A3 Environmental, LLC
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March 18, 2024

Illinois Environmental Protection Agency
Bureau of Land - #24
Leaking Underground Storage Tank Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

Attention: Ms. Jennifer Rossi
Project Manager, Leaking Underground Storage Tank Section

Subject: Conditional Approval – Response to Comments
Corrective Action Plan
108 North Route 83
Lake Villa, IL 60046
LPC No.: 0970845045

Dear Ms. Rossi:

A3 Environmental, LLC (A3E) on behalf of The Lake Villa Community Consolidated School District 41 is pleased to submit this response to comments for your review and approval. This letter was prepared to respond to comments provided in your email dated July 19, 2023 and to include additional information regarding the proposed engineered barrier conditionally approved on November 9, 2022.

1.0 Response to Comments

Below, A3E has provided each comment from the Illinois EPA, followed by our response:

Comment 1 – *For lead contamination, the pH listed in the RBCA equations is 8.4. If this the correct pH for the site (with lab reports) then the pH specific CUO of 107 can be used and lead would no longer be a constituent of concern…*

> **A3E Response** – The pH value of 8.4 originated from a composite sample identified as "pH" that was taken during a prior investigation. This sample is a composite sample containing soils from multiple unknown locations at the site, and therefore is not representative of that sample specifically. Based on this information we will assume that the pH of the soil containing elevated lead concentrations remains unknown, and lead will remain a constituent of concern.

Comment 2 - *The point of compliance is the opposite side of Milwaukee Avenue therefore, the Sw should be measured to eastern ROW of Milwaukee Avenue instead of the eastern property boundary.*

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A3E Response – A3E has revised the Sw for the constituents that are not horizontally delineated to correct for the compliance point (ethylbenzene and xylenes). The new Sw is 165' (South boundary to the eastern ROW of Milwaukee Ave). The revised models can be referenced in Attachment B. Please note that the estimated distance of migration is still less than one foot from the source, and therefore does not change the conclusion.

2.0 Engineered Barrier Details

In the Corrective Action Plan submitted by A3E in July 2022 and conditionally approved by the IEPA on November 9, 2022, the following engineered barrier was proposed:

An engineered barrier, in the form of asphalt, in accordance with 35 IAC 742.1105(c)(2)(C), that shall be maintained to prevent exposure to the soils exceeding the Tier I inhalation exposure pathways.

A3E is providing the following specifications for your review and approval.

The proposed asphalt barrier will be constructed with the following scope of work, at a minimum:

- Excavation and grading of existing surface soils to a minimum of 8.5" below ground surface, to be disposed of at an off-site Subtitle D landfill;
- Installation of approximately 6" of compacted virgin limestone aggregate; and
- Installation of approximately 2.5" of hot-mix N50 asphalt.

A figure depicting the proposed engineered barrier location is provided in Attachment A.

We hope the above referenced information meets with your approval. Please call Patrick Hook or Colleen Stull at 630-507-9002 with any questions you may have on any of the above referenced information.

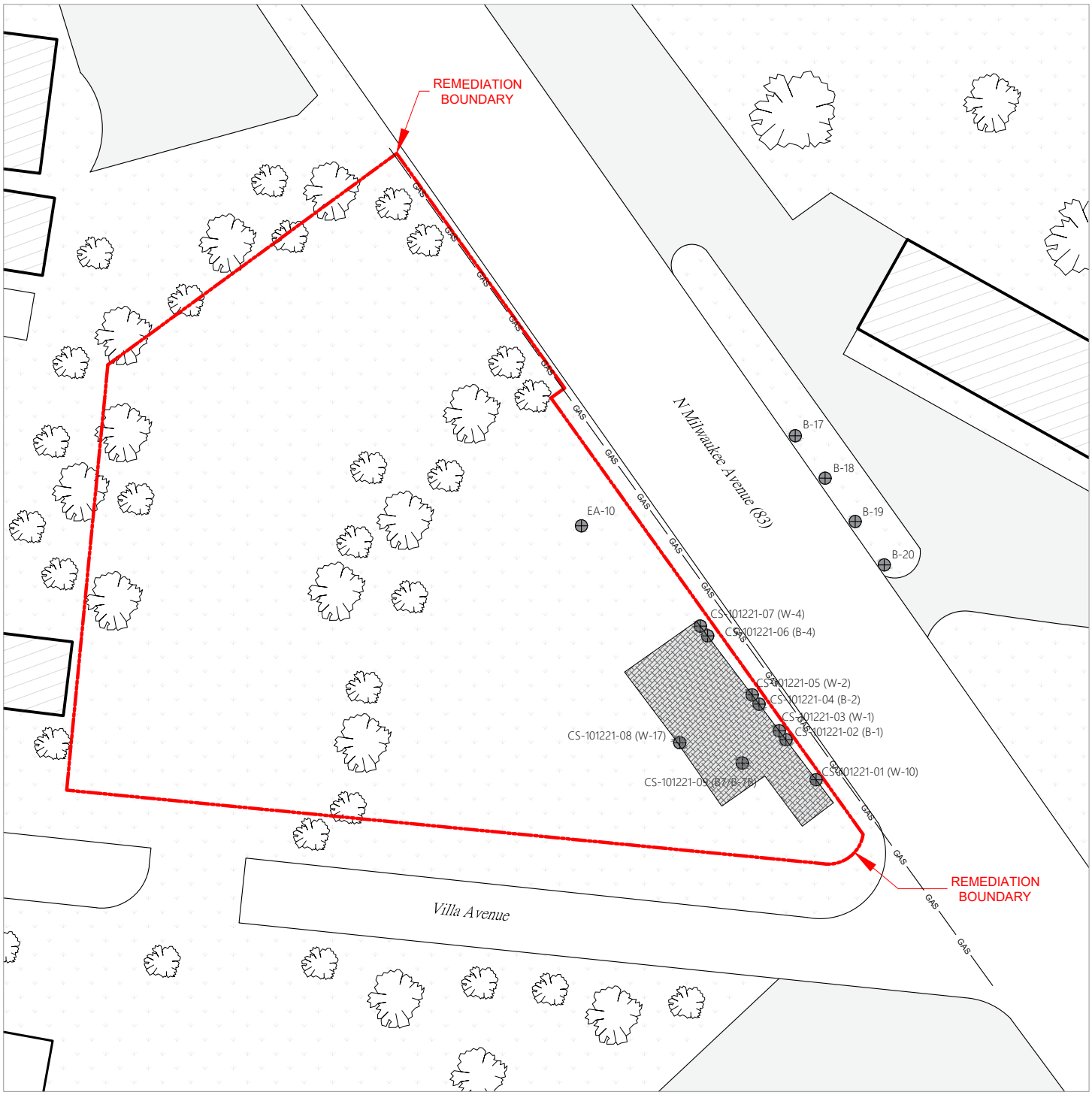
Respectfully,

Colleen Stull
Senior Project Manager

Patrick Hook, P.G.
Lead Consultant

Attachments:

A – Engineered Barrier Map
B – Revised R-26 Model



Imagery Adopted from Google Earth Pro
Parcel Data from Report All

Scale 1" = 60'

30' 0 60'

FIGURE 1
Proposed Corrective Action Map

Legend

- Remediation Boundary
- Soil Sample
- W-# Historical Wall Sample
- B-# Historical Bottom/Floor Sample
- CS-# October 2021 Sample
- GAS Apx Location of Gas Line
- Asphalt Barrier

Site Location	Pleviak School 108 N Milwaukee Avenue, Lake Villa, IL 60046
Client	Lake Villa School District 41 131 McKinley Avenue, Lake Villa, IL 60046

A3 Environmental Consultants
3030 Warrenville Road, Suite 418, Lisle, IL 60532
Phone: 888-405-1742

Project No.	2021.0520	Drawn By	S. Clark
Date	2.28.2022	Revision	

A3E ENVIRONMENTAL CONSULTANTS

RBCA Equations R14/R26

Predicted Downgradient Concentration Based On COC Leaching From Soil
RBCA Equations R14 and R26

Site: Lake Villa LUST
Address: 108 North Milwaukee Avenue
Exposure Route: predicted downgradient groundwater concentration of COC leached from soil
Analyte: Lead **Location:** NW

Leaching Factor Calculation

Maximum soil concentration	$Soil_{source}$:	93	mg/kg	
Leaching factor	LF_{SW}:	0.001407569	$(mg/l_{water})/(mg/kg_{soil})$	
Soil bulk density	ρ_s:	1.5	g/cm^3	
Volumetric water content in vadose zone soils	θ_{WS}:	0.30	cm^3_{water}/cm^3_{soil}	
Soil water sorption coefficient (based on pH of soil, from 35 IAC 742, Appendix C, Table J)	k_s:	710	cm^3_{water}/g_{oil}	
pH of soil	pH:	8.4		
Henry's Law Constant	H':	0	cm^3_{water}/cm^3_{air}	
Volumetric air content in vadose zone soils	θ_{as}:	0.13	cm^3_{air}/cm^3_{soil}	
Groundwater Darcy velocity	U_{gw}:	0.094608	cm/yr	
Hydraulic gradient	i:	0.02	cm/cm (unitless)	
Aquifer hydraulic conductivity	K:	1.50E-07	cm/s = 0.01296 cm/d = 4.7304 cm/yr	
Groundwater mixing zone thickness	δ_{gw}:	200	cm	
Infiltration rate	I:	30	cm/yr	
Width of source parallel to direction of groundwater movement	W:	60	ft = 1828.8 cm	

ρ_s
1.5 or
gravel=2.0
sand=1.8
silt=1.6
clay=1.7
or site specific

θ_{WS}
surface soil=0.15
subsurface soil=0.30
gravel=0.20
sand=0.18
silt=0.16
clay=0.17
or site specific

f_{oc}
surface soil = 0.006
subsurface soil = 0.002
or site specific

θ_{as}
surface soil=0.28
subsurface soil=0.13
gravel=0.05
sand=0.14
silt=0.16
clay=0.17
or site specific

SOLUTION

Leaching factor	LF_{sw}:	0.001407569	mg/kg
Maximum soil concentration	$Soil_{source}$:	93	mg/kg
with	$GW_{source} = Soil_{source} * LF_{sw}$		
Predicted groundwater concentration at the source	GW_{source}:	0.13	mg/l

RBCA Equations R14/R26

Site: Lake Villa LUST
Address: 108 North Milwaukee Avenue
Exposure Route: predicted downgradient groundwater concentration of COC leached from soil
Analyte: Lead **Location:** NW

Downgradient Groundwater Calculation

Greatest potential concentration of COC at the source	C_{source}:	0.13	mg/l		
Distance along centerline of groundwater plume emanating from a source	X:	166	ft =	5059.68	cm
Longitudinal dispersivity	α_X:	505.968	cm		
First order degradation constant	λ:	0	d^{-1}		
Specific discharge	U:	0.000602791	cm/d		
Aquifer hydraulic conductivity	K:	1.50E-07	cm/s =	0.01296	cm/d
Hydraulic gradient	i:	0.02	cm/cm (unitless)		
Total soil porosity	θ_T:	0.43	cm^3/cm^3_{soil}		
Source width perpendicular to groundwater flow direction (horiz.)	S_W:	20	ft =	609.6	cm
Transverse dispersivity	α_y:	168.656	cm		
Source width perpendicular to groundwater flow direction (vert.)	S_d:	6.56	ft =	199.9488	cm
Vertical dispersivity	α_z:	25.2984	cm		

θ_T
0.43 or
gravel=0.25
sand=0.32
silt=0.40
clay=0.36
or site specific

SOLUTION

Dissolved concentration along centerline	$C_{(X)}$:	0.007420846	mg/l

Intermediate Solutions

R16	α_X:	505.968	cm
R17	α_y:	168.656	cm
R18	α_z:	25.2984	cm
R19	U:	0.000602791	cm/d
R20	k_s:	710	cm^3_{water}/g_{oil}
R24	U_{gw}:	0.094608	cm/yr