

# LIMITED ASBESTOS SURVEY

THE ARSENAL  
2018 ROOF RENOVATION  
713 CRAVEN STREET  
BEAUFORT, SOUTH CAROLINA 29902



*Prepared For:*

**CITY OF BEAUFORT, SC**  
**Attention: Mr. Neil Pugliese**  
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*Performed By:*

**TES**

**Trident Environmental Services, Inc.**

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# LIMITED ASBESTOS SURVEY

The Arsenal  
2018 Roof Renovation  
713 Craven Street  
Beaufort, SC 29902

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## EXECUTIVE SUMMARY

The limited asbestos survey performed by Trident Environmental Services, Inc. on June 5, 2018 of The Arsenal Roof located at 713 Craven Street in Beaufort, South Carolina **did** reveal the presence of asbestos containing building materials. The following summary exhibits the asbestos containing building materials (ACBM) that were identified in the inspection.

### Asbestos

Description	Type
Tar Application (low & high roof)	Category I – Non Friable

RACM – Regulated Asbestos Containing Material

The identified asbestos containing building materials (ACBM's) to include the item(s) listed above. All removal work of the identified asbestos should be performed by a properly trained and licensed abatement contractor prior to the planned renovation/demolition activities.

## **BACKGROUND**

Trident Environmental Services, Inc. was contracted by the City of Beaufort, South Carolina to perform a limited asbestos survey of The Arsenal Roof located at 713 Craven Street in Beaufort, South Carolina. The survey was performed in order to satisfy the NESHAP requirements for renovation and/or demolition. The Arsenal on Craven Street was built in 1798 to house the Beaufort Volunteer Artillery. The two story structure is built slab on grade and is approximately 9,700 square feet. Currently, the building operates as the Beaufort History Museum and was occupied on the date of inspection.

The upper roof on the two-story structure is approximately 2,850 square feet. Roofing materials consist of EPDM membrane, foam insulation over built-up roofing on a wood substrate. The two lower roofs consists of approximately 2,400 square feet. Roof construction is EPDM membrane and foam insulation over a wood substrate. Both the upper and lower roofs have concrete crenulations coated with ACM roof tar around the perimeter. **Note: This survey was limited to the roof and should not be considered or used as an all-inclusive survey for the structure.**

Non suspect material include glass, metals, brick or masonry block, cement, fiberglass, concrete, pressed wood or wood, plastic and rubber.

### **Asbestos**

The inspection was conducted to identify asbestos-containing building materials (ACBM) which may be disturbed during the renovation/demolition activities. The identification of ACBM's will aid in the prevention of occupational exposures and/or environmental releases of airborne asbestos fibers. Identification of ACBM also complies with Title 40 Code of the Federal Regulations, Part 61, and South Carolina Department of Health and Environmental Control (SCDHEC) Regulation 61-86.1, along with Title 29 Code of Federal Regulations, Part 1926 enforced by the Occupational Safety and Hazard Administration (OSHA). The Asbestos Survey describes the investigative procedures utilized, results of the suspect ACBM sampled/analyzed, and recommendations regarding the structures as related to asbestos.

## ASBESTOS SURVEY

### Asbestos Investigative Procedures

Trident Environmental Services, Inc. conducted an inspection for suspect ACM's on June 5, 2018 of The Arsenal Roof located at 713 Craven Street in Beaufort, South Carolina. It is our understanding that the subject structure will undergo renovation or demolition activities in the near future. The asbestos survey was performed by observing and sampling suspect building materials. Significant destructive testing was not utilized during the inspection. There is a possibility that suspect materials exist in inaccessible areas such as wall cavities and pipe chases. If any additional suspect ACM's are discovered during the course of demolition activities, bulk samples should be extracted to identify the presence, or absence, of asbestos prior to continuation of work activities.

A sampling strategy was developed to provide representative samples for analysis. Samples were then extracted from a variety of suspect ACM's. Bulk samples collected were recorded on a Chain-of-Custody record and submitted to Electron Microscopy Services Laboratory Analytical, Inc. (EMSL) a Polarized Light Microscopy (PLM) laboratory. The laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP), which is administered by the National Institute of Standards and Technology (NIST). EMSL is accredited by NVLAP for the analysis of bulk asbestos by PLM ([NVLAP Lab Code: 200841-0](#)). NOB samples were submitted to EMSL for analyses by Transmission Electron Microscopy (TEM) as required by SCDHEC.

The suspect materials were analyzed by trained microscopists utilizing PLM techniques coupled with dispersion staining in accordance with EPA Test Method Title 40 Code of Federal Regulations, Chapter I (1-1-87 edition), Part 763, Subpart F- Appendix A. This method identifies asbestos mineral fibers based on six optical characteristics: morphology, birefringence, refractive index, extinction angle, sign of elongation and dispersion staining colors. The laboratory analysis reports the specific type of asbestos identified (there are six asbestos minerals) and the percentage of asbestos present. The EPA and OSHA defines materials as asbestos containing if an asbestos content of greater than one percent (>1%) is detected in a representative sample.

The SCDHEC require NOB materials with negative or trace results by PLM to be analyzed by at least one TEM. SCDHEC in accordance with ASTM E 2356-04 defines NOB materials as "materials that are not friable and that consist of fibers and other particulate matter embedded in a solid matrix of asphalt, vinyl or other organic substances." Examples of NOB materials include but are not limited to flooring materials such as vinyl floor tiles, vinyl sheet flooring, adhesives, mastics, asphalt shingles, roofing materials, glazing, caulks, and cove base.

The EPA classifies ACBM into two categories, friable and non-friable. A friable material creates a greater health hazard due to the fact that it may be “crumbled, pulverized or reduced to powder by the forces expected to act upon it in the course of demolition or renovation operations.”

*Friable Asbestos* material means any material containing more than one percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763 section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

*Category I Non Friable Asbestos-Containing Material (ACM)* means asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than one percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

*Category II Non Friable ACM* means any material, excluding Category I non friable ACM, containing more than one percent asbestos as determined using the methods specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. (cement siding, transite board shingles, etc.)

*Regulated Asbestos-Containing Material (RACM)* means (a) Friable asbestos material, (b) Category I non friable ACM that has become friable, (c) Category I non friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II non friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

The following section summarizes the sample numbers, locations, type material, asbestos type, percent of asbestos detected, present condition of the asbestos containing material, potential for disturbance, and hazard assessment ratings. The asbestos sample laboratory analyses and chain of custody records are included at the end of this report.

**Asbestos Abbreviations and Hazard Assessment Key**

The EPA and SCDHEC require that confirmed ACBM is given a hazard assessment based on its present condition and potential for future disturbance. This hazard assessment is used as a tool for prioritization in future remedial actions regarding the ACBM. The following key demonstrates the criteria that make up the hazard assessment.

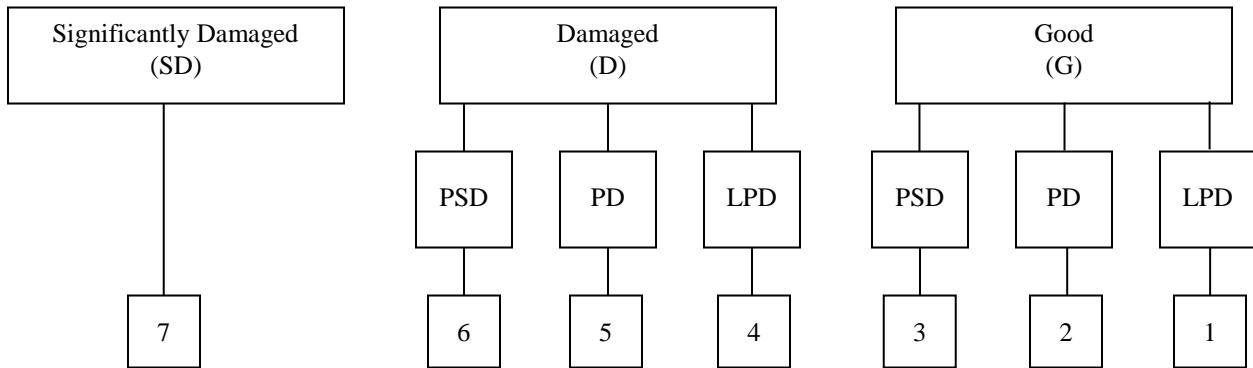
**Present Condition**

- F = Friable
- NF = Non-friable
- G = Good (very localized limited damage)
- D = Damaged (<10% distributed and/or <25% localized)
- S = Significantly Damaged (≥10% distributed and/or 25% localized)

**Potential for Future Disturbance**

- LPD = Low Potential for Disturbance (Contact, Vibration, and/or Air Erosion – low concern)
- PD = Potential for Damage (Contact, Vibration, and/or Air Erosion – moderate concern)
- PSD = Potential for Significant Damage (Contact, Vibration and/or Air Erosion – high concern)

**Hazard Assessment**



**HOMOGENOUS AREA ESTIMATED FOOTAGE TABLE**  
**The Arsenal Roof Renovation – 713 Craven Street – Beaufort, SC**

<b>HOMOGENOUS AREA ID #</b>	<b>DESCRIPTION</b>	<b>ESTIMATED AMOUNT</b>
01	Roof Flashing (low roof)	420 SF
02	Roof Core (low roof)	840 SF
<b>03</b>	<b>Tar Application (low &amp; high roof)</b>	<b>566 LF</b>
04	Roof Flashing (high roof)	740 SF
05	Roof Core (high roof)	3,315 SF
06	Cloth (high roof)	680 SF
07	Roof Flashing (low roof)	420 SF
08	Roof Core (low roof)	840 SF



**ASBESTOS SUMMARY**

**The Arsenal Roof Renovation – 713 Craven Street – Beaufort, SC**

DESCRIPTION	TYPE	ESTIMATED AMOUNT
<b>Tar Application (low &amp; high roof)</b>	<b>Category I – Non Friable</b>	<b>566 LF</b>

RACM – Regulated Asbestos Containing Material

\*PACM - Presumed Asbestos Containing Material

*SCDHEC requires any non-friable material that is identified in an asbestos inspection report in a condition other than good and non-friable must be handled as a Regulated Asbestos Containing Material (RACM) and identified as friable on the asbestos abatement application. This requirement is reflected in the Asbestos Summary Table listed above.*

Asbestos fibers were identified in the Tar Application (low & high roof). Approximately 566 linear feet is in good condition and considered Category I – Non Friable Asbestos.

**The estimated quantities provided should be verified by contractor and/or building owner. Any discrepancies are to be addressed prior to removal of ACM. Please note that removal costs vary depending on the contractor, the quantity/condition of the ACM, and the accessibility/location of the ACM.**

## ASBESTOS SAMPLE DATA TABLE

### The Arsenal Roof Renovation – 713 Craven Street – Beaufort, SC

DESCRIPTION OF EACH SAMPLE AREA				LABORATORY		ASSESSMENT OF MATERIALS	
Homogeneous Area & Sample ID	Description	Location/Room #	Friable (Y/N)	Asbestos Present		Condition Assessment Category	Hazard Assessment Category
				Percent	Asbestos		
01-01A	Roof Flashing (membrane)	Low Roof	N	0.0%	ND	7	N/A
01-01B	Roof Flashing (insulation)	Low Roof	N	0.0%	ND	7	N/A
01-02A	Roof Flashing (membrane)	Low Roof	N	0.0%	ND	7	N/A
01-02B	Roof Flashing (insulation)	Low Roof	N	0.0%	ND	7	N/A
01-03A T	Roof Flashing (membrane)	Low Roof	N	0.0%	ND	7	N/A
01-03B	Roof Flashing (insulation)	Low Roof	N	0.0%	ND	7	N/A
02-04A	Roof Core (membrane)	Low Roof	N	0.0%	ND	7	N/A
02-04B	Roof Core (insulation)	Low Roof	N	0.0%	ND	7	N/A
02-05A	Roof Core (membrane)	Low Roof	N	0.0%	ND	7	N/A
02-05B	Roof Core (insulation)	Low Roof	N	0.0%	ND	7	N/A
02-06A T	Roof Core (membrane)	Low Roof	N	0.0%	ND	7	N/A
02-06B	Roof Core (insulation)	Low Roof	N	0.0%	ND	7	N/A
<b>03-07</b>	<b>Tar Application</b>	<b>Low Roof</b>	<b>N</b>	<b>15.0%</b>	<b>CHRY</b>	<b>7</b>	<b>1</b>
<b>03-08</b>	<b>Tar Application</b>	<b>Low Roof</b>	<b>N</b>	<b>NT</b>	<b>PACM</b>	<b>7</b>	<b>1</b>
<b>03-09</b>	<b>Tar Application</b>	<b>Low Roof</b>	<b>N</b>	<b>NT</b>	<b>PACM</b>	<b>7</b>	<b>1</b>
04-10A	Roof Flashing (membrane)	High Roof	N	0.0%	ND	7	N/A
04-10B	Roof Flashing (cementitious)	High Roof	N	0.0%	ND	7	N/A
04-10C	Roof Flashing (tar)	High Roof	N	0.0%	ND	7	N/A
04-10D	Roof Flashing (insulation)	High Roof	N	0.0%	ND	7	N/A
04-11A	Roof Flashing (membrane)	High Roof	N	0.0%	ND	7	N/A
04-11B	Roof Flashing (cementitious)	High Roof	N	0.0%	ND	7	N/A
04-11C	Roof Flashing (tar)	High Roof	N	0.0%	ND	7	N/A
04-11D	Roof Flashing (insulation)	High Roof	N	0.0%	ND	7	N/A
04-12A T	Roof Flashing (membrane)	High Roof	N	0.0%	ND	7	N/A
04-12B	Roof Flashing (cementitious)	High Roof	N	0.0%	ND	7	N/A
04-12C T	Roof Flashing (tar)	High Roof	N	0.0%	ND	7	N/A
04-12D	Roof Flashing (insulation)	High Roof	N	0.0%	ND	7	N/A
05-13A	Roof Core (membrane)	High Roof	N	0.0%	ND	7	N/A
05-13B	Roof Core (tar)	High Roof	N	0.0%	ND	7	N/A

**Assessment Categories**

- |  |   |
|--|---|
| (1) Thermal Systems Insulation – Good Condition        | (5) Surfacing – Damaged                   |
| (2) Thermal Systems Insulation – Damaged               | (6) Surfacing – Significantly Damaged     |
| (3) Thermal Systems Insulation – Significantly Damaged | (7) Miscellaneous – Good Condition        |
| (4) Surfacing – Good Condition                         | (8) Miscellaneous – Damaged               |
|  | (9) Miscellaneous – Significantly Damaged |

**Asbestos Present**

- |                      |                          |
|----------------------|--------------------------|
| AMOS – Amosite       | ACTI – Actinolite        |
| CHRY – Chrysotile    | ND – None Detected       |
| CROC – Crocidolite   | NT – Not Tested          |
| ANTH – Anthophyllite | PACM – Presumed ACM      |
| TREM – Tremolite     | <b>Asbestos Detected</b> |

**ASBESTOS SAMPLE DATA TABLE**  
**The Arsenal Roof Renovation – 713 Craven Street – Beaufort, SC**

DESCRIPTION OF EACH SAMPLE AREA				LABORATORY		ASSESSMENT OF MATERIALS	
Homogeneous Area & Sample ID	Description	Location/Room #	Friable (Y/N)	Asbestos Present		Condition Assessment Category	Hazard Assessment Category
				Percent	Asbestos		
05-13C	Roof Core (insulation)	High Roof	N	0.0%	ND	7	N/A
05-14A	Roof Core (membrane)	High Roof	N	0.0%	ND	7	N/A
05-14B	Roof Core (tar)	High Roof	N	0.0%	ND	7	N/A
05-14C	Roof Core (insulation)	High Roof	N	0.0%	ND	7	N/A
05-15A T	Roof Core (membrane)	High Roof	N	0.0%	ND	7	N/A
05-15B T	Roof Core (tar)	High Roof	N	0.0%	ND	7	N/A
05-15C	Roof Core (insulation)	High Roof	N	0.0%	ND	7	N/A
06-16	Cloth	High Roof	Y	0.0%	ND	7	N/A
06-17	Cloth	High Roof	Y	0.0%	ND	7	N/A
06-18	Cloth	High Roof	Y	0.0%	ND	7	N/A
07-19	Roof Flashing	Low Roof	N	0.0%	ND	7	N/A
07-20	Roof Flashing	Low Roof	N	0.0%	ND	7	N/A
07-21 T	Roof Flashing	Low Roof	N	0.0%	ND	7	N/A
08-22A	Roof Core (membrane)	Low Roof	N	0.0%	ND	7	N/A
08-22B	Roof Core (cementitious)	Low Roof	N	0.0%	ND	7	N/A
08-22C	Roof Core (insulation)	Low Roof	N	0.0%	ND	7	N/A
08-23A	Roof Core (membrane)	Low Roof	N	0.0%	ND	7	N/A
08-23B	Roof Core (cementitious)	Low Roof	N	0.0%	ND	7	N/A
08-23C	Roof Core (insulation)	Low Roof	N	0.0%	ND	7	N/A
08-24A T	Roof Core (membrane)	Low Roof	N	0.0%	ND	7	N/A
08-24B	Roof Core (cementitious)	Low Roof	N	0.0%	ND	7	N/A
08-24C	Roof Core (insulation)	Low Roof	N	0.0%	ND	7	N/A

**Assessment Categories**

- |  |   |
|--|---|
| (1) Thermal Systems Insulation – Good Condition        | (5) Surfacing – Damaged                   |
| (2) Thermal Systems Insulation – Damaged               | (6) Surfacing – Significantly Damaged     |
| (3) Thermal Systems Insulation – Significantly Damaged | (7) Miscellaneous – Good Condition        |
| (4) Surfacing – Good Condition                         | (8) Miscellaneous – Damaged               |
|  | (9) Miscellaneous – Significantly Damaged |

**Asbestos Present**

- |                      |                          |
|----------------------|--------------------------|
| AMOS – Amosite       | ACTI – Actinolite        |
| CHRY – Chrysotile    | ND – None Detected       |
| CROC – Crocidolite   | NT – Not Tested          |
| ANTH – Anthophyllite | PACM – Presumed ACM      |
| TREM – Tremolite     | <b>Asbestos Detected</b> |

## CONCLUSIONS/RECOMMENDATIONS

### Asbestos Inspection

The limited asbestos survey performed by Trident Environmental Services, Inc. on June 5, 2018 of the roof of The Arsenal Roof located at 713 Craven Street in Beaufort, South Carolina **did** reveal the presence of ACM's. Renovation or demolition activities that will disturb the ACM's will require removal per state and federal regulations. Asbestos materials can become hazardous when, due to damage, disturbance, or deterioration over time, they release asbestos fibers into the air of the building. All areas that contain asbestos should be utilized in a controlled manner to reduce the potential for disturbance. OSHA requires notification to all trades/contractors about the condition of the ACM's to prevent possible occupational exposures.

Demolition activities in public and commercial building are regulated by OSHA, EPA, and SCDHEC. Code 40 of Federal Regulations Part 61, Subpart M, Final Rule, "National Emissions Standards for Hazardous Air Pollutants" (NESHAP), and SCDHEC Regulation 61-86.1 require the proper removal and disposal of ACM that is affected by renovation or demolition. Demolition of the subject structures will require written notification, proper transportation, and disposal per state and federal regulations.

**PHOTOGRAPHS**  
**The Arsenal/Roof – 713 Craven Street – Beaufort, SC**



HOMOGENEOUS AREA 01  
ROOF FLASHING (LOW ROOF)



HOMOGENEOUS AREA 02  
ROOF CORE (LOW ROOF)



HOMOGENEOUS AREA 03  
TAR APPLICATION (LOW ROOF)



HOMOGENEOUS AREA 04  
ROOF FLASHING (HIGH ROOF)



HOMOGENEOUS AREA 05  
ROOF CORE (HIGH ROOF)



HOMOGENEOUS AREA 06  
CLOTH (HIGH ROOF)

**PHOTOGRAPHS**

**The Arsenal/Roof – 713 Craven Street – Beaufort, SC**



HOMOGENEOUS AREA 07  
ROOF FLASHING (LOW ROOF)



HOMOGENEOUS AREA 08  
ROOF CORE (LOW ROOF)

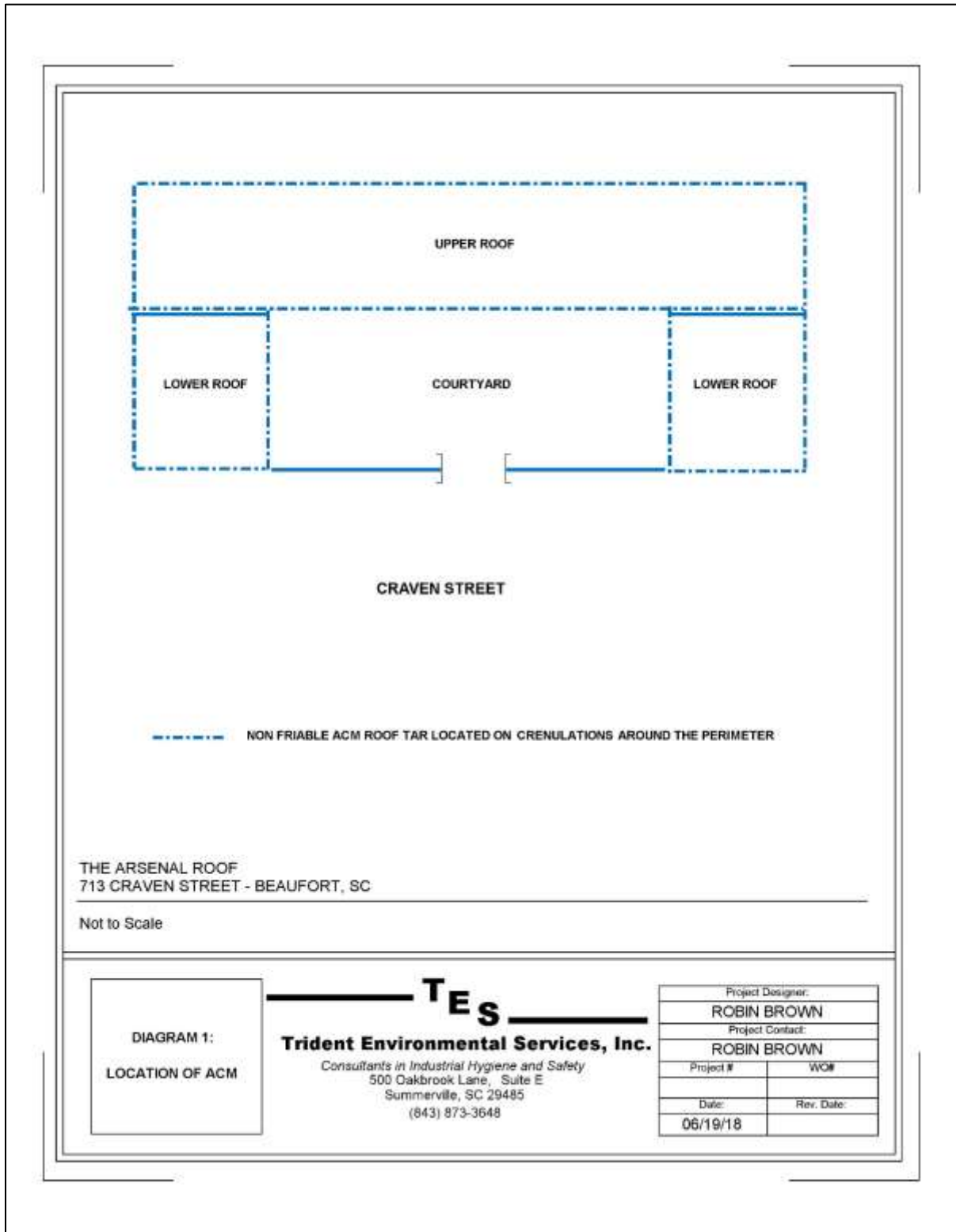


DIAGRAM 1:  
 LOCATION OF ACM

**TES**  
**Trident Environmental Services, Inc.**  
 Consultants in Industrial Hygiene and Safety  
 500 Oakbrook Lane, Suite E  
 Summerville, SC 29485  
 (843) 873-3648

Project Designer:	
ROBIN BROWN	
Project Contact:	
ROBIN BROWN	
Project #	WOM
Date:	Rev. Date:
06/19/18	

**LIMITED  
ASBESTOS SURVEY**

Inspection Date: 06/05/2018

Preparation Date: 06/11/2018

Inspected By:




Kevin E Leedy  
S.C. Inspector License ASB – 20589

**SCDHEC ISSUED**  
Asbestos ID Card

---

**Kevin Leedy**

	<b>CONSULTPD</b>	<b>ASB-22878</b>	<b>06/22/18</b>
	<b>CONSULTBI</b>	<b>ASB-20589</b>	<b>01/24/19</b>
	<b>AIRSAMPLER</b>	<b>ASB-20498</b>	<b>01/25/19</b>

Expiration Date:

Prepared By:



Hunter Hanson  
S.C. Inspector License BI – 01468

**SCDHEC ISSUED**  
Asbestos ID Card

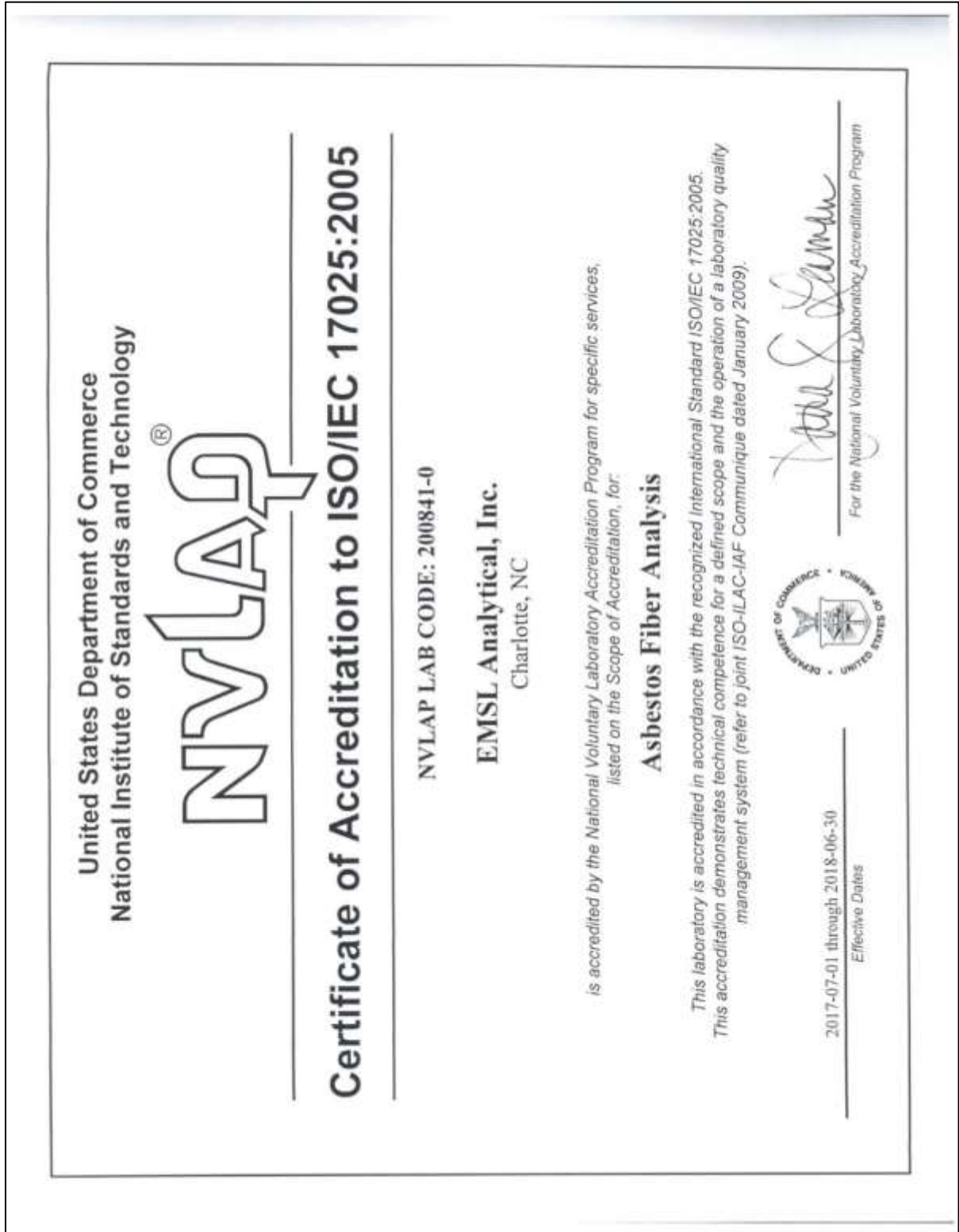
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**Hunter Hanson**

	<b>CONSULTBI</b>	<b>BI-01468</b>	<b>10/28/18</b>
	<b>AIRSAMPLER</b>	<b>AS-00413</b>	<b>01/06/19</b>

Expiration Date:





United States Department of Commerce  
National Institute of Standards and Technology



**Certificate of Accreditation to ISO/IEC 17025:2005**

NVLAP LAB CODE: 200841-0

**EMSL Analytical, Inc.**  
Charlotte, NC

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:

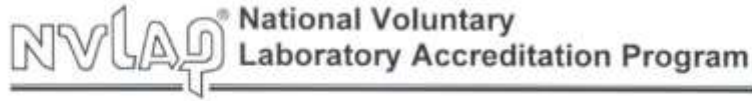
**Asbestos Fiber Analysis**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).



*John S. Sambo*  
For the National Voluntary Laboratory Accreditation Program

2017-07-01 through 2018-06-30  
Effective Dates



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMSL Analytical, Inc.  
376 Crompton Street  
Charlotte, NC 28273  
Mr. Lee Plumley  
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http://www.emsl.com

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 200841-0

Bulk Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A01	EPA – Appendix E to Subpart E of Part 763 -- Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

<u>Code</u>	<u>Description</u>
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program



**EMSL Analytical, Inc.**  
 10001 Southern Loop Blvd Pineville, NC 28134  
 Tel/Fax: (704) 525-2205 / (704) 525-2382  
 http://www.EMSL.com / charlotte@emsl.com

EMSL Order: 411804493  
 Customer ID: TRID50  
 Customer PO:  
 Project ID:

**Attention:** Kevin Leedy  
 Trident Environmental Services, Inc.  
 500 Oakbrook Lane  
 Suite E  
 Summerville, SC 29485  
**Project:** The Arsenal - Beaufort, SC

**Phone:** (843) 670-9987  
**Fax:**  
**Received Date:** 06/07/2018 9:50 AM  
**Analysis Date:** 06/07/2018  
**Collected Date:** 06/05/2018

**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
01-01-Membrane #11804493-0001	Low Roof - Roof Flashing	Gray/White Non-Fibrous Homogeneous	10% Synthetic	8% Ca Carbonate 82% Non-fibrous (Other)	None Detected
01-01-Insulation #11804493-0001A	Low Roof - Roof Flashing	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01-02-Membrane #11804493-0002	Low Roof - Roof Flashing	White Fibrous Homogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
01-02-Insulation #11804493-0002A	Low Roof - Roof Flashing	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
01-03-Insulation #11804493-0002B	Low Roof - Roof Flashing	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
02-04-Membrane #11804493-0003	Low Roof - Roof Core	Gray/White Fibrous Heterogeneous	8% Synthetic	8% Ca Carbonate 84% Non-fibrous (Other)	None Detected
02-04-Insulation #11804493-0003A	Low Roof - Roof Core	Yellow Non-Fibrous Homogeneous		5% Ca Carbonate 95% Non-fibrous (Other)	None Detected
02-05-Membrane #11804493-0004	Low Roof - Roof Core	White Fibrous Homogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
02-05-Insulation #11804493-0004A	Low Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
02-06-Insulation #11804493-0004B	Low Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
03-07 #11804493-0005	Low Roof - Tar Application	Brown/Black Fibrous Heterogeneous	15% Cellulose	70% Non-fibrous (Other)	15% Chrysotile
03-08 #11804493-0005B	Low Roof - Tar Application				Positive Stop (Not Analyzed)
04-10-Membrane #11804493-0007	High Roof - Roof Flashing	Gray/Black/Yellow Fibrous Heterogeneous	8% Synthetic	8% Ca Carbonate 84% Non-fibrous (Other)	None Detected
04-10-Cementitious Layer #11804493-0007A	High Roof - Roof Flashing	Gray Non-Fibrous Homogeneous	15% Min. Wool	10% Ca Carbonate 75% Non-fibrous (Other)	None Detected
04-10-Tar #11804493-0007B	High Roof - Roof Flashing	Black Fibrous Homogeneous	10% Glass	90% Non-fibrous (Other)	None Detected
04-10-Insulation #11804493-0007C	High Roof - Roof Flashing	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 06/07/2018 15:05:13



**EMSL Analytical, Inc.**  
 10001 Southern Loop Blvd Pineville, NC 28134  
 Tel/Fax: (704) 525-2205 / (704) 525-2382  
 http://www.EMSL.com / charlotte@emsl.com

EMSL Order: 411804493  
 Customer ID: TRID50  
 Customer PO:  
 Project ID:

**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos % Type
			% Fibrous	% Non-Fibrous	
04-11-Membrane #11804493-0008	High Roof - Roof Flashing	Gray/Black/Green Fibrous Homogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
04-11-Cementitious Layer #11804493-0009A	High Roof - Roof Flashing	Gray Fibrous Homogeneous	20% Min. Wool	80% Non-fibrous (Other)	None Detected
04-11-Tar #11804493-0008B	High Roof - Roof Flashing	Black Fibrous Homogeneous	10% Glass	90% Non-fibrous (Other)	None Detected
04-11-Insulation #11804493-0008C	High Roof - Roof Flashing	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
04-12-Cementitious Layer #11804493-0009D	High Roof - Roof Flashing	Gray Non-Fibrous Homogeneous	15% Min. Wool	10% Ca Carbonate 75% Non-fibrous (Other)	None Detected
04-12-Insulation #11804493-0008E	High Roof - Roof Flashing	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
05-13-Membrane #11804493-0009	High Roof - Roof Core	Gray/Black/Yellow Fibrous Heterogeneous	8% Synthetic	10% Ca Carbonate 82% Non-fibrous (Other)	None Detected
05-13-Tar #11804493-0009A	High Roof - Roof Core	Black Non-Fibrous Homogeneous	8% Glass	5% Ca Carbonate 87% Non-fibrous (Other)	None Detected
05-13-Insulation #11804493-0009B	High Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
05-14-Membrane #11804493-0010	High Roof - Roof Core	Gray/Green Fibrous Homogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
05-14-Tar #11804493-0010A	High Roof - Roof Core	Black Non-Fibrous Homogeneous	8% Glass	92% Non-fibrous (Other)	None Detected
05-14-Insulation #11804493-0010B	High Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
05-15-Insulation #11804493-0010C	High Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
06-16 #11804493-0011	High Roof - Cloth	Gray/White Fibrous Heterogeneous	8% Synthetic	8% Ca Carbonate 84% Non-fibrous (Other)	None Detected
06-17 #11804493-0012	High Roof - Cloth	Gray/White Fibrous Heterogeneous	8% Synthetic	10% Ca Carbonate 82% Non-fibrous (Other)	None Detected
06-18 #11804493-0013	High Roof - Cloth	Green/Beige Fibrous Homogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
07-19 #11804493-0014	Low Roof - Roof Flashing	Gray/White Fibrous Heterogeneous	5% Synthetic 10% Min. Wool	8% Ca Carbonate 77% Non-fibrous (Other)	None Detected
07-20 #11804493-0015	Low Roof - Roof Flashing	Gray/White Fibrous Homogeneous	8% Synthetic 5% Min. Wool	87% Non-fibrous (Other)	None Detected

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EMSL Order: 411804493  
 Customer ID: TRID50  
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 Project ID:

**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
08-22-Membrane #11804493-001E	Low Roof - Roof Core	Gray/Green Fibrous Heterogeneous	10% Synthetic	5% Ca Carbonate 85% Non-fibrous (Other)	None Detected
08-22-Cementitious Layer #11804493-001EA	Low Roof - Roof Core	Gray Non-Fibrous Homogeneous	15% Min. Wool	8% Ca Carbonate 77% Non-fibrous (Other)	None Detected
08-22-Insulation #11804493-001EB	Low Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
08-23-Membrane #11804493-001F	Low Roof - Roof Core	Gray Fibrous Homogeneous	10% Synthetic	90% Non-fibrous (Other)	None Detected
08-23-Cementitious Layer #11804493-001FA	Low Roof - Roof Core	Gray Fibrous Homogeneous	<1% Cellulose 15% Min. Wool	85% Non-fibrous (Other)	None Detected
08-23-Insulation #11804493-001FB	Low Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
08-24-Cementitious Layer #11804493-001FC	Low Roof - Roof Core	Gray Fibrous Homogeneous	10% Min. Wool	8% Ca Carbonate 82% Non-fibrous (Other)	None Detected
08-24-Insulation #11804493-001FD	Low Roof - Roof Core	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analysis:  
 Eric Loomis (25)  
 Kristie Elliott (16)

*Lee Plumley*  
 Lee Plumley, Laboratory Manager  
 or Other Approved Signatory

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 Samples analyzed by EMSL Analytical, Inc. Pineville, NC NVLAP Lab Code 200841-0 WA 3303 00312

Initial report from: 06/07/2018 15:05:13



**EMSL Analytical, Inc.**  
 10801 Southern Loop Blvd Pineville, NC 28134  
 Tel/Fax: (704) 525-2205 / (704) 525-2382  
 http://www.EMSL.com / charlotte@emsl.com

EMSL Order: 411804493  
 Customer ID: TRID50  
 Customer PO:  
 Project ID:

**Attention:** Kevin Leedy  
 Trident Environmental Services, Inc.  
 500 Oakbrook Lane  
 Suite E  
 Summerville, SC 29485  
**Project:** The Arsenal - Beaufort, SC

**Phone:** (843) 670-9987  
**Fax:**  
**Received Date:** 06/07/2018 9:50 AM  
**Analysis Date:** 06/09/2018  
**Collected Date:** 06/05/2018

**Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1**

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
01-03-Membrane 411804493-0018	Low Roof - Roof Flashing	Gray Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
02-09-Membrane 411804493-0019	Low Roof - Roof Core	Gray/Green Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
04-12-Membrane 411804493-0020	High Roof - Roof Flashing	Gray Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
04-12-Tar 411804493-0021	High Roof - Roof Flashing	Black Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
05-15-Membrane 411804493-0022	High Roof - Roof Core	Gray Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
05-15-Tar 411804493-0023	High Roof - Roof Core	Black Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
07-21 411804493-0024	Low Roof - Roof Flashing	Gray Non-Fibrous Heterogeneous	100	None	No Asbestos Detected
08-24-Membrane 411804493-0025	Low Roof - Roof Core	Gray Non-Fibrous Heterogeneous	100	<0.1 Fibrous_Other	No Asbestos Detected

Analyst(s)  
 Aaron Hartley (8)


Lee Plumley, Laboratory Manager  
 or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. insulation, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Pineville, NC.

Initial report from: 06/11/2018 12:19:36




OrderID: 411804493



**EMISL ANALYTICAL, INC.**  
LABORATORY • ANALYSIS • TESTING

**Asbestos Bulk Building Material  
 Chain of Custody**  
**EMSL Order Number (Lab Use Only):**  
411804493

EMSL Analytical, Inc.  
 10801 Southern Loop Blvd  
  
 Pineville, NC 28134  
 PHONE: (704) 525-2205  
 FAX: (704) 525-2382

Company: TRIDENT ENVIRONMENTAL SERVICES, INC		EMSL-Bill to: <input checked="" type="checkbox"/> Same <input type="checkbox"/> Different <small>* If Bill to is Different note instructions in Comments**</small>	
Street: 500 Oakbrook Lane Suite E		<small>Third Party Billing requires written authorization from third party</small>	
City: Summerville	State/Province: SC	Zip/Postal Code: 29485	Country: US
Report To (Name): Kevin Leedy		Telephone #: 8438733648	
Email Address: kevinleedy@tridentenvironmental.com		Fax #:	Purchase Order:
Project Name/Number: The Arsenal - Beaufort, SC		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email <input type="checkbox"/> Mail	
U.S. State Samples Taken: SC		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	
<b>Turnaround Time (TAT) Options* – Please Check</b>			
<input type="checkbox"/> 3 Hour <input type="checkbox"/> 6 Hour <input checked="" type="checkbox"/> 24 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 72 Hour <input type="checkbox"/> 96 Hour <input type="checkbox"/> 1 Week <input type="checkbox"/> 2 Week			
<small>*For TEM Air 3 hr through 6 hr, please call ahead to schedule. There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.</small>			
<b>PLM - Bulk (reporting limit)</b>		<b>TEM - Bulk</b>	
<input checked="" type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NIOSH 9002 (<1%) <input type="checkbox"/> NY ELAP Method 198.1 (friable in NY) <input type="checkbox"/> NY ELAP Method 198.6 NOB (non-friable-NY) <input type="checkbox"/> OSHA ID-191 Modified <input type="checkbox"/> Standard Addition Method		<input checked="" type="checkbox"/> TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1 <input type="checkbox"/> NY ELAP Method 198.4 (TEM) <input type="checkbox"/> Chatfield Protocol (semi-quantitative) <input type="checkbox"/> TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2 <input type="checkbox"/> TEM Qualitative via Filtration Prep Technique <input type="checkbox"/> TEM Qualitative via Drop Mount Prep Technique Other: <input type="checkbox"/>	
<input checked="" type="checkbox"/> Check For Positive Stop – Clearly Identify Homogenous Group		Date Sampled: 06/05/18	
Samplers Name: Leedy		Samplers Signature: 	
Sample #	HA #	Sample Location	Material Description
		See attached COC	
Client Sample # (s): 01-01 - 08-24	Total # of Samples: 24		
Relinquished (Client): 	Date: 6/6/18 Time: 1616		
Received (Lab): 	Date: 6/12 Time: 950 EST FX		
Comments/Special Instructions:	8060 8870 8679		

OrderID: 411804493

411804493

**TES**  
 Trident Environmental Services, Inc.  
 Consultants in Industrial Hygiene and Safety  
 500 Oakbrook Lane, Suite E  
 Summerville, SC 29485  
 Phone (843) 873-3648  
 Fax (843) 821-1767

**CHAIN OF CUSTODY FORM**  
**Asbestos Bulk Samples**

Project Name: The Arsenal - Date: 6/5/18  
 Location: Beaufort, SC

DESCRIPTION OF EACH SAMPLE AREA					ASSESSMENT OF MATERIALS			
Homog Area	Sample ID	Location	Description	Friable (+)	Friable (-)	Asbestos Type	COND Assess	HAZ Assess
01	01	Low Roof	roof flashing		X			
	02					X		
	03					X		
02	04			roof core		X		
	05					X		
	06					X		
03	07			tar applicator		X		
	08					X		
	09					X		
04	10	High Roof	roof flashing		X			
	11					X		
	12					X		
05	13			roof core		X		
	14					X		
	15					X		
06	16			cloth	X			
	17				X			
	18				X			
07	19	Low Roof	roof flashing		X			
	20					X		
	21					X		

<b>CONDITION Assessment Categories</b> (1) Thermal Systems Insulation - Good Condition (2) Thermal Systems Insulation - Damaged (3) Thermal Systems Insulation - Significantly Damaged (4) Surfacing - Good Condition (5) Surfacing - Damaged (6) Surfacing - Significantly Damaged	<b>Asbestos Present</b> (1) Amosite (2) Chrysotile (3) Crocidolite (4) Anthophyllite (5) Tremolite (6) Actinolite	<b>HAZARD Assessment Categories</b> G = Good Condition D = Damaged S = Significantly Damaged LPD = Low Potential for Disturbance
---	---	--

Samples Collected by: [Signature] Date / Time: 6/5/18  
 Samples Received by: \_\_\_\_\_ Date / Time: \_\_\_\_\_

Page 2 Of 3



