminant concentrations greater than the NYSDEC TOGS groundwater (Class GA) water quality standards to adjacent surface water (Beer Kill).
- To the extent practicable, restore groundwater contaminant concentrations to less than the NYSDEC TOGS groundwater (Class GA) water quality standards.
- Prevent exposure to or inhalation of volatilized contaminants from groundwater with concentrations greater than the NYSDEC TOGS groundwater (Class GA) water quality standards.

Soils

- Prevent ingestion/direct contact of soils with contaminant concentrations greater than NYSDEC RRSCOs.
- Prevent inhalation of soil dust with contaminant concentrations greater than NYSDEC RRSCOs.
- Prevent off-site migration of soils with contaminant concentrations greater than NYSDEC RRSCOs.
- Prevent or minimize impacts to groundwater and/or surface water resulting from soil contamination with concentrations greater than NYSDEC Protection of Groundwater SCOs.
- Prevent off-site migration of soils with contaminant concentrations greater than NYSDEC Part 375 Protection of Ecological Resources SCOs.

Solid Wastes

- Prevent ingestion/direct contact with solid wastes with contaminant concentrations greater than NYSDEC RRSCOs.
- Prevent off-site migration of solid wastes with contaminant concentrations greater than NYSDEC RRSCOs.
- Prevent or minimize impacts to groundwater and/or surface water resulting from solid wastes with concentrations greater than NYSDEC Protection of Groundwater SCOs.
- Prevent ingestion of leachate with contaminant concentrations greater than the NYSDEC Class GA water quality standards.
- Prevent off-site migration of leachate with contaminant concentrations greater than the NYSDEC Class GA water quality standards.
- Prevent exposure to or inhalation of volatilized contaminants from the solid wastes.
- Prevent migration of landfill gas generated by the decomposition of solid wastes.

Surface Water

- None.

Sediments

- None.

Air

- See inhalation RAOs listed above.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under Federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the Site contamination can be found in the FS report. Dividing the Site into six (6) Areas of Concern (AOCs) facilitated the development and evaluation of remedial alternatives, based on the nature and extent of contamination.

- AOC 1 - Landfill Area - VOCs, SVOCs, metals, PCBs and pesticides were detected in the soils within the area at concentrations greater than the RRSCOs.
- AOC 2 - Debris Pile Area - SVOCs, metals, PCBs and pesticides were detected in the soils within the area at concentrations greater than the RRSCOs.
- AOC 3 - Dumpster Staging Area - VOCs, metals, and PCBs were detected in the soils within the area at concentrations greater than the RRSCOs.
- AOC 4 - Scattered Debris Area - Metals were detected in the soils at one location within the area at concentrations greater than the RRSCOs.
- AOC 5 - Battery Disposal Area - Metals and PCBs were detected in the soils within the area at concentrations greater than the RRSCOs.
- AOC 6 - Off-Property Residential Area - SVOCs and metals were detected in the soils within the area at concentrations greater than the RRSCOs.

The six AOCs are shown in Figure 2.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the remedy performance with any potentially responsible parties or procure contracts for design and construction. The alternatives are described below.

SOIL REMEDIAL ALTERNATIVES

Based on the screening analyses and evaluations performed in the FS, remedial alternatives 2B, 2D, 3A and 3B were screened out of the final alternatives which are discussed below.

Alternative 1: No Action

Capital Cost	$0
Annual Operation/Maintenance (O&M) Cost	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The “no action” option is included as a basis for comparison with active soil remediation technologies. If no remedial action is taken, contaminants already present in the soils will remain in place and will continue to impact the underlying groundwater. Organic contaminants (PAHs) may degrade over time due to natural attenuation processes. Metal and PCB contaminants will remain in the Site soils for long periods of time with little or no decrease in concentration. There are no capital, operations/maintenance/ monitoring costs associated with this alternative. There are no permitting or institutional legal restrictions needed for this alternative. This alternative will not meet any of the RAOs for the Site and is unlikely to be accepted by the state and/or local community.

Alternative 2A – Capping/On-Site Consolidation

Capital Cost:	$5,152,800
Annual Operation and Maintenance (O&M) Cost:	$75,500
Present-Worth Cost:	$6,323,000
Construction Time:	9 months

Alternative 2A consists of the installation of an impermeable cap in the combined AOCs 1, 2 and 3. Soils in AOC-4, 5 and 6 with concentrations greater than the RRSCOs will be excavated and relocated to

AOC-1, prior to any capping (on-site consolidation). The impermeable cap will consist of a 60-mil high-density polyethylene (HDPE) liner underlain by a gas collection layer, if needed, and overlain by a 2-foot thick soil protective layer. A fence will also be constructed around the cap perimeter. The proposed cap will meet the substantive requirements of 6 NYCRR Part 360 regulations for a landfill cap.

The excavation and on-site consolidation can be implemented in a relatively short time frame. Delineation of the soil impacts in either a pre-design or post-excavation sampling program would be required as part of the remedial action. Impacted soils would be excavated and transported to the landfill area of AOC 1, 2 and 3 where the soils will be relocated, prior to installation of the cap. The excavation will be backfilled with clean fill imported from an off-site source. Construction of the cap can also be completed in a relatively short time frame. However, long-term monitoring and maintenance costs are also associated with the cap. A storm water management system will be incorporated into the cap design to divert storm water flow around and away from the solid waste. It is anticipated that passive vents will be installed into the gas collection layer of the cap. Given that the solid waste appears to be located above the groundwater table, it is expected that leachate generation will diminish considerably or cease permanently once the impermeable cap is installed on top of the waste. Therefore, a leachate collection system has not been assumed as part of the remedial design. A pre-design investigation consisting of test trenching and exploratory test pits around the perimeter of the solid waste area has been included as part of this alternative. The test pit/trench investigation will establish the limits of the solid waste. Any contaminated soils in AOC 1 which are determined to be outside the footprint of the proposed cap will be excavated and relocated within the footprint of the cap. Any soils or waste materials that are characterized as hazardous will be transported off-site for proper disposal and will not be placed under the cap. Based on available data, it is anticipated that hazardous waste will not be encountered at the Site.

In addition to the seven existing EPA monitoring wells, additional bedrock groundwater monitoring wells will be installed as part of this alternative and incorporated into a long-range groundwater monitoring program to be set forth in a site management plan.

Institutional and engineering controls will also be required as part of this alternative to be set forth in a site management plan.

The objectives of this alternative are to prevent or minimize future human exposure to contaminated soils and to reduce the potential for infiltration into the groundwater through the consolidation of contaminated soils beneath the impermeable cap.

Alternative 2C – Capping/On-Site Consolidation

Capital Cost:	$4,695,938
Annual Operation and Maintenance (O&M) Cost:	$65,700
Present-Worth Cost:	$5,711,000
Construction Time:	9 months

Alternative 2C includes all of the aspects of the Alternative 2A (as discussed above) except that, in Alternative 2C, the cap is limited to AOC-1 and the contaminated soils from all other AOCs (2, 3, 4, 5, and 6) will be excavated and consolidated into AOC-1 prior to installing the cap.

The objectives of this alternative are to prevent or minimize future human exposure to contaminated soils and to reduce the potential for infiltration into the groundwater through the consolidation of contaminated soils beneath the impermeable cap.

Alternative 4 – Off-Site Disposal

Capital Cost:	$23,822,000
Annual Operation and Maintenance (O&M) Cost:	$0
Present-Worth Cost:	$23,822,000
Construction Time:	6 months

Alternative 4 consists of excavation and off-site disposal of soils with contaminants greater than RRSCOs. This alternative will meet all of the RAOs and return the Site to pre-release conditions. This alternative can be implemented in a relatively short time frame. However, this alternative has high costs as a result of the extensive quantities of soils to be disposed of off-site and the associated costs of such action for excavation, transport and disposal. This alternative will require extensive truck traffic carrying excavated soils through the Ellenville community. There are no long term monitoring, maintenance or operations costs associated with this alternative.

Groundwater Remedial Alternatives

Alternative G1 – No Action

Capital Cost:	$0
Annual Operation and Maintenance (O&M) Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

Alternative G1 – No Action provides a basis for comparison with other groundwater remedial alternatives. If no remedial action is taken, the limited occurrences of contaminants present in the groundwater would remain. There are no capital, operations, maintenance or monitoring costs associated with this alternative. There are no permitting or institutional legal restrictions needed for this alternative.

Alternative G2 – Monitored Natural Attenuation

Capital Cost:	$63,625
Annual Operation and Maintenance (O&M) Cost:	$51,000
Present-Worth Cost:	$770,000
Construction Time:	0 months

There is no active remedial action associated with Alternative G2. However, there is a long-term monitoring component to this alternative. In addition to the seven existing EPA monitoring wells, additional bedrock groundwater monitoring wells will be installed as part of this alternative. Sampling of the groundwater monitoring wells will be completed on a semiannual basis for an estimated period of 30 years. Groundwater samples will be analyzed for VOCs, SVOCs, metals and PCBs.

Alternative G3 – Groundwater Pump and Treat

Capital Cost:	$629,000
Annual Operation and Maintenance (O&M) Cost:	$416,900
Present-Worth Cost:	$5,896,000
Construction Time:	9 months

Alternative G3 represents an active remedial option consisting of pumping and treating groundwater to remove contaminant mass from higher concentration areas of the aquifer and establish hydraulic control of the aquifer to minimize any off-site migration. Due to the radial flow at the Site, it is assumed that three extraction wells pumping at approximately 10 gpm each would be required to control the aquifer at the Site. A 30-gpm treatment system capable of removing VOCs [carbon units] and metals [ion exchange] would be required.

Pump and treat systems have relatively long time frames of operation (an estimated 30 years is assumed). The treatment system will require a small enclosure (building) that is assumed to be located near the Site entrance to facilitate utility service. This alternative assumes that treated effluent will be discharged to an infiltration system and would require an SPDES permit equivalent.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria: overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, short-term effectiveness, implementability, cost and state and community acceptance.

The evaluation criteria are described below.

- <u>Overall protection of human health and the environment</u> addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.
- <u>Compliance with ARARs</u> addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other Federal and state environmental statutes and requirements or provide grounds for invoking a waiver.
- <u>Long-term effectiveness and permanence</u> refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and operation and maintenance costs and net present-worth costs.
- State acceptance indicates if, based on its review of the RI/FS and Proposed Plan, the State concurs with the preferred remedy.
- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Overall Protection of Human Health and the Environment

Since no action would be implemented, Alternatives 1 and G1 would not provide control of exposure to contaminated soils, offer no reduction in risk to human health posed by contaminated soils and provide no groundwater response. The impermeable cap for Alternatives 2A and 2C would prevent exposure to the contaminated soils, eliminate migration of contaminated soils due to wind blown dust or storm water erosion and mitigate inhalation risks of potential landfill gas. In addition, the impermeable cap would minimize further release of contaminants to the groundwater by limiting future storm water infiltration through the cap. Alternative 4 would be protective of human health and the environment, since all contaminated soils would be removed from the Site with the Site essentially being restored to pre-disposal conditions. Direct contact risks would be reduced by removing contaminated soils. Potential impacts to groundwater will be mitigated by removing contaminated soils. Alternative G3 reduces the risks of ingestion of impacted groundwater, by preventing any future migration of contaminated groundwater through extraction and treatment.

Compliance with ARARs

Alternatives 2A, 2C and 4 would meet NYS Part 375 SCOs. Alternative G3 would meet Class GA standards. Alternatives 1, G1 and G2 would not meet ARARs.

A landfill cover is an action-specific ARAR for site closure. Alternatives 2A and 2C satisfy this action-specific ARAR. It is not relevant to Alternatives 1 and 4.

Since Alternatives 2A, 2C and 4 would involve the excavation of contaminated soils, they would require compliance with fugitive dust and VOC emission requirements. In addition, Alternative 4 would be subject to Federal and state regulations related to the transportation and off-site treatment/disposal of wastes.

Long-Term Effectiveness and Permanence

Alternatives 1 and G1 would not reduce risk in the long term, since the contaminants would not be controlled, treated or removed. Alternative 4 provides the highest degree of long-term effectiveness and permanence, because the impacted soils are permanently removed from the Site. Alternative 4 would have no long-term reliance on institutional controls. Alternatives 2A and 2C rely on a soil/HDPE liner meeting the substantive requirements of NYS Part 360 to control infiltration to groundwater, direct contact exposure and migration of impacted soils. Although capping is effective and reliable, it is less reliable in the long-term than Alternative 4 (full soils removal) due to potential for cap failure. Alternative 2C has slightly less impact than Alternative 2A as a result of a smaller cap footprint and resulting lower risk of cap failure. Alternatives 2A and 2C have long-term groundwater monitoring requirements. Alternative G3 permanently removes contaminants from the groundwater aquifer and irreversibly treats VOCs and metal contaminants.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment

Alternatives 2A, 2C and 4 do not use any treatment technologies to reduce the toxicity, mobility or volume of contaminants through treatment. Under Alternatives 2A and 2C, contaminated soils, although controlled by a cap, would remain on Site. Contaminated soils in Alternative 4 would be transported for off-site disposal at an approved landfill facility. Alternative G3 uses treatment technologies to reduce the hazards posed by contaminants in the groundwater at the Site. Alternative G2 uses no treatment technologies but allows for the natural attenuation of contaminated groundwater.

Short-Term Impacts and Effectiveness

There are no short-term impacts for the No Action alternatives (1 and G1). Under Alternatives 2A, 2C and 4, some particulate emissions may result during soil handling, excavation and landfill cap construction. Dust control and soil erosion and sedimentation controls would reduce the short-term impacts. Alternative 4 poses the greatest impact, since the largest volume of soils/solid waste will be disturbed and handled. Similarly, Alternative 2C poses a slightly larger impact than Alternative 2A because of the relocation of a greater quantity of impacted soils. Alternative G2 has the greatest short-term effectiveness as contaminated groundwater remains in situ and is not extracted to the surface. Alternative G3 increases the risks of exposure, ingestion and inhalation of contaminants by workers and the community because contaminated groundwater is extracted to the surface for treatment. Safety techniques including alarmed monitoring equipment and fencing would be used to minimize exposure risks.

Implementability

Alternative 4 would be the simplest to implement although handling of the solid waste will add some complexity to the alternative. Alternatives 2A and 2C are slightly more complex to implement because of the cap construction and installation of the geomembrane liner. Long-term inspection and maintenance to maintain the integrity of the cap would be required. Long-term groundwater monitoring would also be required to assess the effectiveness of the cap in reducing the affect on the groundwater contamination. Alternative G1 would be the simplest of the groundwater remedies to implement. Alternative G2 would be more complex. Alternative G3 would require construction of a treatment plant requiring readily available engineering services, treatment and equipment. All treatment technologies are well established and proven. However, monitoring of the groundwater aquifer and treatment plant effluent would be required to assess the effectiveness of the system.

Cost

The no action Alternatives (1 and G1) have no cost because no activities are implemented. Alternative 2C has the lowest capital cost ($4,695,938) of the active soil alternatives followed by Alternative 2A ($5,152,800). Alternative 4 has the highest capital cost ($23,822,000) and the lowest operations and maintenance costs ($0) of the soil alternatives. Alternatives 2A and 2C have similar annual operations and maintenance costs of $75,500 and $65,700, respectively. Alternative 2C has the lowest overall present value cost ($5,711,000) followed by Alternative 2A ($6,323,000). Alternative 4 has the highest overall present value cost of the soil alternatives ($23,822,000). Alternative G2 has lower capital, ($63,625) operations and maintenance ($51,000) and overall present value cost ($770,000), compared to Alternative G3 with ($629,000 capital), ($416,900 operations and maintenance) and ($5,896,000 present value cost).

State Acceptance

NYSDEC concurs with the preferred remedy.

Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD following review of the public comments received on the various reports and the Proposed Plan.

PROPOSED REMEDY

Based upon an evaluation of the various alternatives, EPA, in conjunction with NYSDEC, recommends Alternative 2C – Capping (AOC 1) and On-site Consolidation (AOCs 1-6) for soils and Alternative G1 - No Action for groundwater as the preferred remedy for the Site (See Figure 3).

The preferred remedy consists of the following: 1) excavation of contaminated soils throughout the six AOCs, which includes some adjacent residential properties, where contaminants in the soils exceed the cleanup objectives, 2) backfilling the excavated areas with clean fill, 3) consolidating all excavated soils in the upper and central portion of the Site (AOC 1), 4) installing a landfill cap system which meets the substantive requirements of NYS Part 360 over the existing landfill and the relocated contaminated soils (AOC-1) and 5) development of a site management plan to include long-term groundwater monitoring and engineering and institutional controls, incorporating periodic reviews and certifications.

Alternative 2C includes the component of long-term groundwater monitoring. EPA is not proposing an active groundwater remedy and selected Alternative G1, because of limited groundwater contamination (both inorganic and organic) underlying the Site. The isolated low levels of contamination do not appear to be mobile, show no migration off-site and do not show a significant area-wide impact on groundwater from the Site. There is also no clearly defined plume of inorganics in the groundwater.

Alternative 2C effectively removes the sources of contamination in the soils from potentially further impacting groundwater. During the pre-design phase, additional bedrock groundwater monitoring wells will be installed and incorporated into a sitewide management plan which will include a groundwater monitoring program which is part of this preferred alternative. This program will be developed to determine and monitor the effects of the cap remedy on both the shallow and deeper bedrock aquifer to reduce contaminant levels to below Federal and State standards. Institutional controls, *i.e.*, groundwater well restrictions, will be put in place on the Site.

During the pre-design investigation, the areal extent of soil contamination would be further delineated in order to better define 1) the location of the excavations and 2) the quantities of impacted soils to be consolidated under the landfill cap. Post-excavation sampling would be performed to verify achievement of cleanup goals. Clean fill would be used to backfill all excavated areas, and disturbed surfaces would be restored to current conditions.

Since background samples collected near the Site showed levels above USCOs, delineating and excavating the contaminated soils to USCOs would be difficult. Specifically, the RAO would be more stringent than background conditions. Thus, after assessing the levels of area-wide soil contamination, the use of the RRSCOs would satisfy the cleanup objectives for the Site. By removing the soils with the highest concentrations of contaminants and consolidating these soils under the cap, the potential exposure will be reduced thus reducing any risk.

Also, during the pre-design phase, as a result of recorded soil gas levels, an evaluation of the potential for soil vapor intrusion will be conducted. Sub-slab sampling will be conducted at adjacent residences during the winter heating season. Accordingly, with respect to any future development at the Site, any new construction should evaluate and include impermeable barriers and/or incorporate appropriate subslab depressurization systems or other vapor mitigation technology in order to prevent any subsurface vapors from impacting indoor air.

Institutional controls would be enacted at the Site which would include the development of an environmental easement or other restrictive covenant to be filed in the property records of Ulster County that 1) would prevent any disruption to the landfill cap, 2) would include groundwater use restrictions on the Site and 3) would allow for residential use of the non-landfill portion of the property, as well as restricted residential, commercial and/or industrial use.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years. Also, provisions will be made for periodic reviews and certifications of the institutional and engineering controls, pursuant to 6NYCRR 375. If justified by these reviews, additional remedial actions may be implemented at the Site.

Basis for the Remedy Preference

Alternative 2C provides the most cost-effective solution, applying the evaluation criteria given the reasonably anticipated future use of the Site. The installation of a landfill cap would reduce contaminant mobility thus limiting any migration to the groundwater as a result of infiltration.

As a result of the installation of a landfill cap, the limited groundwater contamination underlying the Site and the incorporation of a long-term groundwater monitoring program into Alternative 2C, Alternative G1 is the preferred groundwater alternative.

The preferred remedy of excavating the contaminated soils from AOCs 1 through 6 and consolidating them under the landfill cap (AOC 1) would provide protection of the groundwater. Alternative 2A would provide a similar remedial action even though there is less soil consolidation; however, there would be a larger landfill cap. As a result, Alternative 2A would require more maintenance and is less cost-effective. Alternative 2C, with a reduced cap size, would provide more usable area for potential reuse and redevelopment of the Site. EPA strongly supports reuse and redevelopment at Superfund sites. Alternative 2C requires less cost than Alternative 2A and 4. Alternative 2C excavates the contaminated soils in the AOCs throughout the Site and consolidates them under a landfill cap which meets the substantive requirements of NYS Part 360, in combination with engineering and institutional controls. Alternative 4 is considerably more expensive than Alternative 2A or 2C, requiring a large excavation effort and off-site disposal.

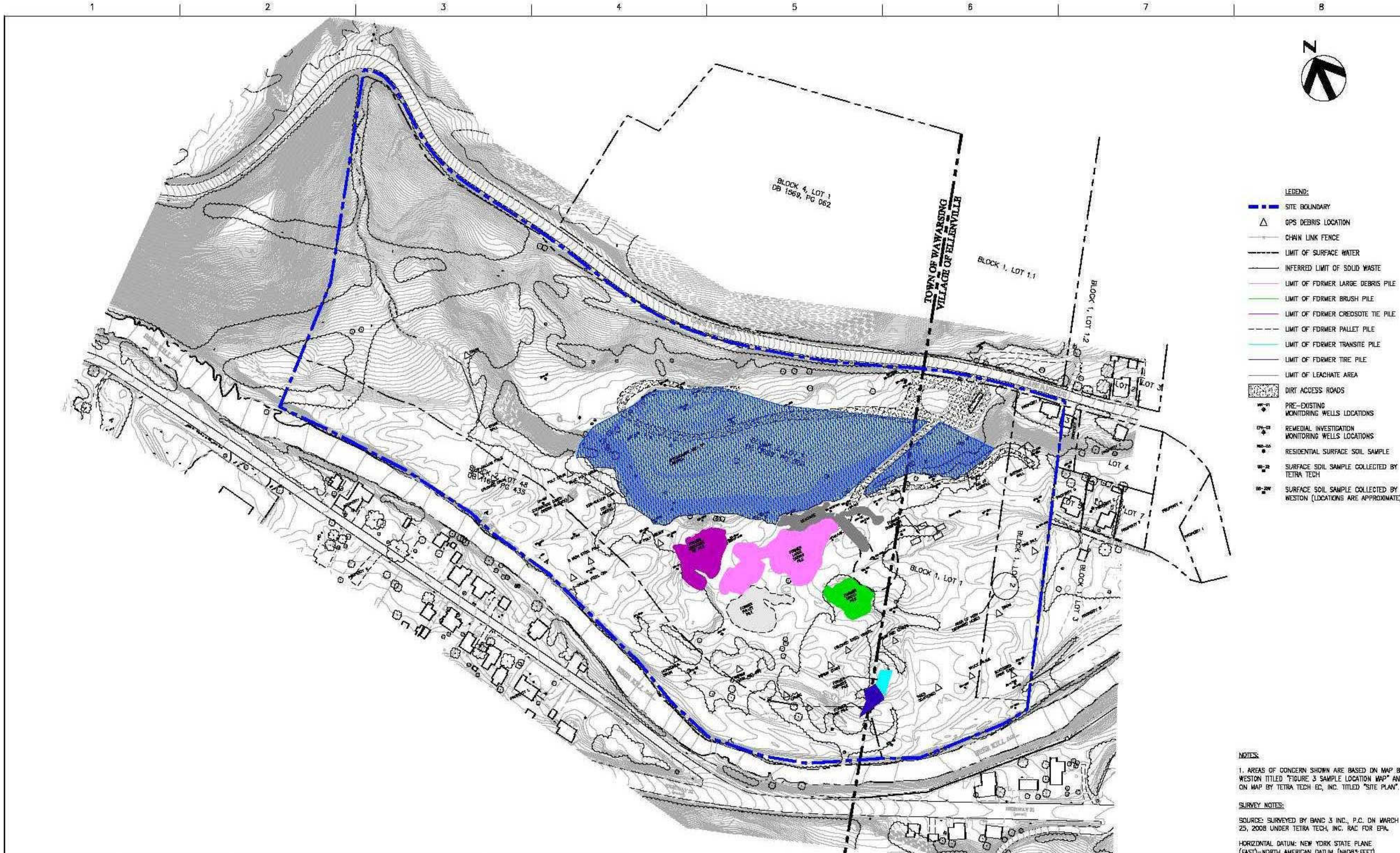
Alternative 1 was not selected, because it is simply a baseline for comparison with other alternatives. Alternative 2A was not selected, because of the increased area of the cap and does not afford the opportunity for increased redevelopment and reuse of the Site. Alternative 4 was not selected, because of the impact of the extensive truck traffic through the community and its high cost. Therefore, EPA believes that Alternative 2C would meet the soil cleanup objectives and afford extensive groundwater monitoring to provide the best balance of tradeoffs with respect to the evaluating criteria.

The preferred remedy would be protective of human health and the environment, provide long-term effectiveness, achieve ARARs in a reasonable time frame and be cost-effective among alternatives with respect to the evaluation criteria.

In accordance with EPA Region 2's Clean and Green policy and in order to maximize the net environmental benefits, EPA will evaluate the use of sustainable technologies and practices during the design, construction and operation of the selected remedy.

EPA, in conjunction with NYSDEC, believes that the preferred remedy would treat principal threats and utilize permanent solutions to the maximum extent practicable.

Under Alternatives 2C and G1, the Agency is taking effective action to remove the sources of contamination in the soils from potentially further impacting groundwater.



NOTES:

1. AREAS OF CONCERN SHOWN ARE BASED ON MAP BY WESTON TITLED "FIGURE 3 SAMPLE LOCATION MAP" AND ON MAP BY TETRA TECH EC, INC. TITLED "SITE PLAN".

SURVEY NOTES:

SOURCE: SURVEYED BY BAND 3 INC., P.C. ON MARCH 25, 2008 UNDER TETRA TECH, INC. RAC FOR EPA.

HORIZONTAL DATUM: NEW YORK STATE PLANE (EAST)–NORTH AMERICAN DATUM (NAD83:FEET)

HDR

ISSUE	DATE	DESCRIPTION
2	07/12/2010	FINAL ISSUE
1	05/07/2010	DRAFT ISSUE

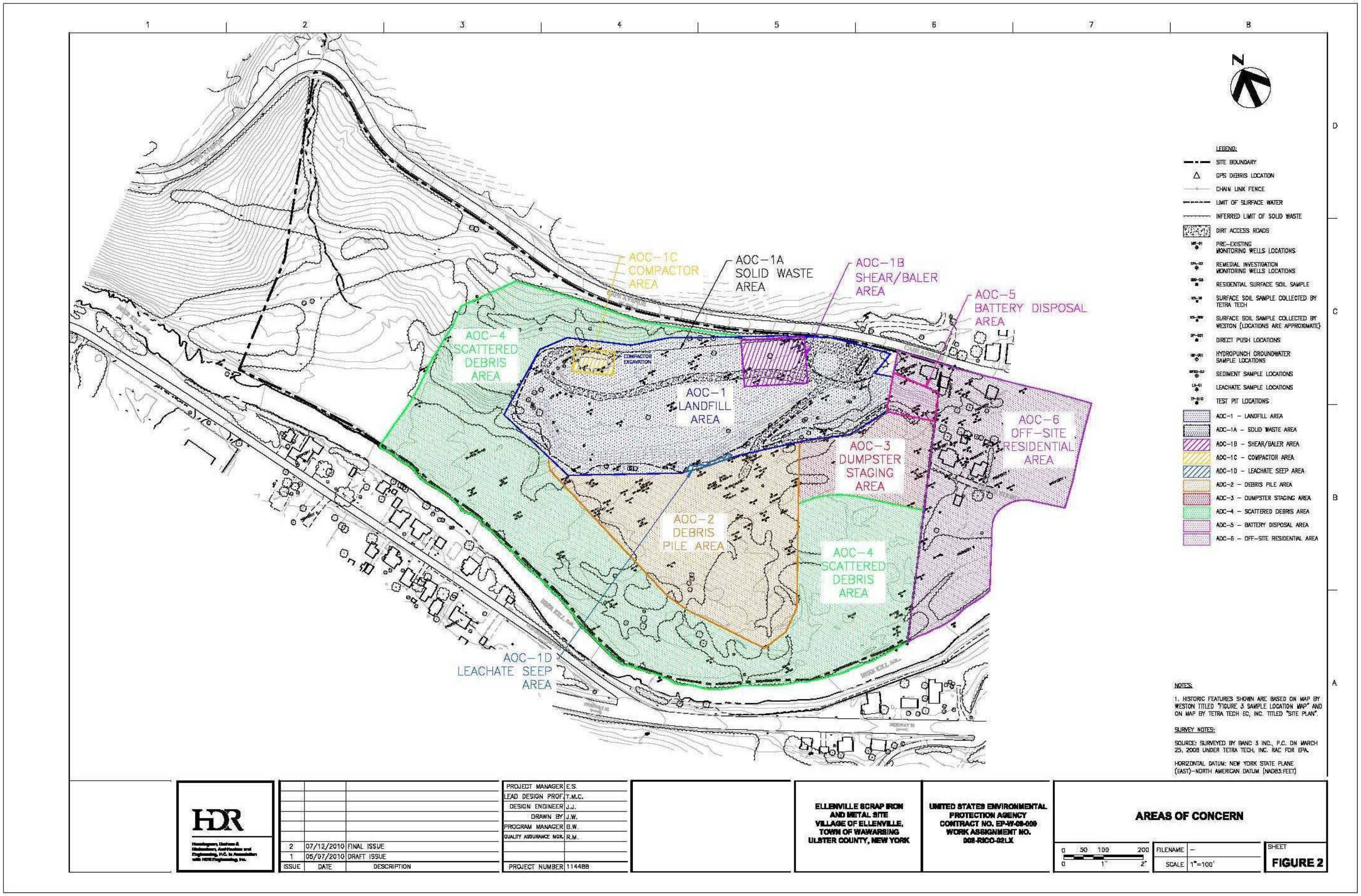
PROJECT MANAGER	E.S.
LEAD DESIGN PROF.	T.M.C.
DESIGN ENGINEER	J.J.
DRAWN BY	J.W.
PROGRAM MANAGER	B.W.
QUALITY ASSURANCE MGR.	R.M.
PROJECT NUMBER	1-14488

ELLENVILLE SCRAP IRON AND METAL SITE
VILLAGE OF ELLENVILLE,
TOWN OF WAWARSING
ULSTER COUNTY, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CONTRACT NO. EP-W-09-009
WORK ASSIGNMENT NO. 008-RICO-02LX

SITE MAP

FILENAME –
SCALE 1"=100'
SHEET **FIGURE 1**



AOC-1C COMPACTOR AREA
AOC-1A SOLID WASTE AREA
AOC-1B SHEAR/BALER AREA
AOC-5 BATTERY DISPOSAL AREA
AOC-4 SCATTERED DEBRIS AREA
COMPACTOR EXCAVATION
AOC-1 LANDFILL AREA
AOC-6 OFF-SITE RESIDENTIAL AREA
AOC-3 DUMPSTER STAGING AREA
AOC-2 DEBRIS PILE AREA
AOC-4 SCATTERED DEBRIS AREA
AOC-1D LEACHATE SEEP AREA
N
LEGEND:
SITE BOUNDARY
GPS DEBRIS LOCATION
CHAIN LINK FENCE
LIMIT OF SURFACE WATER
INFERRED LIMIT OF SOLID WASTE
DIRT ACCESS ROADS
PRE-EXISTING MONITORING WELLS LOCATIONS
REMEDIAL INVESTIGATION MONITORING WELLS LOCATIONS
RESIDENTIAL SURFACE SOIL SAMPLE
SURFACE SOIL SAMPLE COLLECTED BY TETRA TECH
SURFACE SOIL SAMPLE COLLECTED BY WESTON (LOCATIONS ARE APPROXIMATE)
DIRECT PUSH LOCATIONS
HYDROPUNCH GROUNDWATER SAMPLE LOCATIONS
SEDIMENT SAMPLE LOCATIONS
LEACHATE SAMPLE LOCATIONS
TEST PIT LOCATIONS
AOC-1 - LANDFILL AREA
AOC-1A - SOLID WASTE AREA
AOC-1B - SHEAR/BALER AREA
AOC-1C - COMPACTOR AREA
AOC-1D - LEACHATE SEEP AREA
AOC-2 - DEBRIS PILE AREA
AOC-3 - DUMPSTER STAGING AREA
AOC-4 - SCATTERED DEBRIS AREA
AOC-5 - BATTERY DISPOSAL AREA
AOC-6 - OFF-SITE RESIDENTIAL AREA
NOTES:
1. HISTORIC FEATURES SHOWN ARE BASED ON MAP BY WESTON TITLED "FIGURE 3 SAMPLE LOCATION MAP" AND ON MAP BY TETRA TECH EC, INC. TITLED "SITE PLAN".
SURVEY NOTES:
SOURCE: SURVEYED BY BAND 3 INC., P.C. ON MARCH 25, 2008 UNDER TETRA TECH, INC. RAC FOR EPA.
HORIZONTAL DATUM: NEW YORK STATE PLANE (EAST)-NORTH AMERICAN DATUM (NAD83:FEET)
HDR
2 07/12/2010 FINAL ISSUE
1 05/07/2010 DRAFT ISSUE
ISSUE DATE DESCRIPTION
PROJECT MANAGER E.S.
LEAD DESIGN PROF. T.M.C.
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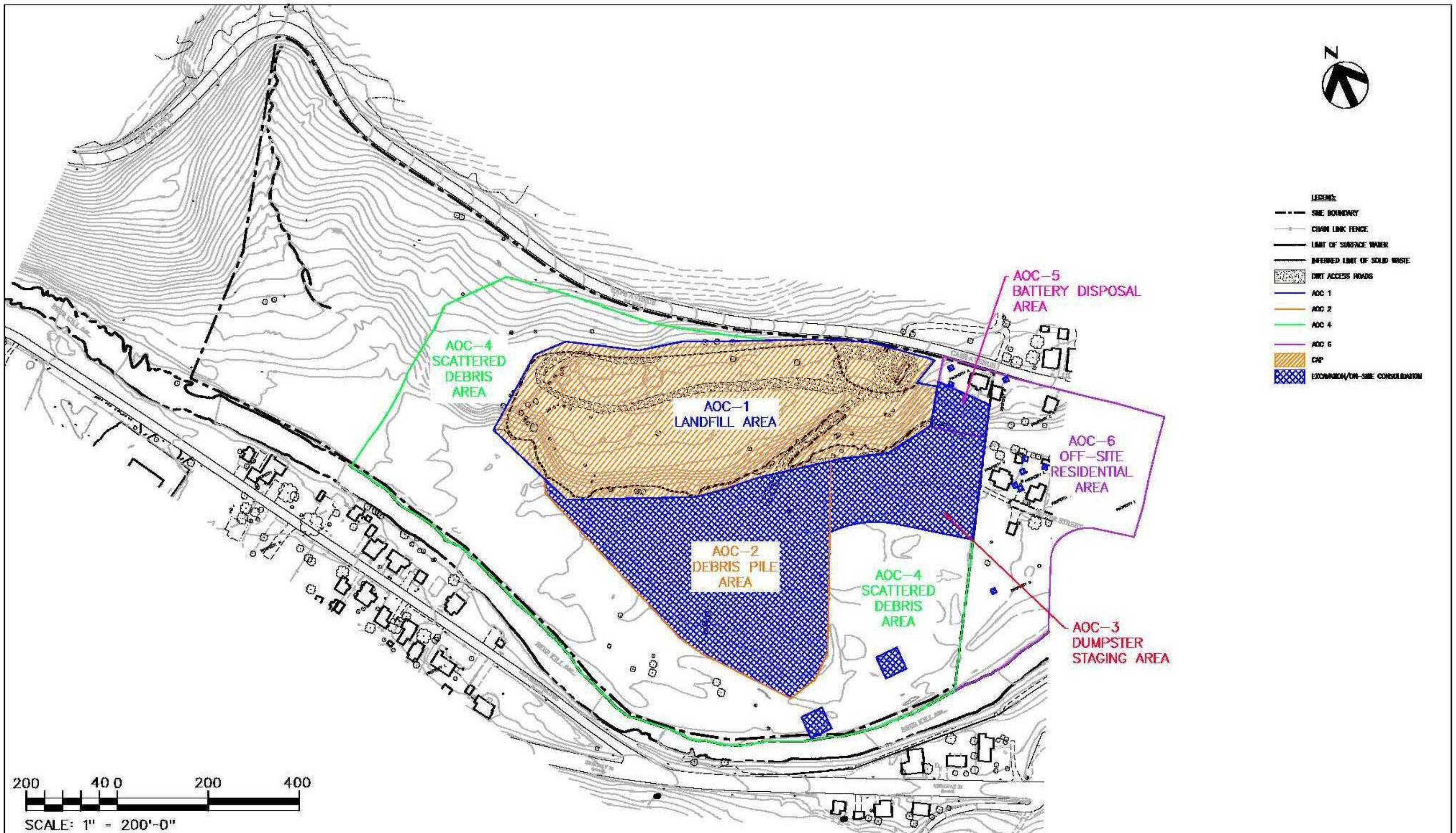
PROJECT NUMBER 114488
ELLENVILLE SCRAP IRON AND METAL SITE
VILLAGE OF ELLENVILLE, TOWN OF WAWARSING
ULSTER COUNTY, NEW YORK
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CONTRACT NO. EP-W-09-009
WORK ASSIGNMENT NO. 008-RICO-02LX
AREAS OF CONCERN
0 50 100 200
0 1" 2"
FILENAME -
SCALE 1"=100'
SHEET
FIGURE 2



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HORIZONTAL DATUM: NEW YORK STATE PLANE (EAST)-NORTH AMERICAN DATUM (NAD83:FEET)

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ELLENVILLE SCRAP IRON AND METAL SITE VILLAGE OF ELLENVILLE, TOWN OF WAWARSING ULSTER COUNTY, NEW YORK	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. EP-W-09-009 WORK ASSIGNMENT NO. 008-RICO-02LX	ALTERNATIVE 2C - CAPPING/ON-SITE CONSOLIDATION	DATE 07-12-2010 FIGURE FIGURE 3