REVISED Analysis of Brownfield Cleanup Alternatives

Former Don Miller Site
800 North Block of East Washington Avenue
Madison, WI 53703

Revised January 2013

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1 INTRODUCTION

The City of Madison Engineering Division and SCS Engineers have prepared this Revised Analysis of Brownfield Cleanup Alternatives (ABCA) for remediation of the 800 North Block of East Washington Avenue in Madison, WI, also referred to as the Former Don Miller site (the site). This revised ABCA addresses minor changes to the recommended cleanup alternative and addresses cleanup(?)progress made since the original ABCA was prepared in July 2012. The ABCA provides three alternatives to be evaluated for the future environmental remediation the site. The ABCA has been prepared as a requirement for a Wisconsin Department of Natural Resources Ready for Reuse grant and two U.S. Environmental Protection Agency (US EPA) brownfields cleanup grants. It provides an overview of site conditions, site cleanup objectives, and a review of remedial options.

The City of Madison purchased the 4.25-acre 800 North Block of East Washington Avenue in July 2011 with the intent to split the block into smaller parcels and sell off for private redevelopment. Alternative cleanup and environmental management activities considered for the site included the following:

1. No Action
2. Complete Soil Excavation and Off-Site Landfill Disposal
3. Targeted Soil Excavation with Engineered Barriers

The potential cleanup alternatives were evaluated based on the following criteria: effectiveness, implementation feasibility, remedial costs, and general reasonableness. Based on this analysis, the recommended cleanup alternative for the 800 North Block of E. Washington Avenue is targeted soil excavation and use of engineered barriers, such as buildings, asphalt, and concrete. This alternative will provide long-term effectiveness, is easily implemented, supports the City's sustainability goals, and will be significantly less expensive than complete excavation and off-site disposal of all impacted material. To be effective, the remediation will require close coordination among the City, the site's developer, and the Wisconsin Department of Natural Resources (WDNR) to ensure that impacted soil is either removed or capped using engineered barriers.

2 SITE DESCRIPTION AND HISTORY

2.1 Site Location and Description

The site is the Former Don Miller Car Dealership located on the 800 North Block of E. Washington Avenue, in Madison, WI. A detailed account of the site description and history can be found in the April 2011 All Appropriate Inquiries Phase 1 Environmental Site Assessment commissioned by the City of Madison. The City purchased the contaminant site as a Bona Fide Prospective Purchaser (BFPP) from East Washington, LLC and East Washington II, LLC in July 2011.

The 4.5-acre site is a former commercial and industrial property located in downtown Madison, WI, approximately one-half mile from the Capitol Square. The property is bounded by E. Washington Avenue to the southeast, N. Livingston Street to the southwest, E. Mifflin Street to the northwest, and N. Patterson Street to the northeast. Adjacent properties include Reynolds Park, the Water Utility's public supply well #24, Breese Stevens soccer field, Reynolds Transfer and Storage Company, the former Don Miller Subaru dealership (currently under redevelopment as a mixed use commercial/residential apartment building), various small commercial and industrial properties, and private residences. The entire block was identified as blighted in a July 12, 2005 Blight Determination Study prepared for the establishment of the Capitol Gateway Tax Incremental District #36.

The site consists of two parcels: 070913212159 and 070913212034. The property formerly included three vacant slab-on-grade buildings, a slab-on-grade building leased as an auto body shop, a vacant office trailer, and various small sheds. The vacant buildings and trailer were most recently used for automotive sales and repair. The buildings were demolished in October 2012 with only the concrete floor slabs and foundations remaining. The remainder of the property consists of an asphalt-covered parking area.

2.2 Site History

Prior to the City of Madison's purchase of the site, it was occupied by the Don Miller car dealership, and was used for automotive sales, rentals, and auto body repair and painting.

The site has been in commercial and industrial use since at least 1902, and historical uses have included a service station, machine shop, garage, auto sales, auto repair, spray painting, used auto parts, wrecking yard, solvent storage, and leather saddlery manufacturing. Prior to development, peat deposits in site soil borings indicate that the site was marshy and was subsequently filled.

Between 1983 and 1990, 16 underground storage tanks (USTs) were registered as closed/removed from both the site. Several of these tanks resulted in additional remedial activities, including three tank bed investigations enrolled in the Wisconsin Petroleum Environmental Cleanup Fund Award (PECFA). Remediation of the site's petroleum contamination to industrial standards was achieved through the use of soil excavation, pump and treat systems, soil vapor extraction systems, bioremediation injection systems, and natural attenuation. In addition, in these remediation zones, extensive soil and groundwater testing was performed. According to Don Miller, by 1990, the dealership had removed all known USTs on the property and no additional USTs have since been installed. All site investigations opened with the WDNR's Bureau for Remediation and Redevelopment Program have been closed. All were closed to industrial standards with residual soil and/or groundwater contamination.

2.3 Summary of Previous Studies

Prior to the City's purchase of the site, a block-wide Phase 1 Environmental Site Assessment (ESA) was completed by BT Squared, Inc in April 2011. After purchase of the site, a block-wide Phase 2 ESA was completed by SCS BT Squared, Inc. As part of the Phase 2 investigation, 26 direct push borings were taken ranging from 8 to 15 feet below ground surface (bgs). Borings were logged and sampled for soil and/or groundwater and analyzed for one or more of the following parameters: petroleum volatile organic compounds (PVOCs), additional volatile organic compounds (VOCs), diesel range organics (DRO), semivolatile organic compounds (SVOCs), and selected metals.

From the soil boring logs, the site geology consists of fill material to a depth of 4 to 6 feet bgs overlying peat to 6 to 8 feet bgs, with clay below the peat. The fill material is generally silty sand containing varying amounts of coal fragments, coal cinders, glass, and red brick fragments. Depth to groundwater is shallow and varies from 6 to 9 feet across the site.

The soil analytical results show that the entire block contains soil and fill materials with widespread PVOCs, SVOCs, and metals contamination. The contamination is associated the site's ash-contaminated historical fill and former underground storage tanks. DRO and PVOC contamination was detected above NR 746 direct contact standards, primarily in the location of former tank beds. SVOC contamination was detected above the WDNR's Consensus-Based Sediment Quality Guidelines generic residual contaminant levels (RCLs). Specifically, SVOC levels were above groundwater, industrial direct contact, and non-industrial direct contact RCLs throughout the site. The SVOC contamination is related to the pervasive coal/cinder ash deposits observed at all soil boring locations in the site's 4 to 6 feet of historic fill. Metals, specifically arsenic, lead, and cadmium were detected above NR 720 industrial and non-industrial direct contact RCLs, and were associated with historic fill, tank beds, and former manufacturing activities. Groundwater was detected above NR 140 enforcement standards for PVOCs in two borings.

SVOC and metal contamination related to contaminated historic fill was found primarily between the ground surface to approximately 6 feet bgs. PVOC contamination in select areas extends deeper, likely below the shallow water table. Given the intermingled nature of the site's contamination, it will be difficult during excavation of the site to differentiate between clean and contaminated material. As a result, it is anticipated that a majority of material removed from the site during redevelopment will require management as a solid waste.

To aid in the site's redevelopment, the Phase 2 ESA recommended the following work. The City should demolish all buildings on site to allow for excavation of SVOC and petroleum contaminated materials not accessible during previous excavations. The demolitions will also mitigate environmental concerns related to the actual buildings, such as asbestos and lead-based paint. After demolition, the City should focus excavation activities on previously inaccessible petroleum contaminated soil. Depending on the redevelopment plan, areas with lower levels of soil contamination can be addressed with excavation or a protective barrier. The protective barrier may include pavement, buildings, or 2 feet of clean fill. The Phase 2 ESA also recommended creating a Material Management Plan to coordinate the soil excavation and potential groundwater dewatering.

3 ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

3.1 Cleanup Goals and Objectives

The cleanup goal for the site is to perform sufficient remediation to allow for its sale and private redevelopment into a mixed-employment/residential/retail space. The objectives are to eliminate exposure pathways using WDNR-approved remedial actions that are economical and achieve the goal of redevelopment. The City of Madison is currently requesting proposals from developers interested in redeveloping the property consistent with the City's planning documents for the neighborhood. It is anticipated the proposed redevelopment plan will require the demolition and removal of the site's remaining pavement, concrete and a sizable amount of SVOC, PVOC, and metals contaminated soil.

The City intends to work closely with the selected developer to coordinate remediation of the block in the most economical and environmentally efficient way possible. The City has been awarded a $400,000 WDNR Ready for Reuse grant to be used on the entire block. In addition, the City has also been awarded a $200,000 USEPA grant to be used on the north half of the block, and a $200,000 USEPA grant for the south half of the block. In total, the City will receive $800,000 of state and federal brownfields funds for remediation of the property.

The City has targeted the use of the USEPA funds for soil excavation in the areas of the three former LUST investigations. In addition to this work, the City proposes to use the WDNR Ready for Reuse funds for demolition and additional soil excavation on site.

3.2 Exposure Pathways

Phase 2 ESA borings have identified that subsurface soil and groundwater are in exceedance of NR 140, NR 720, NR 746, and the WDNR's Consensus-Based Sediment Quality Guidelines. Presently, the block's buildings, asphalt, and concrete cap this contamination, virtually eliminating public exposure. However, the remediation and redevelopment of the block will present the following potential exposure pathways:

- Direct contact with contaminated soil, groundwater, and asbestos containing materials
- Ingestion of contaminated soil and groundwater
- Inhalation of contaminated soil, soil gas, and asbestos containing materials

Contaminated material on site includes subsurface soils, groundwater, soil gas, and asbestos containing material associated with the site's deteriorating buildings. Exposure routes include direct contact with contaminated material (ACM), ingestion of contaminated soil or groundwater, and the inhalation of contaminated soil gas, soil particulates, and ACM. Ingestion of groundwater is not considered a completed exposure pathway due to the groundwater use restriction associated with the property at the time of closure. Residents and tenants of the site will be served by the City's municipal water supply. Potential future receptors include nearby residents, citizens accessing the adjacent right of way, citizens utilizing the adjacent Reynolds Park, site remedial workers, site construction workers, utility workers, City of Madison staff, and commercial and residential users of the site.

3.3 Relevant Cleanup Laws and Applicable Standards

Relevant cleanup requirements for the site are identified below:

- Wisconsin Administrative Code (WAC), Chapter NR 720 Residual Contaminant Level
- WAC, Chapter NR 746 Risk Screening and Closure Criteria for Petroleum Product Contaminated Sites, and Agency Roles and Responsibilities
- WAC, Chapter NR 140 Groundwater Quality
- WDNR, Consensus-Based Sediment Quality Guidelines, Recommendations for Use, and Application Interim Guidance (WT-732, December 2003)
- Chapter 292 – Remedial Action, Wisconsin State Statutes

3.4 Identification of Potential Cleanup Alternatives

Based on the Phase 2 ESA soil and groundwater sampling results, three potential cleanup alternatives were evaluated for the site:

1. No Action
2. Complete Soil Excavation and Off-Site Landfill Disposal
3. Targeted Soil Excavation with Engineered Barriers

Alternative #1 - No Action

This alternative would involve no remedial activities at the site, leaving it in its current condition.

Alternative #2 – Complete Soil Excavation and Off-site Landfill Disposal

This alternative includes the excavation and off-site disposal of all impacted soil at an off-site landfill. Impacted soil would be excavated, temporarily stockpiled if necessary, loaded into trucks, and transported to a licensed landfill. Backfill from off-site sources would be brought into the site to raise the grade following removal of impacted soils.

The cost estimate below assumes that 40% to 60% of the material between the depth of 0 to 6 feet bgs is impacted by contaminated historic fill and would require off-site disposal. Deeper excavation would be required in select petroleum-contaminated areas. While it is possible less material would require excavation, the boring logs demonstrate the difficulty of separating clean fill from contaminated fill at the time of excavation. Coal and cinder ash-contaminated materials are pervasive, vary in thickness, and are intermingled with PVOC and metal contamination across the site.

Potential nearby landfills include the Dane County Rodefeld Landfill and the Waste Management Madison Prairie Landfill in Sun Prairie, Wisconsin. Discussions with both landfills indicate that the levels of SVOCs in the waste would require it to be landfilled, rather than applied as daily cover or allowed to degrade in a biopile.

Alternative #3 – Targeted Soil Excavation with Engineered Barriers

This alternative assumes that proposed buildings will be constructed with advanced foundation systems, like geopiers or pilings, through the contaminated fill. The proposed site improvements would be used as engineered barriers over impacted soils to address direct contact concerns. Examples of engineered barriers include buildings and pavement. Engineered barriers that do not consist of hardscapes (e.g. buildings or pavement) will be capped with clean fill as required by the WDNR.

Based on this plan, the excavation of impacted fill material will be targeted to the most grossly contaminated areas, as well as ash-contaminated soil near the surface that will require removal for construction of building floor slabs and paved areas. Specifically, Ready for Reuse funds will be used to demolish all aboveground improvements on site that overlie soils targeted for excavation. If the redevelopment plan is not ready for immediate implementation following cleanup activities the site will be graded to drain and temporarily seeded with an appropriate grass seed mix.

3.5 Evaluation of Cleanup Alternatives

Potential cleanup alternatives were evaluated based on the following criteria: effectiveness, implementation feasibility, remedial costs, and general reasonableness.

Alternative #1 - No Action

- *Effectiveness* – The No Action Alternative is not effective because it does nothing to address the toxicity, mobility, or volume of contamination on site. It also constrains and potentially eliminates any practical redevelopment. The only benefit is that by not removing the current building and asphalt cap, there is minimal chance of future exposure to the contamination.
- *Implementation Feasibility* – This alternative is easily implemented.
- *Remedial Costs* – There is no cost for this alternative.
- *General Reasonableness* – This alternative provides no long-term management of the site's contamination and effectively prohibits site development. As a result, this is not a reasonable cleanup option.

Alternative #2 – Complete Soil Excavation and Off-site Landfill Disposal

- *Effectiveness* – Complete excavation and off-site disposal of all impacted soil provides the most long-term effectiveness by permanently removing all contamination. This alternative would ensure that future redevelopment of the site would not encounter any residual contamination, thereby eliminating future exposure pathways.
- *Implementation Feasibility* – This alternative may be implemented through a standard public works contract and is not technically complicated. It will require demolition of all structures on site. Assuming 40% to 60% of all excavated material will require off site landfill disposal, 26,000 to 39,000 tons of material will be hauled to a nearby landfill. An excavation of this size would likely take months and require 900 to 1,300 dump truck loads to the landfill.

- *Remedial Costs* – A breakdown of estimated costs for complete excavation of all contaminated material is included below. This assumes that 40% to 60% of all material excavated between 0 and 6 feet bgs will require off-site landfill disposal.

Activity	Price - low (40% off-site disposal)	Price - high (60% off-site disposal)
Building Demolition	$ 50,000	$ 50,000
Soil Excavation and Restoration	$ 483,000	$ 686,000
Landfill tipping Fee	$ 650,000	$ 975,000
Environmental Consulting	$ 50,000	$ 50,000
Total =	$ 1,233,000	$ 1,761,000

- *General Reasonableness* – Both economic and environmental factors make this option unreasonable. Economically, it makes most sense to excavate the least amount of contamination necessary to eliminate exposure pathways and threats to the environment and human health. Based on the site design, a significant portion of the contamination can be effectively managed on site through engineered barriers. In addition, the environmental impact of unnecessarily hauling and landfilling 26,000 to 39,000 tons of contaminated soil does not support the City of Madison Sustainability Plan goal to minimize solid waste from entering our area landfills.

Alternative #3 – Targeted Soil Excavation with Engineered Barriers

- *Effectiveness* – Targeted soil excavation and use of engineered barriers option would provide long-term protection to human health and the environment as long as the barriers are competent and maintained. Soil excavation must target the areas with the most likely exposure pathways, such as vapor intrusion and direct contact.
- *Implementation Feasibility* – This alternative may be implemented through a standard public works contract and is not technically complicated. To be most effective, it will require coordination with the site developer for construction of the engineered barriers. Like the previous option, all site buildings will require demolition to reach underlying soil contamination. Demolition and targeted soil excavation can likely be accomplished in 1 to 2 months. Contaminated soil can be hauled to a nearby landfill for disposal. Final capping of the site with engineered barriers will occur with the site redevelopment.
- *Remedial Costs* – A breakdown of estimated costs for targeted excavation of contaminated material is included below. This option assumes that the engineered barriers will be installed after the City sells the property to a private developer. As a result, engineered barrier cost estimates are not provided here.

Activity	Unit Cost	Quantities	Costs
Building Demolition and Asbestos Abatement	$ 55,000	--	$ 55,000
Soil Excavation and Restoration	$20/ton	18,500 tons	$ 370,000
Landfill tipping Fee	$27/ton	18,500 tons	$ 499,500
Environmental Consulting			$ 43,500
		Total =	**$968,000**

- *General Reasonableness* – Based on the City of Madison Capitol Corridor plan a significant portion of the site will be covered with buildings, parking ramps, asphalt, and concrete. The most economical remediation of the site utilizes these barriers to address concerns with direct contact. This alternative takes advantage of these barriers, while still allowing for the excavation and off site disposal of contamination where removal is required for protection of human health and the environment.

Recommended Cleanup Alternative

The recommended cleanup alternative for the 800 North Block of E. Washington Avenue is targeted soil excavation and use of engineered barriers. This alternative will provide long-term effectiveness, is easily implemented, supports the City's sustainability goals, and will be significantly less expensive than complete excavation and off-site disposal of all impacted material. To be effective, the City will need to partner close with the site's developer to ensure that impacted soil is either removed or capped using engineered barriers.