



www.archenvgroup.com
healthAIR - Industrial Hygiene Services
cleanWATER - Consulting & Testing Services
safeEARTH - Hazardous Waste & Recycling Services

MEMORANDUM

TO:	Joseph Corace Southfield Public Schools
FROM:	Ann O'Brien
DATE:	June 24, 2024
RE:	Southfield Public Schools Transportation and Maintenance Facility Frequently Asked Questions (FAQs) – Remediation Activities to Address Petroleum Fuel and Chlorinated Solvents Contamination

Mr. Corace:

This memo provides a series of Frequently Asked Questions (FAQs) and Answers pertaining to remediation activities planned to address petroleum fuel and chlorinated solvents contamination present at the Southfield Public Schools (SPS) Transportation Facility. It is being prepared at the request of SPS following a recent Board of Education Meeting held on June 13, 2024. The Board Meeting confirmed the district's remedial clean-up decision to inject a biological enhancement compound, at the SPS Transportation and Maintenance Facility.

MEMORANDUM

Joseph Corace

June 24, 2024

Southfield Public Schools Transportation and Maintenance Facility

Frequently Asked Questions (FAQs) – Remediation Activities to Address Petroleum Fuel and Chlorinated Solvents

Page 2

What contamination is present at the Transportation and Maintenance Facility?		<i>A Petroleum release occurred due to a leaking underground storage tank containing diesel fuel which was located outside of the bus garage, this is under the Michigan’s Part 213 rules. Additional a Tetrachloroethylene (PCE) are contaminants present inside the bus garage this is under the Michigan Part 201 rules.</i>
How does the injection treatment work?	<i>PCE</i>	<i>The PCE contaminant in the bus garage is a molecule with four chlorine atoms attached to carbon. The treatment would utilize 3D-Micoremulsion, S-MicorZVI and Bio-Dechlor Inoculum Plus to address the PCE contamination. These products are designed to help the naturally occurring bacteria break these chlorine bonds, which effectively destroys the contaminant molecule. This process of destroying the molecule creates the non-hazardous byproducts of carbon dioxide, chlorine ions, and ethene in the process.</i>
	<i>Petroleum</i>	<i>The petroleum hydrocarbon contaminant is present in the parking lot area. These contaminant molecules are made up of only hydrogen and carbon. Petrofix is designed to break the hydrogen and carbon bonds and rebind them into non-hazardous carbon dioxide and sodium bisulfate, which is basically another form of salt. The PetroFix is a liquid form of carbon that, once injected, totally covers the subsurface in carbon particles. These carbon particles have a strong affinity for the petroleum hydrocarbon molecules, so as these contaminants are moving through the aquifer, the carbon will grab them. Once stopped from moving, the naturally occurring petroleum consuming bacteria in the subsurface will degrade the hydrocarbons into carbon dioxide. The PetroFix barrier application is best described as turning the ground into a water filter, dirty water goes in, and clean water comes out the other side.</i>
How big of an area requires treatment?	<i>PCE</i>	<i>The estimated treatment area is approximately 3,750 square feet under the bus garage, with the total volume of 5,139 gallons of compounds to be injected. Refer to the attached map for the area of injection.</i>
	<i>Petroleum</i>	<i>Based on an estimated area of impacted soil, which is approximately 5,600 square feet in the source area (the former location of the Underground Storage Tanks (USTs)), and approximately 135 feet of PetroFix barrier along the eastern property line, totaling a 5,735 area, with a total of 11,025 gallons applied to the source area, and 9,730 gallons along the barrier wall. See the attached map, for the location of the Injection.</i>
What is the treatment cost?	<i>PCE</i>	<i>The application and product cost in the bus garage area for the first injection would be approximately \$103,000. Cost to write the Part 201 Response Activity Plan and provide oversight for quarterly sampling activities (4 quarters of vapor pin sampling, including labor, analytical costs and mileage) following the injection is approximately \$123,000. A second injection may be required to address the Part 201 release, increasing the cost by an additional \$75,000. Total estimated cost: \$226,000 - \$301,000.</i>
	<i>Petroleum</i>	<i>The application and product cost for the parking lot area (the UST release location) and barrier wall would be approximately \$157,000. Cost to provide oversight for sampling activities (four (4) quarterly groundwater sampling of 12 monitoring wells, and one soil boring per year, including labor, analytical costs and mileage) following the injection is approximately \$21,500. A second injection may be required to address the Part 213 release, however, increasing the cost by an additional \$52,000. This will be evaluated after the monitoring period. Total estimated cost: \$178,500 - \$230,500.</i>

MEMORANDUM

Joseph Corace

June 24, 2024

Southfield Public Schools Transportation and Maintenance Facility

Frequently Asked Questions (FAQs) – Remediation Activities to Address Petroleum Fuel and Chlorinated Solvents

Page 3

What is the timing for treatment?	<i>PCE</i>	<i>AEG will submit a Response Activity Plan to EGLE Part 201 division to review the injection option and request approval. Currently, Part 201 does not impose deadlines for cleanup activities to be completed. The Part 201 does not have a timeline in when they need to respond, however, they typically respond before 6 months. Once approved, AEG will work with the SPS and determine the most cost-effective solution to minimize downtime at the Bus Garage and Parking area to install the injection plans with the least amount of disturbance to the daily operations at the bus garage. After initial injection, the enhanced aerobic biological activity will need a minimum of six (6) months before this injection can be successfully evaluated. It is possible a second injection may be needed. A 1.5-year time frame will be used to evaluate the injection system which includes a minimum of four (4) quarters of sampling. This is based on EGLE requirements for monitoring, and the recommendations from Regenesis on how the product works.</i>
	<i>Petroleum</i>	<i>In approximately 6 months, EGLE will have reviewed and approved SPS's remediation plan. At this point, treatment may commence. After initial injection, the enhanced aerobic biological activity will need a minimum of six (6) months before this injection can be successfully evaluated. A second injection may be required. Based on concentrations after injections, an evaluation will be needed to determine what levels the compounds of concern are at. A 1.5-year time frame will be used to evaluate the injection system which includes a minimum of four (4) quarters of sampling. This is based on EGLE requirements for monitoring, and the recommendations from Regenesis on how the product works. Once the plume is stable to decreasing AEG will move forward with submittal of a closure report.</i>
Is any of the cost going to be paid by the State?		<i>Yes. Soil remediation activities are automatically approved by the Michigan Underground Storage Tank Authority (MUSTA) for Part 213 only. The Part 201 activities are not MUSTA eligible for reimbursement.</i>
Why is clean-up necessary?		<i>Based on contaminated soil and groundwater the workers inside the bus garage could be impacted by the volatilization of indoor air contaminants. If soil was excavated/removed potential construction workers could have direct impact with soil. The current groundwater contamination remains on site; however, corrective action is being required so impacted groundwater doesn't reach the "sensitive habitats" that are associated with the wetlands and/or aquatic species that are associated with wetlands and flood plains adjacent to the Evans Branch of the Rouge River which is located approximately 180 feet east of the site. Currently no soil and/or groundwater impact has left the property.</i>
Where did the contamination come from inside the building?		<i>The soil vapor inside the bus garage under the Bus Maintenance Building is not from the release from the diesel underground storage tank. It's possible the contamination arose from bus cleaning and degreasing operations that are conducted in that part of the building. Historically, the rinse water from these washing activities was typically discharged into drains in the floor which are connected to an oil water separator system prior to discharge. The current practice is the rinse water and washing activities, are now stored in a used oil tank above ground and is picked up for waste disposal.</i>

MEMORANDUM

Joseph Corace

June 24, 2024

Southfield Public Schools Transportation and Maintenance Facility

Frequently Asked Questions (FAQs) – Remediation Activities to Address Petroleum Fuel and Chlorinated Solvents

Page 4

<p>What is the history of this product and are they safe to use?</p>	<p><i>PCE</i></p>	<p><i>None of the products associated with the biological injection system have ingredients identified as hazardous according to OSHA 29 CFR 1910.1200.</i></p> <p><i>PersulfOx was introduced in the mid-2010s and is aimed at mass reduction and destruction of contaminants in both soil and groundwater. The product is easy to handle but requires some safety precautions to ensure its potential exposure pathways are limited. The product is a fine white powder that is mixed with water and injected. During the mixing process, a particulate mask is worn to prevent accidental inhalation of dust. Once mixed with water the product is alkaline in nature, so rubber boots are worn by field staff to ensure organic materials (leather, cotton, etc) are not degraded if they encounter the product. If contact does occur, a simple rinse with clean water will mitigate any possible effects. The product is injected, and the oxidative aspects of the product are consumed, leaving behind harmless sulfosalts, water, and carbon dioxide as byproducts.</i></p> <p><i>3DME was introduced in the mid 2000’s and is food grade with minimal safety concerns. It is a white liquid with an oily consistency that is mixed with water and injected directly into the subsurface. The product is designed to reduce chlorinated solvent contaminants to a non-hazardous ethene byproduct.</i></p> <p><i>S-MicroZVI was introduced in 2019 and is also food grade with minimal safety concerns. The product is designed to reduce chlorinated solvent contaminants to a non-hazardous ethene byproduct. The only harmful exposure pathway is via direct contact with the eyes but is easily mitigated by normal PPE (safety glasses). It is coapplied into the same injection locations as the 3DME.</i></p> <p><i>BDI Plus is a bacterial culture population that specializes in chlorinated solvent degradation. The product is a tan liquid shipped in a pressurized keg that is kept on ice during the injection process. The only harmful exposure pathway is inhalation of the product during the mixing process. This exposure pathway is mitigated by the injection crew never coming in direct contact with the product, it is introduced directly to the injection equipment with no outside handling of the product necessary.</i></p> <p><i>All the products proposed for use at the Southfield School site have been used on federal and state regulated sites, military bases, and private sites. These are some of our most used products.</i></p>
	<p><i>Petroleum</i></p>	<p><i>None of the products associated with the biological injection system have ingredients identified as hazardous according to OSHA 29 CFR 1910.1200.</i></p> <p><i>PetroFix was introduced in 2017 to our product lineup. The product is aimed at reducing and eliminating petroleum contaminants in groundwater. The product is food grade and there are minimal safety and handling concerns associated with its use. It’s directly injected into the subsurface in a line to create a below ground permeable barrier system. The product is chemically inert and utilizes microscopic absorptive forces to contain the contaminants as the groundwater moves through the permeable reactive barrier.</i></p> <p><i>All the products proposed for use at the Southfield School site have been used on federal and state regulated sites, military bases, and private sites. These are some of our most used products.</i></p>

MEMORANDUM

Joseph Corace

June 24, 2024

Southfield Public Schools Transportation and Maintenance Facility

Frequently Asked Questions (FAQs) – Remediation Activities to Address Petroleum Fuel and Chlorinated Solvents

Page 5

<p>Is our water safe now to use and could it become unsafe due to the treatment?</p>	<p><i>The site currently has a restriction for no drinking water wells located near the source area and in the future, this may be increased to include a wider area on the school property. This is not an immediate current risk, since the groundwater on the site is considered shallow groundwater, and SPS is connected to municipal water. The nearest drinking water well is located approximately 2,360 feet northwest of the site. This well is set at a depth of 100 feet below grade and the well screen is at approximately 100 below grade as well. This is significantly below the documented groundwater impact at the site. Therefore, the migration of groundwater off-site to the potable well is very unlikely.</i></p> <p><i>Any geochemical changes that come from the products planned to be utilized at the site are temporary and will have no negative effects on the wider area’s groundwater quality. The products are designed to be minimally dispersive beyond the anticipated radius of influence (ROI) of each injection location. AEG will continue to monitor the groundwater monitoring wells on Site to verify the groundwater plume is shrinking or stable to make sure to be protective of human health and the environment.</i></p>
---	---

MEMORANDUM

Joseph Corace

June 24, 2024

Southfield Public Schools Transportation and Maintenance Facility

Frequently Asked Questions (FAQs) – Remediation Activities to Address Petroleum Fuel and Chlorinated Solvents

Page 6

Please let me know if you have any questions or need further information.

Regards,

Arch Environmental Group, Inc.
Environmental Services

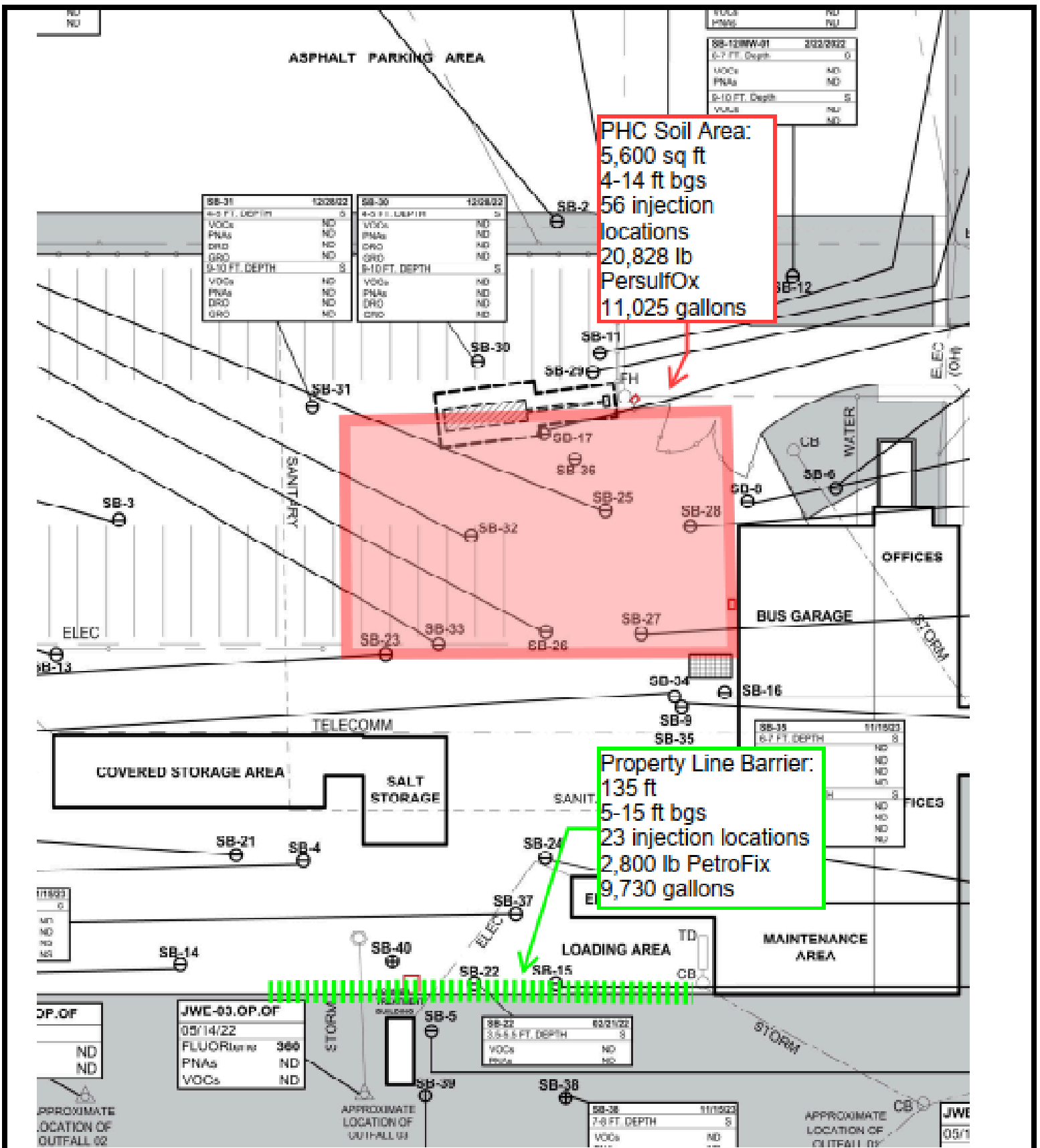


Ann O'Brien

Environmental Consultant III, Project Geologist

Southfield Public Schools 24661 Lasher Road,
Southfield, Michigan

MAPS



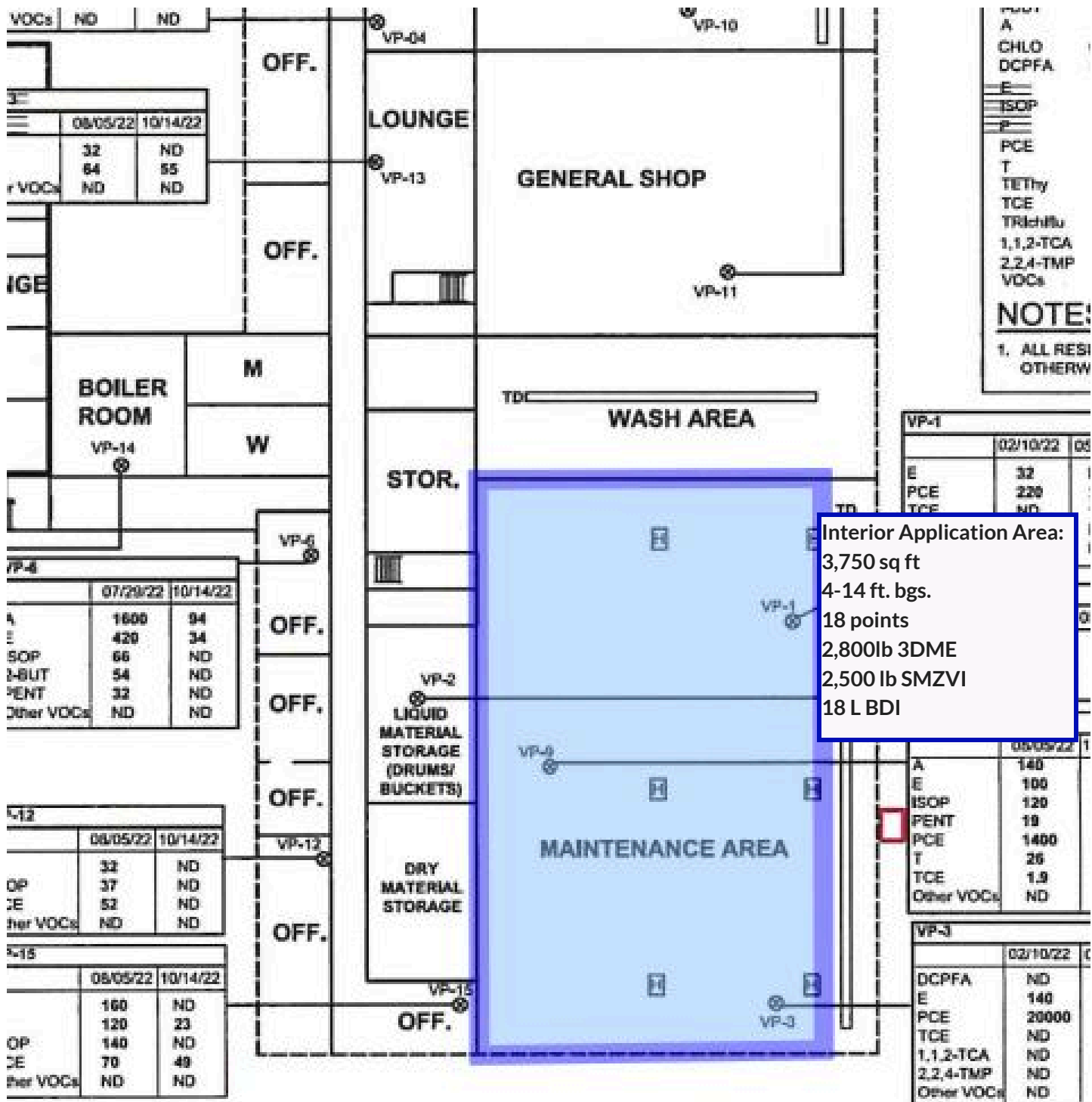
Southfield School Transportation

Arch Environmental Group

Not yet submitted

Figure 1- Parking Lot Treatment Area Map





**OUTHFIELD PUBLIC SCHOOLS-TRANSPORTATION FACILITY
 INITIAL ASSESSMENT REPORT**

1661 LAHSER ROAD
 OUTHFIELD, MICHIGAN 48075

**VAPOR PORT LOCATIONS
 VOC RESULTS**

DRAWN: CCD
 REVIEWED: RK
 DATE: 11/11/2023

Southfield School Transportation

Arch Environmental Group

March 01, 2024

Figure 1 - Bus Garage Treatment Area Map

