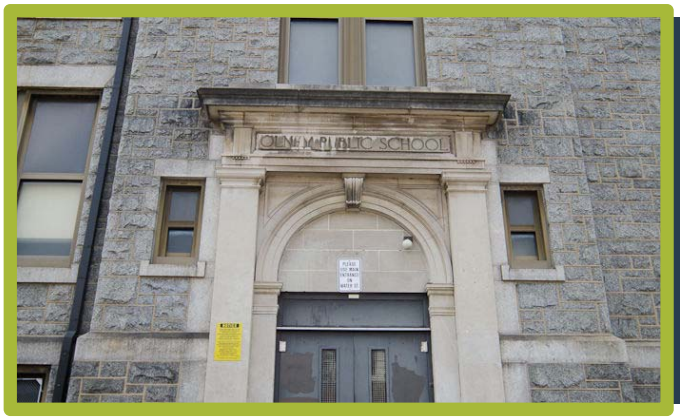

Olney Elementary School
5301 N. Water Street
Philadelphia, Pennsylvania

Asbestos Abatement Air Monitoring Report

AUGUST 16, 2018

PREPARED FOR:

School District of Philadelphia
440 North Broad Street, Room 3053
Philadelphia, Pennsylvania

Attn: Mr. Gerald Junod

PREPARED BY:

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VERTEX Project No: 51064

Work Order Numbers: 1642572, 1730552, 1730553, 1730558, 1730559, 1730591

Control No: 2018740003.1

Encumbrance Number: 582165

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

In June 2018, The Vertex Companies, Inc. (VERTEX) was retained by the School District of Philadelphia to provide air monitoring and laboratory services in conjunction with an abatement project at the Olney Elementary School located at 5301 N. Water Street in Philadelphia, PA. These services were performed under Encumbrance Number 582165, School District Control Number 2018740003.1 and Work Order Numbers 1642572, 1730552, 1730553, 1730558, 1730559 and 1730591.

Work activities were initiated in response to the newspaper article (i.e., dated May 10, 2018 online at Philly.com and May 13, 2018 in the Philadelphia Inquirer). The article reported that wipe sampling was performed by a staff member in the hallway outside of Room #311. The analytical result for the single wipe sample collected yielded a level of 8,510,000 F/cm^2.

Following the review of the article and the analytical result reported, the School District of Philadelphia initiated a remedial effort to address the reported concerns. To that end, the following protocol was employed:

Initial Response

1. The School District reviewed the recently completed 3-year AHERA Re-Inspection performed at the School.

Secondary Response

1. The School District of Philadelphia retained The Vertex Companies, Inc. (VERTEX) to consult/ oversee any resulting remediation or abatement to be performed.
2. VERTEX, in conjunction with a representative of the Philadelphia Federation of Teachers, Mr. Jerry Roseman of Occupational Health Consultation Services, Inc. (OHCS) and multiple representatives from the School, School District and the City of Philadelphia performed a re-inspection of the area sampled outside Room #311 as well as other areas throughout the facility.
3. The re-inspection confirmed that asbestos containing pipe insulation was identified throughout the facility.
4. A DDC was prepared by VERTEX. The DDC was utilized to define the abatement remedial effort to be employed. The scope of work included:

    - The removal of approximately 12 linear feet of pipe insulation within the hallway outside Classroom #311.
    - The removal of approximately 12 linear feet of pipe insulation within the hallway outside Classrooms #304/306.
    - The removal of approximately 12 linear feet of pipe insulation within the women's staff restroom next to Classroom #311.
    - The removal of approximately 56 linear feet of pipe insulation within Classroom #108. In addition, approximately 14 fittings and approximately 50 square feet of 9"x9" vinyl asbestos floor tile was removed within the Classroom #108 restroom.

Abatement Redial Effort

1. The first phase of abatement (i.e., 3rd floor) operations were performed on June 8, 2018. The second phase of abatement (i.e., Classroom #108/restroom) were performed between June 9, 2018 and July 6, 2018.
2. All work was performed in full accordance with the City of Philadelphia's Asbestos Control Regulations.
3. All work was performed by members of the School District of Philadelphia's A-Team. The A-Team workers are all licensed by the City of Philadelphia and Commonwealth of Pennsylvania to perform asbestos abatement operations.
4. Daily air monitoring was performed by a licensed Asbestos Project Inspector (API) throughout the duration of the remedial effort.
5. At the completion of each phase of abatement, VERTEX's API performed a visual inspection and did not observe any dust or debris on any surfaces within the work areas.
6. The final air testing protocol employed included:
    - VERTEX collecting five (5) samples within each minor work location to be analyzed by Phase Contrast Microscopy (PCM).
    - VERTEX collecting two (2) samples within each minor work area location to be analyzed by Transmission Electron Microscopy (TEM).
    - OHCS collecting one (1) sample within each minor work area location to be analyzed by TEM.
    - VERTEX and OHCS collecting five (5) samples within the major work area to be analyzed by TEM.
7. Analytical results of clearance testing within the first phase minor work areas for both VERTEX and OHCS yielded levels below the City of Philadelphia's clearance criteria and below the AHERA clearance criteria.
8. Analytical results of clearance testing within the second phase major work area found conflicting results. Specifically, VERTEX's results yielded levels below the clearance criteria and OHCS's results yielded levels above the clearance criteria.
9. The work area (Classroom #108/restroom) was re-cleaned on July 2, 2018. Following re-cleaning, the API performed a visual inspection and did not observe any dust or debris on any surfaces within the work area.
10. The second set of analytical results of clearance testing for both VERTEX and OHCS yielded levels below the City of Philadelphia's clearance criteria of 0.00554 AS/cc, and the AHERA clearance criteria <70 AS/mm^2.

2.0 PROJECT OVERSIGHT

VERTEX provided an API for on-site inspection and daily air monitoring throughout the duration of the project. Services were performed by certified APIs George Steffe (certification no. 951-1008), William Klinger (certification no. 011-1002), Bernard Brunner (certification no. 064-0008) and Louis DiMichele (certification no. 991-1004). The project was managed by Donald P. Heim.

3.0 RESULTS

1. Airborne concentrations (i.e., five PCM samples) collected in the three minor work areas after abatement (final clearances) were below the City of Philadelphia's clearance criteria of 0.01 F/cc.

2. Airborne concentrations (i.e., two TEM samples) collected in the three minor work areas after abatement (final clearances) were below the City of Philadelphia's clearance criteria of 0.00393 AS/cc, and the AHERA clearance criteria <70 AS/mm^2.

3. Airborne concentrations (i.e., five TEM samples) collected in the major work area after abatement (final clearances) were below the City of Philadelphia's clearance criteria of 0.00554 AS/cc, and the AHERA clearance criteria <70 AS/mm^2. Note: Initial testing by OHCS failed to achieve the clearance criteria.

4. Airborne concentrations collected outside the regulated work areas during abatement activities (perimeters) yielded levels below 0.01 F/cc.

5. Airborne concentrations collected inside the regulated work areas during abatement activities also yielded levels below 0.01 F/cc.

Please refer to the attached tables for a summary of all air sampling results. Note: Section 8.0 provides documentation in regard to sampling performed by OHCS for the PFT. VERTEX does not warrant these results but provides them for informational purposes only.

4.0 ANALYTICAL / AIR MONITORING METHODLOGIES

Phase Contrast Microscopy (PCM) air samples were collected and analyzed in accordance with the National Institute of Safety and Health (NIOSH) Analytical Method #7400, "Asbestos Fibers in Air," using A counting rules. A segment of the collected sample filter is mounted on a slide, treated chemically to make the filter transparent, and then examined using a special microscope reticule and counting procedure with phase contrast illumination at 400 to 500 magnification. Any particle having a length to width (or aspect) ratio greater than 3:1, and a length of 5 micrometers (µm) or greater is counted as a fiber. PCM analysis does not distinguish between asbestos and non-asbestos fibers.

All air samples were collected by the high-volume method in which a pump is used to draw a volume of air through a membrane filter at a known rate. Typical sampling rates for final air testing are less than 10 Liters per minute (L/min) for approximately 1200-1,800 liters. Samples are collected in 25-millimeter (mm) cassettes containing a mixed cellulose ester (MCE) filter with a 0.8 µm-effective pore size for PCM analysis.

Final clearance air samples were collected and analyzed by Transmission Electron Microscopy (TEM). Analysis was performed International Asbestos Testing Laboratories (IATL) of Mount Laurel, New Jersey (AIHA #100188).

5.0 ABATEMENT METHODOLOGIES

Abatement was performed by Commonwealth of Pennsylvania/City of Philadelphia licensed asbestos abatement workers. All licensed workers donned proper personal protective (PPE) equipment, including but not limited to TYVEK® suits and NIOSH approved half-face air purifying respirators.

Minor Projects

Critical barriers consisting of two layers of plastic sheeting were used to seal over all openings in the work areas and prevent airborne asbestos from migrating to adjacent areas.

A tent enclosure, comprised of 2 layers of 6-mil plastic sheeting on the walls and floor, was constructed around each work area. A single stage decontamination system was established at the entrance to each tent enclosure. The tent enclosure was utilized as a secondary containment to facilitate glovebag removal methodologies. Note: A remote three-stage decontamination system was established at a designated location on the first floor.

The pipe insulation removal process consisted of pre-wetting of the pipe insulation, taping the glovebag to the pipe, re-wetting of the asbestos insulation, cutting metal bands, removing the insulation, wetting the insulation in the glovebag, wet wiping of the pipe, followed by glovebag removal. A HEPA vacuum was utilized to establish negative pressure inside the glovebags prior to removal. All bags were double bagged for disposal as asbestos waste.

At the completion of abatement operations, final air testing incorporated both PCM (i.e., five samples each) and TEM (i.e., two samples each) methodologies. All clearance samples performed yielded levels below applicable clearance criteria.

Major Project

Critical barriers consisting of two layers of plastic sheeting were used to seal over all openings in the work areas and prevent airborne asbestos from migrating to adjacent areas.

A Negative Pressure Enclosure (NPE) was constructed and consisted of two layers of six mil plastic sheeting on the walls and floor. Negative pressure was achieved by ventilating the contained area utilizing HEPA air filtration devices (AFDs). AFDs were utilized to achieve a minimum of four air changes per hour within the enclosure and a minimum of 0.02 column inches of water pressure differential.

An airlock was established at the entrance to the NPE and entrance to the airlock was controlled using a three-stage personal decontamination system, containing plastic doorways. The integrity of these barriers was checked visually, and negative pressure was monitored, utilizing smoke tube measurements.

At the completion of abatement operations, final air testing incorporated TEM (i.e., five samples) methodologies. All clearance samples performed by VERTEX yielded levels below applicable clearance criteria. Note: Initial clearance testing performed by OHCS yielded levels which exceeded the clearance criteria. As a result, the work area was re-cleaned and re-encapsulated. Re-testing of the work area found levels below the applicable clearance criteria by both VERTEX and OHCS.

Following the completion of the abatement operations, all waste generated as part of the removal project was double-bagged and labeled for proper disposal at an EPA approved landfill. Asbestos waste will be transported by Super Kwik, a licensed waste transporter, and disposed of Dauphin Meadows, an EPA approved landfill.

6.0 SUMMARY OF PCM AIR SAMPLING RESULTS

Olney Elementary School 5301 N. Water Street Philadelphia, Pennsylvania				
Sample #	**Sample Location/Activity**	**Volume (L)**	**Fibers per 100 Fields**	**Sample Result (F/cc)**
Date collected: 6/8/18 Site Activity/Work Area: 3rd Floor Women's Staff Restroom/Baselines				
6.8.01	Baseline: In women's staff restroom	1210	6.5	0.003
6.8.02	Baseline: In women's staff restroom	1200	6	0.002
6.8.03	Baseline: In women's staff restroom	1200	5	<0.002
6.8.04	Blank	-	0	-
Date collected: 6/8/18 Site Activity/Work Area: 3rd Floor Hall/Baselines				
6.8.05	Baseline: In hall at room #311	1210	6	0.002
6.8.06	Baseline: In hall at room #304	1200	10	0.004
6.8.07	Baseline: In hall at stairwell	1200	8	0.003
6.8.08	Blank	-	0	-
Date collected: 6/8/18 Site Activity/Work Area: Basement Room 108/Baselines				
6.8.09	Baseline: Room 108 by kitchenette	1370	6	0.002
6.8.10	Baseline: Room 108 by kitchenette	1370	7	0.003
6.8.11	Baseline: Room 108 by computers	1350	5	<0.002
6.8.12	Baseline: Room 108 center of room	1350	4	<0.002
6.8.13	Baseline: Room 108 bathroom	1340	4.5	<0.002
6.8.14	Blank	-	0	-
6.8.15	Blank	-	0	-
Date collected: 6/8/18 Site Activity/Work Area: 3rd Floor Hallway & Women's Restrooms/Removal of ACPI				
6.8.16	Perimeter: In hall at women's restroom	900	6.4	0.004
6.8.17	Perimeter: In hall at room #304	900	1	<0.003
6.8.18	Work area: In tent at room #311	267	3.5	<0.010
6.8.19	Blank	-	0	-
Date collected: 6/8/18 Site Activity/Work Area: 3rd Floor Women's Staff Restrooms/PCM Finals				
6.8.20	Final: In tent in women's staff restroom	1220	2.5	<0.002
6.8.21	Final: In tent in women's staff restroom	1220	0	<0.002
6.8.22	Final: In tent in women's staff restroom	1220	1	<0.002
6.8.23	Final: In tent in women's staff restroom	1220	1.5	<0.002
6.8.24	Final: In tent in women's staff restroom	1220	3	<0.002
6.8.25	Blank	-	0	-

Olney Elementary School 5301 N. Water Street Philadelphia, Pennsylvania				
Sample #	**Sample Location/Activity**	**Volume (L)**	**Fibers per 100 Fields**	**Sample Result (F/cc)**
Date collected: 6/9/18 **Site Activity/Work Area: Basement Room 108/Pre-Clean & Prep**				
6.9.01	Perimeter: In hall 15' from room 108	1092	5.5	0.002
6.9.02	Perimeter: In hall at panel box adjacent to room	1086	4	<0.002
6.9.03	Perimeter: Outside room 108	1092	5	<0.002
6.9.04	Perimeter: At stairs	1086	3.5	<0.002
6.9.05	Blank	-	0	-
Date collected: 6/9/18 **Site Activity/Work Area: 3rd Floor Hall Tent at Room #304/PCM Finals**				
6.9.01	Final: In tent at room #304	1267	3	<0.002
6.9.02	Final: In tent at room #304	1267	0	<0.002
6.9.03	Final: In tent at room #304	1267	1.5	<0.002
6.9.04	Final: In tent at room #304	1257	1.5	<0.002
6.9.05	Final: In tent at room #304	1257	0	<0.002
6.9.06	Blank	-	0	-
Date collected: 6/9/18 **Site Activity/Work Area: 3rd Floor Hall Tent at Room #311/PCM Finals**				
6.9.07	Final: In tent at room #311	1247	3	<0.002
6.9.08	Final: In tent at room #311	1247	2.5	<0.002
6.9.09	Final: In tent at room #311	1238	2.5	<0.002
6.9.10	Final: In tent at room #311	1238	2	<0.002
6.9.11	Final: In tent at room #311	1238	4	<0.002
6.9.12	Blank	-	0	-
6.9.13	Blank	-	0	-
Date collected: 6/10/18 **Site Activity/Work Area: Prep in Room 108/Demobilization 3rd Floor**				
6.10.01	1st floor hallway (basement) outside room 108	1267	7.5	0.003
6.10.02	1st floor hallway (basement) outside boy's lunch room	1274	9	0.003
6.10.03	2nd floor hallway above room 108 next to Kindergarten class room across mech room	1274	4	<0.002
6.10.04	3rd floor hallway outside room	1274	6	0.002
6.10.05	3rd floor hallway outside room 307	1267	5	<0.002
6.10.06	Blank	-	0	-

Olney Elementary School 5301 N. Water Street Philadelphia, Pennsylvania				
Sample #	**Sample Location/Activity**	**Volume (L)**	**Fibers per 100 Fields**	**Sample Result (F/cc)**
Date collected: 6/16/18 **Site Activity/Work Area: Classroom 108/Prep Work Building Containment**				
6.16.01	Perimeter: Classroom 107	1329	10.5	0.004
6.16.02	Perimeter: Hallway outside classroom 107	1329	10.5	0.004
6.16.03	Perimeter: Hallway outside classroom 108	1329	9	0.003
6.16.04	Perimeter: At stairs	1329	8	0.003
6.16.05	Work area: Classroom 108	1329	21	0.008
6.16.06	Blank	-	0	-
6.16.07	Blank	-	0	-
Date collected: 6/18/18 **Site Activity/Work Area: Prep for Pipe Insulation & Floor Tile Removal under Containment Classroom 108, 108 Restroom**				
6.18.01	Perimeter: In hallway at room 107	1092	1.5	<0.002
6.18.02	Perimeter: In hallway at electrical panel box A1	1092	2	<0.002
6.18.03	Perimeter: In hallway at room 108	1089	2	<0.002
6.18.04	Work area: In room 108	1083	3.5	<0.002
6.18.05	Blank	-	0	
Date collected: 6/19/18 **Site Activity/Work Area: Classroom 108/Prep Work for Removal of APCI**				
6.19.01	Perimeter: In parking lot, outside stairwell No. 5 (south) entrance	705	6.5	0.005
6.19.02	Perimeter: In hall outside Classroom 108	702	3	<0.004
6.19.03	Perimeter: In hall outside girl's lunchroom	696	4	<0.004
6.19.04	Clean room: 3 stage decon	660	2	<0.004
6.19.05	Work area: Classroom 108, under pipe area	660	4	<0.004
6.19.06	Blank	-	0	-
Date collected: 6/19/18 **Site Activity/Work Area: Classroom 108/Prep Work for Removal of VAT & APCI**				
6.19.07	Perimeter: End of hall at electrical panel box #A-1	1116	0	<0.002
6.19.08	Perimeter: In hall at Room #108	1110	1	<0.002
6.19.09	Perimeter: In Room #108 at decon	1095	4.5	<0.002
6.19.10	Decon: Change room (3-stage w/shower)	1095	2	<0.002
6.19.11	Work area: In containment adjacent to restroom	1092	2.5	<0.002
6.19.12	Blank	-	0	-

Olney Elementary School 5301 N. Water Street Philadelphia, Pennsylvania				
Sample #	**Sample Location/Activity**	**Volume (L)**	**Fibers per 100 Fields**	**Sample Result (F/cc)**
Date collected: 6/20/18 **Site Activity/Work Area: Prep for Pipe Insulation & Floor Tile Removal under Containment Classroom 108, 108 Restroom**				
6.20.01	Perimeter: In parking lot, outside stairwell No. 5 (south) entrance	1113	1	<0.002
6.20.02	Perimeter: In hall, outside Classroom 108	1110	2.5	<0.002
6.20.03	Perimeter: In hall, outside girl's lunchroom	1098	2	<0.002
6.20.04	Clean room 3 stage decon	1113	4	<0.002
6.20.05	Work area: Classroom 108, under pipe area	1113	6	0.002
6.20.06	Perimeter: In parking lot, outside Stairwell No. 5 (south) entrance	795	0	<0.003
6.20.07	Perimeter: In hall, outside Classroom 108	795	1	<0.003
6.20.08	Perimeter: In hall, outside girl's lunchroom	795	2	<0.003
6.20.09	Clean room 3 stage decon	792	3.5	<0.003
6.20.10	Work area: Classroom 108, under pipe area	792	2	<0.003
6.20.11	Blank	-	0	-
Date collected: 6/21/18 **Site Activity/Work Area: Room 108 – Complete Area Prep/Removal of ACPI & VAT**				
6.21.01	Perimeter: In hallway at electrical panel box A1	1095	0	<0.002
6.21.02	Perimeter: At entrance to room 108	1092	1.5	<0.002
6.21.05	Perimeter: Outside building at AFD exhaust	999	0	<0.003
6.21.03	Decon: Change room 3-stage w/shower	1080	2	<0.002
6.21.04	Work area: Center of containment adj. to center pipe riser	996	20.5	0.010
6.21.06	Blank	-	0	-
Date collected: 6/21/18 **Site Activity/Work Area: Classroom 108/Removal ACPI & VAT**				
0110	Perimeter: Hallway outside classroom 108	735	11	0.007
0114	Perimeter: Classroom 108 shelf to right of entrance	735	6	0.004
0130	Clean room 3 stage decon	735	6	0.004
0132	Work area: Near AFD	735	6.5	0.004
0133	Blank	-	0	-
0134	Blank	-	0	-

Olney Elementary School 5301 N. Water Street Philadelphia, Pennsylvania				
Sample #	**Sample Location/Activity**	**Volume (L)**	**Fibers per 100 Fields**	**Sample Result (F/cc)**
Date collected: 7/2/18 **Site Activity/Work Area: Classroom 108 – Re-clean/Encapsulation**				
7.2.01	Perimeter: 2nd floor over Classroom #108	1800	3	<0.001
7.2.02	Perimeter: 1st floor hallway outside Classroom #108	1800	4.5	<0.001
7.2.03	Blank	-	0	-

7.0 SUMMARY OF TEM AIR SAMPLING RESULTS

8.0 SUMMARY OF ANALYTICAL SAMPLING RESULTS PERFOMRED BY OHCS