



BASELINE INDOOR AIR QUALITY ASSESSMENT

GREATER LOWELL TECHNICAL HIGH SCHOOL 250 Pawtucket Blvd, Tyngsboro, MA

Prepared For:

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Superintendent
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Prepared By:

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Job #: 5137

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1. EXECUTIVE SUMMARY

BACKGROUND

Consigli retained Cashins & Associates, Inc., to perform a pre-construction baseline indoor air quality (IAQ) assessment at the Greater Lowell Technical High School in Tyngsboro, Massachusetts. This testing was conducted in order to determine background levels of various airborne constituents.

SCOPE OF WORK

On June 19, 2014, a Senior Indoor Air Quality Consultant from Cashins & Associates performed air sampling as required by the Indoor Air Quality Specification as well as additional testing requested by Consigli.

Measurements were taken for the following:

- Carbon Dioxide
- Temperature
- Relative Humidity
- Carbon Monoxide
- Volatile Organic Compounds (VOCs)
- Dust
- Asbestos (TEM)
- Lead

FINDINGS

Real-time readings for CO₂, CO, VOCs, and dust were all below response action limits set forth in the IAQ Specification.

Airborne lead levels were all below the laboratory's limit of detection.

Asbestos was found in only one of the eight samples taken in representative locations throughout the building. This sample was found to have 19,438 asbestos structures per square millimeter (mm²). The Asbestos Hazard Emergency Response Act (AHERA) criteria for air clearance following an abatement project is 70 structures/mm².



2. INTRODUCTION

Cashins & Associates, Inc. was retained by Consigli to provide professional industrial hygiene consulting services. Our scope of work consisted of measuring various basic indoor air quality parameters and sampling for asbestos and lead at the Greater Lowell Technical High School located in Tyngsboro, Massachusetts. This assessment took place on June 19, 2014.

3. INDOOR AIR QUALITY PARAMETERS

The following is a breakdown of upper limits related to indoor air quality as stipulated in section 01 81 19 of the Project Specification:

Analyte	Upper Limit
Airborne dust	150 $\mu\text{g}/\text{m}^3$
Volatile Organic Compounds (VOCs)	2 ppm (2,000 ppb)
Carbon Monoxide (CO)	2 ppm
Carbon Dioxide (CO ₂)	1,000 ppm

4. METHODOLOGIES

A TSI Q-Track indoor air quality meter was used to measure carbon dioxide, carbon monoxide, temperature, and relative humidity in the space. The range of measurements obtained is reported in Table 1.

A RAE Instruments part per billion photo-ionization detector (PID) was utilized to screen the school building for the presence of TVOC. The PID is a screening tool that provides information as to total volatile organic compound loading in the space. The instrument does not provide information pertaining to which specific compounds are present in the air.

Dust concentrations were measured using a MIE pDR-1000AN passive air sampler. This real-time aerosol monitor measures both respirable and thoracic fractions, with optimal responses to particles in the 0.1-10 micron size range. The monitor was zeroed on June 19, 2014 prior to the monitoring event by using a hand-inflatable "zero air" pouch in conjunction with an inlet filter cartridge.

Asbestos samples were collected onto 25 mm MCE filter with pore size ≤ 0.45 microns in accordance with 40 CFR Part 763 (AHERA) sampling methods. They were analyzed via Transmission Electron Microscopy (TEM) by ProScience Analytical Services, Inc.



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Lead samples were collected onto 0.8 µm, 37 mm mixed cellulose ester (MCE) filters using high-volume sampling pumps. They were analyzed via the NIOSH 7301 method by Liberty Mutual Industrial Hygiene Laboratory.

5. FINDINGS

5.1 Findings: Basic IAQ Parameters

We have listed in Table 1 the results of the real-time air sampling.

Table 1: Real-time Air Quality Findings

Location	CO ₂ (ppm)	CO (ppm)	TVOC (ppb)	Dust (µg/m ³)
1st floor				
Hall @ 1140	386	<0.1	15	4
Hall @ 1244	400	<0.1	16	31
Village area	474	<0.1	17	3
Room 1323	373	<0.1	36	4
Auto Collision	434	<0.1	192	53
Hall @ 1501	414	<0.1	40	15
Hall @ 1622	417	<0.1	45	81
Hall @ 1540	418	<0.1	64	5
Hall @ 1442	415	<0.1	65	9
Hall @ 1342	428	<0.1	67	4
Hall @ 1564	385	<0.1	47	4
Hall @ 1460	387	<0.1	46	26
Vending area	402	<0.1	30	4
Room 1249	424	<0.1	52	6
Hall @ 1263	433	<0.1	51	3
Hall @ 1157	418	<0.1	63	4
Room 1140	431	<0.1	58	4
2nd floor				
Hall @ 2147	392	<0.1	61	8
Skylight/lockers area @ 2333	450	<0.1	78	16
@ 2320	406	<0.1	85	7
Skylight/lockers area @ 2540	428	<0.1	80	7
@ 2522	459	<0.1	89	11
@ 2524	431	<0.1	109	11
@ 2327	379	<0.1	110	10
@ 2328	372	<0.1	103	5
@ 2141	395	<0.1	98	4
	381	<0.1	99	6
	519	<0.1	35	18



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Table 1: Real-time Air Quality Readings

Location	CO ₂ (ppm)	CO (ppm)	TVOC (ppb)	Dust (µg/m ³)
Room 2157	400	<0.1	37	7
@2271	445	<0.1	45	4
@2243	444	<0.1	44	4
@2370	424	<0.1	45	55
@2363	453	<0.1	43	57
@2343	478	<0.1	38	6
Room 2460	409	<0.1	76	6
@2440	387	<0.1	50	13
Room 2566	426	<0.1	62	11
@2542A	398	<0.1	55	39
Room 2560	450	<0.1	103	26
3rd Floor				
East Commons	390	<0.1	93	33
@3640	418	<0.1	94	50
@3543	439	<0.1	100	9
@3445	386	<0.1	75	19
@3443	424	<0.1	58	5
@3240	406	<0.1	64	6
@3340	389	<0.1	61	6
@3247	410	<0.1	73	13
West Commons	388	<0.1	64	4
@3145	411	<0.1	75	4
@3166	439	<0.1	72	2
@3160	447	<0.1	73	4
@3250	433	<0.1	76	6
@2370	407	<0.1	80	12
@ Balcony B	459	<0.1	75	4
@3472	392	<0.1	48	4
@3464	404	<0.1	48	4
Room 3462	368	<0.1	49	4
@3446	386	<0.1	68	25
@3566	398	<0.1	72	31
@3561	396	<0.1	78	72
@3663L	408	<0.1	80	28



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5.2 Findings: Asbestos

In Table 2 we have listed the results of air sample analysis by TEM.

Table 2: results of TEM Analysis

<i>Sample #</i>	<i>Location</i>	<i>Volume (L)</i>	<i>Total s/mm²</i>
061914-5317-01A	1 st floor, near room 1327	1551.55	NSD
061914-5317-02A	1 st floor at stair #7	1545.35	NSD
061914-5317-03A	1 st floor @ stair #18	1545.35	NSD
061914-5317-04A	2 nd floor @ stair #5	1551.55	19.438
061914-5317-05A	2 nd floor @ stair #18	1551.55	NSD
061914-5317-06A	2 nd floor, near room 2255	1615.14	NSD
061914-5317-07A	3 rd floor, near room 3251	1545.35	NSD
061914-5317-08A	3 rd floor, near room 3555	1551.55	NSD

NSD = No Structures Detected

5.3 Findings: Lead

In Table 3 we have listed the results of lead air sample analysis.

Table 3: results of Lead Air Sample Analysis

<i>Sample #</i>	<i>Location</i>	<i>Volume (L)</i>	<i>Results (mg/m³)</i>
061914-5317-01L	1 st floor, near room 1327	1718.95	<0.00015
061914-5317-02L	1 st floor at stair #7	1717.40	<0.00015
061914-5317-03L	1 st floor @ stair #18	1714.30	<0.00015
061914-5317-04L	2 nd floor @ stair #5	1725.15	<0.00014
061914-5317-05L	2 nd floor @ stair #18	1718.95	<0.00015
061914-5317-06L	2 nd floor, near room 2255	1794.96	<0.00014
061914-5317-07L	3 rd floor, near room 3251	1714.30	<0.00015
061914-5317-08L	3 rd floor, near room 3555	1725.15	<0.00014



6. DISCUSSION

Levels of CO₂, CO, VOCs, and dust were all below response action limits set forth in the IAQ Specification.

Airborne lead levels were all below the laboratory's limit of detection.

Asbestos was found in only one of the eight samples taken in representative locations throughout the building. This sample was found to have 19.438 asbestos structures per square millimeter (mm²). The Asbestos Hazard Emergency Response Act (AHERA) criteria for air clearance following an abatement project is 70 structures/mm².

Indoor air quality should be monitored on a regular basis throughout this project in order to ensure that concentrations of various airborne contaminants remain at acceptable levels.

Please call if you have any questions or if we can be of further assistance.

Sincerely,
Cashins & Associates, Inc.



Zachary Keefe, CIE
Senior Indoor Air Quality Consultant



APPENDIX A

LABORATORY ANALYTICAL SHEETS



CASHINS & ASSOCIATES, Inc.

ProScience Analytical Services, Inc.

22 Cummings Park, Woburn, Massachusetts 01801
 781-935-3212 ~ Fax: 781-932-4857 ~ E-Mail: general@proscience.net

Laboratory Report

Client Project #: 5317
 Client Reference: N/A
 PO #: N/A
 Client #: 29
 Client Name: Cashins & Associates

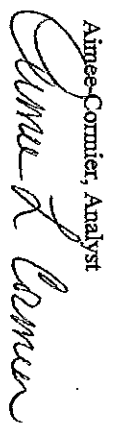
Batch: AT 14572
 Method: AHERA
 Date Received: 6/23/2014
 Date Analyzed: 7/1/2014
 Date of Report: 7/1/2014

Lab ID	Clear ID	Description	Type	VOL(L)	# GO	GOA	TGOA	Analytical Sensitivity	# STR >=5	Total # STR	Total Asbestos	
											>=5	Total s/lcc
A110463	061914-5317-01A	Near 1327, 1st Floor	area	1551.55	5	0.010289	0.05145	.0048	NSD	NSD	NSD	NSD
A110464	061914-5317-02A	At Stair #7, 1st Floor	area	1545.35	5	0.010289	0.05145	.0048	NSD	NSD	NSD	NSD
A110465	061914-5317-03A	At Stair #18, 1st Floor	area	1545.35	5	0.010289	0.05145	.0048	NSD	NSD	NSD	NSD
A110466	061914-5317-04A	At Stair #5, 2nd Floor	area	1551.55	5	0.010289	0.05145	.0048	1	1	.00482	.00482
A110467	061914-5317-05A	At Stair #18, 2nd Floor	area	1551.55	5	0.010289	0.05145	.0048	NSD	NSD	NSD	NSD
A110468	061914-5317-06A	Near 2255, 2nd Floor	area	1615.14	5	0.010289	0.05145	.0046	NSD	NSD	NSD	NSD
A110469	061914-5317-07A	Near 3251, 3rd Floor	area	1545.35	5	0.010289	0.05145	.0048	NSD	NSD	NSD	NSD
A110470	061914-5317-08A	Near 3555, 3rd Floor	area	1551.55	5	0.010289	0.05145	.0048	NSD	NSD	NSD	NSD

ASBESTOS STRUCTURE TYPE TOTAL					
CHR	AMO	GRO	ACT	TRE	ANT
1	0	0	0	0	0

Comments:

All sizes in microns **Key:** GO = Grid Opening GOA = Grid Opening Area TGOA = Total GOA
 CHR = Chrysotile AMO = Amosite GRO = Crocidolite ACT = Actinolite TRE = Tremolite ANT = Anthophyllite
 NSD = No Structures Detected

Aimee Cormier, Analyst


Analysis Results

Liberty Mutual Industrial Hygiene Laboratory

71 Frankland Road
Hopkinton, MA 01748
(800) 230-6263 FAX: (508) 435-3575
EMail: LMIHLaboratory@LibertyMutual.com Web: www.libertymutual.com

Report Date: 6/27/2014

Zachary Keefe

Cashins & Assoc., Inc.
599 North Avenue, Suite 8

Wakefield, MA 01880

Survey Date: 6/23/2014 Project ID: Job # 5317
Date Received: 6/24/2014 Project Number:
Customer PO: Project Name:
Collector: Zachary Keefe Project Location:

Sample Set: 1406183


LM Sample No.	Sample No.	Analyte	Sampling Time (min.)	Sampling Rate (liters/min)	Volume (liters)	Results
1406183-001	061914-5317-01L	Lead	155	11.09	1718.95	<0.00015 mg/cu m
1406183-002	061914-5317-02L	Lead	155	11.08	1717.40	<0.00015 mg/cu m
1406183-003	061914-5317-03L	Lead	155	11.06	1714.30	<0.00015 mg/cu m
1406183-004	061914-5317-04L	Lead	155	11.13	1725.15	<0.00014 mg/cu m
1406183-005	061914-5317-05L	Lead	155	11.09	1718.95	<0.00015 mg/cu m
1406183-006	061914-5317-06L	Lead	162	11.08	1794.96	<0.00014 mg/cu m
1406183-007	061914-5317-07L	Lead	155	11.06	1714.30	<0.00015 mg/cu m
1406183-008	061914-5317-08L	Lead	155	11.13	1725.15	<0.00014 mg/cu m
1406183-009	061914-5317-09L Blank	Lead				<0.00025 mg/sample

Analyte	Media	LOQ	Method	*Modify	Instrument	Blank Corrected	Analysis Date
Lead	0.8u MCE Filter	0.25 ug/sample	NIOSH 7301	No	ICP	Yes	27-Jun-14

* Modify: A "Yes" indicates a minor modification in the Method.

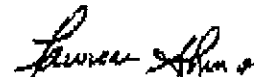
Lab Comments

Analyzed by:



Joseph Seiss, IH Chemist

Peer Reviewed by:



Lawrence Shum, Senior Chemist

Approved By:



Ethel Patricia, Laboratory Manager

The results provided in this report relate only to the items tested. Samples were received in acceptable condition unless otherwise noted.