SECTION 01013 - SUMMARY OF THE WORK - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. State Project No. T201380104 … Kent County
Asbestos Services
"Hanger" Building (Task 27)
Agreement #1542, Asbestos Management Services
56 Sign Shop Lane
Dover, Delaware

1. Owner: Delaware Department of Transportation (DelDOT)

B. **Contract Documents**:

Prepared for the project by BrightFields, Inc.
801 Industrial Street,
Wilmington, DE 19801

Conditions that are indicated on the Contract Documents include but are not limited to the following:

1. Master Specification for the Delaware Department of Transportation, dated March 1, 2011 and approved on March 4, 2011;
2. Specification Addenda.

Notices & Permits:

1. Job Site Notices & Permits:
    a. Equal Employment Opportunity
    b. Material Safety Data Sheets
    c. Federal Environmental Protection Agency (EPA) 10-day Notification; if required
    d. State of Delaware (DNREC) 10-day Notification; if required
    e. Prevailing Wage Determination
    f. Emergency Planning Procedures
    g. Sub-Contractors List

Work to be performed subsequent to work under this contract: Although DelDOT properties are subject for demolition, only asbestos-containing material (ACM) or ACM contaminated materials are to leave the site.

All other building materials will be inventoried to ensure that nothing else leaves the site. Water and electricity will be available for abatement activities onsite. Contractor shall make themselves familiar with available utility and follow the requirements of Section 01503. The Contractor will be responsible for making any connections or providing water or electric from the source provided.

Contractor will also be responsible for following all Occupational Health and Safety Administration (OSHA) guidelines for the duration of the project.

C. **The Work** consists of the partial demolition of non- asbestos-containing materials to access the following asbestos-containing materials for proper removal:

Roofing Materials

i. Asbestos-containing roofing tar and associated felt backing (black) associated with small isolated flat roof accessed from office 214 or the southern HVAC chase located on the second floor – estimated 348 square feet (5% Chrysotile).

ii. Asbestos-containing silver roof coat associated with the lowest slightly angled roof over Rooms 124 and 128 – estimated 570 square feet (1.5% Chrysotile).

iii. Asbestos-containing silver roof coat associated with the second level flat roof primarily over the boiler, sign fabrication, and screening rooms – estimated 4,008 square feet (2.75% Chrysotile).

iv. Asbestos-containing silver flashing and patch coating associated with penetrations throughout the second level flat roof primarily over the boiler, sign fabrication, and screening rooms – estimated 4,008 square feet (2.75% Chrysotile).

v. Asbestos-containing silver roof coat associated with the third level flat roof over the second level office space – estimated 4,967 square feet (3% Chrysotile).

vi. Asbestos-containing asphalt rolled roofing associated with the third level flat roof over the second level office space – estimated 4,967 square feet (6% Chrysotile).

Thermal System Insulation

i. Asbestos-containing cementitious ventilation system duct and vent hood located in the screening room and across the 2nd Level flat roof – estimated 65 linear feet of 2’ diameter duct, 45 linear feet of 1.5’ diameter duct, and 68 square feet on vent hood (15 Chrysotile and 15% Crocidolite).

ii. Asbestos-containing joint caulk associated with ventilation system duct and vent hood joint connections located in the screening room and across the second level flat roof – estimated 140 linear feet (8% Chrysotile).

iii. Asbestos-containing rope gasket associated with ventilation system duct and vent hood joint connections located in the screening room and across the second level flat roof – estimated 140 linear feet (15% Chrysotile).

iv. Asbestos-containing vibration damper cloth associated with ventilation system duct at the connection to the blower fan located on the second level flat roof – estimated 8 square feet (90% Chrysotile).

v. Asbestos-containing unused pipe insulation and associated debris located in the attic space above the rear maintenance shop – estimated 800 square feet (15% Chrysotile and 8% Amosite). Please note that two unused 4 foot sections of the pipe insulation were observed with damage debris scattered across the attic floor and on items stored in the attic.

vi. Asbestos-containing 4” cement pipe insulation located in maintenance shop, office and storage area, above the drop and wood ceiling in the sign fabrication room, through a portion of the screening room, and in the boiler room – estimated 250 linear feet (15% Chrysotile and 8% Amosite).

vii. Asbestos-containing 2” corrugated pipe insulation located in front office area, portions of the screening room, and in the boiler room – estimated 400 linear feet (15% Chrysotile).

viii. Asbestos-containing mudded elbows and valves associated with the brown paper wrapped fiberglass pipe insulation located in front office area, portions of the screening room, and in the boiler room – estimated 25 linear feet (5% Chrysotile).

ix. Asbestos-containing silver duct coating associated with the exterior 2' x 2' box duct located on the second level flat roof – estimated 1,250 square feet (3% Chrysotile).

x. Asbestos-containing asphalt duct coating associated with the exterior 2' x 2' box duct located on the second level flat roof – estimated 1,250 square feet (5% Chrysotile).

xi. Asbestos-containing duct coating associated with the interior 2' x 2' metal box duct located along the northern wall of the metal room and in the boiler room – estimated 450 square feet (10% Chrysotile).

xii. Asbestos-containing vibration damper cloth associated with two large air handling units located in the boiler room – estimated 20 square feet (80% Chrysotile).

xiii. Asbestos-containing vibration damper cloth associated with three connections of the 2' x 2' metal box duct to the centrally located large air handling unit located in the boiler room – estimated 24 square feet (80% Chrysotile).

Miscellaneous

i. Asbestos-containing cementitious siding panels (gray) as exterior and interior walls and as ceilings in room 122 and chase areas adjacent to rooms 113 and 113A – estimated 14,870 square feet (15% Chrysotile).

ii. Asbestos-containing sheet good (white with small multi-color squares pattern) located in the 1st floor front office area under carpet – estimated 2,000 square feet (8% Chrysotile).

1. **Removal Procedures:**

Removal of asbestos-containing roofing materials and exterior cementitious siding panels (miscellaneous):

i. Please note: Abatement activities cannot begin or be completed without the Owner's licensed Project Monitor present.

ii. Install a remote 3-stage decontamination unit with shower adjacent to the work area (Section 01563).

iii. An established hot zone will be established using asbestos danger tape (red in color). Two layers of polyethylene sheeting will be placed on the surface below the asbestos-containing roofing material.

iv. Material that is not consider asbestos-containing or can be segregated from the asbestos-containing material in a manner that the material is free of asbestos-containing debris, may be removed and staged for disposal by others.

v. Once an approval to commence is received from the Owners' representative, the roofing materials associated with the structure shall be removed in a manner preventing the materials from becoming friable. The Owners' representative will not tolerate the free fall of any asbestos-containing roofing materials during abatement activities. Amended water shall be used during the duration of the removal procedures. Dry removal of any asbestos-containing materials will not be tolerated.

vi. A thorough visual inspection will be performed to evaluate if the area has been sufficiently cleaned of ACM and all visible debris.

vii. During abatement activities, the Owner's representative may collect phase contrast microscopy air samples to evaluate if the Contractor is removing materials in a non-friable manner.

Removal of asbestos-containing Thermal Systems Insulation (TSI):
Method 1: Wrap and Cut/Tented Glove Bag

i. Please note: Abatement activities cannot begin or be completed without the Owner's licensed Project Monitor present.

ii. Install a remote 3-stage decontamination unit with shower that is adjacent to the work area (Section 01563).

iii. Install and run high efficiency particulate absolute (HEPA) air filtration devices in each work area. Establish and maintain a pressure differential of -0.02 inches of water measured on a strip chart recorder or other approved method in each work area. The Owners' representative shall inspect and record the pressure differential at least 2 times per 8-hour shift. The Contractor shall supply a pressure differential manometer that is capable of monitoring and recording on a strip chart, pressure differential of 0.005 inches of water. The manometer shall be equipped with an automatically activated alarm system that will sound if the pressure differential drops below the pre-set value. The Owner's representative may request that all strip charts be turned at the completion of the project phase. Work shall not commence until an adequate pressure differential is achieved and maintained in each work area.

iv. Establish a tent enclosure around the pipe insulation area utilizing one layer of six mill polyethylene sheeting. In addition install a floor consisting of polyethylene sheeting under the asbestos-containing pipe insulation. Please note this work may require separate tent enclosures depending on the obstructions from building materials limiting access.

v. Once the tent enclosure has been erected and approved by the owner's licensed Project Monitor, adequately wet the pipe insulation utilizing amended water and wrap the pipe insulation with two layers of six mill polyethylene sheeting. If necessary utilize glove bag methods in accordance with Section 01529 to create access points on the pipe to cut the section of pipe out of the structure.

vi. Upon removal of the wrapped pipe from the work areas, the contractor shall sufficiently clean the work area utilizing a HEPA vacuum cleaner and deconstruct the tent enclosure, Section 01711. All asbestos-containing materials are to be properly labeled and removed from the work area to the waste trailer. After this procedure is completed and a visual inspection has passed, the contractor shall deconstruct the tent enclosure.

vii. HEPA filtered air filtration devices shall remain in use until the tent enclosure has been completely deconstructed.

viii. After this procedure is completed and a visual inspection has passed, final clearance sampling will be performed by the Owner's representative. Final Clearance shall be conducted by phase contrast microscopy (PCM) analysis using EPA approved protocol.

ix. HEPA filtered air filtration devices shall remain in use until final analytical clearance has been established.

Removal of asbestos-containing Thermal Systems Insulation (TSI):
Method 2: Type C Gross Removal

i. Please note: Abatement activities cannot begin or be completed without the Owner's licensed Project Monitor present.

ii. Please note in the event that the gross removal technique is utilized, abatement activities will be completed under Type "C" Supplied Air Respiratory Protection, as described in Section 01562 – Respiratory Protection. Each work area shall establish the following guidelines.

iii. Install 3-stage decontamination unit with shower that is attached to the work area. The decontamination unit will be erected in such a manner as to allow for a separate equipment room/bag-out. In no instance will the personal decontamination unit be used as a bag-out/equipment passage unless there is only one entry way into the work area and the method has been approved by the Owner's Project Monitor present.

iv. Install and run high efficiency particulate absolute (HEPA) air filtration devices in each work area. Pre-clean the entire work area. Install critical barriers within the individual work areas. Install a minimum of 2 layers of polyethylene sheeting to walls, ceilings and floors of work area. Please note that all critical barriers be sealed for the entire area.

v. Establish and maintain a pressure differential of -0.02 inches of water measured on a strip chart recorder or other approved method in each work area. The Owners' representative shall inspect and record the pressure differential at least 2 times per 8-hour shift. The Contractor shall supply a pressure differential manometer that is capable of monitoring and recording on a strip chart, pressure differential of 0.005 inches of water. The manometer shall be equipped with an automatically activated alarm system that will sound if the pressure differential drops below the pre-set value. The Owner's representative may request that all strip charts be turned at the completion of the project phase. Work shall not commence until an adequate pressure differential is achieved and maintained in each work area.

vi. A pre-commencement inspection shall be conducted by the abatement Contractor's supervisor and the Owner's representative; when approval from the Owner's representative is received the abatement activities may commence. The asbestos-containing materials shall be adequately wetted with amended water during the abatement process. Dry removal of any asbestos-containing materials will not be tolerated. The asbestos-containing building materials shall be continuously wetted and immediately placed into 6 ml. asbestos disposal bags for proper disposal, according to section 02081 of the Master Specification.

vii. Once an approval to commence is received from the owners' representative, the thermal system insulation shall be removed After removal of all thermal system insulation within the work area is complete, the area must be thoroughly cleaned and encapsulated. Amended water shall be used during the duration of the removal procedures. Dry removal of any asbestos-containing materials will not be tolerated.

viii. After this procedure is completed and a visual inspection has passed, final clearance sampling will be performed by the Owner's representative. Final Clearance shall be conducted by phase contrast microscopy (PCM) analysis using EPA approved protocol.

ix. HEPA filtered air filtration devices shall remain in use until final analytical clearance has been established.

Removal of asbestos-containing Thermal Systems Insulation and debris located in maintenance shop attic space (TSI):

i. Please note: Abatement activities cannot begin or be completed without the Owner's licensed Project Monitor present.

ii. Please note in the event that the gross removal technique is utilized, abatement activities will be completed under Type "C" Supplied Air Respiratory Protection, as described in Section 01562 – Respiratory Protection. Each work area shall establish the following guidelines.

iii. Install 3-stage decontamination unit with shower that is attached to the work area. The decontamination unit will be erected in such a manner as to allow for a separate equipment room/bag-out. In no instance will the personal decontamination unit be used as a bag-out/equipment passage unless there is only one entry way into the work area and the method has been approved by the Owner's Project Monitor present.

iv. Install and run high efficiency particulate absolute (HEPA) air filtration devices in each work area. Pre-clean the entire work area. Install critical barriers within the individual work areas. Install a minimum of 2 layers of polyethylene sheeting to walls, ceilings and floors of work area. Please note that all critical barriers be sealed for the entire area.

v. Establish and maintain a pressure differential of -0.02 inches of water measured on a strip chart recorder or other approved method in each work area. The Owners' representative shall inspect and record the pressure differential at least 2 times per 8-hour shift. The Contractor shall supply a pressure differential manometer that is capable of monitoring and recording on a strip chart, pressure differential of 0.005 inches of water. The manometer shall be equipped with an automatically activated alarm system that will sound if the pressure differential drops below the pre-set value. The Owner's representative may request that all strip charts be turned at the completion of the project phase. Work shall not commence until an adequate pressure differential is achieved and maintained in each work area.

vi. A pre-commencement inspection shall be conducted by the abatement Contractor's supervisor and the Owner's representative; when approval from the Owner's representative is received the abatement activities may commence. The asbestos-containing materials shall be adequately wetted with amended water during the abatement process. Dry removal of any asbestos-containing materials will not be tolerated. The asbestos-containing building materials shall be continuously wetted and immediately placed into 6 ml. asbestos disposal bags for proper disposal, according to section 02081 of the Master Specification.

vii. Please note that all debris located within the attic space is considered contaminated and will be disposed as asbestos-contaminated waste.

viii. Once an approval to commence is received from the owners' representative, the thermal system insulation shall be removed. After removal of all thermal system insulation and associated debris within the work area is complete, the area must be thoroughly cleaned and encapsulated. Amended water shall be used during the duration of the removal procedures. Dry removal of any asbestos-containing materials will not be tolerated.

ix. After this procedure is completed and a visual inspection has passed, final clearance sampling will be performed by the Owner's representative. Final Clearance shall be conducted by phase contrast microscopy (PCM) analysis using EPA approved protocol.

x. HEPA filtered air filtration devices shall remain in use until final analytical clearance has been established.

Removal of asbestos-containing interior cementitious siding panels and asbestos-containing flooring materials (miscellaneous):

i. Please note: Abatement activities cannot begin or be completed without the Owner's licensed Project Monitor present. Each work area shall establish the following guidelines.

ii. Install 3-stage decontamination unit with shower that is attached to the work area. The decontamination unit will be erected in such a manner as to allow for a separate equipment room/bag-out. In no instance will the personal decontamination unit be used as a bag-out/equipment passage unless there is only one entry way into the work area and the method has been approved by the Owner's Project Monitor present.

iii. Install and run high efficiency particulate absolute (HEPA) air filtration devices in each work area. Pre-clean any areas needing critical barriers and install critical barriers within the individual work areas. Please note that all critical be sealed for the entire area.

iv. Establish and maintain a pressure differential of -0.02 inches of water measured on a strip chart recorder or other approved method in each work area. The Owners' representative shall inspect and record the pressure differential at least 2 times per 8-hour shift. The Contractor shall supply a pressure differential manometer that is capable of monitoring and recording on a strip chart, pressure differential of 0.005 inches of water. The manometer shall be equipped with an automatically activated alarm system that will sound if the pressure differential drops below the pre-set value. The Owner's representative may request that all strip charts be turned at the completion of the project phase. Work shall not commence until an adequate pressure differential is achieved and maintained in each work area.

v. A pre-commencement inspection shall be conducted by the abatement Contractor's supervisor and the Owner's representative; when approval from the Owner's representative is received the abatement activities may commence. The asbestos-containing materials shall be adequately wetted with amended water during the abatement process. Dry removal of any asbestos-containing materials will not be tolerated. The asbestos-containing building materials shall be continuously wetted and immediately placed into 6 ml. asbestos disposal bags for proper disposal, according to section 02081 of the Master Specification.

i. Once an approval to commence is received from the owners' representative, the

cementitious panels and/or flooring materials shall be removed in a manner preventing the materials from becoming friable. BrightFields will not tolerate the free fall of any asbestos-containing cementitious panels during abatement activities. Amended water shall be used during the duration of the removal procedures. Dry removal of any asbestos-containing materials will not be tolerated

vi. After this procedure is completed and a visual inspection has passed, final clearance sampling will be performed by the Owner's representative. Final Clearance shall be conducted by phase contrast microscopy (PCM) analysis using EPA approved protocol.

vii. HEPA filtered air filtration devices shall remain in use until final analytical clearance has been established.

2. **The following inspections shall be performed during the project phases indicated:**

a. Pre-Cleaning: A visual inspection of all pre-cleaned surfaces must be performed by the Contractors' on-site supervisor and the Owners' representative together prior to any abatement activities.

b. Daily Project Inspections: An inspection of the integrity of the work area shall be performed a minimum of twice daily by the Owners representative.

c. Final Visual Inspection (air clearance): A final visual inspection of the work area shall be performed by the Contractors' on-site supervisor and Owners' representative prior to aggressive final air clearance sampling.

d. Project Completion Inspection (post air clearance): A final visual inspection of the work area shall be performed by the Contractors' on-site supervisor and Owners' representative after aggressive final air clearance sampling has passed and containment system has been demobilized, prior to turning the area (s) over to the Owner.

Minimum Respiratory protection for this project shall include **full face Powered Air Purifying Respirators (PAPR)** for set up and removal of the asbestos-containing materials. In the event that the Contractor chooses to remove the thermal system insulation via "method 2", Type "C" Supplied Air Respiratory Protection will be required.

All existing electric power in the work area shall be confirmed de-energized by the abatement Contractor and temporary power shall be brought to the work area from outside – see section 01503 of the Specification. The Owner shall not supply temporary utilities. It is the Contractors' responsibility to comply with all OSHA requirements.

All workers must have their current State of Delaware Asbestos Worker/Supervisor Badge and current medical information available daily for verification and recording purposes by the Owners' representative in order to work on the project. NO EXCEPTIONS SHALL BE TOLERATED.

The abatement Contractor shall supply extra, new respirators (PAPR or Type "C"), respirator cartridges, disposable coveralls (w/head and foot covers) at the decontamination unit for use by authorized visitors as well as the Owners' representative at all times. All decontamination procedures shall be strictly followed and enforced. A signed copy of the Workers' Acknowledgment shall be obtained from each worker - section 01301 of the Specification.

Measurements provided in this section are approximate and it is understood that ALL

measurements must be verified by the Contractor and reported to the Owners' representative.

1. All work shall be performed in accordance with the requirements of the specification and all applicable Federal, State and local regulations.

2. Related Specifications – Master Specification for Asbestos Abatement/Decontamination for Delaware Department of Transportation.

3. Submittals: Prior to starting work, submit the following to the Owners' representative for review. Do not begin without the approval of the Owners' representative.

    a. Scope of Work - Submit a detailed plan of the procedures to be used in complying with the requirements of this specification. Include the location and layout of decontamination unit(s), the sequencing of work, the interfacing of other trades, methods to be used to assure the safety of the building occupants and visitors, detailed disposal plan and a detailed description of the methods to be used to control pollution. The plan shall be submitted at the pre-work meeting and approved by the Owners' representative prior to starting work.

4. Inspection: Prior to starting work, inspect work areas. Prepare a list of damages to the structure, surfaces and equipment of surrounding areas of the building that may be construed as damage caused by the work. Photograph or videotape existing conditions as necessary to document these conditions. Submit to the Owners' representative prior to starting work.

1.3 WORK SEQUENCE

A. **The Work** will be conducted in one phase:

Roofing Materials

1. Asbestos-containing roofing tar and associated felt backing (black) associated with small isolated flat roof accessed from office 214 or the southern HVAC chase located on the second floor – estimated 348 square feet (5% Chrysotile).
2. Asbestos-containing silver roof coat associated with the lowest slightly angled roof over Rooms 124 and 128 – estimated 570 square feet (1.5% Chrysotile).
3. Asbestos-containing silver roof coat associated with the second level flat roof primarily over the boiler, sign fabrication, and screening rooms – estimated 4,008 square feet (2.75% Chrysotile).
4. Asbestos-containing silver flashing and patch coating associated with penetrations throughout the second level flat roof primarily over the boiler, sign fabrication, and screening rooms – estimated 4,008 square feet (2.75% Chrysotile).
5. Asbestos-containing silver roof coat associated with the third level flat roof over the second level office space – estimated 4,967 square feet (3% Chrysotile).
6. Asbestos-containing asphalt rolled roofing associated with the third level flat roof over the second level office space – estimated 4,967 square feet (6% Chrysotile).

Thermal System Insulation

1. Asbestos-containing cementitious ventilation system duct and vent hood located in the screening room and across the 2nd Level flat roof – estimated 65 linear feet of 2' diameter duct,

45 linear feet of 1.5' diameter duct, and 68 square feet on vent hood (15 Chrysotile and 15% Crocidolite).

2. Asbestos-containing joint caulk associated with ventilation system duct and vent hood joint connections located in the screening room and across the second level flat roof – estimated 140 linear feet (8% Chrysotile).

3. Asbestos-containing rope gasket associated with ventilation system duct and vent hood joint connections located in the screening room and across the second level flat roof – estimated 140 linear feet (15% Chrysotile).

4. Asbestos-containing vibration damper cloth associated with ventilation system duct at the connection to the blower fan located on the second level flat roof – estimated 8 square feet (90% Chrysotile).

5. Asbestos-containing unused pipe insulation and associated debris located in the attic space above the rear maintenance shop – estimated 800 square feet (15% Chrysotile and 8% Amosite). Please note that two unused 4 foot sections of the pipe insulation were observed with damage debris scattered across the attic floor and on items stored in the attic.

6. Asbestos-containing 4" cement pipe insulation located in maintenance shop, office and storage area, above the drop and wood ceiling in the sign fabrication room, through a portion of the screening room, and in the boiler room – estimated 250 linear feet (15% Chrysotile and 8% Amosite).

7. Asbestos-containing 2" corrugated pipe insulation located in front office area, portions of the screening room, and in the boiler room – estimated 400 linear feet (15% Chrysotile).

8. Asbestos-containing mudded elbows and valves associated with the brown paper wrapped fiberglass pipe insulation located in front office area, portions of the screening room, and in the boiler room – estimated 25 linear feet (5% Chrysotile).

9. Asbestos-containing silver duct coating associated with the exterior 2' x 2' box duct located on the second level flat roof – estimated 1,250 square feet (3% Chrysotile).

10. Asbestos-containing asphalt duct coating associated with the exterior 2' x 2' box duct located on the second level flat roof – estimated 1,250 square feet (5% Chrysotile).

11. Asbestos-containing duct coating associated with the interior 2' x 2' metal box duct located along the northern wall of the metal room and in the boiler room – estimated 450 square feet (10% Chrysotile).

12. Asbestos-containing vibration damper cloth associated with two large air handling units located in the boiler room – estimated 20 square feet (80% Chrysotile).

13. Asbestos-containing vibration damper cloth associated with three connections of the 2' x 2' metal box duct to the centrally located large air handling unit located in the boiler room – estimated 24 square feet (80% Chrysotile).

Miscellaneous

1. Asbestos-containing cementitious siding panels (gray) as exterior and interior walls and as ceilings in room 122 and chase areas adjacent to rooms 113 and 113A – estimated 14,870 square feet (15% Chrysotile).

2. Asbestos-containing sheet good (white with small multi-color squares pattern) located in the 1st floor front office area under carpet – estimated 2,000 square feet (8% Chrysotile).

1.4 ASBESTOS-CONTAINING MATERIALS:

A. **The work** of this contract involves activities that will disturb asbestos-containing materials. The location and type of asbestos-containing materials known to be present at the worksite is set forth in the "Schedule of Asbestos-Containing Materials" at the end of this section. If any other asbestos-containing materials or suspect asbestos-containing materials are found, notify the Owner, other employers and employees about the location and quantity of the asbestos-containing materials or suspect asbestos-containing materials within 24 hours of the discovery.

The following asbestos-containing materials are known to be present at the worksite. If any other materials are found that are suspected of containing asbestos, notify the Owners' representative immediately.

Roofing Materials

1. Asbestos-containing roofing tar and associated felt backing (black) associated with small isolated flat roof accessed from office 214 or the southern HVAC chase located on the second floor – estimated 348 square feet (5% Chrysotile).
2. Asbestos-containing silver roof coat associated with the lowest slightly angled roof over Rooms 124 and 128 – estimated 570 square feet (1.5% Chrysotile).
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2. Asbestos-containing joint caulk associated with ventilation system duct and vent hood joint connections located in the screening room and across the second level flat roof – estimated 140 linear feet (8% Chrysotile).
3. Asbestos-containing rope gasket associated with ventilation system duct and vent hood joint connections located in the screening room and across the second level flat roof – estimated 140 linear feet (15% Chrysotile).
4. Asbestos-containing vibration damper cloth associated with ventilation system duct at the connection to the blower fan located on the second level flat roof – estimated 8 square feet (90% Chrysotile).
5. Asbestos-containing unused pipe insulation and associated debris located in the attic space above the rear maintenance shop – estimated 800 square feet (15% Chrysotile and 8% Amosite). Please note that two unused 4 foot sections of the pipe insulation were observed with damage debris scattered across the attic floor and on items stored in the attic.

6. Asbestos-containing 4” cement pipe insulation located in maintenance shop, office and storage area, above the drop and wood ceiling in the sign fabrication room, through a portion of the screening room, and in the boiler room – estimated 250 linear feet (15% Chrysotile and 8% Amosite).
7. Asbestos-containing 2” corrugated pipe insulation located in front office area, portions of the screening room, and in the boiler room – estimated 400 linear feet (15% Chrysotile).
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13. Asbestos-containing vibration damper cloth associated with three connections of the 2’ x 2’ metal box duct to the centrally located large air handling unit located in the boiler room – estimated 24 square feet (80% Chrysotile).

Miscellaneous

1. Asbestos-containing cementitious siding panels (gray) as exterior and interior walls and as ceilings in room 122 and chase areas adjacent to rooms 113 and 113A – estimated 14,870 square feet (15% Chrysotile).
2. Asbestos-containing sheet good (white with small multi-color squares pattern) located in the 1st floor front office area under carpet – estimated 2,000 square feet (8% Chrysotile).

1.5 ASBESTOS HEALTH RISK:

A. The disturbance or dislocation of asbestos-containing materials may cause asbestos fibers to be released into the atmosphere, thereby creating a potential health risk to workers. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the risk and of proper work procedures which must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified asbestos-containing materials, take appropriate continuous measures as necessary to protect all building occupants from the risk of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

1.6 CONTRACTOR USE OF PREMISES

A. **General:** During the abatement period the Contractor shall have limited use of the premises for abatement operations.

B. **Use of the Site:** Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. **Owner Occupancy:** Allow for Owner occupancy and Owner's representative.

2. **Driveways and Entrances:** Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. **Use of the Existing Building:** Maintain the existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building during the construction period.

1. **Smoking**: Smoking or open fires will not be permitted on the property.

2. **Toilet Rooms:** Use of onsite toilets will not be permitted. It will be the Contractors' responsibility to provide temporary sanitary facilities.

1.7 OCCUPANCY REQUIREMENTS

A. **Partial Owner Occupancy:** The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. The Owners' representative will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner occupancy.

1.8 AIR MONITORING BY THE OWNER:

A. **The Owner has contracted for air monitoring.** Air monitoring may be conducted both outside and inside of the work area during the work, and for clearance sampling at the end of the project

1. **Outside of the Work Area**: The Owner's air monitoring firm may sample air outside of the Work Area to detect faults in the Work Area isolation such as:
   a. Contamination of the building outside of the Work Area with airborne asbestos fibers,
   b. Failure of filtration or rupture in the differential pressure system,
   c. Contamination of air outside the building envelop with airborne asbestos fibers.

2. **Inside the Work Area**: The Owners' air monitoring firm may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring is to detect airborne asbestos concentrations which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.

B. **Work area clearance**: Clearance air sampling by the Owners' air monitor at the completion of asbestos abatement work is described in Section 01711 Project Decontamination.

C. **Air monitoring** required by OSHA is work of the Contractor and is not covered in this section. Contractor shall comply with all applicable regulatory sampling requirements as well as all

monitoring requirements detailed in the Section.

1.9 SCHEDULE OF AIR SAMPLES BY OWNER:

A. **Sample cassettes**: Samples will be collected on 25 mm. cassettes as follows:

1. **PCM**: 0.8 micrometer mixed cellulose ester.

B. **Number and Volume of Samples**: The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the Owner may vary depending upon job conditions and the analytical method used.

C. **Sample Volume and Sensitivity:**

1. **PCM**: The sample volumes collected by the Owners' air monitor will be determined by the following formula:

$$\frac{(\text{\# Fibers in sample} - \text{fibers in blank})\ 385\text{mm squared}}{(\text{Vol. Liters})\ (1000)\ (0.00785\text{mm squared})\ (\text{\# fields})} = \text{fibers/cc}$$

Where:

Number of fibers	=	5.5 fibers/100 fields, based on a limit of detection (LOD) of 7 fibers/mm^2 on the filter
Area of 100 fields	=	0.785mm^2
Total Filter Area	=	385mm^2
Limit Value	=	as specified in the schedules of samples below

a. For purposes of this specification, the sample volume calculated above will be considered to be of sufficient size so that there is a 95% level of confidence that the value measured by each individual sample at the limit of detection (LOD) is less than or equal to the limit values specified below.

b. For purposes of this specification, the Limit of Detection (LOD) is defined as 7 fibers/mm^2 on the filter or 5.5 fibers/100 fields.

c. For purposes of this specification overloaded samples will be considered as exceeding the applicable limit value.

D. **Base Line:**

1. **Before Start of Work:** The owners' representative may secure air samples to establish a base line.
2. **Base Line:** a level expressed in fibers per cubic centimeter which is twenty-five percent greater than the largest of the following:
   a. Average of the PCM samples collected outside each Work Area
   b. Average of the PCM samples collected outside the building
   c. 0.01 fibers per cubic centimeter
3. **Samples collected for Transmission Electron Microscopy (TEM) analysis** will be held without analysis. These samples will be analyzed under the conditions and terms set forth in "Fibers Counted" and "Affect on Contract Sum".

4. **PCM Samples**

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (Liters/ Minute)
Each Work Area	5	0.01	1200	1-10
Outside Each Work Area	5	0.01	1200	1-10
Outside Building	5	0.01	1200	1-10

5. **TEM Samples:**

Location Sampled	Number of Samples	Analytical Sensitivity (Struct. /cc.)	Approx. Volume (Liters)	Rate (Liters/ Minute)
Each Work Area	1	0.005	1,200	1-10
Outside Each Work Area	1	0.005	1,200	1-10
Outside Building	1	0.005	1,200	1-10

E. Daily:

1. **From start of work** of Section 01526 Temporary Enclosures through the work of Section 01711 Project Decontamination, the Owner may take samples.

2. **Sample volume and sensitivity**: inside the work area may vary depending upon conditions in the work area. If samples are overloaded at the sample volume required for a limit value equal to the "Stop Action Levels" or "Immediate Stop Action Levels" given later in this section, the level is considered to have been exceeded.

3. **PCM Samples:**

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (LPM)
Each Work Area	2	0.01	1000	1-10
Outside Each Work Area at Critical Barrier	1	0.01	1000	1-10
Clean Room	1	0.01	1000	1-10
Equipment Decon	1	0.01	1000	1-10

Outside Building	1	0.01	1000	1-10
Output of Pressure Differential System	1	0.01	1000	1-10

F. **Additional samples** may be taken at the Owner's or Owners' representatives' discretion. If airborne fiber counts exceed allowed limits additional samples may be taken as necessary to monitor fiber levels.

1.10 ANALYTICAL METHODS USED BY THE OWNER:

A. The following methods will be used by The Owner in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume sampling.

1. Phase Contrast Microscopy (PCM) will be performed using the NIOSH 7400 method.

2. Transmission Electron Microscopy (TEM) will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A (when applicable).

1.11 LABORATORY TESTING BY OWNER:

A. **The services of a testing laboratory** may be employed by the Owner to perform laboratory analyses of the air samples. A technician will be at the job site, and samples will be sent daily by carrier for next day delivery, so that verbal reports on air samples can be obtained within 24 hours.

B. **A complete record** of all air monitoring and results will be furnished to the Owners' representative, the Owner, and the Contractor.

C. **The Contractor will have access** to all air monitoring tests and results upon request.

D. **Written Reports**: of all air monitoring tests will be posted at the job site on a daily basis.

1.12 FIBERS AND STRUCTURES

A. **Fibers Counted:** The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.

1. **Large Fibers:** "Airborne Fibers" referred to above include all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission or scanning electron microscopy demonstrates to the satisfaction of the Owners' representative that non-asbestos fibers are being counted. "Airborne Fibers" counted in samples analyzed by transmission electron microscopy shall be asbestos fibers, greater than 5 microns in length.

   For purposes of stop action levels, subsequent to analysis by electron microscopy, the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by PCM by the proportion of fibers that are asbestos as determined by TEM (a number equal to, asbestos fibers counted, divided by all fibers counted in the electron microscopy analysis).

2. **Small Structures:** "Airborne Fibers" referred to above include asbestos structures (fibers,

bundles, clusters or matrices) of any diameter and any length greater than 0.5 microns.

1.13 ADDITIONAL TESTING:

A. **The Contractor may conduct** air monitoring and laboratory testing. If Contractor elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner. The Contractor is required to provide Owner with results of all air monitoring and testing within 3 days of receiving results.

1.14 PERSONAL MONITORING:

A. **Owner will not perform** air monitoring for the Contractor to meet Contractor's OSHA requirements for personal sampling or any other purpose.

1.15 MISCELLANEOUS PROVISIONS

A. **None.**

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 STOP ACTION LEVELS:

A. **Inside Work Area:** Maintain an average airborne count in the work area of less than the Stop Action Level given below for the type of respiratory protection in use. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify Owners' representative. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Owners' representative.

STOP ACTION LEVEL (F/cc)	IMMEDIATELY STOP LEVEL (F/cc)	MINIMUM RESPIRATOR REQUIRED	PROTECTION FACTOR
0.1	0.5	Half face	10
0.5	2.5	PAPR	1,000
1.0	5.0	Supplied Air Pressure Demand	1,000

1. If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time cease all work except corrective action. Notify the Owners' representative. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by the Owners' representative.

B. **Outside Work Area:** If any air sample taken outside of the Work Area exceeds the base line

established in Part 1 of this section, immediately and automatically stop all work except corrective action. The Owners' representative will determine the source of the high reading and so notify the Contractor in writing.

C. Corrective Action:

1. If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

   a. Immediately erect new critical barriers as set forth in Section 01526 Temporary Enclosures to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (e.g. wall, ceiling, and floor).
   b. Decontaminate the affected area in accordance with Section 01712 Cleaning & Decontamination Procedures.
   c. Require that respiratory protection as set forth in Section 01562 Respiratory Protection be worn in affected area until area is cleared for re-occupancy in accordance with Section 01711 Project Decontamination.
   d. Leave Critical Barriers in place until completion of work and insure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.
   e. If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth in Section 01563 Decontamination Units at entry point to affected area.
   f. After Certification of Visual Inspection in the Work Area remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Section 01711 Project Decontamination.

2. If the high reading was the result of other causes initiate corrective action as determined by the Owners' representative.

D. Effect on Contract Sum: Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

3.2 STOP WORK:

A. If the Owner or Owners' representative presents a written stop work order, immediately and automatically conform to that stop work order, while maintaining temporary enclosures and pressure differential. Do not recommence abatement work until authorized in writing by Owner or Owners' representative.

B. Immediately initiate the following actions: After being presented with a stop work order immediately:

1. Cease all asbestos removal activities, or any other activities that disturbs asbestos-containing materials.

2. Repair any fallen, ripped or otherwise failed work area isolation measures.

3. Maintain in operation all work area isolation measures including those required by Sections 01526 Temporary Enclosures, 01513 Temporary Pressure Differential & Air Circulation System, 01563 Decontamination Units.

4. Maintain all worker protections including those required by Sections 01560 Worker Protection - Asbestos Abatement, and 01562 Respiratory Protection.
5. Fog the air in the work area with a mist of amended water to reduce airborne fiber levels.

C. Do not recommence work until authorized in writing by the Owner or Owners' representative.

3.3 SCHEDULE OF ASBESTOS-CONTAINING MATERIALS:

Quantities are estimations only and need to be field verified by Contractor.

APPROXIMATE QUANTITIES AND LOCATIONS

CONTRACTOR MUST VERIFY ALL QUANTITIES AND LOCATIONS OF ASBESTOS-CONTAINING MATERIALS

59 Sign Shop Lane, Dover, Delaware

Type	Location	Material	Quantity	% Asbestos
Roofing Material	Small flat roof accessed on second floor office area.	Roofing tar, thin coat (black)	348 square feet	5% Chrysotile
	Small flat roof accessed on second floor office area.	Felt paper (black)	348 square feet	5% Chrysotile
	Low level roof, top layer	Silver coat (silver)	570 square feet	1.5% Chrysotile
	Second level roof, 1st layer under stone	Silver coat (silver)	4,008 square feet	2.75% Chrysotile
	Second level roof, 1st layer under stone around equipment and penetrations	Built-up silver flashing patch (silver)	4,008 square feet	2.75% Chrysotile
	Second level roof 2'x2' square duct outer layer	Duct outer layer (silver)	1,250 square feet	3% Chrysotile
	Under second level roof 2'x2' square duct outer layer	Asphalt duct coating (black)	1,250 square feet	5% Chrysotile
	High roof, 1st layer	Silver coat (silver)	4,967 square feet	3% Chrysotile
	High roof, 2nd layer	Asphalt rolled roofing (black)	4,967 square feet	6% Chrysotile

Thermal System Insulation	2' diameter duct (65' exterior), 1.5' diameter duct (18' exterior & 27' interior), 3x2, 1x20 & 2x2x2 vent hood	Cementitious ventilation hood (grey)	68 square feet on vent, 110 linear feet of duct	15% Chrysotile 15% Crocidolite
	15 exterior joints, 6 interior joints associated with cementitious ventilation hood	Joint caulk associated (beige/red)	140 square feet	8% Chrysotile
	15 exterior joints, 6 interior joints associated with cementitious ventilation hood	Rope gasket (white)	140 square feet	15% Chrysotile
	Roof side of duct at blower inlet and outlet associated with HA03	Vibration damper cloth (grey/white)	8 square feet	90% Chrysotile
	Maintenance shop attic. Unused insulation in box, debris on attic floor	Pipe insulation (white)	800 square feet	15% Chrysotile 8% Amosite
	Maintenance shop attic from garage to interior connection changes to fiberglass on interior side of wall. Boiler room. Sign fabrication room. Screening room.	4" pipe insulation (white)	250 linear feet	15% Chrysotile 5% Amosite
	Boiler room. Office. Screening room.	2" corrugated pipe insulation (white/gray)	400 linear feet	15% Chrysotile
	Associated with 1" brown wrap fiberglass lines in front office area, 1st floor. Screening room. Boiler room. Above bath in front office.	Mudded elbow and joints (gray)	25 linear feet	5% Chrysotile
	2'x2' metal duct in metal/boiler rooms	Duct board coating (white)	450 square feet	10% Chrysotile
	Air handlers in boiler room	Vibration damper cloth (black)	20 square feet	80% Chrysotile
	Air handler connected to 2'x2' duct in boiler room	Vibration damper cloth (tan)	24 square feet	80% Chrysotile
Misc.	4'x8', 1/8" thick panels. Front & rear office and paint booth area.	Cementitious siding panels (grey)	14,870 square feet	15% Chrysotile
	Front office area	Sheet good (white)	2,000 square feet	8% Chrysotile

END OF SECTION - 01013