Alternatives Analysis and Remedial Work Plan

2 Love Road Site
BCP Site No. C314113

Herbert Redl

Poughkeepsie, New York

July 2012

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Project No. 20040761.A8N

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CERTIFICATION

I, Gregory Toothill, am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for the 2 Love Road Site (NYSDEC BCA Index No. W3-1026-04-10, Site No. C314113).

I certify that the Site description presented in this RWP is identical to the Site descriptions presented in the Brownfield Cleanup Agreement for 2 Love Road Site and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls, and Engineering Controls applicable to the Site and provision for development of an Environmental Easement to be created and recorded pursuant ECL 71-3605. This RWP requires that all affected local governments, as defined in ECL 71-3603, will be notified that such Easement has been recorded. This RWP requires that a Site Management Plan must be submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, for approval by the Department.

I certify that this RWP has a plan for transport and disposal of all soil and other material removed from the property under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State, and local laws.

I certify that this RWP has a plan for import of all soils and other material from off-Site and that all activities of this type will be in accordance with all local, State, and Federal laws and requirements.

I certify that that this RWP has a plan for nuisance control during the remediation and all invasive development work, including dust and odor suppression plans and that such plans are sufficient to control dust and odors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

085943	7/19/2012	
NYS Professional Engineer #	Date	Signature

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

1 Introduction

Fuss & O'Neill of New York, PC (Fuss & O'Neill) has been retained by Herbert Redl Properties to prepare this Alternatives Analysis and Remedial Work Plan (AA/RWP) for the 2 Love Road site located in the Town of Poughkeepsie, Dutchess County, New York (the "site") as shown on *Figure 1*. The owner of the property, a Brownfield Cleanup Program (BCP) Volunteer, is currently evaluating development alternatives for restricted residential use of the site. This AA/RWP has been developed to remediate the site in anticipation of future restricted residential development. Final site development may be completed concurrently with the remediation work or after it is completed and a Certificate of Completion is issued by the New York State Department of Environmental Conservation (NYSDEC).

The objective of the AA/RWP is to provide alternatives for the remedial activities, as warranted, under the NYSDEC's Brownfield Cleanup Program (BCP) and present a plan for implementing the chosen remedial alternative. The AA/RWP includes analysis of a no action alternative, an alternative for returning the site to the requirements for unrestricted use and a restricted residential use alternative.

1.1 Site Description

The site consists of approximately 4.6 acres of vacant land. Access to the site is along Love Road, which intersects with Burnett Boulevard Extension. Love Road curves through the site and provides access to both the lower and upper portions of the property. Site elevation varies from approximately 196 feet above mean sea level at the far southeastern end of the property to approximately 152 feet above mean sea level at the far northwestern end of the property. It appears that the topography of the site reflects the amount of fill that was placed on site. Generally, the fill is thicker at the southern portion of the site where the elevation is higher. The open area in the central part of the property is generally flat. The foundation of a demolished building exists on the southern side of the site. An approximate 0.1-acre pond lies in the center of the property, north of the existing foundation. This pond may have been part of a former storm water retention system.

Adjoining parcels are primarily commercial real estate. The site is abutted immediately to the south by US Route 44 (Dutchess Turnpike) and to the east by an abandoned railroad bed. The site is surrounded to the north and west by a commercial plaza commonly referred to as the Dutchess Center Plaza or Route 44 Plaza. This plaza was constructed on lands that previously contained the Poughkeepsie Municipal Landfill. It is reported that the landfill waste was relocated further to the north prior to construction of the plaza.

1.2 Site History

The site was formerly occupied by a petroleum bulk storage (PBS) facility, a lumber/building supply yard, a gasoline service station, and a brick factory. The central portion of the site was formerly owned and operated by E.A. Aldrich through the late 1950s as a gas station, until the NYSDOT widened and elevated US Route 44. The expansion of the roadway required 10-15 feet of the property, which was obtained through eminent domain. This land loss required the

gas station to close, at which point Love/Effron Oil purchased the property to operate a PBS facility.

The most recent use for the central parcel was as a PBS facility that operated from the 1970s to the 1980s. The existing foundation present at the site was likely used as a garage, offices, and a loading facility. The PBS facility closed in the late 1980s. During operation, the PBS facility had a 2,500,000-gallon fuel oil tank, two 25,000-gallon fuel oil tanks, and three 20,000-gallon fuel oil tanks. The 2,500,000-gallon tank was located in a diked storage area to the north of the existing foundation, which likely was used as a garage and/or loading facility. The two 25,000-gallon tanks and one of the 20,000-gallon tanks were located on a concrete pad along the fence in the central portion of the property, near what is believed to be the former truck loading facility. The other two 20,000-gallon tanks were located on cradles between the former garage and fenced area. The New York State Department of Environmental Conservation (NYSDEC) PBS Unit reported the tanks were cleaned and abandoned in the early 1990s by the former owner/operator. Both a NYSDEC PBS registration certificate and a letter from Luzon Environmental Services have been obtained stating the tanks have been closed and removed.

The western portion of the site was formerly owned by Dutchess County. The parcel was taken in lieu of taxes owed by the prior owner.

2 Previous Investigations

The initial remedial investigation at the Love Road site commenced on June 16, 2005. A total of 48 test pits, 29 soil probes, and two temporary monitoring wells were advanced during the initial investigation in 2005. The results of the initial remedial investigation were documented in the Site Characterization and Remedial Investigation Summary Report (Fuss & O'Neill, 2006.) A supplemental remedial investigation was performed in 2008 and 2009 to evaluate potential impacts to soil vapor, sediment, and to further evaluate impacts to groundwater. Five soil gas sample ports, three bedrock monitoring wells, and one overburden monitoring well were completed and two sediment samples were collected during the supplemental remedial investigation. Results of the supplemental remedial investigation are documented in the Supplemental Remedial Investigation Report (Fuss & O'Neill, 2010.) The NYSDEC indicated that the investigative work satisfied the requirements of the remedial program in a letter dated April 7, 2010. The findings of these previous investigations are summarized in the following sections.

2.1 Site Geology

Observations made during the site investigations indicate that the surface material at the site consists of a 1-2 ft. thick layer of construction fill underlain by a moderately soft to moderately dense fine sand, blue-grey silt, and clayey silt.

The depth to the underlying bedrock at the site was found to be variable. Bedrock outcrops observed on the eastern margin of the site contain competent siltstone layers interbedded with somewhat less competent shale. Bedrock contours at this site have formed a bowl-shaped depression where depth to bedrock was greater than 30 feet below grade; surrounded on

virtually all sides by dramatic rises in elevation where the bedrock was very close to the ground surface and outcropped in some locations.

2.2 Site Hydrogeology

Based on the test pit investigation and temporary monitoring wells, depth to groundwater was observed to range from two feet to more than 11 feet below ground surface. Groundwater encountered in test pits at the east/southeast section of the site was very shallow, sometimes less than 4.0 ft. bgs.

2.3 Areas of Concern

Three areas of concern (AOCs) were identified at the site, including the former fuel unloading area by the north central entrance (AOC-01), the area surrounding and including the existing foundation (AOC-02), and the parcel north of Love Road adjacent to the railroad bed (AOC-03). A figure indicating the location of these AOCs is included as *Figure 2*. These areas were identified based on visual and olfactory field observations and exceedances of regulatory guidance values for a number of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) associated with petroleum product releases.

AOC-01 contains low levels of SVOCs, below the Subpart 375-6 unrestricted use criteria. Acetone, and metals, including lead, nickel, and zinc were detected at levels exceeding the Subpart 375-6 unrestricted use criteria in AOC-01. Acetone is a common laboratory contaminant and there is no known potential source of acetone at the site based on the historic use of the site. Therefore, it is likely that the acetone observed in samples at the site was associated with laboratory contamination and are not indicative of conditions at the site. AOC-01 was the subject of an interim remedial measure (IRM) to excavate grossly impacted soil atop the shallow bedrock. A summary of the IRM is included in *Section 2.4* of this report. One test pit (TP-24) that was advanced within the AOC, but outside of the IRM soil removal area had acetone present at a level that exceeded the Subpart 375-6 unrestricted use criteria.

AOC-02 contains VOC impacted soil; specifically, acetone was present above the subpart 375-6 unrestricted use criteria. However, as with the rest of the site, the acetone is believed to be associated with laboratory contamination. Metals including: arsenic, nickel, and zinc, were also detected at levels exceeding the unrestricted use criteria in this area. One sample collected at nine feet below ground surface at TP-29 had arsenic at 18.8 mg/kg, which exceeds the restricted residential and commercial use criteria. A sample collected from the top one foot of soil at TP-29 had no exceedances of the unrestricted use criteria.

A 1,000-gallon underground storage tank (UST) located in AOC-2 was removed from the upper tier of the property on the southeast edge of the existing foundation through an approved IRM in November 2005. Samples collected from the tank grave located in this area contained VOCs including: n-butylbenzene, ethylbenzene, naphthalene, n-propylbenzene, toluene, 1,2,4-trimethylbenzene, o-xylene, and m/p-xylene and an SVOC, naphthalene, above the subpart 375-6 unrestricted use criteria. A summary of the IRM is included in *Section 2.4* of this report.

AOC-03 was impacted by low levels of VOCs and SVOCs at levels below the unrestricted use criteria. Acetone was reported at levels exceeding the subpart 375-6 unrestricted use criteria. However, as with the rest of the site, the acetone is believed to be associated with laboratory contamination. Metals, including lead, manganese, mercury, nickel, and zinc were detected at levels exceeding unrestricted use criteria. One sample collected at four to seven feet below ground surface at TP-35 had mercury at 1.4 mg/kg, which exceeds the restricted residential criteria. A sample collected from the top foot of soil at TP-35 had no exceedances of the unrestricted use standard for VOCs, SVOCs, or metals. Subsurface soil appears to exhibit fewer impacts closer to the northern property line.

Metals, including arsenic, copper, lead, manganese, mercury, nickel, and zinc at levels exceeding unrestricted use criteria were found in many of the samples collected across the site, including those outside of the AOCs. The metals present at the site are assumed to be indicative of background conditions in the area. One sample collected from soil in the top 3.5 feet of soil at TP-12 had manganese at a level that slightly exceeded the restricted residential use standard. This sample was collected from below a paved area and therefore may be indicative of the pavement sub-base material.

A figure showing the historic sample locations and the locations of exceedances of applicable standards is included as *Figure 2*. Summary tables of the laboratory data are included as *Tables 1-6*. It should be noted that *Table 1* compares samples analyzed for total chromium to the standards for hexavalent chromium. It is likely that the chromium at the site exists as trivalent chromium. This conclusion is based on the history of the site use and the fact that chromium was not found in the groundwater. If hexavalent chromium was present at the site it is likely that chromium would have been observed in the groundwater. Only one sample collected at TP-31 had a slight exceedance of the unrestricted use standard for trivalent chromium.

2.4 Interim Remedial Measures

During the Remedial Investigation, a 1,000-gallon UST was observed in AOC-02 at the southeast edge of the property near the existing foundation as shown in *Figure 2*. It is believed that this tank was a gasoline UST associated with the former gasoline station. The UST was removed in November 2005 as part of an IRM approved by the NYSDEC and NYSDOH. A small hole was noted in the bottom of the tank, and impacts were observed underneath; however, the bulk of the impacts seen in this area are likely not due solely to this tank, based on historical use. The tank was surrounded by the same dense blue-gray silt and clay as seen in other areas of the site, which likely minimized the extent of potential releases from the tank. Confirmatory soil samples were collected in the grave of the tank. Analytical results for samples collected from the sidewalls and bottom of the tank pit suggest that the tank may have been leaking. Samples collected from the tank grave located in this area contained VOCs including: n-butylbenzene, ethylbenzene, naphthalene, n-propylbenzene, toluene, 1,2,4-trimethylbenzene, o-xylene, and m/p-xylene and SVOCs including naphthalene above the subpart 375-6 unrestricted use criteria. A table of the analytical testing results for the tank grave samples collected during the IRM is included as *Table 3*.

An area of heavy petroleum staining and free product was encountered in AOC-01 during the site investigation. To address this immediate threat to the environment, an Interim Remedial

Measure (IRM) work plan was submitted to the NYSDEC and was approved in October of 2005. The plan consisted of excavation of grossly impacted soil near the northern most entrance, underneath and adjacent to the two existing concrete pads. The soil excavation IRM was initiated on July 24, 2007. During the excavation two tanks approximately 500-gallons in size, connected with a 4-inch pipe were removed and disposed. It is believed that these tanks may have been used as an oil/water separator. The area of excavation and the location of the former tanks are shown on *Figure 2*. Analytical results from seven confirmatory samples had no detections of VOCs or SVOCs and low levels of total petroleum hydrocarbons were observed in only two of the samples. A table of the analytical results for the confirmation samples collected during the IRM is included as *Table 2*. The IRM is documented in a report entitled "Soil Excavation Interim Remedial Measure." (Fuss & O'Neill, 2007) Soil from excavated during the IRM remains on the site and is scheduled to be removed by December 2011.

3 Remedial Action Objectives

Final development plans have not been completed at this time; however, the proposed remedial action will prepare the site for an anticipated restricted residential use. The remedial action will protect residents and/or employees and visitors to the site at the site from potential exposure to the contaminants of concern and to reduce the potential for off-site migration of the contaminants of concern. The proposed remedy is intended to eliminate or substantially mitigate the threat to the public health and to the environment presented by the impacted soil and groundwater.

The environmental media sampled as part of this investigation include soil, soil vapor, and groundwater. The standards used to evaluate each of these media are as follows:

- Soil: Table 375-6.8(a) Unrestricted Use Soil Cleanup Objectives and Table 375-6.8 (b) Protection of Groundwater and Restricted Residential Use Soil Cleanup Objectives found in 6 NYCRR Part 375
- Groundwater: The NYSDEC Groundwater Standards as provided in the Technical and Operational Guidance Series 1.1.1 (TOGS 1.1.1)
- Soil Vapor: NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York

The Volunteer is recommending a course of action consistent with a Track 4 cleanup under the BCP. Under Track 4, the Soil Cleanup Objectives (SCOs) can be employed as set fourth in subpart 375-6 and the remedial program may include the use of long-term institutional or engineering controls. The remedy will include preventing direct exposure to contaminants and/or removal of the impacted soil, mitigation of vapor intrusion potential and reduction in the off-site migration potential of impacted groundwater. Since the site will be used for restricted residential purposes, the Remedial Work Plan has been developed to include alternatives to meet the Restricted Residential SCOs as appropriate for the final site use. In addition, the Protection of Groundwater SCO was used as the remedial action goal for the VOC-impacted soil at AOC-02, the source of the groundwater impacts.

As part of the remedy, a comprehensive site management plan will be prepared and implemented for the site. The comprehensive site management plan will include institutional

and engineering control plans which detail the requirements necessary to ensure the institutional and engineering controls required for the site remain in place and are effective. This plan will include but not be limited to:

- A description of all institutional and engineering controls as required by the environmental easement
- A copy of the environmental easement for imposing the institutional controls on site
- A groundwater monitoring plan and if necessary an indoor air monitoring plan, including frequency and number of sample locations
- Provisions for periodic certification of the institutional and engineering controls
- Appropriate plans for implementation of engineering controls, such as a soil management plan for handling soils removed from beneath a soil cover or cap
- Any provisions necessary to identify or establish methods for implementing the institutional controls required by the site remedy, as determined by the environmental easement

4 Land Use Criteria

The site is currently vacant land and was last used as a bulk storage facility. A restricted residential use is planned for the site; however, final development plans for the site have not been finalized. Population growth projections included in the Poughkeepsie Town Plan (Town of Poughkeepsie, 2007) indicate steady population growth through 2025. This growth would support the need for additional residential housing.

The site is located adjacent to an existing retail shopping developments located to the north and west, a former railroad track that has been converted to a rail trail to the east, and commercial office space located to the south on the opposite side of US Route 44 (Dutchess Turnpike). An industrial site is located to the east of the rail trail and single family residential neighborhoods are located within 350 feet to the south and east of the site. No agricultural uses exist in the vicinity of the site.

The site is located in the Highway Business zoning district of the Town of Poughkeepsie. The Highway Business zoning district allows for a variety of commercial uses. A zoning variance will be required for the proposed restricted residential use; however, residential uses exist in close proximity to the site and would not be inconsistent with current uses in the area. Revitalization of this currently underutilized abandoned property is consistent with the goals of the Poughkeepsie Town Plan. There are no federal or state land-use designations related to the site. The site is not located within a brownfield opportunity area. No institutional controls are currently in place at the site. Electricity, water, and wastewater utilities are currently available at the site. An existing road (Love Road) runs through the site and provides site access. The site is also located in close proximity to public transportation.

There are no apparent environmental justice concerns associated with this project. While single family residential uses are present in close proximity to the site, the site is currently separated from these residential sites by several commercial properties. Development of the site for restricted residential development would not be expected to negatively impact the surrounding

commercial properties. Redevelopment of the site would likely be considered an improvement over the previous use of the site as a petroleum bulk storage facility. The public will have the opportunity to provide comments on the project prior to approval of this AA/RWP. In addition the public will have the opportunity to provide comments during the Town of Poughkeepsie site plan approval process.

According to the NYSDEC's Environmental Resource Mapper on-line mapping program, the site does not contain any critical habitats supporting threatened or endangered species. The site is in the vicinity of rare animals. Correspondence with the NYSDEC Natural Heritage program indicates that the State threatened Blanding's turtle (*Emydoidea blandingii*) has been documented within 0.6 miles of the site. The program does not indicate that rare animals exist on the site and there has been no visible evidence of any such animals during previous visits to the site. It is likely that the species can be found in one of the extensive wetland areas either to the north or to the southeast of the site. Overland travel of this species to the site is possible but very unlikely given the number of road crossings and obstructions between the mapped wetland areas and the site. According to the NYSDEC's Environmental Resource Mapper on-line mapping program, there are no natural freshwater streams, ponds or other water bodies present within the limits of the site. There are no NYSDEC-regulated wetlands or wild, scenic, or recreational rivers within the site boundaries. One isolated man-made water retention pond exists in the central portion of the site. There are no unique geologic features identified at or near the site according to the NYSDEC's Environmental Resource Mapper. There are no known significant federal or state historic or heritage sites or Native American religious sites on or in close proximity to the site.

Groundwater impacts are contained within the site. Municipal water is available through the surrounding area of the site. A small portion of the site located at the northwest corner is located within the 100 year floodplain. This area is outside of any of the AOCs and will not be developed with any structures.

5 Alternatives Analysis

The remedial alternatives for the site are evaluated in terms of the following criteria:

- Overall protection of human health and the environment
- Compliance with Standards, Criteria, and Guidelines (SCGs) including action specific and location specific SCGs
- Long-term effectiveness and permanence, focusing on the reliability and adequacy of controls
- Reduction in toxicity, mobility, or volume
- Short-term effectiveness, focusing on the protection of community, workers, and environment during remedial actions
- Implementability
- Cost
- Community acceptance
- Land use criteria

The general types of remedial alternatives considered for this BCP site include:

- A no-action alternative that represents what would happen if no remedial measures were taken
- Cleanup to criteria for unrestricted site use (Track 1 Alternative)
- Site specific cleanup tailored to mitigate exposure routes consistent with the intended future use of the facility including placement of an environmental easement that restricts future site use to restricted residential or less stringent use (commercial or industrial) (Track 4 Alternative)

The proposed alternatives were evaluated based on the capacity to meet the Remedial Action Objectives. The remedial alternatives were described and screened in accordance with the criteria outlined above. The preferred remedies are consistent with the NYSDEC's goals for the program in that they remain consistent with the overall program criteria: protect human health and the environment; and to comply, to the extent practical and feasible, with SCGs for the site.

The focus of this evaluation was to develop a satisfactory remedial alternative that will allow this property to be developed for restricted residential use. The proposed alternatives were developed to be protective of those persons using the facility.

Section 5.1 considers the "No Action Remedial Alternative" for the site. *Section 5.2* contains a discussion of a remedial alternative that would allow unrestricted use of the site and *Section 5.3* contains a discussion of an alternative that would require environmental easements that would limit the site to a restricted residential or less stringent use (commercial or industrial).

5.1 No Action Remedial Alternative

Under this alternative, the property would be developed without directly mitigating the environmental issues. Any reduction in the concentration of metals and VOCs would be the result of dispersion or dilution. Dispersion or dilution could potentially result in additional future groundwater impacts and does not meet the SCGs. Risk to human health from contact with the impacted soil exists. However, risks of future exposure to the contamination would be mitigated in part because much of the impacted soil would be isolated beneath paved areas, building slabs, or exist below the ground surface following development of the site. The isolation would also help to reduce the mobility of the contaminants.

This alternative involves no monitoring. Although this option could be implemented, it provides no direct mitigation to existing problems and relies on naturally occurring processes. There would be no reduction in the toxicity of the contaminants and potential health risk factors would still exist. There are no foreseeable costs associated other than those normally associated with construction activity.

This alternative does not meet the overall remedial action goals presented in *Section 3*. It is presumed that the NYSDEC would not accept this alternative and would not grant the applicable liability waivers or provide a Certificate of Completion because it does nothing to meet the overall remedial action objectives and does not insure eventual compliance with the

SCGs. This alternative is not considered further because it has no potential to meet the objectives of the BCP.

5.2 Unrestricted Use Remedial Alternative

This alternative would involve excavation and off-site disposal of impacted soil in all areas that exceed the Unrestricted SCOs in Table 375-6.8(a) and treatment of groundwater to TOGS 1.1.1 standards/guidance values. No vapor intrusion mitigation would be warranted because the source would be removed.

Approximately 44,000 cubic yards of non-hazardous waste soil would need to be removed from this area, which will also address the source of the groundwater contamination. Once the source of the groundwater impacts is removed, natural attenuation and dilution should eventually result in the groundwater meeting the TOGS 1.1.1 standards. If necessary, naturally occurring aerobic contaminant biodegradation could be accelerated by direct injection of a groundwater amendment to the groundwater table.

5.2.1 Overall Protection of Human Health and Environment

This alternative would be protective of human health and the environment. Soil exceeding the Unrestricted Use SCOs would be removed from the site and disposed of at a permitted facility. Once the source of the groundwater impacts is removed, natural attenuation and dilution should eventually result in the groundwater meeting the TOGS 1.1.1 standards.

5.2.2 Compliance with Standards, Criteria, and Guidance (SCGs)

This alternative provides compliance with the soil SCGs and should result in compliance with groundwater SCGs. Soil with contaminants exceeding the Unrestricted Use SCOs would be removed from the site and disposed of at an appropriate permitted facility. Removal of the source of contaminants should result in the groundwater eventually meeting the TOGS 1.1.1 standards.

5.2.3 Long Term Effectiveness

Soil with contaminants exceeding Unrestricted SCOs would be removed from the site. This is an effective and permanent solution to remediating the site. The source of impacts to groundwater will be removed, which should expedite attenuation and dilution of the groundwater contamination.

5.2.4 Reduction of Toxicity, Mobility, or Volume

This alternative reduces the toxicity, mobility, and volume of contaminated soil at the site by removing soil with contaminants exceeding the Unrestricted SCOs in Table 375-6.8(a). Removal of the source material in soil should result in the groundwater meeting the TOGS 1.1.1 standards in the long term.

5.2.5 Short Term Impacts and Effectiveness

This alternative provides short-term benefit and effectiveness by removing soil with contaminants exceeding the Unrestricted SCOs. Groundwater exceeding the TOGS 1.1.1 standards would likely remain in the short term; however, the removal of the contamination source will accelerate biodegradation of contaminants in groundwater. Since municipal water is available at the site there is little potential for direct exposure to impacts in groundwater.

During the construction phase, protection to workers and the environment would be accomplished through adherence to OSHA standards, a site specific Health and Safety Plan (HASP) and a Community Air Monitoring Plan (CAMP.)

5.2.6 Implementability

This alternative could be implemented using typical contaminated soil removal procedures. The soil would be temporarily stockpiled in a soil management area before being disposed of at an appropriate permitted facility.

5.2.7 Cost Effectiveness

The construction costs associated with implementing this alternative is estimated to be approximately $7,675,000 (*Appendix A*). This alternative would be significantly more expensive to implement than alternative remedial strategies and would make development of the site economically infeasible. This alternative provides only marginal additional benefit compared to an alternative that employs engineering and institutional controls and therefore does not warrant the increased cost that would be incurred by selecting this alternative.

5.2.8 Community Acceptance

This alternative would return the site to a condition that would allow unrestricted use of the site and exceeds the level of remediation required for the site's intended restricted residential use. This level of remediation effort would be unlikely to receive any community opposition.

5.2.9 Land Use

Under this alternative no future restriction on land use would be placed on the property. Future use of the site would be restricted according to the town zoning. Potential future use of the site is unlikely to place any further burden on the community compared to the previous use of the site as a petroleum bulk storage facility.

5.3 Restricted Use Remedial Alternative

This alternative would involve limited excavation and off-site disposal of impacted soil located in the vicinity of the former 1,000 gallon UST at AOC-02 that exceeds the Protection of Groundwater SCO. In addition, in areas where exceedances of the restricted residential use SCO exist, a cover consisting of clean soil, an asphalt pavement cover, or a concrete slab (e.g. building slab) would be installed. A minimum of two feet of clean soil will be placed over

locations exceeding the restricted residential use SCO that will not be otherwise covered by asphalt pavement or building slabs. Existing clean soil, meeting the restricted residential SCO, present over impacted soil may be used to account for the minimum thickness of clean soil cover.

Any buildings constructed over areas of VOC impacts in soil or groundwater (AOC-02) will be constructed with a sub-slab depressurization system (SSDS.) The SSDS will create a negative pressure differential below the building slab that will prevent soil vapors from entering the building.

This alternative would require institutional controls be implemented in the form of an environmental easement. The environmental easement would:

- Restrict the site to restricted residential or less stringent uses (commercial or industrial)
- Restrict the use of groundwater at the site
- Require that a Site Management Plan (SMP) be followed
- Set forth requirements for periodic certification that the institutional and engineering controls for the site remain in place and are in a DEC-approved form and that nothing has occurred that would impair the ability of the controls to protect public health and the environment.

Approximately 650 cubic yards of non-hazardous waste soil would need to be removed from this area. Removal of the source area associated with the groundwater impacts at AOC-02 should result in a stabilization or reduction in the extents of the groundwater plume and eventual natural attenuation of the groundwater impacts.

5.3.1 Overall Protection of Human Health and Environment

This alternative would be protective of human health and the environment. Soil exceeding the Protection of Groundwater SCO that is located in the vicinity of the former 1,000 gallon UST at AOC-02, would be removed from the site and disposed of at a permitted facility. Once the source of the groundwater impacts is removed, natural attenuation and dilution should eventually result in the groundwater meeting the TOGS 1.1.1 standards. All remaining soil that exceeds the restricted residential SCO will be covered by a clean soil, asphalt, or concrete cover that will prevent potential exposure to impacted soils.

Any buildings constructed over areas where VOC impacts exist will be constructed with a SSDS to prevent exposure to soil vapors that may have otherwise had the potential to impact the indoor air.

An environmental easement would restrict the site to a restricted residential, commercial, or industrial use. The easement would ensure that site management procedures were in place to prevent exposure to remaining impacted soil, soil vapor, and groundwater.

This alternative would provide an appropriate level of protection for the sites intended future use.

5.3.2 Compliance with Standards, Criteria, and Guidance (SCGs)

Soil exceeding the Restricted Residential Use SCOs would be left in place at the site; however, exposure to impacted soil will be prevented by the installation of a cover consisting of clean soil, asphalt pavement, and/or concrete slabs.

Removal of the source material at AOC-02 that exceeds the Protection of Groundwater SCO should result in a reduction in the groundwater plume and eventual compliance with TOGS 1.1.1 standards/guidance.

Installation of a SSDS for any building built within the areas of observed VOC impacts to soil and groundwater will prevent soil vapors from entering the building and will help to ensure that the indoor air complies with the NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York."

5.3.3 Long Term Effectiveness

An environmental easement will be placed on the site that will require compliance with a Site Management Plan. The Site Management Plan will include comprehensive inspection, monitoring, and operation and maintenance plans that will ensure that the engineering and institutional controls that will be implemented at the site remain in place and suitable for their intended use in perpetuity.

5.3.4 Reduction of Toxicity, Mobility, or Volume

This alternative reduces the toxicity, mobility, and volume of contaminated soil at the site by removing soil with contaminants exceeding the Protection of Groundwater SCOs. Removal of this source material should result in a reduction in the groundwater plume and eventual compliance with TOGS 1.1.1 standards/guidance.

5.3.5 Short Term Impacts and Effectiveness

This alternative provides short-term benefits and effectiveness by removing soil with contaminants exceeding the Protection of Groundwater SCOs. Groundwater exceeding the TOGS 1.1.1 standards would likely remain in the short term; however, the removal of the contamination source should result in a reduction in the groundwater plume and eventual compliance with TOGS 1.1.1 standards/guidance. Installation of a composite cover consisting of clean soil, asphalt pavement, and/or concrete would prevent direct exposure to remaining impacted soils exceeding the Restricted Residential SCOs immediately following construction. An SSDS installed in any buildings constructed in areas where VOC impacts exist in soil and groundwater would have the immediate impact of preventing soil vapors from entering the building and impacting indoor air.

During the construction phase, protection to workers and the environment would be accomplished through adherence to OSHA standards, a site specific Health and Safety Plan (HASP,) and a Community Air Monitoring Plan (CAMP.) In addition, because the quantity of impacted material being disturbed would be significantly less than for the unrestricted use

alternative, the potential for exposure to impacted material during construction would be reduced.

5.3.6 Implementability

This alternative could be implemented using typical contaminated soil removal procedures and standard construction techniques used for site development. The soil being removed from the site may be temporarily stockpiled in a soil management area before being disposed of at an appropriate permitted facility or may alternatively be direct loaded into trucks or roll-off containers.

5.3.7 Cost Effectiveness

The construction costs associated with implementing this alternative would vary based on the final development plans for the site, but for purposes of this comparison have been estimated to be approximately $181,000 (*Appendix A*). Since final site develop plans have not been completed, for the purposes of this cost estimate it was assumed that two feet of clean soil fill will be required over areas where surface soils exceed the restricted residential use standards. This is a cost effective alternative that provides for compliance with the Remedial Action Objectives in a way that would make development of the site economically feasible.

5.3.8 Community Acceptance

This alternative would return the site to a productive use after many years of being abandoned and do so in a manner that would protect the occupants and visitors to the site from unsafe exposure to remaining environmental impacts at the site. The community would have the opportunity to provide comments on the Remedial Work Plan as part of the Citizen Participation requirements of the BCP. In addition the community would have the opportunity to provide comments during the site plan approval process with the Town of Poughkeepsie. It is believed that this remedial alternative would be unlikely to receive any significant community opposition.

5.3.9 Land Use

Under this alternative land use restrictions in the form of an environmental easement would be placed on the property. Future use of the site would be limited to restricted residential, commercial, or industrial uses. The Town of Poughkeepsie zoning codes would further restrict future use of the site. Potential future use of the site is unlikely to place any further burden on the community compared to the previous use of the site as a petroleum bulk storage facility.

5.4 Preferred Remedial Alternative

Three remedial alternatives were evaluated for the site, including no further action, remediation to unrestricted use standards, and remediation for restricted residential use. The Volunteer's preferred remedial alternative is remediation of the site for restricted residential use. This alternative provides for a cost effective way to achieve compliance with the Remedial Action

Objectives and SCGs in both the short term and long term. This alternative is also unlikely to face any significant community opposition.

The overall remedial goal is to protect site occupants and visitors from potential exposure to the contaminants of concern and to reduce the potential for off-site migration of contaminants. The preferred remedial strategies for the site follow a Track 4 cleanup under the BCP and consist of source area removal, elimination of exposure pathways by either removing or rendering inaccessible soils that exceed the Restricted Residential SCOs, installation of a SSDS as part of any building constructed within areas impacted by VOCs (AOC-01, AOC-02, and AOC-03) to prevent exposure to soil vapors, and the execution of an environmental easement. A comprehensive site management plan will be prepared for the site, which will detail the requirements necessary to ensure the engineered and institutional controls required for the site remain in place and are effective.

It is anticipated that the overall construction costs to complete the preferred remedial strategies will be approximately $181,000. The construction cost to restore the site to unrestricted use was estimated to be $7,675,000 which would have made development of the site economically infeasible. These costs are for construction only and do not include engineering oversight, reporting, or ongoing monitoring. It is assumed that engineering oversight, reporting, and ongoing monitoring would be similar for both alternatives and therefore would not significantly impact the choice of remedial alternatives. A summary of the estimated costs are included in *Appendix A*. Additional description of the selected remedial alternative is included in the following sections.

6 Remedial Work Plan

6.1 Governing Documents

The remedial work performed at the site shall be in accordance with the site-specific HASP, the Quality Assurance Project Plan (QAPP), Construction Quality Assurance Plan (CQAP), Soils Management Plan, Community Air Monitoring Plan (CAMP), and the Community Participation Plan (CPP).

6.1.1 Site-Specific Health & Safety Plan

A site-specific HASP for the project was prepared and was submitted to the NYSDEC prior to the remedial investigation. The HASP addresses the requirements of Occupational Safety and Health Administration (OSHA) general industry (29 CFR Part 1910) and construction (29 CFR Part 1926) standards. The HASP includes details regarding the responsibilities of key personnel, personal protection equipment (PPE), emergency information, and decontamination/cleanup procedures. All personnel involved in the field activities will familiarize themselves with the HASP and comply with its requirements. The remediation contractor will prepare and follow a HASP which meets the requirements of 29 CFR 1910.120.

6.1.2 Community Air Monitoring Plan

The CAMP will be adhered to as described in detail in *Section 6.9*.

6.1.3 Quality Assurance Project Plan

A QAPP for the project was prepared and was submitted to the NYSDEC prior to the remedial investigation. The QAPP establishes sampling and analysis protocols, quality assurance/quality control (QA/QC) procedures for data collection and data analysis activities at the site. Confirmatory end point samples will be collected and analyzed in accordance to the QAPP.

6.1.4 Soil Management Plan

The Soil Management Plan includes detailed plans for managing all soils/materials that are disturbed at the site, including excavation, handling, storage, transport, and disposal. It also includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations and is included in *Section 6.7* of this report.

6.1.5 Construction Quality Assurance Plan

The CQAP documents how successful performance of the Remedial Action tasks will be assured. The CQAP will be adhered to as described in detail in *Section 6.8*.

6.1.6 Citizen Participation Plan

A Citizen Participation Plan (CPP) for the site was previously prepared and approved by the NYSDEC during the remedial investigation phase of the project. The CPP outlines the mechanism provided in the BCP that allows public commentary during the completion of remedial activities at the site.

A Citizen Participation Fact Sheet stating the availability of the AA/RWP for review will be submitted to the NYSDEC for review and distribution following NYSDEC review of the AA/RWP.

6.2 General Remedial Construction Information

6.2.1 Project Organization

Key people that will be responsible for the Remedial Action Work include:

Volunteer:	Herbert Redl	
Project Director:	Andrew Zlotnick, LEP, LEED-AP	Fuss & O'Neill
Project Manager/ Remedial Engineer:	Gregory Toothill, PE	Fuss & O'Neill

6.2.2 Remedial Engineer

The Remedial Engineer for this project will be Gregory Toothill, PE of Fuss & O'Neill. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the site and will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under his/her supervision and that the remediation was conducted in accordance with the RWP. The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal.

6.2.3 Remedial Action Construction Schedule

The desired start date for implementation of this RWP is late 2013-early 2014. The anticipated schedule for future site activities is as follows:

- Perform market and economic analysis of site development alternatives – 2012
- Implement RWP – Spring 2014
- Submit SMP – Fall 2014
- Submit FER – Fall 2014
- Execute Environmental Easement with Site Management Plan – Winter 2014
- Certificate of Completion issued by NYSDEC – Winter 2014

NYSDEC will be notified a minimum of 7 days before beginning work at the site. Should any portion of this schedule need to be augmented due to unforeseen conditions, a revised schedule would be submitted for NYSDEC approval.

6.2.4 Work Hours

The hours for operation of remedial construction will be between 7AM and 6PM Monday through Friday.

6.2.5 Site Security

The majority of the site is secured by existing fencing located on the southwest side of Love Road. A retaining wall located at the south boundary of the site blocks access to the site from US Route 44. Fencing also surrounds the area of AOC-03. If the existing fencing must be removed during construction, temporary construction fencing will be installed to secure access to the site during construction.

6.2.6 Contingency Plan

If more extensive contaminant sources are found during remedial activities, additional sampling will be performed on product, sediment, and surrounding soils. The analysis will be tailored to specific COCs based on the AOC and may include TAL metals, TCL VOCs or TCL SVOCs.

6.2.7 Worker Training and Monitoring

Requirements for worker training and monitoring are covered in the project HASP.

6.2.8 Agency Approvals

Permits or government approvals required for remedial construction will be obtained prior to the start of remedial construction. A complete list of permits, certificates or other approvals or authorizations required to perform the remedial work will be included in the FER.

6.2.9 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the site prior to the start of any remedial activities as depicted in *Appendix B*. The sign will indicate that the project is being performed under the New York State BCP. The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

6.2.10 Emergency Contact Information

An emergency contact sheet with names and phone numbers will be kept at the site along with the HASP and will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

6.3 Reporting

Once remedial work begins at the site, a monthly status report of activities that have been completed during the previous month and activities that are scheduled to be prepared during the following month will be submitted to the NYSDEC. The monthly reports will be included in the FER.

6.3.1 Other Reporting

Photographs will be taken of remedial activities and included in the FER. Photos will illustrate remedial program elements. Daily job-site logs will be recorded for all remedial work.

6.3.2 Complaint Management Plan

Any complaints that address issues that have the potential to cause an immediate risk to health and safety will be addressed immediately by Fuss & O'Neill in coordination with appropriate project staff. After any necessary emergency measures are taken the incident will be recorded in the on-site log book and reported to the Project Manager and the NYSDEC project manager.

For complaints regarding nuisance type incidents (i.e. traffic, noise, etc.) that do not represent an immediate threat to health and safety, the incident will be recorded in the on-site log book and reported to Fuss &O'Neill's project manager who will in turn notify the NYSDEC project manager. A plan to address the complaint will be developed and implemented as soon as feasible.

6.3.3 Deviations from the Remedial Work Plan

If the need should arise to modify the RWP after it has been approved, the State will be notified of any such change. Any such notification will include the reason(s) why it is necessary or desirable to deviate from the approved RWP and the effect the deviation(s) will have on the overall remedy. The State may either approve or deny the modification. If field conditions are encountered that require an immediate modification to the work plan, the NYSDEC project manager will be notified by telephone or email and the change will be documented.

6.4 Site Preparation

The Volunteer and his contractors are solely responsible for the identification of utilities that might be affected by work under the RWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RWP. The Volunteer and his contractors are solely responsible for safe execution of all invasive and other work performed under this RWP. A minimum of three working days prior to beginning any excavation work at the site, a utility mark out request will be made with Dig Safely New York at 1-800-962-7962.

All equipment shall be provided to the site free of contamination. Fuss & O'Neill retains express authority to prohibit from the site any equipment which has not been thoroughly decontaminated prior to arriving at the project location. The remedial contractor is prohibited from decontaminating equipment on the project site which is not thoroughly decontaminated upon arrival.

The remedial contractor shall decontaminate all equipment which comes in contact with contaminated material, either directly or indirectly, (i.e., excavation, sampling and testing equipment), after completion of work at one location and prior to beginning work at another location, if so directed by Fuss & O'Neill.

6.5 Soil Excavation

Soil exceeding the protection of groundwater SCO in the vicinity of the former 1,000 gallon UST located in AOC-02 will be excavated and disposed of at permitted disposal facility. The estimated quantity of soil to be removed from the site is 650 cubic yards. The approximate extents of the excavation area are depicted on *Figure 3*; however, the final extent of excavation will be based on conditions observed in the field.

Fuss & O'Neill will oversee all invasive work and the excavation and load-out of excavated material. The excavation will start in the center of outlined areas as shown on *Figure 3*. As the excavations proceed downward and outward from that initial location, soils will be visually

inspected and screened in the field with a hand-held PID to help guide the excavation process. When the excavation reaches the predetermined limits and no evidence of source or grossly contaminated soil is noted, the excavation will cease for that area and confirmatory samples will be collected, as described in *Section 6.6*. Should confirmatory sampling indicate that contamination exceeding the Protection of Groundwater SCO still remains, additional excavation will be undertaken, or a feasibility analysis will be presented to justify no further action.

The depth of the excavation will be dependent upon the vertical extent of contamination, but will not extend below the groundwater table (approximately 10.5 feet below ground surface.) In addition, some site features may present potential barriers to soil excavation laterally. These barriers may include former building foundations. The remedial contractor will be prepared to work around any encountered barriers without causing damage to the barriers; however, field determinations regarding feasibility and health and safety concerns may limit this activity.

The Volunteer and associated parties performing this work are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as roadways and building foundations).

6.6 Remedial Performance Evaluation (Post Excavation End-Point Sampling)

Post-excavation confirmatory samples will be collected and analyzed to demonstrate compliance with Protection of Groundwater SCOs. The samples will be analyzed using ASP Level B protocols by a New York State Environmental laboratory Approval Program (NYS-ELAP) certified laboratory by the following methods:

- Target compound list (TCL) volatile organic compounds (VOCs) via USEPA 8260

The contractor will assist with the collection of confirmatory samples. Confirmatory side-wall samples will be collected a minimum of every 30 linear feet and bottom samples will be collected at a minimum rate of one for every 900 square feet. The FER will provide a tabular and map summary of all end-point sample results.

6.7 Soil Management Plan

6.7.1 Soil Screening Methods

Visual, olfactory, and PID soil screening will be performed by a qualified hydrogeologist or engineer during all remedial excavations into known or potentially contaminated material. Soil screening will be conducted during all excavation and invasive work performed during the remedy.

6.7.2 Materials Load-Out

Two options will be considered for material load-out: stockpiling or direct load-out into trucks or roll-off containers.

Stockpiling

Under this option, excavated soil will be temporary stockpiled in the area shown on *Figure 3*. Waste characterization will be performed of the stockpiled soil for off-site disposal. All excavated concrete and pavement to be removed from the site will be temporarily consolidated in separate piles. The stockpiles will include the following as detailed on *Figure 4*:

1. Two layers of 6 mil plastic sheeting will be placed on the ground surface. The plastic is intended to contain excess runoff.
2. The stockpiles will be surrounded with non-impacted excavated soil, imported fill, hay bales, or other material suitable for constructing a berm to contain runoff.
3. Dust suppression measures will be provided as necessary to prevent fugitive dust generation.
4. Stockpiles will be covered as needed with plastic on a daily basis to prevent infiltration of precipitation. The cover will be secured in place with sandbags, stones, or similar weights as warranted.
5. The stockpiles will be maintained and inspected daily for damage, erosion and sediment controls, and other signs of wear. Repairs to damaged controls will be made immediately. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

Should this option be implemented, the stockpiled soils will be removed from the site in a timely manner in accordance to *Sections 6.7.3 and 6.7.4*.

Direct Load-Out

Under this option, excavated soil will be directly loaded onto trucks or roll-off containers and transported to an approved waste disposal facility. Pre-waste characterization sampling will be conducted prior to remedial activities. Stockpiling of contaminated soil on-site will not be necessary and therefore, a soil management area will not be constructed. Directly loading soil will also help in minimizing disturbances to the facility by reducing truck traffic.

6.7.3 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with applicable local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. Proposed in-bound and out-bound truck routes to the site will follow US Route 44 or NYS Route 55 to Burnett Boulevard to Love Road. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) limiting total distance to major highways; (c) promoting safety in access to highways; and (d) overall safety in transport.

Trucks will be prohibited from stopping and idling outside of the project site. Material transported by trucks exiting the site will be secured with tight-fitting covers. Egress points for truck and equipment transport from the site will be monitored to ensure they are clean of dirt and other materials derived from the site during site remediation as outlined in *Section 6.7.7*.

Approved waste documentation (e.g., waste manifests) will be signed by the Volunteer or the Volunteer's designee. No waste will be transported off-site without prior knowledge or approval by the Volunteer or the Volunteer's designee. Weigh tickets for each truck will be provided and included in the FER.

6.7.4 Materials Disposal Off-Site

Disposal locations will be established at a later date and will be reported to the NYSDEC Project Manager. The total quantity of material expected to be disposed of off-site is approximately 650 cubic yards. Waste characterization will be performed for off-site disposal in accordance with the requirements of the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

If any soil needs to be exported from the site that is not intended to be disposed of at a permitted disposal facility, the soil will be sampled according to the schedule shown below in *Table A*. Any soil excavated and removed from the site will be treated as contaminated and regulated material and will be disposed in accordance with all applicable local, State (including 6 NYCRR Part 360) and Federal regulations unless the levels of contamination do not exceed the lower of the groundwater and residential use levels in 6 NYCRR 375 Table 375-6.8(b) or a beneficial use determination is issued by the NYSDEC.

Table A: Soil Sampling Schedule for Clean Soil Exported From a Site

Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 cubic yards or consult with NYSDEC		

6.7.5 Fluids Management

Dewatering activities are not anticipated to be necessary for the excavation activities outlined in this work plan. No attempt will be made to dewater any of the excavations prior to or during the removal of soils. However, immediately prior to backfilling, waters that may have accumulated in the excavation will be removed using properly licensed vacuum trucks in

compliance with applicable local, State, and Federal regulations. Dewatering fluids will be disposed of at an appropriately permitted facility.

6.7.6 Backfill from Off-Site Sources

The remedial party must provide documentation of the source of fill to DER for approval of the source of the material before it is used on the site, which should include:

- the name of the person providing the documentation and relationship to the source of the fill;
- the location where the fill was obtained;
- identification of any state or local approvals as a fill source; and
- if no prior approval is available for the source, a brief history of the use of the property which is the source of the fill.

The following material may be imported, without chemical testing, to be used as backfill beneath pavement, buildings or as part of the final site cover, provided that it contains less than 10% by weight material which would pass through a size 80 sieve and consists of:

- gravel, rock, or stone consisting of virgin material from a permitted mine or quarry; or
- recycled concrete or brick from a DEC registered construction and demolition debris processing facility if the material conforms to the requirements of Section 304 of the New York State Department of Transportation *Standard Specifications Construction and Materials Volume 1* (2002).

All material that does not meet the above criteria will be sampled according to the schedule shown below in *Table B* and shall not exceed the lower of the groundwater and residential use levels in 6 NYCRR 375 Table 375-6.8(b).

Table B: Soil Sampling Schedule for Soil Imported to the Site

Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 cubic yards or consult with NYSDEC		

Bills of lading for all material imported to the site will be included in the FER.

6.7.7 Erosion and Sedimentation Controls

Prior to starting site work, erosion and sedimentation (E&S) controls will be installed as

deemed necessary around the downgradient perimeter of the work areas and truck/equipment access routes. E&S controls are intended, to the extent practicable, to limit the potential for impacted sediments to leave the site.

E&S controls will be constructed in accordance with the standards and guidelines outlined in New York State Standards and Specification for Erosion and Sediment Control. The requirements of a typical NYSDEC Permit GP-02-01 will be met prior to installation of the sediment and erosion control measures. Structures will consist of silt fencing or other appropriate barrier material installed at the downgradient end of the work areas to prevent excess surface runoff from leaving the site. In addition a stabilized construction entrance for vehicles exiting the site will be installed at the site entrance/exit. Additional sub-area E&S measures may be employed around the Soil Management Area. All activity and equipment, various waste materials and disturbed earth will remain upgradient of E&S controls during construction activities. Additionally, critical areas within the work area may be protected with additional measures during construction to reduce the velocity of and redirect runoff. The E&S structures will be maintained during implementation of the remedy and will remain in place until construction is complete and stabilization of the remedy is achieved.

6.7.8 Dust Control Plan

Dust management during invasive on-site work, will be achieved by the following methods:

- If necessary, dust suppression may be achieved through the use of a dedicated on-site water truck for road and soil wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

6.7.9 Odor Control Plan

Based on the distance of the site to its nearest occupied properties and the conditions observed during the remedial investigations, nuisance odors are not anticipated to be of a concern. However, all necessary means, including the halt of work, will be employed if nuisance odors are identified. At a minimum, procedures will include: halting work and determining the source of the odors; limiting the area of open excavations; shrouding open excavations with tarps and other covers; and using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: direct load-out of soils to trucks for off-site disposal and the use of staff to determine if nuisance odors are present in surrounding properties. NYSDEC and NYSDOH will be notified of complaints regarding nuisance odors.

6.7.10 Decontamination Procedures

The contractor will furnish labor, materials, tools, and equipment for decontamination of all personnel, equipment, and supplies which enter the contaminated work area or are exposed to contaminated material.

6.8 Construction Quality Assurance Plan (CQAP)

This Construction Quality Assurance Plan (CQAP) documents how successful performance of the Remedial Action tasks will be assured. A qualified hydrogeologist or engineer shall oversee all remedial activities on the site. Any imported fill material used as backfill for intermediate grading, backfill material, or for the clean soil cover shall be certified as clean fill, by analytical testing performed by either the supplier of the material or the Volunteer. Imported soil will be analyzed according to the schedule included in *Section 6.7.6*.

A project kickoff meeting between the Volunteer, Fuss & O'Neill's Project Manager, the Health and Safety Supervisor, the remediation contractor(s), and the NYSDEC Project Manager shall be held at the Site prior to implementing this RWP. Additional project meetings will be held as deemed necessary by the Volunteer.

Monthly reports summarizing site activities that occurred during the previous month and scheduled to occur in the following month shall be prepared for submittal to the NYSDEC while construction activities are occurring at the site. Upon completion of remedial activities a Final Engineering Report will be prepared and submitted to the NYSDEC and NYSDOH. Detailed descriptions of these reports are included in *Sections 6.3 and 6.11*.

6.9 Community Air Monitoring Plan

Continuous monitoring will be required for all ground intrusive activities including but not limited to soil/waste excavation and handling, and test pitting or trenching.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

<u>VOC Monitoring, Response Levels, and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should

be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
- All 15-minute readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (NYSDEC and NYSDOH) and County Health personnel to review.

6.10 Residual Contamination to Remain On-site

Since residual contaminated soil will exist beneath the site after the remedy is complete, Engineering and Institutional Controls are required to protect human health and the environment. These controls are described below. Long-term management of Engineering and Institutional Controls and of residual contamination will be executed under a site specific Site Management Plan (SMP) that will be developed following the completion of the remedial activities.

Engineering Controls will be implemented to protect public health and the environment by appropriately managing residual contamination. Engineering Controls at the site include:

- A composite cover system consisting of bituminous concrete, concrete, the building's foundation, and/or a clean soil cover
- Buildings constructed within the AOC-01, AOC-02, or AOC-03 areas where VOC impacts have been identified will include the underground components of a sub-slab depressurization system (SSDS.) Indoor air/sub-slab vapor sampling will be performed following building construction to determine if the SSDS will need to be completed.

6.10.1 Composite Cover System

Exposures to residual contamination above the restricted residential SCOs will be restricted by a composite cover system. This composite cover system will be an element of construction and will consist of asphalt pavement, concrete sidewalks and building slab, and/or a clean soil cover. The composite cover system will serve as a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

The composite cover system will provide an effective barrier to any residual contamination that may remain in the ground. The FER will list the residual contamination on the site in tabular and map form and include presentation of exceedances of the Unrestricted and the Restricted Residential SCOs.

The composite cover system will be installed in the areas shown on *Figure 3*. Details of the composite cover construction are included on *Figure 4*. A restricted residential use is planned for the site; however, final development plans have not been completed. Some differences between how the composite cover system would be constructed exist based on the final development plans.

A composite cover will be installed over areas where exceedances of the restricted residential SCOs remain. In areas that will not be covered by asphalt pavement or a concrete slab, a minimum of two feet of clean soil will be used for the composite cover. In locations where existing clean soil exists over the impacted material, the existing clean material will be utilized as part of the clean soil cover. In areas where imported clean soil is used as the composite cover, a demarcation layer consisting of a geotextile fabric or orange construction fencing will be placed over the existing soils prior to placing the imported clean soil. Details of the clean soil cover for restricted residential use are included on *Figure 4*.

Following completion of the composite cover system, they will be surveyed by a New York State surveyor and "As-Built" drawings will be included in the FER. An Environmental Easement will, in part, assure the restricted use of the site and that Engineering and Institutional controls are maintained.

The SMP will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after remedial activities are completed. Future site development or other invasive activities that occur at the site will require special consideration and have to follow the protocols outlined in the SMP. Inspection, maintenance, and restoration of the composite system will also be outlined in the SMP.

6.10.2 Sub-Slab Depressurization System

Any building constructed over areas where VOC impacts in soil or groundwater have been observed at AOC-02 will be installed with the sub-slab components of a Sub-Slab Depressurization System (SSDS.) Following construction of the building sub-slab vapor and indoor air monitoring will be completed and compared to the Soil Vapor/Indoor Air Matrices included in the NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" to determine if the SSDS must be completed.

A complete SSDS includes the following elements:

- An active sub-slab soil depressurization system.
- A physical vapor barrier to prevent migration of volatiles and undesired pollutants into the depressurized sub-slab space.
- Building pressurization through use of the heating ventilation and air conditioning (HVAC) system to supply more outdoor air to the occupied space than is actively exhausted (i.e., maintain slightly positive pressure inside the building over that of the outdoor ambient air pressure).

The sub-slab venting system will create a negative pressure barrier which will force the migration of any errant air from the interior building space toward the subsurface, therefore, protecting the occupied space from sub-slab volatiles. The SSDS would remove vapors from the subsurface away from potential entry pathways to the atmosphere. In addition, a slightly positive pressure inside the building will cause air to flow from inside the building to the outdoors through openings in the building shell (i.e., vents, windows, doors, and cracks), further eliminating subsurface contaminant migration into the building. The sub-slab is also sealed using a physical barrier located directly beneath the slab and at all wall and penetrations.

The system consists of two major design elements including the piping network and active vapor mitigation fans with associated controls. Final plans for the SSDS, if necessary, will be prepared once the final site plan has been developed. Conceptual details of the sub-slab piping and exhaust fan are included on *Figure 5*.

The sub-slab vapor extraction network will consist of perforated PVC pipe laterals and solid PVC pipe headers. The perforated pipe will be bedded in a minimum six inch layer of one-half-

inch to one-inch diameter coarse aggregate (i.e., meeting standards for ASTM #5 coarse aggregate).

The vapor barrier will be protected from damage during construction (e.g., penetrations caused by reinforcing bars, gravel, and pedestrian and equipment traffic). Additional measures, including, lap joints, and the application of polyurethane sealant and caulk at floor cracks and along expansion joints, were incorporated into the design to minimize contaminant entry pathways to the interior of the building.

Finally, if deemed necessary, active venting will be accomplished by installing solid PVC piping that connects the sub-slab piping to in-line duct mitigation fan(s) located on the roof of the building. The fan(s) will be installed with a variable frequency drive (VFD) to adjust the sub-slab pressure distribution. The fan(s) will be outfitted with differential pressure gauges that will serve as a visual indicator that the system is functioning.

6.10.3 Groundwater Monitoring

A network of up to four overburden groundwater monitoring wells will be installed following site development to monitor residual groundwater impacts at AOC-03. Exact placement of the wells will be dependent upon the final site layout. At minimum there will be one well installed upgradient of the observed groundwater impacts, one well located downgradient of the observed groundwater impacts, and two wells located within the impacted area.

Groundwater monitoring activities will be conducted quarterly once remedial activities are completed. Sampling will be conducted to demonstrate that plume stabilization has been reached and that the remedial activities were effective in further reducing VOC concentrations in groundwater.

Monitoring will continue until permission to reduce the frequency or discontinue monitoring is granted in writing by the NYSDEC. If residual groundwater concentrations are found to be below TOGS 1.1.1 standards or have become asymptotic over an extended period, permission to discontinue groundwater monitoring will be requested from the NYSDEC.

6.10.4 Institutional Controls

After remedial activities are complete, the site will have residual contamination remaining in place. Engineering Controls for the residual contamination have been incorporated into the remedy to render the overall site remedy protective of public health and the environment. A site-specific Environmental Easement will be recorded with Dutchess County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors adhere to all Engineering and Institutional Controls placed on this site by this NYSDEC-approved remedy. Institutional Controls provide restrictions on site usage and mandate operation, maintenance, monitoring and reporting measures for all Engineering and Institutional Controls. The SMP will describe the appropriate methods and procedures to ensure compliance with the Engineering and Institutional.

6.10.5 Environmental Easement

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the remedial action is complete. The Environmental Easement will be submitted as part of the FER. The Environmental Easement renders the site a Controlled Property and contains the Institutional Controls required under this remedy.

Institutional Controls can, generally, be subdivided between controls that support Engineering Controls (i.e. composite covers), and those that place general restrictions on site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support the Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- The operation, inspection, maintenance, and certification of Engineering Controls as specified in the SMP;
- Groundwater and indoor air monitoring will be performed as defined in the SMP;
- Data and information pertinent to Site Management must be reported at the frequency and in a manner defined in the SMP;
- On-site environmental monitoring devices, such as monitoring wells, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

The site will also have a series of Institutional Controls in the form of site restrictions. The site restrictions that apply to the site are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the site that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;

- The site may be used for restricted residential (or less stringent) use only, provided the long-term Engineering and Institutional Controls included in the SMP are employed;

- The site may not be used for a higher level of use, such as residential use without an amendment or extinguishment of this Environmental Easement;

- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the site are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This time period must be certified by an expert that the NYSDEC finds acceptable.

6.10.6 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion for the Remedial Action. Site Management continues in perpetuity or until released in writing by NYSDEC.

The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance and the guidelines provided by NYSDEC and will include an Engineering and Institutional Control Plan for implementation and management of Engineering and Institutional Controls; a Monitoring Plan for implementation of site monitoring activities; a Soil Management Plan to address any future invasive activities; and a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to the NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be determined by the NYSDEC. The first certification will be due for submission to NYSDEC 18 months after the date of the Certificate of Completion.

6.11 Final Engineering Report

A FER will be submitted to NYSDEC following implementation of the remedial activities. The FER provides the documentation that the remedial work required has been completed and has been performed in compliance with this plan. The FER will be certified by the Remedial Engineer and will include the following:

- A comprehensive account of the locations and characteristics of all material removed from the site including the surveyed locations of excavations;
- As-built drawings of engineered controls;
- An accounting of the destination of all material removed from the site, including excavated contaminated soil, non-regulated material, and fluids;
- A description of any deviations in the RWP;

- A summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis;
- A summary of all residual contamination left on the site after the remedy is complete. Residual contamination includes all contamination that exceeds the Unrestricted Use SCO and Restricted Residential Use SCOs. A feasibility analysis may be included if soil exceeding the Protection of Groundwater SCO was not removed from the area of the former 1000-gallon UST at AOC-02; and
- The Environmental Easement.

7 References

Fuss & O'Neill of New York, P.C., 2004. Quality Assurance Program Plan (QAPP) For Site Investigation Work Plan – Love Road Future Guardian Self Storage Facility; Dated December 20, 2004.

Fuss & O'Neill of New York, P.C., 2005. Site Health and Safety Plan; Dated April 2005.

Fuss & O'Neill of New York, P.C., 2006. Site Characterization and Remedial Investigation Summary Report – 2 Love Road Site, Poughkeepsie, NY; Dated July 2006.

Fuss & O'Neill of New York, P.C., 2007. Soil Excavation Interim Remedial Measure (IRM) – 2 Love Road BCP Site. Dated September 2007.

Fuss & O'Neill of New York, P.C., 2010. Fish & Wildlife Resource Impact Analysis - 2 Love Road Site; Dated September 2009, revised October 2010.

Fuss & O'Neill of New York, P.C., 2010. Supplemental Remedial Investigation Report - 2 Love Road Site; Dated January 2010, revised October 2010.

Town of Poughkeepsie New York, 2007. Poughkeepsie Town Plan and Final Generic Environmental Impact Statement; Dated September 26, 2007.

Tables

Table 1
Alternatives Analysis/Remedial Work Plan - Summary of Detected Constituents in Soil
2 Love Road, Poughkeepsie, NY
July 2012

				Site ID	TP-01	TP-02	TP-02	TP-03	TP-04	TP-05	TP-06	TP-07	TP-07	TP-08	TP-09	TP-09
				Sample #	TP-01-01_1.5	TP-02-01_0-1	TP-02-02_1-3	TP-03-01_0-1	TP-04-01_1-3	TP-05-01_0-4	TP-06-01_2-4	TP-07-01_0-4	TP-07-02_4-6	TP-08-01_0-2	TP-09-01_4-4.5	TP-09-02_1.5
				Date	6/16/2005	6/16/2005	6/16/2005	6/17/2005	6/16/2005	6/16/2005	6/16/2005	6/16/2005	6/16/2005	6/16/2005	6/16/2005	6/16/2005
				Depth	1.5	0.5	2	0.5	2	2	3	2	5	1	4.25	1.5
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
VOCs (ug/kg)																
Acetone	50	500000	100000		<24U	<25J	<21U	<120U	<23J	<23U	48	<23J	<25J	<21U	<25J	<23U
Benzene	60	44000	4800		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1U	<5.6U
Benzene, 1,2,4-trimethyl	3600	190000	52000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7J	<6.2U	<5.4U	<6.1U	<5.6U
Benzene, 1,3,5-trimethyl-	8400	190000	52000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1U	<5.6U
Benzene, 1-methylethyl-	NE	NE	NE		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1J	<5.6U
Ethylbenzene	1000	390000	41000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1U	<5.6U
M/P-xylenes	260	500000	100000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1U	<5.6U
Methyl ethyl Ketone	120	500000	100000		<12U	<12U	<10U	<60U	<11U	<12U	<12J	<11U	<12U	<11U	<12U	<11U
n-Butylbenzene	12000	500000	100000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	13	<5.6U
n-Propylbenzene	3900	500000	100000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1J	<5.6U
o-Xylene	260	500000	100000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1U	<5.6U
p-Cymene	NE	NE	NE		<5.9U	<6.2U	<5.2U	<30J	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1U	<5.6U
sec-Butylbenzene	11000	500000	100000		<5.9U	<6.2U	<5.2U	<30J	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	15	<5.6U
tert-Butylbenzene	5900	500000	100000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7U	<6.2U	<5.4U	<6.1J	<5.6U
Toluene	700	500000	100000		<5.9U	<6.2U	<5.2U	<30U	<5.7U	<5.8U	<6.0U	<5.7J	<6.2U	<5.4U	<6.1J	<5.6U
SVOCs (ug/kg)																
Acenaphthene	20000	500000	100000		<390U	<410U	<340U	<390U	<380U	<390U	<390U	<380U	<410U	<350U	<400J	430
Fluoranthene	100000	500000	100000		<390U	<410U	<340U	<390U	<380U	<390U	<390U	<380U	<410U	<350J	<400U	<370J
Fluorene	30000	500000	100000		<390U	<410U	<340U	<390U	<380U	<390U	<390U	<380U	<410U	<350U	<400J	610
2-Methylnaphthalene	NE	NE	NE		<390U	<410U	<340U	<390U	<380U	<390U	<390U	<380U	<410U	<350U	<400J	800
Naphthalene	12000	500000	100000		<5.9U ?	<6.2U ?	<5.2U ?	<30U ?	<5.7U ?	<5.8U ?	<6.0U ?	11 ?	<6.2U ?	<5.4U ?	<6.1U ?	<5.6U ?
Phenanthrene	100000	500000	100000		<390U	<410U	<340U	<390U	<380U	<390U	<390U	<380U	<410U	<350U	<400J	1400
Pyrene	100000	500000	100000		<390U	<410U	<340U	<390J	<380U	<390U	<390U	<380U	<410U	<350J	<400J	<370J
Metals (mg/kg)																
Aluminum	NE	NE	NE		15800	12200	14100	15500	17200	17100	17000	15000	16800	20300	17800	16500
Arsenic	13	16	16		8.1	5.3	6	8.6	7	7.9	**[13]**	5.3	7.7	9.2	12.3	10
Barium	350	400	400		89.3	38.1	43.6	77	91.7	109	67	79.6	102	81.1	76.7	87.7
Beryllium	7.2	590	72		<0.58U	<0.62U	<0.51U	<0.59U	<0.55U	<0.58U	<0.58U	<0.54U	<0.62U	0.67	<0.59U	<0.54U
Cadmium	2.5	9.3	4.3		<0.58U	<0.62U	<0.51U	<0.59U	<0.55U	<0.58U	<0.58U	<0.54U	<0.62U	<0.52U	<0.59U	0.77
Calcium	NE	NE	NE		3760	27200	11100	1870	1550	2420	1060	1650	2860	1600	1440	11000
Chromium*	1 (Hexavalent) / 30 (Trivalent)	400 / 1500	110 / 180		**[20.2]**	**[15.4]**	**[16.3]**	**[18.5]**	**[20.9]**	**[21.4]**	**[20.7]**	**[17.3]**	**[21.5]**	**[26.3]**	**[21.5]**	**[26.1]**
Cobalt	NE	NE	NE		13.2	12.1	12.6	13.4	13.4	14.8	18.6	12.8	14.3	17.6	17.9	13.6
Copper	50	270	270		36.3	29.6	28.5	30.1	30.5	34.3	25.4	23.6	32.7	31.6	29.2	34.2
Iron	NE	NE	NE		34200	27900	35000	31100	34000	35400	41000	26400	34300	34400	27000	31100
Lead	63	1000	400		39.5	12.4	17	13.5	14.7	16.5	18.8	15	17.3	25.8	21.6	**[79.5]**
Magnesium	NE	NE	NE		7710	9400	8310	5900	6980	6450	5030	5580	7330	8780	6050	8670
Manganese	1600	10000	2000		983	619	1010	496	775	638	1010	642	727	1010	443	983
Mercury	0.18	2.8	0.81		<0.04U	<0.04U	<0.03U	<0.04U	<0.04U	<0.04U	<0.04U	<0.03U	<0.04U	0.05	0.07	0.14
Nickel	30	310	310		28.9	25	28.2	28.7	29.4	**[31.5]**	25.3	24.4	**[32.5]**	**[37.5]**	29.6	28.6
Potassium	NE	NE	NE		1380	1310	1050	1780	1690	1770	1160	1230	1610	1330	1250	1310
Selenium	3.9	1500	180		1.5	0.81	1.3	1.2	1.6	1.1	1.5	1.2	1	0.9	1.1	1.3
Sodium	NE	NE	NE		150	74.6	63.4	91.9	89.2	156	67.9	66.9	83.4	<52.5U	93.4	77.5
Vanadium	NE	NE	NE		21.4	14.2	15.7	18.9	22.4	23.4	25.2	19.5	22.2	25.1	23	**23**
Zinc	109	10000	10000		89.4	67.7	84.7	80.9	81.4	87.8	61.9	71	91.4	78.6	98.7	**[133]**

Notes:

1. Units: ug = micrograms; mg = milligrams; kg = kilograms
2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **[2040]** indicates an exceedance of applicable Unrestricted Use Soil Cleanup Objectives
5. ***[2040]*** indicates an exceedance of applicable Restricted Residential Use Soil Cleanup Objectives
6. ***[2040]*** indicates an exceedance of applicable Commercial Use Soil Cleanup Objectives
7. **UU-SCO** = Unrestricted Use - Soil Cleanup Objective
8. **PPH-C** = Protection of Public Health - Commercial
9. **PPH - RR** = Protection of Public Health - Restricted Residential
10. U = indicates the compound was analyzed but not detected
11. J = estimated value
12. ? = Highest value reported for both methods utilized
13. * Samples analyzed for total chromium but compared to the worst case hexavalent chromium standard

Table 1
Alternatives Analysis/Remedial Work Plan - Summary of Detected Constituents in Soil
2 Love Road, Poughkeepsie, NY
July 2012

				Site ID	TP-10	TP-12	TP-13	TP-14	TP-15	TP-16A	TP-16A	TP-16B	TP-17	TP-17	TP-18	TP-19
				Sample #	TP-10-01_3-5	TP-12-01_1-3	TP-13-01_2-4	TP-14-01_4-5	TP-15-01_3-5	TP-16A-01_1-4	TP-16A-02_4	TP-16B-01_5-10	TP-17-01_7-10	TP-17-02_3-5	TP-18-01_4-5	TP-19-01_0-2
				Date	6/16/2005	6/16/2005	6/16/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005
				Depth	4	2	3	4.5	4	2.5	4	7.5	8.5	4	4.5	1
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
VOCs (ug/kg)																
Acetone	50	500000	100000		<23U	<21U	<23U	<24U	42	<25J	<130J	**[66]**	**[84]**	<3000J	<23U	<22U
Benzene	60	44000	4800		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3U	<33U	<6.3U	<12J	<760U	<5.8U	<5.6U
Benzene, 1,2,4-trimethyl	3600	190000	52000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	59	33	<6.3J	150	2700	<5.8U	<5.6U
Benzene, 1,3,5-trimethyl-	8400	190000	52000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3J	<33U	<6.3U	200	1300	<5.8U	<5.6U
Benzene, 1-methylethyl-	NE	NE	NE		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3J	160	<6.3J	62	<760J	<5.8U	<5.6U
Ethylbenzene	1000	390000	41000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3J	<33J	<6.3U	38	840	<5.8U	<5.6U
M/P-xylenes	260	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3U	<33U	<6.3U	150	<760J	<5.8U	<5.6U
Methyl ethyl Ketone	120	500000	100000		<12U	<10U	<11U	<12U	<13J	<13U	<66U	<13J	48	<1500U	<12U	<11U
n-Butylbenzene	12000	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	13	540	19	81	<760J	<5.8U	<5.6U
n-Propylbenzene	3900	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	11	300	<6.3J	99	<760J	<5.8U	<5.6U
o-Xylene	260	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3J	<33U	<6.3U	26	<760J	<5.8U	<5.6U
p-Cymene	NE	NE	NE		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	10	110	<6.3J	160	<760J	<5.8U	<5.6U
sec-Butylbenzene	11000	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	15	530	58	46	<760J	<5.8U	<5.6U
tert-Butylbenzene	5900	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3J	<33U	<6.3J	15	<760U	<5.8U	<5.6U
Toluene	700	500000	100000		<5.8U	<5.2U	<5.6U	<5.9U	<6.3U	<6.3U	<33U	<6.3J	<12J	<760U	<5.8U	<5.6U
SVOCs (ug/kg)																
Acenaphthene	20000	500000	100000		<380U	<340U	<370U	<390U	<420U	<8400J	<440J	<420U	<410U	<400U	<390U	<1100U
Fluoranthene	100000	500000	100000		<380J	<340U	<370U	<390J	<420U	<8400J	<440J	<420U	<410U	<400U	<390U	<1100U
Fluorene	30000	500000	100000		<380U	<340U	<370U	<390U	<420U	<8400J	570	<420U	<410U	<400U	<390U	<1100U
2-Methylnaphthalene	NE	NE	NE		<380U	<340U	<370U	<390U	<420U	50000	1700	<420U	950	1800	<390U	<1100U
Naphthalene	12000	500000	100000		<5.8U ?	<5.2U ?	<5.6U ?	<5.9U ?	<6.3U ?	8700 ?	<33U ?	<6.3U ?	740 ?	1300 ?	<5.8U ?	<5.6U ?
Phenanthrene	100000	500000	100000		<380U	<340U	<370U	<390J	<420U	9200	1200	<420J	<410U	<400U	<390U	<1100U
Pyrene	100000	500000	100000		<380J	<340U	<370U	<390J	<420U	<8400J	<440J	<420J	<410U	<400U	<390U	<1100U
Metals (mg/kg)																
Aluminum	NE	NE	NE		16800	21200	15100	16000	21300	16100	17400	16300	17100	21400	16400	17900
Arsenic	13	16	16		5.6	11.2	6	7.1	8.3	5.4	7.5	8.7	8.4	9.9	7.7	7.5
Barium	350	400	400		80.1	86.4	81.2	63.5	113	71.6	91.2	102	119	116	66.5	68.6
Beryllium	7.2	590	72		<0.57U	0.66	<0.55U	<0.58U	<0.62U	<0.61U	<0.66U	<0.61U	<0.62U	<0.60U	<0.56U	<0.55U
Cadmium	2.5	9.3	4.3		<0.57U	<0.52U	<0.55U	<0.58U	<0.62U	<0.61U	<0.66U	<0.61U	<0.62U	<0.60U	<0.56U	<0.55U
Calcium	NE	NE	NE		2190	1840	1510	10300	2020	3320	2200	2500	8300	1250	5330	4710
Chromium*	1 (Hexavalent) / 30 (Trivalent)	400 / 1500	110 / 180		**[19.3]**	**[29.5]**	**[17.9]**	**[17.2]**	**[25.6]**	**[18.8]**	**[20.9]**	**[20]**	**[21.4]**	**[24.7]**	**[20.5]**	**[20]**
Cobalt	NE	NE	NE		12.4	25.5	14.5	11.8	16.5	13.4	17.8	14.3	15.3	17.1	14.5	12.9
Copper	50	270	270		27.7	**[73.1]**	25.6	30.5	36.8	26.6	32.6	33.4	30.9	32.4	29.3	32.7
Iron	NE	NE	NE		29700	41500	30700	29100	38300	30100	34800	33700	33800	35600	32100	29400
Lead	63	1000	400		52.1	24.5	17.6	40.2	17	40.1	16.8	18.1	19.5	20.3	12.1	27.1
Magnesium	NE	NE	NE		6280	17000	7090	11600	6810	6920	6230	5990	7020	6800	6770	8840
Manganese	1600	10000	2000		831	***[2100]***	989	1050	764	925	889	691	1020	892	1010	1480
Mercury	0.18	2.8	0.81		0.09	0.04	<0.04U	0.04	0.05	<0.04U	<0.04U	<0.04U	<0.04U	0.06	0.04	0.05
Nickel	30	310	310		26.7	**[43.5]**	25.7	25.7	**[35.9]**	26.9	**[34.8]**	29.7	**[32.9]**	**[34.1]**	28.3	27.6
Potassium	NE	NE	NE		1070	1510	1060	993	1540	1140	1020	910	1400	2020	1640	1380
Selenium	3.9	1500	180		1.5	1.9	2.2	1	1.5	0.73	1.4	1.5	1.8	1.7	0.98	1.5
Sodium	NE	NE	NE		<56.5U	<52.2U	70.5	120	169	97.7	174	126	79.8	83.5	141	58.5
Vanadium	NE	NE	NE		21.4	25.6	19.6	20.6	25.7	23.1	20.1	19.2	21.6	27.8	22.5	25.3
Zinc	109	10000	10000		**[140]**	104	72.8	103	86.1	86	88.1	83	86.2	85.9	76.2	93.7

Notes:

1. Units: ug = micrograms; mg = milligrams; kg = kilograms
2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **[2040]** indicates an exceedance of applicable Unrestricted Use Soil Cleanup Objectives
5. ***[2040]*** indicates an exceedance of applicable Restricted Residential Use Soil Cleanup Objectives
6. ***[2040]*** indicates an exceedance of applicable Commercial Use Soil Cleanup Objectives
7. **UU-SCO** = Unrestricted Use - Soil Cleanup Objective
8. **PPH-C** = Protection of Public Health - Commercial
9. **PPH - RR** = Protection of Public Health - Restricted Residential
10. U = indicates the compound was analyzed but not detected
11. J = estimated value
12. ? = Highest value reported for both methods utilized
13. * Samples analyzed for total chromium but compared to the worst case hexavalent chromium standard

Table 1
Alternatives Analysis/Remedial Work Plan - Summary of Detected Constituents in Soil
2 Love Road, Poughkeepsie, NY
July 2012

				Site ID	TP-19	TP-20	TP-21	TP-21	TP-22	TP-24	TP-25	TP-28	TP-28	TP-29	TP-29	TP-30
				Sample #	TP-19-02_0-2	TP-20-01_3.5-4.5	TP-21-01_6-6.5	TP-21-02_3-4	TP-22-01_8.5-9	TP-24-01_8-9	TP-25-01_5.5-6.5	TP-28-01_1-4	TP-28-02_9.5	TP-29-01_9	TP-29-02_0-1	TP-30-01_9.5
				Date	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/17/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005
				Depth	1	4	6.25	3.5	8.75	8.5	6	2.5	9.5	9	0.5	9.5
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**		Duplicate 1	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
VOCs (ug/kg)																
Acetone	50	500000	100000		<22U	<23J	<24U	<25U	<110U	**[100]**	<26U	<25U	<23U	<25J	**[110]**	<26J
Benzene	60	44000	4800		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	38	<6.1U	<5.9U	<6.6U
Benzene, 1,2,4-trimethyl	3600	190000	52000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	100	<6.1U	<5.9U	<6.6U
Benzene, 1,3,5-trimethyl-	8400	190000	52000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	250	<6.1U	<5.9U	<6.6U
Benzene, 1-methylethyl-	NE	NE	NE		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	61	<6.1U	<5.9U	<6.6U
Ethylbenzene	1000	390000	41000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	80	<6.1U	<5.9U	<6.6U
M/P-xylenes	260	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	160	<6.1U	<5.9U	<6.6U
Methyl ethyl Ketone	120	500000	100000		<11U	<12U	<12U	<12U	<56U	14	<13U	<12U	<11U	<12U	14	<13U
n-Butylbenzene	12000	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	27	<6.1U	<5.9U	<6.6U
n-Propylbenzene	3900	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	89	<6.1U	<5.9U	<6.6U
o-Xylene	260	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	6.3	<6.1U	<5.9U	<6.6U
p-Cymene	NE	NE	NE		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	37	<6.1U	<5.9U	<6.6U
sec-Butylbenzene	11000	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28J	<6.5U	<6.5U	<6.1U	18	<6.1U	<5.9U	<6.6U
tert-Butylbenzene	5900	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28J	<6.5U	<6.5U	<6.1U	<5.6J	<6.1U	<5.9U	<6.6U
Toluene	700	500000	100000		<5.6U	<5.8U	<6.0U	<6.2U	<28U	<6.5U	<6.5U	<6.1U	6.4	<6.1J	<5.9J	<6.6J
SVOCs (ug/kg)																
Acenaphthene	20000	500000	100000		<1100U	<380U	<390U	<410U	<370U	<430U	<430J	<410U	<370U	<400U	<390U	<430U
Fluoranthene	100000	500000	100000		<1100U	<380U	<390U	<410U	<370U	<430U	<430U	<410U	<370U	<400U	<390U	<430U
Fluorene	30000	500000	100000		<1100U	<380U	<390U	<410U	<370J	<430U	<430J	<410U	<370U	<400U	<390U	<430U
2-Methylnaphthalene	NE	NE	NE		<1100U	<380U	<390U	<410U	<370U	<430U	<430J	<410U	<370U	<400U	<390U	<430U
Naphthalene	12000	500000	100000		<5.6U ?	<5.8U ?	<6.0U ?	<6.2U ?	<28U ?	<6.5JB ?	<6.5J ?	<6.1JB ?	110 ?	<6.1JB ?	<5.9JB ?	<6.6JB ?
Phenanthrene	100000	500000	100000		<1100U	<380U	<390U	<410U	<370J	<430U	<430J	<410U	<370U	<400U	<390U	<430U
Pyrene	100000	500000	100000		<1100U	<380U	<390U	<410U	<370J	<430U	<430U	<410U	<370U	<400U	<390U	<430U
Metals (mg/kg)																
Aluminum	NE	NE	NE		17100	17100	20800	23200	12500	20500	17200	20100	11100	11400	17900	20200
Arsenic	13	16	16		7.7	8.3	9.9	7.2	7	9.3	7.5	11.6	5.6	***[18.8]***	5.9	10.9
Barium	350	400	400		73.7	70.4	140	134	61.2	107	76	127	45.4	127	93.2	113
Beryllium	7.2	590	72		<0.54U	<0.57U	0.59	<0.62U	<0.55U	<0.62U	<0.64U	<0.59U	<0.54U	<0.60U	<0.56U	<0.66U
Cadmium	2.5	9.3	4.3		<0.54U	<0.57U	<0.59U	<0.62U	<0.55U	<0.62U	<0.64U	<0.59U	<0.54U	<0.60U	<0.56U	<0.66U
Calcium	NE	NE	NE		10400	935	3440	2800	1920	1570	1460	2580	13300	6840	1140	7430
Chromium*	1 (Hexavalent) / 30 (Trivalent)	400 / 1500	110 / 180		**[18.9]**	**[19.4]**	**[22.8]**	**[24.5]**	**[15.9]**	**[22]**	**[19.7]**	**[23.4]**	**[13.5]**	**[13.9]**	**[20]**	**[25.1]**
Cobalt	NE	NE	NE		11.8	13.8	16.5	14.9	11.8	17.3	14	19.8	10.2	13.4	13.4	17
Copper	50	270	270		30.3	29.2	26.1	21.3	32.9	30.4	36.9	38.5	28.2	34.3	18.8	37.5
Iron	NE	NE	NE		29100	31500	33400	29900	25800	34600	30000	41800	25900	28000	27300	37600
Lead	63	1000	400		30.3	15.8	27.2	17.2	14.5	17	14.8	19.4	10.2	13.3	18.9	16.9
Magnesium	NE	NE	NE		11000	5550	6250	5710	5880	5680	6830	6890	5870	5780	4630	8570
Manganese	1600	10000	2000		1500	758	717	1200	791	855	1080	1480	730	***[2410]***	1590	733
Mercury	0.18	2.8	0.81		0.05	<0.04U	0.04	0.05	<0.04U	0.06	0.04	0.05	<0.04U	<0.04U	0.04	<0.04U
Nickel	30	310	310		26.3	23.7	28.8	27.7	25.6	**[30.8]**	29.9	**[37.1]**	22.9	28.4	22.6	**[36.4]**
Potassium	NE	NE	NE		1380	1410	1680	1760	1380	1480	1740	2020	1240	1300	1250	2750
Selenium	3.9	1500	180		2.1	1.3	1.7	2.6	1	2.1	1.5	1.6	1.1	1.1	1.6	0.94
Sodium	NE	NE	NE		69.5	61.1	126	125	55.6	70.4	<64.3U	119	204	119	73.5	106
Vanadium	NE	NE	NE		25.9	22.4	28.5	30.4	16.8	23.8	21.4	26.4	13.2	14.5	24.8	25.1
Zinc	109	10000	10000		94.7	65	96.7	74	95	75.4	88.4	93.4	71.1	78.9	76.2	96.2

Notes:

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13. * Samples analyzed for total chromium but compared to the worst case hexavalent chromium standard

Table 1
Alternatives Analysis/Remedial Work Plan - Summary of Detected Constituents in Soil
2 Love Road, Poughkeepsie, NY
July 2012

				Site ID	TP-30	TP-31	TP-32	TP-32	TP-33	TP-33	TP-35	TP-35	TP-36	TP-37	TP-38	TP-39
				Sample #	TP-30-02_3-4	TP-31-01_4-7	TP-32-01_3-5	TP-32-02_11	TP-33-01_0-1	TP-33-02_8	TP-35-01_0-1	TP-35-02_4-7	TP-36-01_5-7	TP-37-01_4-5	TP-38-01_4-7	TP-39-01_6-7.5
				Date	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005	6/20/2005
				Depth	3.5	5.5	4	11	0.5	8	0.5	5.5	6	4.5	5.5	6.75
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
VOCs (ug/kg)																
Acetone	50	500000	100000		<23J	**[83]**	<26U	<29J	<24U	<25J	<22U	**[51]**	**[97]**	**[69]**	**[120]**	<31J
Benzene	60	44000	4800		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7U	<6.2J	<7.7U
Benzene, 1,2,4-trimethyl	3600	190000	52000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	7.9	<6.2U	<7.7J
Benzene, 1,3,5-trimethyl-	8400	190000	52000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7J	<6.2U	<7.7U
Benzene, 1-methylethyl-	NE	NE	NE		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7J	<6.2U	<7.7U
Ethylbenzene	1000	390000	41000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7U	<6.2U	<7.7U
M/P-xylenes	260	500000	100000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7J	<6.2U	<7.7U
Methyl ethyl Ketone	120	500000	100000		<12U	<13J	<13U	<15U	<12U	<13U	<11U	<12J	13J	<11J	12J	<15U
n-Butylbenzene	12000	500000	100000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7U	<6.2U	<7.7U
n-Propylbenzene	3900	500000	100000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7U	<6.2U	<7.7U
o-Xylene	260	500000	100000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7J	<6.2U	<7.7U
p-Cymene	NE	NE	NE		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7U	<6.2U	<7.7U
sec-Butylbenzene	11000	500000	100000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7J	<6.2U	<7.7U
tert-Butylbenzene	5900	500000	100000		<5.9U	<6.4U	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7U	<6.2U	<7.7U
Toluene	700	500000	100000		<5.9J	<6.4J	<6.4U	<7.3U	<6.0U	<6.3U	<5.5U	<6.2U	<6.6U	<5.7J	<6.2J	<7.7U
SVOCs (ug/kg)																
Acenaphthene	20000	500000	100000		<390U	<420U	<420U	<480U	<390U	<420U	<360U	<410U	<430U	<380J	<410J	<1500U
Fluoranthene	100000	500000	100000		<390U	<420J	<420U	<480U	<390U	<420U	<360J	520	<430J	<380J	410	<1500J
Fluorene	30000	500000	100000		<390U	<420U	<420U	<480U	<390U	<420U	<360U	<410J	<430U	<380J	<410J	<1500U
2-Methylnaphthalene	NE	NE	NE		<390U	<420U	<420U	<480U	<390U	<420U	<360J	<410J	<430U	<380J	<410J	<1500U
Naphthalene	12000	500000	100000		<5.9JB ?	<6.4U ?	<6.4U ?	<7.3U ?	<6.0U ?	<6.3U ?	<5.5U ?	<6.2U ?	<6.6U ?	180 ?	<6.2U ?	8.0 ?
Phenanthrene	100000	500000	100000		<390U	<420U	<420U	<480U	<390U	<420U	<360J	<410J	<430U	<380J	<410J	<1500J
Pyrene	100000	500000	100000		<390U	<420J	<420U	<480U	<390U	<420U	<360J	480	<430J	<380J	<410J	<1500J
Metals (mg/kg)																
Aluminum	NE	NE	NE		16900	24400	23000	12700	17000	11100	12900	14000	21100	17400	12900	21800
Arsenic	13	16	16		6.3	7.3	10.3	9.8	6.9	7.2	8.4	6.1	8.8	9.9	9	9.4
Barium	350	400	400		88.1	172	162	83	96.4	51.6	75.7	50.7	128	52.2	72.5	88
Beryllium	7.2	590	72		<0.57U	0.75	0.72	<0.71U	<0.58U	<0.60U	<0.53U	<0.60U	0.76	<0.55U	<0.62U	<0.75U
Cadmium	2.5	9.3	4.3		<0.57U	<0.61U	<0.62U	<0.71U	<0.58U	<0.60U	0.94	<0.60U	<0.64U	0.71	0.82	1.2
Calcium	NE	NE	NE		1090	23800	3470	19700	2360	2780	35000	8120	2640	2020	3130	5140
Chromium*	1 (Hexavalent) / 30 (Trivalent)	400 / 1500	110 / 180		**[21]**	**[30.6]**	**[28.5]**	**[15.7]**	**[18.1]**	**[13.6]**	**[16]**	**[22.7]**	**[22.6]**	**[21.1]**	**[17]**	**[29.8]**
Cobalt	NE	NE	NE		15.3	15.9	17.3	12.3	13.4	14.1	11.1	12.4	11.6	18.5	12	18.1
Copper	50	270	270		27.5	36.9	42.1	33.9	21.5	32.7	32.4	33.7	31.4	49.3	37.9	49.9
Iron	NE	NE	NE		28000	39500	41100	27500	26400	25800	26300	27500	32400	37200	41000	38700
Lead	63	1000	400		15.2	14.7	18.3	13.4	26	12.8	32	54.9	15.3	**[64.5]**	46.5	**[118]**
Magnesium	NE	NE	NE		6170	9100	8730	7350	4590	4990	24200	9820	5220	9150	5280	13700
Manganese	1600	10000	2000		536	1100	798	935	910	744	1460	318	795	720	**[1810]**	724
Mercury	0.18	2.8	0.81		<0.04U	<0.04U	<0.04U	<0.04U	0.05	<0.04U	<0.04U	***[1.4]***	0.08	0.05	0.04	0.1
Nickel	30	310	310		29.2	**[37.4]**	**[38.7]**	25.6	21.9	24.8	23.5	27.8	26.9	**[37]**	27.7	**[40.8]**
Potassium	NE	NE	NE		1690	2740	2920	1710	893	813	1460	1410	1560	1360	1550	1350
Selenium	3.9	1500	180		1.2	1.5	1.3	1.2	1.3	1	0.75	<0.60U	1.6	1.5	2.5	1.3
Sodium	NE	NE	NE		120	166	128	71.6	76.4	<59.9U	300	90	123	77.2	134	111
Vanadium	NE	NE	NE		21.3	31.3	31.8	15.7	22.1	12.8	17.9	17.6	26.6	21.1	20.4	34.9
Zinc	109	10000	10000		77.1	91.5	98.4	79.1	81.4	79.6	87.6	92.6	88.8	**[120]**	93.6	**[182]**

Notes:

1. Units: ug = micrograms; mg = milligrams; kg = kilograms
2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **[2040]** indicates an exceedance of applicable Unrestricted Use Soil Cleanup Objectives
5. ***[2040]*** indicates an exceedance of applicable Restricted Residential Use Soil Cleanup Objectives
6. ***[2040]*** indicates an exceedance of applicable Commercial Use Soil Cleanup Objectives
7. **UU-SCO** = Unrestricted Use - Soil Cleanup Objective
8. **PPH-C** = Protection of Public Health - Commercial
9. **PPH - RR** = Protection of Public Health - Restricted Residential
10. U = indicates the compound was analyzed but not detected
11. J = estimated value
12. ? = Highest value reported for both methods utilized
13. * Samples analyzed for total chromium but compared to the worst case hexavalent chromium standard

Table 1
Alternatives Analysis/Remedial Work Plan - Summary of Detected Constituents in Soil
2 Love Road, Poughkeepsie, NY
July 2012

				Site ID	TP-41	TP-42	TP-44	TP-44	TP-46	TP-47	TP-47	TP-48
				Sample #	TP-41-01_3-6	TP-42-01_4-6	TP-44-01_10.5	TP-44-02_0-2	TP-46-01_10	TP-47-02_8-9	TP-47-03_8-9	TP-48-01_6-7
				Date	6/21/2005	6/21/2005	6/21/2005	6/21/2005	6/21/2005	6/21/2005	6/21/2005	6/21/2005
				Depth	4.5	5	10.5	1	10	8.5	8.5	6.5
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**		Primary	Primary	Primary	Primary	Primary	Primary	Duplicate 1	Primary
VOCs (ug/kg)												
Acetone	50	500000	100000		<23J	<25J	<25J	**[66]**	<110J	<23J	<23J	<23J
Benzene	60	44000	4800		<5.7U	<6.2U	<6.2U	<5.5U	<28U	<5.7U	<5.7U	<5.7U
Benzene, 1,2,4-trimethyl	3600	190000	52000		<5.7U	<6.2U	<6.2U	<5.5U	250	<5.7U	<5.7U	<5.7U
Benzene, 1,3,5-trimethyl-	8400	190000	52000		<5.7U	<6.2U	<6.2U	<5.5U	33	<5.7U	<5.7U	<5.7U
Benzene, 1-methylethyl-	NE	NE	NE		<5.7U	<6.2U	<6.2U	<5.5U	<28J	<5.7U	<5.7U	<5.7U
Ethylbenzene	1000	390000	41000		<5.7U	<6.2U	<6.2U	<5.5U	<28U	<5.7U	<5.7U	<5.7U
M/P-xylenes	260	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	<28U	<5.7U	<5.7U	<5.7U
Methyl ethyl Ketone	120	500000	100000		<11U	<12U	<12U	<11J	<57U	<11U	<11U	<11U
n-Butylbenzene	12000	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	130	<5.7U	<5.7U	<5.7U
n-Propylbenzene	3900	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	43	<5.7U	<5.7U	<5.7U
o-Xylene	260	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	<28U	<5.7U	<5.7U	<5.7U
p-Cymene	NE	NE	NE		<5.7U	<6.2U	<6.2U	<5.5U	83	<5.7U	<5.7U	<5.7U
sec-Butylbenzene	11000	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	110	<5.7U	<5.7U	<5.7U
tert-Butylbenzene	5900	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	<28U	<5.7U	<5.7U	<5.7U
Toluene	700	500000	100000		<5.7U	<6.2U	<6.2U	<5.5U	<28U	<5.7U	<5.7U	<5.7U
SVOCs (ug/kg)												
Acenaphthene	20000	500000	100000		<370U	<410U	<410U	<360U	<380J	<380U	<380U	<370U
Fluoranthene	100000	500000	100000		<370U	<410U	<410U	<360J	<380U	<380U	<380U	<370U
Fluorene	30000	500000	100000		<370U	<410U	<410U	<360U	<380J	<380U	<380U	<370U
2-Methylnaphthalene	NE	NE	NE		<370U	<410U	<410U	560	510	<380U	<380U	<370U
Naphthalene	12000	500000	100000		<5.7U ?	<6.2U ?	<6.2U ?	<5.5U ?	750 ?	<5.7U ?	<5.7U ?	<5.7U ?
Phenanthrene	100000	500000	100000		<370U	<410U	<410U	360J	<380J	<380U	<380U	<370U
Pyrene	100000	500000	100000		<370U	<410U	<410U	<360J	<380U	<380U	<380U	<370U
Metals (mg/kg)												
Aluminum	NE	NE	NE		14100	18800	16800	10500	15500	16300	15400	15600
Arsenic	13	16	16		7.9	7.4	6.2	9.5	6.3	7.3	7.4	8.4
Barium	350	400	400		83	76.1	74.2	64.6	98.9	79.5	79.3	81.4
Beryllium	7.2	590	72		<0.57U	<0.59U	<0.61U	<0.52U	<0.54U	<0.54U	<0.57U	<0.55U
Cadmium	2.5	9.3	4.3		<0.57U	<0.59U	<0.61U	0.59	<0.54U	<0.54U	<0.57U	0.58
Calcium	NE	NE	NE		30600	1170	1330	8140	12100	2590	2450	12500
Chromium*	1 (Hexavalent) / 30 (Trivalent)	400 / 1500	110 / 180		**[18.8]**	**[23.4]**	**[19.8]**	**[13.7]**	**[19.7]**	**[20.5]**	**[19.5]**	**[20]**
Cobalt	NE	NE	NE		13	11.8	13.3	9.5	13.9	14.4	14.4	16
Copper	50	270	270		34.7	30.3	37.1	29.3	32.3	37.8	38.2	39.7
Iron	NE	NE	NE		29600	33200	31400	27500	31000	32800	32200	32100
Lead	63	1000	400		12.8	15.3	15.1	60.9	14	16.4	15.7	15
Magnesium	NE	NE	NE		7620	6390	6960	6610	6380	7270	6720	7030
Manganese	1600	10000	2000		825	378	693	631	550	876	844	909
Mercury	0.18	2.8	0.81		<0.04U	<0.04U	0.04	0.07	<0.04U	<0.04U	<0.04U	0.04
Nickel	30	310	310		27.7	27.3	28.6	23.2	28.6	**[32.6]**	**[31.1]**	**[33.9]**
Potassium	NE	NE	NE		2010	1870	1990	1060	1890	1840	1880	1920
Selenium	3.9	1500	180		1.3	1.8	1.3	1.1	0.94	1.2	1.3	1.4
Sodium	NE	NE	NE		115	120	<61.2U	142	80.8	109	111	75.1
Vanadium	NE	NE	NE		19.8	27.5	21.8	17.6	20.2	22.2	21.1	21.2
Zinc	109	10000	10000		82.1	76.8	85.4	**[143]**	90	94.4	89.8	94.6

Notes:
1. Units: ug = micrograms; mg = milligrams; kg = kilograms
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10. U = indicates the compound was analyzed but not detected
11. J = estimated value
12. ? = Highest value reported for both methods utilized
13. * Samples analyzed for total chromium but compared to the worst case hexavalent chromium standard

Table 2
Alternatives Analysis/Remedial Work Plan - Soil Excavation IRM Confirmatory Samples
2 Love Road, Poughkeepsie, NY
July 2012

				Site ID	CS-01	CS-02	CS-03	CS-04	CS-05	CS-06	CS-07
				Sample #	767070724-01	767070724-02	767070724-03	767070724-04	767070724-05	767070724-06	767070724-07
				Date	7/24/2007	7/24/2007	7/24/2007	7/24/2007	7/24/2007	7/24/2007	7/24/2007
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**		Primary	Primary	Primary	Primary	Primary	Primary	Primary
Volatile Organics, Method 8260 (STARS), µg/kg											
No Detections											
Semi-Volatile Organics, Method 8270 (STARS), µg/kg											
No Detections											
Total Petroleum Hydrocarbons, Method 418.1, mg/kg											
TPH	NE	NE	NE		< 51U	<23U	<23U	71	<22U	140	<24U

Notes:

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2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **UU-SCO** = Unrestricted Use - Soil Cleanup Objective
5. **PPH-C** = Protection of Public Health - Commercial
6. **PPH - RR** = Protection of Public Health - Restricted Residential
7. U = indicates the compound was analyzed but not detected

Table 3
Alternatives Analysis/Remedial Work Plan - Tank Pull IRM Confirmatory Samples
2 Love Road, Poughkeepsie, NY
July 2012

			Site ID	TG-01	TG-02	TG-03	TG-04	TG-05
			Sample #	767051108-01	767051108-02	767051108-03	767051108-04	767051108-05
			Date	11/8/2005	11/8/2005	11/8/2005	11/8/2005	11/8/2005
CONSTITUENT	**UU-SCO**	**PPH-C**	**PPH-RR**	Primary	Primary	Primary	Primary	Primary
VOCs (ug/kg)								
sec-butylbenzene	11000	500000	100000	5300	380	1100	1100	8200
n-butylbenzene	12000	500000	100000	**[19000]**	1400	11000	8700	**[17000]**
ethylbenzene	1000	390000	41000	**[20000]**	<140U	**[1400]**	**[1400]**	**[8800]**
Isopropyl Benzene	NE	NE	NE	7900	<140U	630	1100	4300
p-isopropyltoluene	NE	NE	NE	480	<140U	420	470	<280U
naphthalene	12000	500000	100000	**[28000]**	510	5300	2800	**[27000]**
n-propylbenzene	3900	500000	100000	**[18000]**	460	2600	2100	**[13000]**
toluene	700	500000	100000	**[3400]**	<140U	530	360	**[1100]**
1,2,4-trimethylbenzene	3600	190000	52000	2400	260	2200	**[14000]**	<280U
1,3,5-trimethylbenzene	8400	190000	52000	1200	160	2300	5100	640
o-xylene	260	500000	100000	**[2300]**	<290U	**[360]**	**[1200]**	**[910]**
m-xylene, p-xylene	260	500000	100000	**[2300]**	<290U	<290U	**[5700]**	<560U
SVOCs (ug/kg)								
Fluorene	30000	500000	100000	7400	980	4000	<380U	7800
2-methylnaphthalene	NE	NE	NE	44000	630	22000	1800	30000
naphthalene	12000	500000	100000	**[14000]**	<380U	6900	1300	11000
Phenanthrene	100000	500000	100000	13000	1500	6400	<380U	13000

Notes:

1. Units: ug = micrograms; kg = kilograms
2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **[2040]** indicates an exceedance of applicable Unrestricted Use Soil Cleanup Objectives
5. **UU-SCO** = Unrestricted Use - Soil Cleanup Objective
6. **PPH-C** = Protection of Public Health - Commercial
7. **PPH - RR** = Protection of Public Health - Restricted Residential
8. U = indicates the compound was analyzed but not detected
9. J = estimated value

Table 4
Alternatives Analysis/Remedial Work Plan -
Remedial Investigation Summary of Detected Constituents in Groundwater
2 Love Road, Poughkeepsie, NY
July 2012

	Site ID	MW-01	MW-02	Field Blank
	Sample #	767050916-01	767050916-02	767050916-FB
	Date	9/16/2005	9/16/2005	9/16/2005
CONSTITUENT	**TOGS 1.1.1 Class GA Standards & Guidance Values**	Primary	Primary	Field Blank
VOCs (ug/L)				
Acetone	50	<20U	2.8J	1.8J
Benzene	1	**[74]**	<5U	<5U
1,2-dichloropropane	1	**[3.7J]**	<5U	<5U
Ethylbenzene	5	**[450]**	<5U	<5U
Toluene	5	2.1J	<5U	<5U
o-xylene	5	1.6J	<5U	<5U
m+p-xylene	5	**[22]**	<5U	<5U
SVOCs (ug/L)				
Di-n-Butylphthalate	NE	1.2J		
2-methylnaphthalene	NE	7.0J		
Naphthalene	10	6.1J		

Notes:

1. Units: ug = micrograms; mg = milligrams; kg = kilograms
2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **[2040]** indicates an exceedance of applicable TOGS 1.1.1 Class GA Standard or Guidance Value
5. U = indicates the compound was analyzed but not detected
6. J = estimated value

Table 5
Alternatives Analysis/Remedial Work Plan - Suplemental Remdial Investigation Summary of Detected Constituents in Groundwater
2 Love Road, Poughkeepsie, NY
July 2012

	Site ID	Trip Blank	2009-MW-04	2009-MW-04	2009-MW-03	2009-MW-02	2009-MW-01
	Sample #	984090720-01	984090720-02	984090720-03	984090720-04	984090720-05	984090720-06
	Date	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009	7/20/2009
CONSTITUENT	**Standards & Guidance Values**	Primary	Primary	Duplicate	Primary	Primary	Primary
VOCs (ug/L)							
Chloromethane	5	0.37J	<1U	0.22J	0.43J	0.55J	<50U
Ethylbenzene	5	<1U	<1U	<1U	<1U	<1U	**[1300]**
Isopropylbenzene	5	<1U	0.13J	0.13J	<1U	<1U	**[160]**
m&p-Xylene	5	<1U	<1U	<1U	<1U	<1U	**[400]**
Methylene chloride	5	**[8.3S]**	0.1JS	<1U	<1U	0.1JS	<50U
Naphthalene	10	<1U	<1U	<1U	<1U	<1U	**[92]**
n-Propylbenzene	5	<1U	<1U	<1U	<1U	<1U	**[220]**
o-Xylene	5	<1U	<1U	<1U	<1U	<1U	**[15J]**
sec-Butylbenzene	5	<1U	0.18J	0.18J	<1U	<1U	**[10J]**
SVOCs (ug/L)							
2-Methylnaphthalene	NE		0.93	1	<0.2U	<0.2U	38D
Acenaphthene	20		0.32	0.34	<0.2U	<0.2U	1.4
Fluorene	50		0.27	0.28	<0.2U	<0.2U	2.5
Naphthalene	10		<0.2U	<0.2U	<0.2U	<0.2U	**[130D]**
Metals (mg/L)							
Arsenic	25		0.009	0.009	<0.004U	<0.004U	0.007
Barium	1000		0.172	0.178	0.08	0.064B	0.107
Cadmium	5		0.0003B	0.0002B	<0.001U	0.0004	<0.001U
Chromium	50		<0.001U	0.0004B	<0.001U	0.0009B	0.0004B
Lead	25		<0.002U	<0.002U	<0.002U	0.0015B	0.007
Mercury	0.7		<0.0002U	<0.0002U	<0.0002U	<0.0002U	<0.0002U
Selenium	10		<0.01U	<0.01U	<0.01U	<0.01U	<0.01U
Silver	50		0.0003B	<0.001U	0.0003B	0.0003B	0.0007B

Notes:

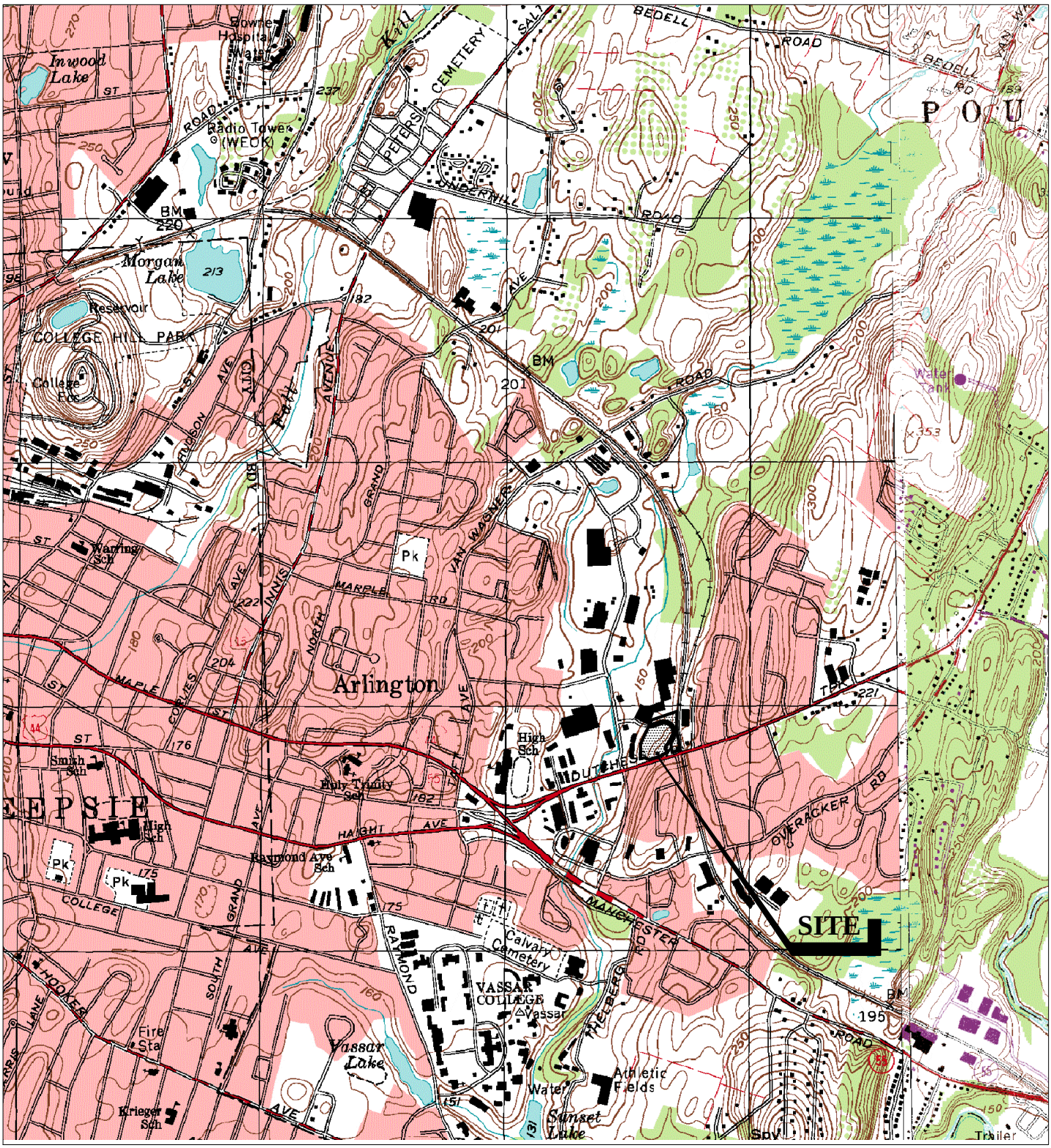
1. Units: ug = micrograms; mg = milligrams; kg = kilograms
2. < =constituent not detected at the specified laboratory reporting limit
3. NE = Not Established
4. **[2040]** indicates an exceedance of applicable TOGS 1.1.1 Class GA Standard or Guidance Value
5. U = indicates the compound was analyzed but not detected
6. J = estimated value
7. B = The reported value was obtained from a reading that was less than the Reporting level (RL) but greater than or equal to the Instrument Detection Level (IDL).
8. D = The reported concentration is the result of a diluted analysis.
9. S = This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

Table 6
Alternatives Analysis/Remedial Work Plan - Supplemental Remedial Investigation
Summary of Soil Vapor Results
2 Love Road, Poughkeepsie, NY
July 2012

	Sample Location:	SG-1	SG-2	SG-3	SG-4	SG-5
	Sample Number:	980080612-01	980080612-02	980080612-03	980080612-04	980080612-05
	Sample Date:	6/12/2008	6/12/2008	6/12/2008	6/12/2008	6/12/2008
Volatile Organic Compounds ($\mu g/m^3$)	**NYSDOH Soil Vapor/ Indoor Air Matrix*** **					
Acetone	NE	36	ND<240	27	55	ND<4.8
Benzene	NE	3.4	1000	7.6	0.4	90
Benzyl Chloride	NE	ND<0.52*	ND<260*	ND<0.26	ND<0.26	ND<5.2*
Bromodichloromethane	NE	ND<0.66	ND<330	ND<0.33	ND<0.33	ND<6.6
Bromoform	NE	ND>1.1	ND<510	ND<0.51	ND<0.51	ND<11.
Bromomethane	NE	ND<0.38	ND<190	ND<0.19	ND<0.19	ND<3.8
1,3-Butadiene	NE	ND<0.22	ND<110	ND<0.11	ND<0.11	ND<2.2
2-Butanone (MEK)	NE	9.3	ND<230	5.4	26	14
Carbon Disulfide	NE	13	3300	0.83	2.7	5
Carbon Tetrachloride	1	ND<0.62	ND<310	0.53	0.49	ND<6.2
Chlorobenzene	NE	ND<0.46	ND<230	ND<0.23	ND<0.23	ND<4.6
Chlorodibromomethane	NE	ND<0.86	ND<430	ND<0.43	ND<0.43	ND<8.6
Chloroethane	NE	ND<0.26	ND<130	ND<0.13	ND<0.13	ND<2.6
Chloroform	NE	ND<0.48	ND<240	ND<0.24	ND<0.24	ND<4.8
Chloromethane	NE	1.1	ND<100	1.3	0.94	ND<2.0
Cyclohexane	NE	71	41000	47	ND<0.17	290
1,2-Dibromoethane	NE	ND<0.76	ND<380	ND<0.38	ND<0.38	ND<7.6
1,2-Dichlorobenzene	NE	ND<0.60	ND<300	ND<0.30	ND<0.30	ND<6.0
1,3-Dichlorobenzene	NE	ND<0.60	ND<300	ND<0.30	ND<0.30	ND<6.0
1,4-Dichlorobenzene	NE	ND<0.60	ND<300	ND<0.30	ND<0.30	ND<6.0
Dichlorodifluoromethane	NE	2.7	ND<250	2.7	2.7	ND<5.0
1,1-Dichloroethane	NE	ND<0.40	ND<200	1.4	0.52	ND<4.0
1,2-Dichloroethane	NE	ND<0.40	240	ND<0.20	ND<0.20	ND<4.0
1,1-Dichloroethylene	2	ND<0.40	ND<200	ND<0.20	ND<0.20	ND<4.0
cis-1,2-Dichloroethylene	2	ND<0.40	ND<200	0.31	ND<0.20	ND<4.0
t-1,2-Dichloroethylene	NE	ND<0.40	ND<200	ND<0.20	ND<0.20	ND<4.0
1,2-Dichloropropane	NE	ND<0.46	ND<230	ND<0.23	ND<0.23	ND<4.6
cis-1,3-Dichloropropene	NE	ND<0.44	ND<220	ND<0.22	ND<0.22	ND<4.4
trans-1,3-Dichloropropene	NE	ND<0.44	ND<220	ND<0.22	ND<0.22	ND<4.4
1,2-Dichlorotetrafluoroethane (114)	NE	ND<0.70	ND<350	ND<0.35	ND<0.35	ND<7.0
Ethanol	NE	6.1	ND<190	3.5	14	ND<3.8
Ethyl Acetate	NE	ND<0.44	ND<370	ND<0.37	ND<0.37	ND<7.3
Ethylbenzene	NE	21	7500	49	0.22	220
4-Ethyl Toluene	NE	19	3300	25	0.25	250
n-Heptane	NE	110	63000	47	0.97	320
Hexachlorobutadiene	NE	ND<2.2**	ND<1100**	ND<1.1	ND<1.1	ND<22**
Hexane	NE	93	43000	51	1	300
2-Hexanone	NE	ND<0.40	ND<200	ND<0.20	5.9	ND<4.0
Isopropanol	NE	2.4	410	1.6	5	5.7
Methyl tert-Butyl Ether (MTBE)	NE	ND<0.36	ND<180	ND<0.18	ND<0.18	ND<3.6
Methylene Chloride	NE	17	6100	4.6	0.78	ND<7.0
4-Methyl-2-Pentanone (MIBK)	NE	ND<0.40	ND<200	ND<0.20	2.7	ND<4.0
Propene	NE	22	ND<180	5.6	6.1	ND<3.5
Styrene	NE	ND<0.42	ND<210	ND<0.21	ND<0.21	ND<4.2
1,1,2,2-Tetrachloroethane	NE	ND<0.68	ND<340	ND<0.34	ND<0.34	ND<6.8
Tetrachloroethylene	2	ND<0.68	ND<340	ND<0.34	ND<0.34	ND<6.8
Tetrahydrofuran	NE	ND<0.30	ND<150	ND<0.15	19	ND<3.0
Toluene	NE	4.4	580	4.3	0.85	20
1,2,4-Trichlorobenzene	NE	2.5*	ND<370*	ND<0.37	ND<0.37	ND<7.4*
1,1,1-Trichloroethane	2	ND<0.54	ND<270	ND<0.27	ND<0.27	ND<5.4
1,1,2-Trichloroethane	NE	ND<0.54	ND<270	ND<0.27	ND<0.27	ND<5.4
Trichloroethylene	1	ND<0.54	ND<270	ND<0.27	ND<0.27	ND<5.4
Trichlorofluoromethane	NE	15	ND<280	1.7	1.4	ND<5.6
1,1,2-Trichloro-1,2,2-Trifluoroethane	NE	ND<0.76	ND<380	0.59	0.65	ND<7.6
1,2,4-Trimethylbenzene	NE	77	10000	84	0.47	780
1,3,5-Trimethylbenzene	NE	5.9	260	27	ND<0.25	58
Vinyl Acetate	NE	ND<1.5	ND<710	ND<0.71	ND<0.71	ND<15
Vinyl Chloride	1	ND<0.26	ND<130	1.5	ND<0.13	ND<2.6
m/p-Xylene	NE	23	7500	53	0.63	330
o-Xylene	NE	2.4	610	5.2	0.23	44

Notes:
$\mu g/m^3$ = micrograms per cubic meter
ND<(xx) = Not detected at or above the Reporting Limit (xx)
NE = Not Established
* = Laboratory fortified blank recovery is outside of control limits. Any reported value for this compound in this batch is expected to be biased on the high side.
** = Laboratory fortified blank recovery is outside of control limits. Any reported value for this compound in this batch is expected to be biased on the low side.
*** = Compounds compared to Sample Matrix 1 have the potential to require mitigation if the sample concentration is greater than 5 $\mu g/m^3$.
Compounds compared to Sample Matrix 2 have the potential to require mitigation if the sample concentration is greater than 100 $\mu g/m^3$.

Figures



MAP REFERENCE

THIS MAP WAS PREPARED FROM THE FOLLOWING 7.5 MINUTE USGS MAPS:
Poughkeepsie Quadrangle 1964, Photorevised 1980
Poughkeepsie Quadrangle 1963, Photorevised 1980

SCALE:	
HORZ.:1" = 2000'	
VERT.: N/A	
DATUM:	
HORZ.:N/A	
VERT.: N/A	
0 1000 2000	
GRAPHIC SCALE	

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POUGHKEEPSIE, NY 12601
845.452.6801
www.fando.com

HERBERT REDL
AA/REMEDIAL WORK PLAN
USGS LOCATION MAP
2 LOVE ROAD
TOWN OF POUGHKEEPSIE NEW YORK

PROJ. No.: 20040761.A8N
DATE: JULY 2012

FIGURE 1

UCS: WRLD | MS VIEW: 2000 | LMAN: PLOT | CTB: F&O STANDARD

AREAS OF CONCERN

AOC–01 – FORMER FUEL UNLOADING AREA

AOC–02 – FORMER UST AREA

AOC–03 – FORMER RAILROAD STORAGE AREA

LEGEND

- PROPERTY LINE/BCP BOUNDARY
- TEST PIT – ONE OR MORE VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED BELOW THE UNRESTRICTED USE CRITERIA (2005)
- TEST PIT – NO VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED (2005)
- SOIL PROBE (NO SAMPLES COLLECTED) (2005)
- TEMPORARY MONITORING WELL AND SOIL BORING (2005)
- TANK GRAVE SAMPLE (2005)
- SOIL EXCAVATION CONFIRMATION SAMPLE (2007)
- SUPPLEMENTAL REMEDIAL INVESTIGATION BEDROCK MONITORING WELL (2009)
- SUPPLEMENTAL REMEDIAL INVESTIGATION SOIL GAS SAMPLE (2008)
- SUPPLEMENTAL REMEDIAL INVESTIGATION OVERBURDEN MONITORING WELL (2009)
- SUPPLEMENTAL REMEDIAL INVESTIGATION SEDIMENT SAMPLE (2008)
- SOIL SAMPLE WITH VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUNDS EXCEEDING THE UNRESTRICTED USE CRITERIA
- SOIL SAMPLE WITH METALS EXCEEDING THE UNRESTRICTED USE CRITERIA
- SOIL SAMPLE WITH METALS EXCEEDING THE RESTRICTED RESIDENTIAL USE CRITERIA
- SOIL SAMPLE WITH METALS EXCEEDING THE COMMERCIAL USE CRITERIA
- OVERBURDEN MONITORING WELL WITH VOLATILE ORGANIC COMPOUNDS EXCEEDING TOGS 1.1.1
- TEST PIT WITH NO SAMPLES COLLECTED BUT ASSUMED UNIMPACTED WITH VOCS BASED ON VISUAL AND OLFACTORY INSPECTION
- TEST PIT WITH NO SAMPLES COLLECTED BUT ASSUMED IMPACTED WITH VOCS OR SVOCS BASED ON VISUAL AND OLFACTORY INSPECTION
- AREA OF CONCERN WITH VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUND IMPACTED SOILS

GENERAL NOTES

1. ALL SAMPLE LOCATIONS AND EXCAVATION AREAS ARE APPROXIMATE.

MAP REFERENCE

1. BASE MAP OBTAINED FROM A DRAWING ENTITLED "SURVEY MAP OF THE LANDS OF DONALD LOVE AND H. PAUL RICHARDS", PREPARED BY RAYMOND J. KIHLMIRE, L.S., FILED IN THE DCCO ON SEPTEMBER 04, 1987.

CTB:
LMAN:
MS VIEW:
UCS:

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:	GAT
CHIEF DESIGNER:	GAT
REVIEWED BY:	DATE

SCALE:
HORZ.: 1" = 60'
VERT.:
DATUM:
HORZ.:
VERT.:
0 30 60
GRAPHIC SCALE

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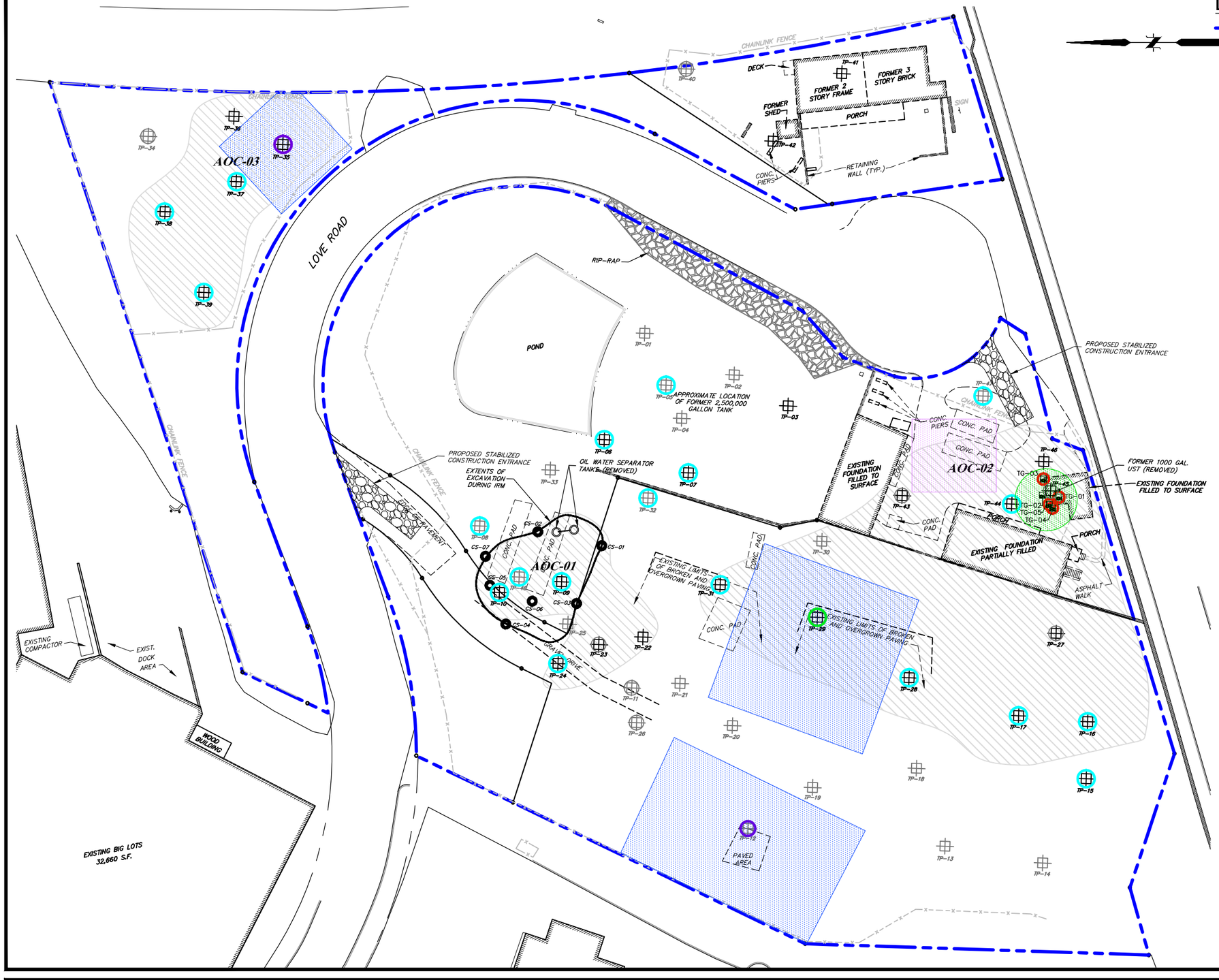
HERBERT REDL
ALTERNATIVES ANALYSIS/REMEDIAL WORK PLAN
HISTORIC SAMPLE LOCATIONS
2 LOVE ROAD

TOWN OF POUGHKEEPSIE NEW YORK

PROJ. No.: 20040761.A8N
DATE: JULY 2012

FIGURE 2



LEGEND

- PROPERTY LINE/BCP BOUNDARY
- TEST PIT – ONE OR MORE VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED BELOW THE UNRESTRICTED USE CRITERIA (2005)
- TEST PIT – NO VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED (2005)
- TANK GRAVE SAMPLE (2005)
- SOIL EXCAVATION CONFIRMATION SAMPLE (2007)
- SUPPLEMENTAL REMEDIAL INVESTIGATION OVERBURDEN MONITORING WELL (2009)
- SOIL SAMPLE WITH VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUNDS EXCEEDING THE UNRESTRICTED USE CRITERIA
- SOIL SAMPLE WITH METALS EXCEEDING THE UNRESTRICTED USE CRITERIA
- SOIL SAMPLE WITH METALS EXCEEDING THE RESTRICTED RESIDENTIAL USE CRITERIA
- SOIL SAMPLE WITH METALS EXCEEDING THE COMMERCIAL USE CRITERIA
- TEST PIT WITH NO SAMPLES COLLECTED BUT ASSUMED UNIMPACTED WITH VOCS BASED ON VISUAL AND OLFACTORY INSPECTION
- TEST PIT WITH NO SAMPLES COLLECTED BUT ASSUMED IMPACTED WITH VOCS OR SVOCS BASED ON VISUAL AND OLFACTORY INSPECTION
- AREA OF CONCERN WITH VOLATILE OR SEMI–VOLATILE ORGANIC COMPOUND IMPACTED SOILS
- AREA REQUIRING COMPOSITE COVER FOR RESTRICTED RESIDENTIAL USE DEVELOPMENT
- PROPOSED SOIL EXCAVATION AREA
- PROPOSED SOIL MANAGEMENT AREA

GENERAL NOTES

1. ALL SAMPLE LOCATIONS AND EXCAVATION AREAS ARE APPROXIMATE.

MAP REFERENCE

1. BASE MAP OBTAINED FROM A DRAWING ENTITLED "SURVEY MAP OF THE LANDS OF DONALD LOVE AND H. PAUL RICHARDS", PREPARED BY RAYMOND J. KIHLMIRE, L.S., FILED IN THE DCCO ON SEPTEMBER 04, 1987.

CTB:
LMAN:
MS VIEW:
UCS:

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:	GAT
CHIEF DESIGNER:	GAT
REVIEWED BY:	DATE

SCALE:
HORZ.: 1" = 60'
VERT.:
DATUM:
HORZ.:
VERT.:
0 30 60
GRAPHIC SCALE

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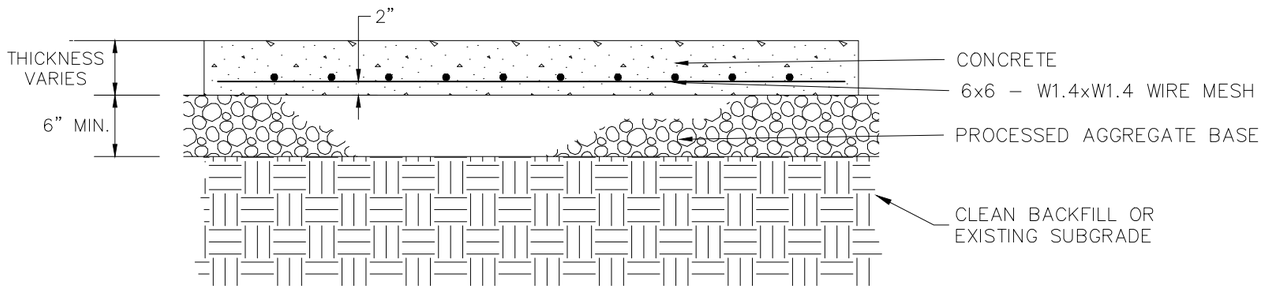
ALTERNATIVES ANALYSIS/REMEDIAL WORK PLAN
ENGINEERING CONTROL PLAN
2 LOVE ROAD

TOWN OF POUGHKEEPSIE NEW YORK

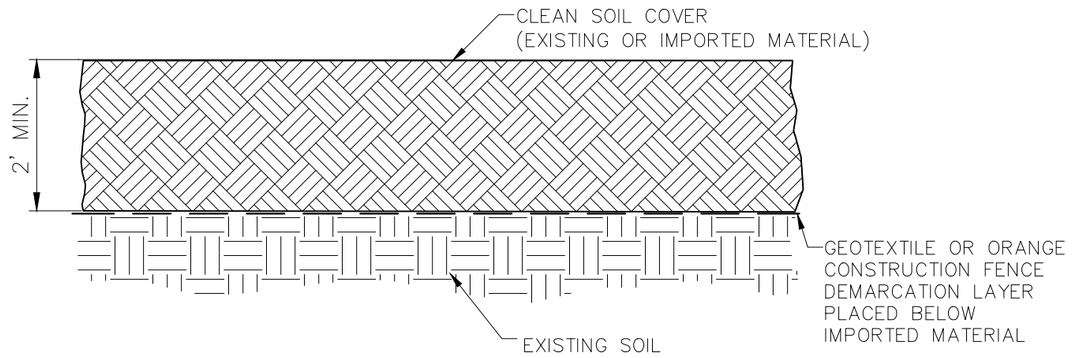
PROJ. No.: 20040761.A8N
DATE: JULY 2012

FIGURE 3



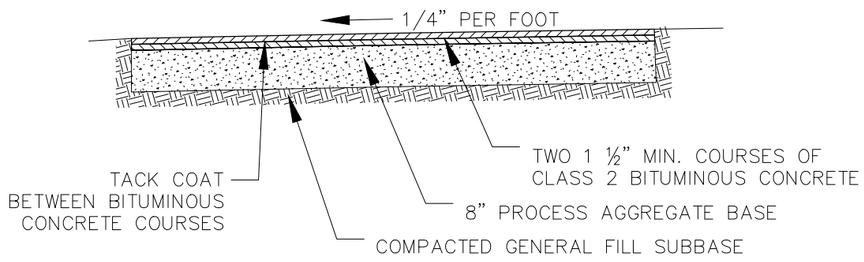
TYPICAL PORTLAND CEMENT CONCRETE COVER DETAIL

NOT TO SCALE



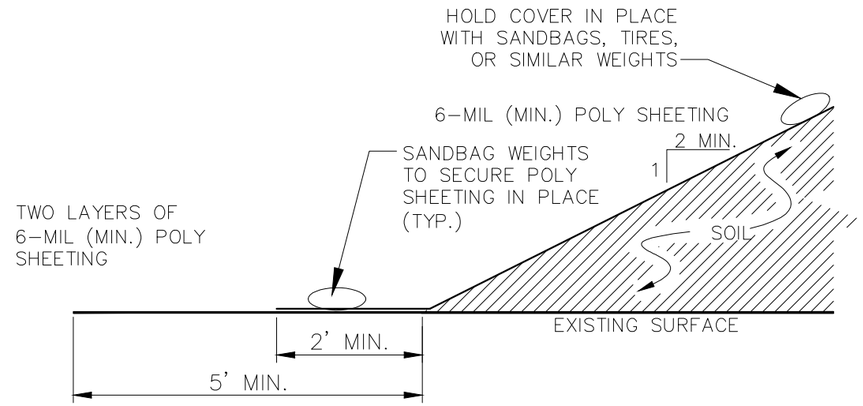
RESTRICTED RESIDENTIAL USE SOIL COVER DETAIL

NOT TO SCALE



TYPICAL BITUMINOUS CONCRETE COVER DETAIL

NOT TO SCALE



SOIL STOCKPILE

NOT TO SCALE

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:	GAT
CHIEF DESIGNER:	GAT
REVIEWED BY:	DATE

SCALE:
HORZ.: 1" = 60'
VERT.:
DATUM:
HORZ.:
VERT.:
0 30 60
GRAPHIC SCALE

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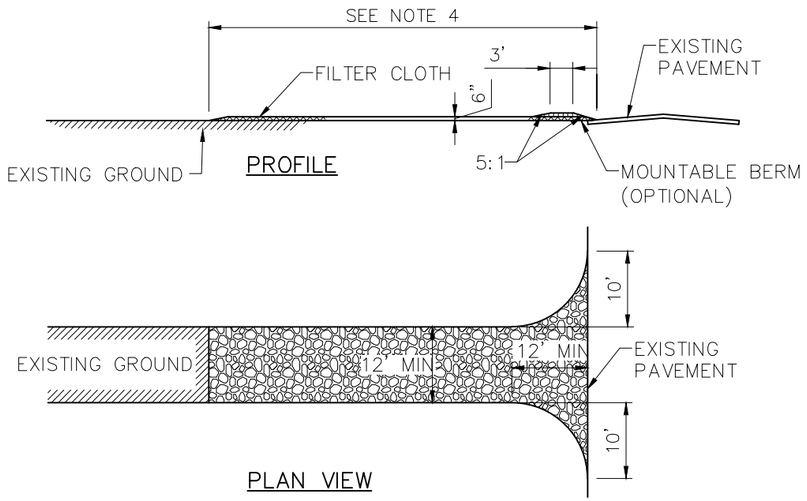
ENGINEERING CONTROL DETAILS SHEET 1
2 LOVE ROAD

TOWN OF POUGHKEEPSIE NEW YORK

PROJ. No.: 20040761.A8N
DATE: JULY 2012

FIGURE 4

CTB:
LMAN:
MS VIEW:
UCS:

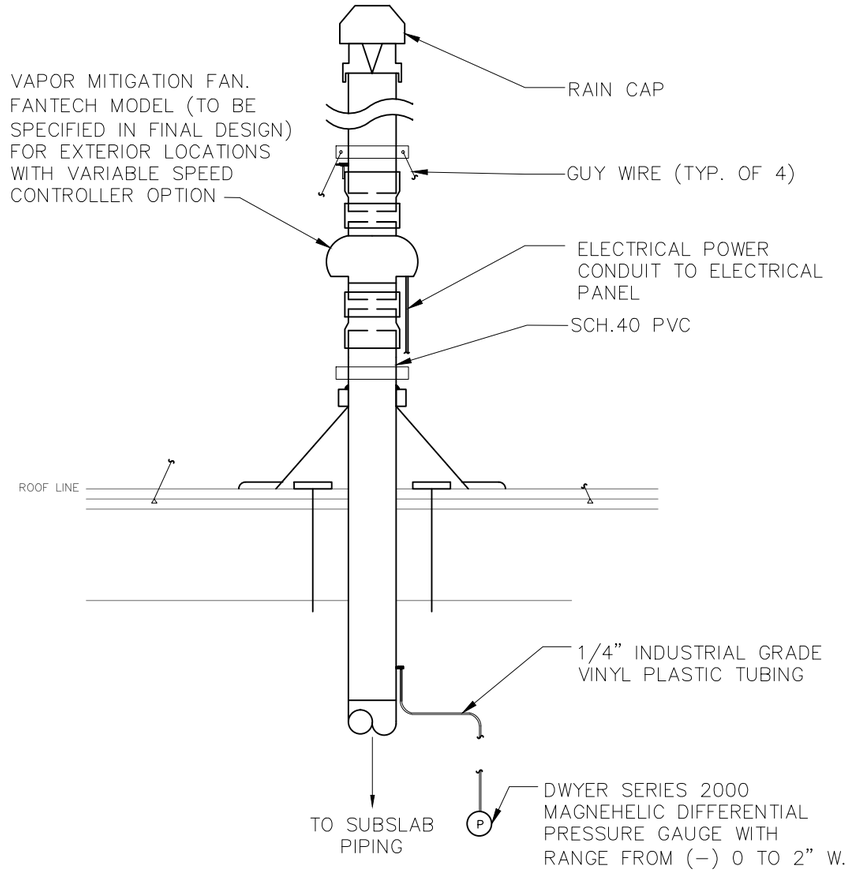


CONSTRUCTION ENTRANCE SPECIFICATIONS:

1. CONSTRUCTION ENTRANCE TO FIELD LOCATED AT A LOCATION ACCEPTABLE TO THE OWNER AND ENGINEER.
2. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY FOUR FEET (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. LENGTH – NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH WOULD APPLY).
6. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
7. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
8. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
9. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
10. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

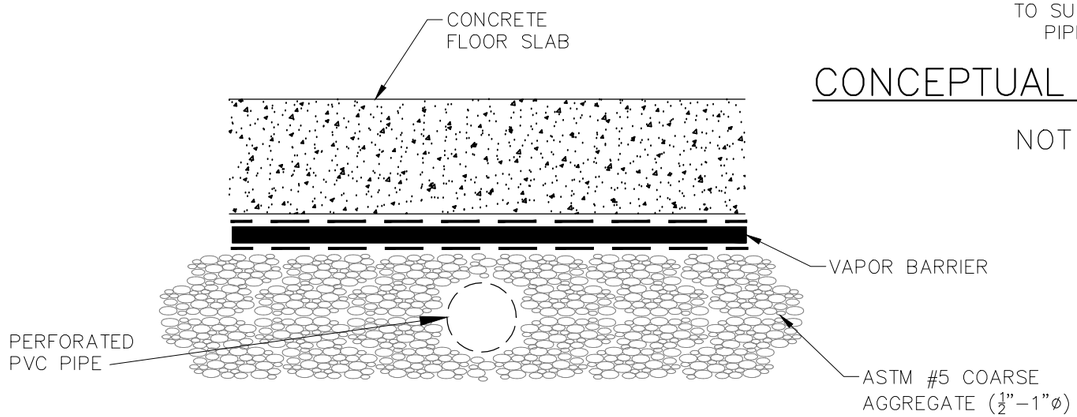
STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



CONCEPTUAL SSDS FAN DETAIL

NOT TO SCALE



CONCEPTUAL SUB–SLAB VENTILATION/VAPOR BARRIER CROSS SECTION

NOT TO SCALE

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:	GAT
CHIEF DESIGNER:	GAT
REVIEWED BY:	DATE

SCALE:
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VERT.:
DATUM:
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VERT.:
0 30 60
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ENGINEERING CONTROL DETAILS SHEET 2
2 LOVE ROAD
TOWN OF POUGHKEEPSIE NEW YORK

PROJ. No.: 20040761.A8N
DATE: JULY 2012

FIGURE 5

CTB:
LMAN:
MS VIEW:
UCS:

Appendix A

Order of Magnitude Opinion of Costs

Fuss & O'Neill

Order of Magnitude Opinion of Cost

Alternatives Analysis/Remedial Work Plan
2 Love Road

Remedial Approach 1: Excavate Impacted Fill exceeding Unrestricted Use Criteria, dispose of at permitted facility, and restore site to existing grade with clean fill.

Item No.	Description	Unit of Measure	Quantity[3]	Unit Cost	Extended Cost
	Construction Costs [1]				
1	Excavate 12' (average) below ground surface	cy	44,000	$15.00	$660,000
2	Transport & dispose of impacted material	ton	66,000	$90.00	$5,940,000
3	Restore Existing Grade w/ Clean Fill	cy	44,000	$24.33	$1,070,520
4	Monitoring Well Network (4 overburden monitoring wells)	LS	1	$4,000.00	$4,000
	Option 1 Total [2]				***$7,675,000***

This is an order of magnitude cost estimate that is expected to be within -30 to +50 percent of the actual project cost. Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions. Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

Revision Date: 10/12/2011	Prepared By: GT	Checked By: AZ

Notes:

1. Based on unit costs provided in a cost estimate for similar work.

2. Only includes construction costs, additional cost associated with oversight, reporting, and monitoring are assumed to be similar to other remedial approaches and therefore do not significantly impact the cost comparison.

3. Quantities based on an impacted area of 98,500 square feet, an average thickness of impacted material of 12', and an estimated density of impacted material of 1.5 tons/cubic yard.

Fuss & O'Neill

Order of Magnitude Opinion of Cost

Alternatives Analysis/Remedial Work Plan
2 Love Road

Remedial Approach 2: Excavate and dispose soil exceeding Groundwater Protection Criteria, Render Soil exceeding restricted residential Beneath a Cap Consisting of 2' Clean Soil

Item No.	Description	Unit of Measure	Quantity	Unit Cost	Extended Cost
	Construction Costs [1]				
1	Excavate 12' (average) below ground surface[3]	cy	650	$2.65	$1,723
2	Transport & dispose of impacted material	ton	975	$90.00	$87,750
3	Restore Existing Grade w/ Clean Fill	cy	650	$24.33	$15,815
4	Install Clean Soil Cover[4]	cy	875	$24.33	$21,289
5	Monitoring Well Network (4 overburden monitoring wells)	LS	1	$4,000	$4,000
6	SSDS[5]	LS	1	$50,000	$50,000
	Option 2 Total [2]				***$181,000***

This is an order of magnitude cost estimate that is expected to be within -30 to +50 percent of the actual project cost. Fuss & O'Neill has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions. Fuss & O'Neill's opinion of probable Total Project Costs and Construction Cost are made on the basis of Fuss & O'Neill's experience and qualifications and represent Fuss & O'Neill's best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but Fuss & O'Neill cannot and does not guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from opinions of probable cost prepared by Fuss & O'Neill. If prior to the bidding or negotiating Phase the Owner wishes greater assurance as to Total Project or Construction Costs, the Owner shall employ an independent cost estimator.

Revision Date: 5/29/2012	Prepared By: GT	Checked By: AZ

Notes:

1. Based on unit costs provided in a cost estimate for similar work.

2. Only includes construction costs, additional cost associated with oversight, reporting, and monitoring are assumed to be similar to other remedial approaches and therefore do not significantly impact the cost comparison.

3. Soil excavation quantity assumes groundwater encountered at 12'.

4. Final Development plans are uncertain at this time. If asphalt pavement or building slabs are proposed over the impacted areas, no additional cost would be required for the composite cover compared to standard construction costs. For the purposes of this cost estimate it is assumed that a demarcation layer and 2' of clean soil cover will need to be installed as the cover material over a 7,500 square foot area and an additional 1' of soil cover will need to be added to an existing 1 foot of clean soil over a 8,150 square foot area.

5. Final Development plans are uncertain at this time. Without a site plans and building plans we can not accurately estimate the need or cost for an SSDS. For the purposes of this cost estimate we have assumed a unit cost of $5/square foot and a 10,000 square foot building located in an area requiring an SSDS. Cost will vary based on size, construction, and location of any building constructed at the site.

Appendix B

BCP Sign Specifications

Program Name

Site Name
Site Number
Name of Party Performing Remedial Activities

Governor
Commissioner
Municipal Executive

Transform the Past.... Build for the Future

SIGNS FOR REMEDIAL PROGRAMS

Instructions

Signs are required at sites where remedial activities are being performed under one of the following remedial programs: State Superfund, Voluntary Cleanup Program (VCP), Brownfield Cleanup Program (BCP), Environmental Restoration Program (ERP), Brownfield Opportunity Area (BOA) Program (note: activities under this program would be for investigation). The cost of the sign will be borne by the parties performing the remedial activities based on the legal document the activities are being performed under (i.e. volunteers/participants would pay 100% of the cost under the BCP; municipalities would be reimbursed for 90% of the cost under the ERP).

Sign Requirements

Size: Horizontal format - 96" wide by 48" high

Construction Materials: Aluminum or wood blank sign boards with vinyl sheeting.

Inserts: "Site Name", "Site Number", "Name of Party Performing Remedial Activities" and "Municipal Executive".
Indicate position, size and topography for specific inserts.

Color Scheme: Copy surrounding DEC logo - "NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION" - PMS 355

DEC logo: PMS 301 Blue
PMS 355 Green

Text:

Program (choose one):	PMS 301
Brownfield Cleanup Program	
Voluntary Cleanup Program	
Brownfield Opportunity Areas Program	
Petroleum Remediation Program	
State Superfund Program	
1996 Clean Water/Clean Air Bond Act - Environmental Restoration Program	
Site Name, Site Number, Party Performing Remedial Activities	PMS 355
Names of Governor, Commissioner, Municipal Executive	PMS 301
Transform the Past.....Build for the Future	PMS 355

Type Specifications: All type is Caslon 540, with the exception of the logotype.
Format is: center each line of copy with small caps and initial caps.

Production Notes: 96" wide x 48" high aluminum blanks will be covered with vinyl sheeting to achieve background color. Copy and logo will be silk screened on this surface.

See attached format