

# ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

## Former Kemper Park Military Academy

Barracks A & D

741 & 743 3<sup>rd</sup> Street

Boonville, Missouri 65233

October 2, 2023 | Terracon Project Number: 15237169

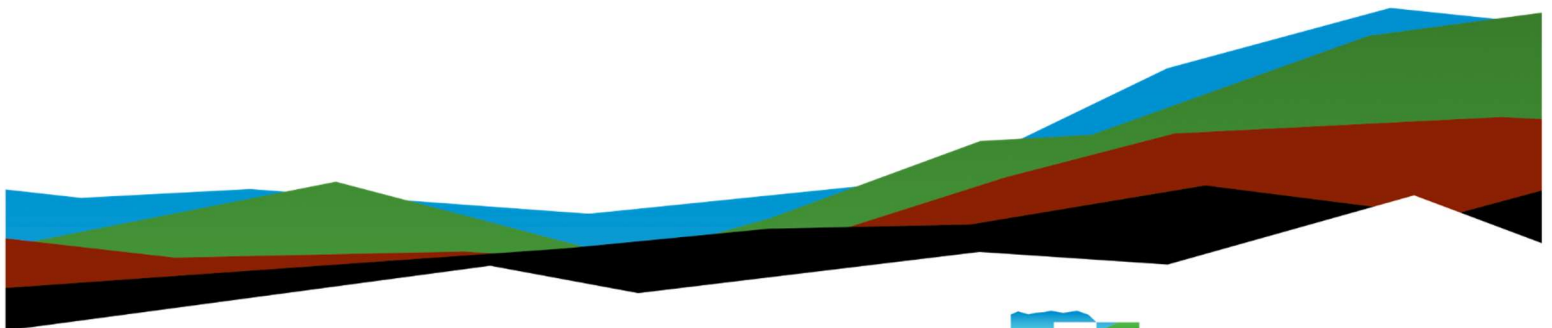


### PREPARED FOR:

#### MDNR Brownfields/Voluntary Cleanup Program

PO Box 176

Jefferson City, MO 65102-0176



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October 2, 2023

MDNR Brownfields/Voluntary Cleanup Program  
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Attn: Christine O'Keefe  
P (573) 751-7538  
christine.o'keefe@dnr.mo.gov

Re: Analysis for Brownfields Cleanup Alternatives  
Former Kemper Park Military Academy  
Barracks A & D  
741 & 743 3<sup>rd</sup> Street  
Boonville, MO 65233  
Terracon Project No. 15237169

Dear Mrs. O'Keefe:

Terracon Consultants, Inc. (Terracon) is pleased to submit this Analysis Of Brownfields Cleanup Alternatives (ABCA) for the barrack buildings located at the addresses referenced above. This ABCA presents alternatives for addressing the identified asbestos and lead-containing materials within the building reported in the Asbestos-Containing Materials and Lead-Based Paint Report prepared by Seagull Environmental Technologies, Inc. (Project No. MOESA121EA2) dated August 2, 2023.

Please refer to the attached report for detailed information.

Terracon appreciates the opportunity to provide this service to the MDNR Brownfields/Voluntary Cleanup Section. If you have any questions regarding this report, please contact the undersigned at 314-692-8811.

Sincerely,

**TERRACON**

*Prepared By:*

A handwritten signature in black ink, appearing to read "Nick Eilerman".

Nick Eilerman  
Sr. Staff Industrial Hygienist

*Reviewed By:*

A handwritten signature in black ink, appearing to read "Mitch Reiber".

Mitch Reiber, PG, CIH  
Senior Industrial Hygienist

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# 1.0 INTRODUCTION

Terracon Consultants, Inc. (Terracon) prepared this analysis of brownfields cleanup alternatives (ABCA) document for the former Kemper Park "A and D Barracks" structures located at 741 and 743 3<sup>rd</sup> Street, Boonville, Missouri. This ABCA provides two alternatives for handling the identified asbestos and three alternatives for lead-containing materials within the building. This ABCA presents alternatives for addressing the identified asbestos and lead-containing materials within the building reported in the Asbestos-Containing Materials and Lead-Based Paint Report prepared by Seagull Environmental Technologies, Inc. (Project No. MOESA121EA2) dated August 2, 2023.

## 1.1 PROJECT GOAL

It is Terracon's understanding that the site may undergo redevelopment by a private developer with plans to create approximately 50 senior living apartments at the two buildings.

# 2.0 SITE/BUILDING DESCRIPTION

The property is the site of the former Kemper Military School, a boys' school that started in the mid-1800s and closed in 2002. The two buildings (former barracks) to be assessed for this activity were likely constructed in the early 1900s. The 23,500 square-foot "A Barracks" and the 71,000 square-foot "D Barracks" were part of the former Kemper Military Academy. The buildings are derelict but in stable condition and may contain asbestos-containing materials and lead-based paint. The property is currently owned by the City of Boonville, which would like to see redevelopment of the buildings, possibly as senior living apartments.

# 3.0 PREVIOUS REPORTS

Prior site assessments include a 2005 Terranext Phase I and II Environmental Site Assessment (ESA), a 2001 Show Me Environmental facility inspection, and a 2023 Phase II ESA. For the purposes of this ACBA Proposal, Terracon had access to, and reviewed, the "Phase II Environmental Site Assessment (ESA) - Asbestos-Containing Materials and Lead-Based Paint Inspection Report", dated August 2, 2023, prepared by Seagull Environmental Technologies, Inc. (Project No. MOESA121EA2, dated August 2, 2023, hereafter referred to as: Seagull's Report).

## 3.1 ASBESTOS FINDINGS

Based on the results of Seagull's Report and laboratory analysis, asbestos was identified in samples of the following materials:

Seagull's Homogenous Sampling Area Code	Material <sup>3</sup>	Location/Functional Space <sup>1</sup>	Quantity <sup>2</sup>
		<b>A Barracks</b>	

<b>Seagull's Homogenous Sampling Area Code</b>	<b>Material<sup>3</sup></b>	<b>Location/Functional Space<sup>1</sup></b>	<b>Quantity<sup>2</sup></b>
A-FT1	9" x 9" Floor Tile (associated mastic is not asbestos containing)	Rooms 1, 26, 27, 61, & 69.	2,287 Square Feet
A-FT3	9" x 9" Floor Tile & Tar Paper	Rooms 35, 48, 52, 57, 60, 70, & 71.	1,888 Square Feet
A-FT4	9" x 9" Floor Tile & Mastic		
A-FT6	9" x 9" Floor Tile & Mastic (associated mastic is not asbestos containing)	Room 47.	36 Square Feet
A-TSI1	Pipe Wrap (foil wrapped)	Basement.	80 Linear Feet
A-ME1	Mudded Pipe Elbow	Basement.	65 Elbows
A-FT8	12" x 12" Floor Tile & Mastic (tile and associated mastic were presumed asbestos-containing material)	Room 53.	75 Square Feet
A-FT9	9" x 9" Floor Tile & Mastic (PACM)	Room 73 (south end).	36 Square Feet
A-TSI2	Pipe Wrap (PACM)	Basement.	254 Linear Feet
A-GCB1	Green Chalkboard (PACM)	Rooms 64, 68, 69, & 73	16 Chalkboards
<b>D Barracks</b>			
D-FT2	9" x 9" Floor Tile & Mastic	All 2 <sup>nd</sup> Floor (Except Rooms 159-162, 137-140, 120-127, 129, & 148); All 3 <sup>rd</sup> Floor (Except Rooms 57, 62, 75, 81-86, 93, 103-107, & 108-110)	12,963 Square Feet
D-FT3	9" x 9" Floor Tile, Mastic, & Leveling Compound (associated leveling compound is not asbestos containing)	Rooms 120-127 & 129.	1,170 Square Feet
D-FT4	9" x 9" Floor Tile & Mastic (associated mastic is not asbestos containing)	Rooms 167, 171, 172, 176, & 177.	1,253 Square Feet
D-FT6	12" x 12" Floor Tile & Mastic	Room 173.	2,330 Square Feet
D-FT7	12" x 12" Floor Tile & Mastic (associated floor tile is not asbestos containing)	Rooms 174, 175, 181, & 182.	1,937 Square Feet
D-FT8	12" x 12" Floor Tile & Mastic (associated mastic is not asbestos containing)	Room 199 (south end).	525 Square Feet
D-TSI1	Pipe Wrap	Rooms 18, 73, 128, & 185.	50 Linear Feet

Seagull's Homogenous Sampling Area Code	Material <sup>3</sup>	Location/Functional Space <sup>1</sup>	Quantity <sup>2</sup>
D-TSI2	Pipe Wrap	Rooms 18, 73, & 128.	32 Linear Feet
D-TSI3	Pipe Wrap	Rooms 207 & 212.	25 Linear Feet
D-TSI4	Pipe Wrap	Rooms 200 & 224.	42 Linear Feet
D-ME1	Mudded Pipe Elbow	Basement.	20 Elbows
D-RF1	Roof Flashing	Roof (middle portion).	400 Linear Feet
D-RM1	Roofing Material (associated "black material" is not asbestos containing)	Roof (middle portion).	4,500 Square Feet
D-SV1	Sheet Vinyl (PACM)	Rooms 38, 93, & 148.	315 Square Feet
D-FT10	12" x 12" Floor Tile and Mastic (PACM)	Room 113.	195 Square Feet
D-FT11	12" x 12" Floor Tile and Mastic (PACM)	Rooms 183, 186, & 190.	295 Square Feet
D-TSI5	Pipe Wrap (PACM)	Rooms 200, 202, 208, 209, & 224.	165 Linear Feet

**1** Locations based on the functional spaces designated in Seagull's Report.

**2** Estimated quantities are based on the information provided in Seagull's Report, and actual quantities may vary significantly, especially if asbestos containing materials are present in hidden and/or inaccessible areas not evaluated as part of the August 2, 2023 survey.

**3** PACM: Presumed asbestos-containing material

## 3.2 LEAD-BASED PAINT FINDINGS

LBP is defined by the United States Environmental Protection Agency (USEPA) and the State of Missouri as any paint or surface coating that contains 1.0 mg/cm<sup>2</sup> or greater of lead as measured by an XRF instrument, or 5,000 parts per million (ppm) lead or 0.5% lead by weight by laboratory analysis.

Lead-based paint (LBP) was identified in Seagull's Report on the following building components:

Component	Substrate	Color(s)	Condition	Positive Test Locations (Sample No.) <sup>1,2</sup>
<b>A Barracks</b>				
Window Frames	Wood	Tan	Fair	Room 6 – south side (38)
		Tan	Fair	Room 8 – west side (55)
		Grey	Poor	Room 13 – south side (85)
		Brown	Good	Room 43 – east side (260)
		White	Poor	Exterior – east side (537)
		White	Poor	Exterior – east side (538)
Wall (bottom)	Wood	Yellow	Good	Room 5 – north side (25)
		White	Good	Room 12 – north side (74)
		White	Good	Room 12 – south side (76)
		White	Good	Room 12 – west side (78)

		Yellow	Good	Room 21 - north side (135)
		Yellow	Fair	Room 21 - east side (137)
		Yellow	Good	Room 21 - south side (139)
		Yellow	Good	Room 26 - north side (168)
		Yellow	Good	Room 26 - south side (170)
		White	Good	Room 30 - south side (183)
		White	Good	Room 43 - north side (255)
		White	Good	Room 43 - east side (257)
		White	Good	Room 43 - south side (259)
		Yellow	Good	Room 48 - north side (288)
		Yellow	Good	Room 48 - south side (290)
Wall (top)	Plaster	White	Good	Room 69 - west side (425)
Door Frames	Wood	Grey	Fair	Room 1 - south side (6)
		Grey	Fair	Room 2 - west side (12)
		Grey	Good	Room 3 - west side (20)
		Grey	Good	Room 6 - west side (37)
		Green	Good	Room 7 - east side (44)
		Grey	Good	Room 9 - east side (64)
		Grey	Good	Room 10 - east side (71)
		Grey	Fair	Room 76 - north side (482)
		White	Poor	Exterior - east side; main entry door (539)
		White	Poor	Exterior - east side; south door (540)
Doors	Wood	Grey	Good	Room 6 - west side (36)
		Grey	Good	Room 7 - east side (45)
		Grey	Good	Room 8 - east side (54)
		Grey	Good	Room 9 - east side (63)
		Grey	Fair	Room 10 - east side (72)
		Black	Good	Room 45 - north side (278)
		Grey	Good	Room 76 - west side (485)
Baseboard	Wood	Grey	Good	Room 12 - north side (79)
		Grey	Good	Room 21 (143)
Newel Post	Wood	Grey	Good	Room 21 (141)
		Blue	Good	Room 43 (262)
		Grey	Good	Room 82 (524)
Wall	Plaster	White	Poor	Room 30 - north side (181)
		White	Poor	Room 52 - north side (309)
		White	Poor	Room 70 - south side (432)
		White	Poor	Room 70 - west side (433)
		Cream	Fair	Room 81 - north side (512)
		Cream	Poor	Room 81 - east side (513)
Handrail	Wood	Brown	Good	Room 43 (261)
<b>D Barracks</b>				
Wall	Plaster	White	Fair	Room 5 - north side (7)
			Poor	Room 5 -south side (9)
			Good	Room 5 - west side (10)
			Good	Room 6 - north side (13)
			Good	Room 7 - east side (20)
			Good	Room 7 - west side (22)
			Fair	Room 8 - north side (26)
			Good	Room 8 - west side (29)
			Fair	Room 11 - north side (32)
			Poor	Room 11 - west side (35)
			Good	Room 13 - north side (38)
			Fair	Room 13 - south side (40)
			Poor	Room 13 - west side (41)
			Fair	Room 16 - east side (45)
			Poor	Room 16 - south side (46)
			Poor	Room 16 - west side (47)
			Poor	Room 18 - north side (50)
			Poor	Room 32 - west side (70)
Poor	Room 41 - north side (89)			

			Poor	Room 41- south side (91)
			Fair	Room 41 - west side (92)
			Poor	Room 43 - east side (95)
			Good	Room 44 - north side (99)
			Good	Room 44 - south side (101)
			Poor	Room 47 - south side (107)
			Poor	Room 61 - south side (129)
			Fair	Room 67 - north side (133)
			Fair	Room 69 - north side (139)
			Poor	Room 77 - north side (157)
			Fair	Room 77 - south side (159)
			Good	Room 78 - north side (163)
			Poor	Room 79 - south side (171)
			Poor	Room 92 - south side (211)
			Poor	Room 102 - south side (234)
			Poor	Room 112 - south side (256)
			Poor	Room 114 - north side (260)
			Poor	Room 116 - north side (266)
			Poor	Room 124 - north side (284)
			Poor	Room 124 - east side (285)
			Poor	Room 150 - north side (349)
			Poor	Room 150 - west side (352)
			Poor	Room 153 - east side (361)
			Fair	Room 157 - west side (368)
			Poor	Room 158 - north side (371)
			Poor	Room 163 - east side (381)
			Poor	Room 163 - west side (382)
			Fair	Room 174 - east side (431)
			Poor	Room 179 - east side (465)
			Poor	Room 181 - north side (477)
			Poor	East stairs on first floor - east side (479)
			Poor	West stairs on first floor - east side (483)
			Poor	Room 182 - north side (487)
			Poor	Room 191 - east side (530)
			Poor	Room 191 - west side (531)
			Poor	Room 194 - east side; east wall portion (546)
			Fair	Room 194 - east side; west wall portion (647)
			Poor	Room 194 - south side (548)
			Poor	Room 194 - west side; south wall portion (549)
		Grey	Poor	Room 195 - north side; east end (555)
			Poor	Room 195 - east side (556)
			Poor	Room 195 - south side (557)
		White	Fair	Room 198 - north side (572)
			Good	Room 198 - south side (574)
			Fair	Room 201 - north side (593)
			Poor	Room 201 - east side (594)
			Poor	Room 217/218 - north side (652)
			Poor	Room 217/218 - east side (653)
Wall (top)	Plaster	White	Poor	Room 38 - east side (79)
Handrail	Wood	Grey	Fair	Room 43 (98)
			Poor	Room 92 (213)
			Poor	Room 153 (364)
			Poor	East stairs on first floor (482)
			Poor	West stairs on first floor (486)
Baseboard	Wood	Black	Poor	Room 195 - south side (559)
			Good	Room 197 - east side (570)
Window Frame	Wood	Tan	Good	Room 199 - south side (584)
			Good	Room 199 - west side (585)
			Good	Room 201 - west side (597)

		Grey	Fair	Room 207 – east side (618)
			Fair	Room 211 – east side (632)
			Fair	Room 212 – east side (635)
		White	Fair	Room 213 – east side (640)
		Red	Fair	Room 221 – south side (666)
		Tan	Good	Room 222 – south side (673)
		White	Poor	Exterior – north side (691)
		White	Poor	Exterior – north side (692)
Doorframe	Wood	Grey	Good	Room 212 – south side (633)
			Poor	Room 217 – north side (656)
			Good	Room 218 – north side (658)
		White	Poor	Exterior – north side (693)
Door	Wood	Grey	Good	Room 212 – south side (634)
			Poor	Room 217 – north side (657)
			Good	Room 218 – north side (659)
Wall	Brick & Plaster	Grey	Poor	Room 213 – east side (637)

1 Locations based on the functional spaces designated in Seagull's Report.

2 Sample number from Table D-2 and D-3 of Seagull's Report

Many components on the building exterior could not be assessed. Seagull's Report assumed all exterior paint to be lead containing based on the results of the limited exterior components tested and due to all exterior paint appearing to be the same color and age (based on degree of weathering). Upon further evaluation, exterior components assumed to contain LBP include: cornice (upper trim and decorative trim above entries), decorative paneling beneath 2<sup>nd</sup> and 3<sup>rd</sup> floor windows, keystones, divided-light transom window components (frames, sashes, and muntins), door frames and door entablatures. All exterior painted components appear to have white paint in poor condition. According to a registration form for the United States Department of the Interior National Park Service National Register of Historic Places, the original wood windows were replaced with aluminum windows and entry doors were replaced with aluminum framed glass doors. Photos observed in the registration form and in Seagulls Report show the aluminum window components as largely unpainted.

Additionally, information concerning the lead content of the red painted, metal exterior stairs was not located in Seagulls Report, the red paint should be assumed positive for lead paint.

While painted surfaces containing lead in concentrations between 0.0 and 1.0 mg/cm<sup>2</sup> do not meet the definition of LBP under Housing and Urban Development (HUD), USEPA or the State of Missouri, the paint does contain lead and is subject to exposure limits under the United States Occupational Safety and Health Administration (USOSHA). Therefore, it is the contractor's responsibility to make appropriate decisions concerning compliance with applicable USOSHA regulations.

Based on results of the XRF lead paint testing in Seagull's Report, painted surfaces containing lead in concentrations between 0.0 and 1.0 mg/cm<sup>2</sup> by the XRF were identified.

## 4.0 APPLICABLE REGULATIONS & STANDARDS

### 4.1 CLEANUP OVERSIGHT RESPONSIBILITY

The responsible party for the cleanup of the site is the current site owner, the City of Booneville.

## 4.2 CLEANUP STANDARDS

### 4.2.1 ASBESTOS

The USEPA's asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP; 40 Code of Federal Regulations (CFR) Part 61, Subpart M) regulates asbestos fiber emissions and asbestos waste disposal practices. The asbestos NESHAP regulation also requires the identification and classification of existing ACM according to friability prior to demolition or renovation activity. Friable ACM is a material containing more than 1% asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. All friable ACM is considered regulated asbestos-containing material (RACM).

The asbestos NESHAP regulation classifies ACM as RACM, Category I nonfriable ACM, or Category II nonfriable ACM. RACM includes all friable ACM, along with Category I and Category II nonfriable ACMs that have become friable; will be or have been subjected to sanding, grinding, cutting, or abrading; or that have a high probability of becoming or have become crumbled, pulverized, or reduced to powder during renovation or demolition activity. Category I nonfriable ACMs are exclusively asbestos-containing packings, gaskets, resilient floor coverings, resilient floor covering mastics, and asphalt roofing products that contain more than 1% asbestos. Category II nonfriable ACMs are all other nonfriable materials other than Category I nonfriable ACM that contain more than 1% asbestos.

The Missouri Department of Natural Resources, (MDNR) Air Pollution Control Program, enforces the asbestos NESHAP as adopted by reference at 10 Code of State Regulations (CSR) 10-6.080. The owner or operator must provide MDNR with written notification at least 10 working days prior to the commencement of asbestos abatement activities that will disturb RACM in amounts greater than or equal to 160 square feet, 260 linear feet, or 35 cubic feet.

The OSHA asbestos standard for construction (29 CFR 1926.1101) regulates workplace exposure to asbestos and establishes permissible exposure limits (PELs) for exposure to airborne asbestos. The standard requires that employee exposure to airborne asbestos fibers be maintained below the permissible exposure limits (PELs) of 0.1 asbestos fiber per cubic centimeter of air (0.1 f/cc) as an 8-hour time-weighted average (TWA) or 1.0 f/cc as a 30-minute excursion limit. The standard classifies construction and maintenance activities that could disturb ACM and specifies work practices and precautions that employers must follow when engaging in each class of regulated work.

### 4.2.2 LEAD-CONTAINING COATINGS

Lead is regulated by the USEPA and USOSHA. USEPA regulates lead use, removal, and disposal and OSHA regulates worker exposure to lead. USEPA defines LBP as paint, varnish, stain, or other wet-applied coating that contains lead equal to or greater than 1.0 milligrams per square centimeter ( $\text{mg}/\text{cm}^2$ ), 5,000  $\text{mg}/\text{kg}$ , or 0.5% by dry weight as determined by laboratory analysis. For the OSHA lead standard, lead includes metallic lead, all inorganic lead compounds, and organic lead soaps. The OSHA standard does not define the amount of lead in paint that constitutes LBP.

USEPA regulates disposal of hazardous materials. The USEPA has stated that components removed with intact LBP that is not delaminating from the substrate may be disposed as general demolition debris. If the LBP is stripped from components, or if it is delaminating from the substrate, the waste may be subject to hazardous waste rules [i.e., Toxicity Characteristics Leaching Procedure (TCLP)]. Whole-building demolition debris is considered a non-hazardous waste with regard to lead. Therefore, no sampling/analysis of painted components for lead is required for disposal as non-hazardous waste. If it

is not a whole-building demolition debris, a composite, representative sample of the demolition debris must be tested to determine if it is regulated as hazardous waste under 40 CFR 261 Identification and Listing of Hazardous Waste.

The USOSHA lead standard for construction (29 CFR 1926.62) applies to all construction work where an employee may be occupationally exposed to lead. All work related to construction, alteration, or repair (including painting and decorating) is included. The lead standard applies to any detectable concentration of lead in paint, as even small concentrations of lead can result in unacceptable employee exposures depending upon on the method of removal and other workplace conditions. Under this standard, construction includes, but is not limited to, the following:

- Demolition or salvage of structures where lead or materials containing lead are present;
- Removal or encapsulation of materials containing lead;
- New construction, alteration, repair, or renovation of structures, substrates, or portions containing lead, or materials containing lead;
- Installation of products containing lead;
- Lead contamination/emergency clean-up;
- Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and
- Maintenance operations associated with construction activities described above.

Employers must assure that no employee will be exposed to lead at concentrations greater than the PEL of 50 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) as an 8-hr TWA without adequate protection. The OSHA standard also establishes an action level of  $30 \mu\text{g}/\text{m}^3$ , which if exceeded, triggers certain requirements, including periodic exposure monitoring and medical monitoring.

### 4.3 LAWS AND REGULATIONS APPLICABLE TO THE CLEANUP

The laws and regulations that will likely be applicable to the cleanup include the federal asbestos NESHAP, USOSHA worker protection, USEPA hazardous waste disposal for lead containing debris (except for whole building demolition), Brownfields Revitalization Act, Federal Davis-Bacon Act, MDNR MRBCA standards, and applicable local regulations.

In addition, all appropriate permits (e.g., abatement notifications, disposal manifests, Missouri One-Call, soil disposal and manifests) would need to be obtained by the responsible parties prior to work commencing.

## 5.0 EVALUATION OF CLEANUP ALTERNATIVES

Evaluations of cleanup alternatives have been developed with specific consideration to USEPA and MDNR Brownfields/Voluntary Cleanup Program (MDNR-BVCP) procedural requirements.

### 5.1 ASBESTOS CONTAINING MATERIALS

Alternative Type	Estimated Cost <sup>1</sup>
#1 – No Action	\$0.00
#2 – Abatement of ACM	Abatement: \$150,000 - \$350,000 Oversight & Clearance: \$30,000 - \$70,000

<sup>1</sup> Estimated abatement cost were provided by ARSI Inc., based on quantities of asbestos containing material identified in the Seagull Report. Oversight & Clearance costs are calculated as 20% of abatement costs.

### 5.1.1 ALTERNATIVE #1 – NO ACTION

Alternative #1 consists of no remedial actions performed on the site.

#### 5.1.1.1 ASSUMPTIONS

The site would be left in its current condition and not utilized for any purpose.

#### 5.1.1.2 EFFECTIVENESS

This alternative may not be effective, depending on specifics of the renovation of the site building. In accordance with the asbestos NESHAP regulations, demolition or renovation of a structure cannot occur without ACM being properly identified and addressed in accordance with all applicable regulations, therefore renovation of the building may be restricted if this alternative was selected. This alternative would also be ineffective in achieving the goal of reducing health risks.

#### 5.1.1.3 COST

There will be no cost associated with Alternative #1.

### 5.1.2 ALTERNATIVE #2 – ABATEMENT OF ACM

#### 5.1.2.1 ASSUMPTIONS

Alternative #2 assumes that the entire building will be gut renovated for future planned usage and that the removal of identified ACM would allow for unrestricted redevelopment of the building. Abatement would be conducted in accordance with all applicable local, state, and federal regulations by a licensed Missouri Asbestos abatement contractor. Regulatory clearance would be obtained through successful implementation of a preapproved Remedial Action Plan. Any sampling for clearance would have to be performed in accordance with a pre-approved Quality Assurance Project Plan (QAPP), per federal cooperative agreement if Brownfields Revolving Loan Funds grants are used.

### 5.1.2.2 EFFECTIVENESS

If all identified ACM could be removed, Alternative 2 would be most effective in reducing the risk to human health posed by the ACM. In addition, full abatement would allow for complete redevelopment of the site without restrictions concerning disturbance of ACM.

### 5.1.2.3 PRACTICALITY

Implementation requires the development of procedures and work practices in compliance with MDNR's Publication 2099 *Asbestos and Lead-Based Paint Abatement Requirements at Brownfields/Voluntary Cleanup Program Sites* (MDNR 2017). The abatement would be conducted in accordance with all applicable local, state, and federal regulations by a Missouri licensed asbestos abatement contractor.

### 5.1.2.4 COSTS

Estimated ACM abatement costs are based on median per unit pricing of local vendors and the approximate cost would range from \$150,000 to \$350,000. These costs include proper removal, handling, and disposal costs. Development of procedures and work practices in compliance with MDNR's Publication 2099 *Asbestos and Lead-Based Paint Abatement Requirements at Brownfields/Voluntary Cleanup Program Sites* (MDNR 2017), including technical oversight and clearance sampling, are estimated to range between \$30,000 and \$70,000.

## 5.2 LEAD-BASED PAINT

Three cleanup alternatives were evaluated to address LBP found on building materials. The alternatives include no action, stabilization/enclosure, and removal through renovation - component demolition/abatement.

Alternative Type	Estimated Cost <sup>1</sup>
Alternative #1 – No Action	\$0.00
Alternative #2 – LBP Stabilization/Enclosure	Stabilization/Enclosure: \$60,000-\$150,000 Oversight & Clearance: \$12,000-\$30,000
Alternative #3 – LBP Removal by Abatement	Abatement: \$150,000-\$300,000 Oversight & Clearance: \$30,000-\$60,000

<sup>1</sup> Estimated costs of LBP Stabilization/Enclosure & LBP Removal by Abatement are based on abatement fees from previous projects with comparable quantities of LBP. Oversight & Clearance costs are calculated as 20% of abatement costs.

### 5.2.1 ALTERNATIVE #1 – NO ACTION

Alternative #1 consists of no remedial actions performed on the site.

#### 5.2.1.1 ASSUMPTIONS

The site would be left in its current condition and not utilized for any purpose.

#### 5.2.1.2 EFFECTIVENESS

This alternative would not be effective regarding redevelopment of the property. Proposed redevelopment of the areas containing LBP would be restricted to ensure that those materials would not be disturbed. This alternative would also be ineffective in achieving the goal of reducing health risks.

#### 5.2.1.3 PRACTICALITY

As the LBP would be left in place, all planned redevelopments would have to consider the location and condition of LBP to ensure those materials would not be disturbed.

#### 5.2.1.4 COST

This alternative would not involve any direct costs.

### **5.2.2 ALTERNATIVE #2 – LBP STABILIZATION/ENCLOSURE**

Alternative #2 would involve stabilization/enclosure of paint on affected components (plaster walls, brick wall, concrete wall, door frames, window frames, pipes, bathroom stall, exterior components) and repair of damaged substrates.

#### 5.2.2.1 ASSUMPTIONS

The stabilization/enclosure of the LBP-containing components would be completed for rehabilitation/renovation purposes; therefore, removal would not be completed as an abatement activity. Stabilization activities would consist of completely scraping all loose and peeling paint from the identified components, maintaining the component substrates in good condition as much as is reasonably possible. Remove areas of damaged and delaminating component substrates back to where the substrate material is intact or well adhered. Components are to be thoroughly sealed with a tinted encapsulant capable of providing stabilization of the remaining lead-based paint. Components selected for enclosure are to be covered with a solid, dust tight barrier or covering. The purpose of the enclosure is to prevent LBP chips and contaminated dusts from migrating from the designated enclosure. Construction of the enclosures must follow all current building code requirements and regulatory approved work practices.

#### 5.2.2.2 EFFECTIVENESS

This alternative would be effective as LBP would be rendered intact through stabilization and/or inaccessible through enclosure. This alternative would allow for redevelopment of the site but with restrictions concerning disturbance and management of LBP (such as an Operations and Maintenance Plan). Stabilization and enclosure are not permanent methods of LBP control and considerations for periodic observation and maintenance of stabilization and enclosures would need to be made. Additional repairs would be necessary over time and spot abatements may be necessary to accommodate future

renovations. This alternative would also be effective in achieving the goal of reducing health risks if the LBP is properly managed and maintained with an O&M plan.

#### 5.2.2.3 PRACTICALITY

Implementation requires the development of procedures and work practices in compliance with MDNR's Publication 2099 entitled "Asbestos and Lead-Based Paint Abatement Requirements at Brownfields/Voluntary Cleanup Program Sites" (MDNR 2009). In addition, much of the LBP would be left in-place. Future redevelopment plans would have to consider the potential impacts LBP would have regarding such proposed work. An LBP Operations & Maintenance Plan (O&M Plan) would be required to document the presence and location of LBP and would include future maintenance procedures regarding the LBP. In addition, filing the LBP O&M Plan on the property's chain of title as an institutional control would be required by MDNR-BVCP.

#### 5.2.2.4 COST

Estimated LBP stabilization/enclosure costs are based on median per unit pricing of local vendors. Approximate costs would range from \$60,000 to \$150,000. Technical oversight and clearance sampling would be necessary. Development of procedures and work practices and a Lead Operations and Maintenance (O&M) Plan in compliance with MDNR's Publication 2099 entitled "Asbestos and Lead-Based Paint Abatement Requirements at Brownfields/Voluntary Cleanup Program Sites" (MDNR 2009), including technical oversight and clearance sampling are estimated to range between \$12,000 and \$30,000.

### **5.2.3 ALTERNATIVE #3 – LBP REMOVAL BY RENOVATION - COMPONENT DEMOLITION & ABATEMENT**

Alternative #3 would involve complete removal of painted components (plaster walls, door frames, window frames, pipes, bathroom stalls) by renovation/component demolition and abatement (concrete lower walls, brick wall and exterior components).

#### 5.2.3.1 ASSUMPTIONS

Alternative #3 assumes that the entire building will be gut renovated for future planned usage and that the removal of identified LBP would allow for unrestricted redevelopment of the building. The removal of the LBP-containing components and in some instances removal of LBP, would be completed for rehabilitation/renovation purposes. Removal of the LBP is an abatement activity would require a Missouri-certified lead-based paint abatement contractor, as well as certified workers. Certain building materials (plaster walls, door frames, window frames, etc.) containing LBP can be removed/demolished and likely disposed of as non-hazardous demolition waste, along with other demolition debris from the site. Historic features and painted brick and concrete walls would need LBP abatement rather than component removal. Disposal characterization testing (specifically, Toxicity Characteristic Leaching Procedure samples) would be required prior to disposal.

#### 5.2.3.2 EFFECTIVENESS

The LBP would be permanently removed. This alternative would allow for redevelopment of the site without restrictions concerning disturbance and management of LBP. This alternative would be very effective in achieving the goal of reducing health risks.

#### 5.2.3.3 PRACTICALITY

Renovation/demolition activities can be conducted by general construction/demolition workers and does not have to be conducted as part of the Brownfields cleanup activity. However, based on the presence of lead, construction/demolition activities must be conducted in accordance with MDNR Publication 2045 (2017) *Managing Construction and Demolition Waste along with OSHA guidelines for protection of workers*. However, renovation/demolition activities are not possible for all identified components. Removal of LBP from components is an abatement activity would require a Missouri-certified lead-based paint abatement contractor, as well as certified workers.

#### 5.2.3.4 COST

Cost factors related to Alternative #3 vary greatly. For general budgeting and comparative purposes, estimated LBP removal costs may range from \$150,000 to well over \$300,000 when considering that some components cannot be removed and would require significant abatement efforts. Estimated costs would include the proper removal, handling, and disposal. Estimated costs for the technical oversight and clearance sampling are estimated between \$30,000 and \$60,000. If BVCP oversight is conducted, then development of procedures and work practices in compliance with MDNR's Publication 2099 *Asbestos and Lead-Based Paint Abatement Requirements at Brownfields/Voluntary Cleanup Program Sites* (MDNR 2017) would be needed.

In addition to removal and abatement fees, considerations for component replacement should be made. Component replacement of historical design elements removed as a method lead hazard control may be subject to stringent design specifications or strictly prohibited.

## 6.0 REFERENCES

*Phase II Environmental Site Assessment (ESA) - Asbestos-Containing Materials and Lead-Based Paint Inspection Report* (Project No. MOESA121EA2) prepared by Seagull Environmental Technologies, Inc. dated August 2, 2023.

Missouri Department of Natural Resources Publication 2099, *Asbestos and Lead-Based Paint Abatement Requirements at Brownfields/Voluntary Cleanup Program Sites*, March 2017.

Missouri Department of Natural Resources Publication 2045, *Managing Construction and Demolition Waste along with OSHA guidelines for protection of workers*, December 2017.