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September 8, 2022

Mr. Michael Lane
Environmental, Health & Safety Manager
Office of Court Management/ Facilities Management & Capital Planning Lowell District Court
41 Hurd Street
Lowell, MA 01852

Ref: Indoor Air Quality & Microbial Assessment – Visit 8
Springfield Court Complex
Roderick L. Ireland Courthouse, 50 State Street, Springfield, MA &
Springfield Housing & Juvenile Courthouse, 80 State Street, Springfield, MA
TRC Project 499949

Dear Mr. Lane:

On August 25, 2022, TRC Environmental Corporation (TRC) conducted a limited indoor air quality and microbial assessment at the above-referenced sites. TRC conducted the following scope of work:

- Visual inspection of up to sixty (60) locations between the two buildings;
- Direct-reading measurements of selected indoor air quality parameters including temperature, relative humidity, carbon monoxide (CO), and carbon dioxide (CO_2); airborne particulate as PM_{10} (particles with aerodynamic diameters of approximately 10 microns or less), total volatile organic compounds (VOC's), and
- Sampling for airborne concentrations of total fungal (mold)[1] spores in eighteen (18) indoor locations.

The site observations, test methods used, results and conclusions, and recommendations are presented below. A copy of the laboratory analytical report and the sample location drawings are included as attachments to this report.

INVESTIGATIVE STRATEGY

Visual Inspection

The readily accessible areas of the above referenced property were visually evaluated for evidence of water staining, water damage, and suspect fungal growth (mold). A reasonable effort was made to identify fungal-impacted building materials.

Carbon Dioxide, Carbon Monoxide, Temperature and Relative Humidity

TRC used a TSI® 7575X Q-Trak to monitor relative humidity, temperature, carbon monoxide (CO), and carbon dioxide (CO_2) levels.

[1] For the purposes of this report, the terms "mold" and "fungi" may be used interchangeably

- *Carbon Dioxide* - Carbon dioxide is exhaled by people and is a useful indicator of adequate make-up (fresh) air and supply per occupant. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 62.1-2019, *Ventilation for Acceptable Indoor Air Quality*, recommends the difference between indoor and outdoor CO_2 concentrations be maintained at 700 parts per million (ppm) or less. Maintaining this condition equates to approximately 15 cubic feet per minute of supply air per occupant. Under this condition, a substantial majority of visitors entering a space will be satisfied with respect to human bioeffluents (body odor). The Massachusetts Department of Public Health (MA DPH) uses a guideline of 800 ppm of CO_2 for publicly occupied buildings[2]. Note that while indoor CO_2 levels are useful for evaluating the outdoor air ventilation provided to a building, these levels are typically well below concentrations that might pose a CO_2-related health risk (greater than 5,000 ppm). Ambient concentrations of CO_2 generally range from 300 - 500 ppm.

- *Carbon Monoxide* - Carbon monoxide is a colorless, odorless gas that can cause fatigue or drowsiness, nausea, headache, and difficulty breathing when present at elevated levels. ASHRAE Standard 62.1-2019 recommends carbon monoxide concentrations less than 9 ppm indoors as an eight-hour average.

- *Temperature and Relative Humidity* - ASHRAE Standard 55-2020, *Thermal Environmental Conditions for Human Occupancy* bases occupant thermal comfort on a combination of metabolic rate, clothing insulation, air temperature (dry bulb temperature as a substitute for operative temperature), radiant temperature, air speed, and humidity. Conditions are considered to be satisfactory when a substantial majority of occupants (80% or more) are not expressing dissatisfaction with thermal comfort.

  ASHRAE standard 62.1-2019 *Ventilation for Acceptable Indoor Air Quality* recommends that the relative humidity be maintained below 65%.

Measurement of Airborne Particulate Matter

A TSI® DustTrak DRX Aerosol Monitor was used to monitor airborne particulate matter of approximately 10 micrometers or less in diameter (PM_{10}).

Airborne particulate in indoor environments originates from various sources including building materials and furnishings, occupant activities, cleaning, construction, and renovation activities, and from outdoors. High concentrations of airborne dust may cause irritation of the eyes, skin, and respiratory tract.

The U.S. EPA has established a health-based National Ambient Air Quality Standard (NAAQS) for PM_{10} to evaluate outdoor air quality. This is not intended to evaluate worker exposure but are meant to protect the health of sensitive individuals within the general population. The NAAQS is based on rolling-24-hour average concentrations over a 3-day period and as such, is not directly comparable to individual PM measurements taken during this assessment; however, the NAAQS

[2] MA DPH "Carbon Dioxide and Its Use in Evaluating Adequacy of Ventilation in Buildings", www.mass.gov/eohhs/docs/dph/environmental/iaq/appendices/carbon-dioxide.pdf

is provided in this report as a benchmark. The NAAQS for PM_{10} is 0.150 milligrams per cubic meter of air (mg/m^3) measured as a 24-hour average concentration.

The OSHA Permissible Exposure Limit (PEL) for occupational exposure for total dust is 15 mg/m^3- and for the respirable dust fraction is 5 mg/m^3, both as 8-hour average concentrations.

The instrument is calibrated approximately annually by the manufacturer and is zeroed prior to use in the field.

Measurement of Total Volatile Organic Compounds (VOCs)

A ppbRAE Model PGM-7240, ppbRAE 3000 photo-ionizing detector (PID) (or similar instrument) was used to monitor VOCs. VOC measurements were performed to determine if unusually elevated concentrations of this group of air contaminants existed at the monitored locations. VOCs have many sources, including, but not limited to the evaporation of paint solvents; adhesives; and office or personal products that are used in the building, such as cosmetic fragrances, air fresheners and deodorizing and sanitizing products.

Although the instrument used in this study is a useful screening method for detecting indoor VOCs, it provides no information on the identities and relative amounts of individual compounds that may be present. If indoor VOC concentrations are significantly and consistently greater than the outdoor VOC concentration, then one or more indoor VOC sources may be present.

The U.S. Green Building Council Leadership in Energy and Environmental Design (USGBC LEED) for New Construction-2009 requirements specify a maximum VOC concentration of 0.500 milligrams per cubic meter of air (mg/m^3) in newly constructed areas and is used in this report as a guideline for evaluating indoor air quality. Assuming an average VOC molecular weight similar to that of n-hexane, this corresponds to approximately 0.140 ppm VOCs.

The instrument was calibrated prior to use in the field using standard isobutylene calibration gas.

Microbial Sampling – Air Samples

Sampling for airborne concentrations of total fungal spores was conducted using Air-O-Cell sampling cassettes. Samples were collected at 15 liters of air per minute for five-minute sampling periods using a high-volume sampling pump. Airborne particulates were drawn through the cassette and directly impacted onto an adhesive collection media. The samples were shipped to Hayes Microbial Consulting of Midlothian, Virginia where they were analyzed to determine the quantity and identity of fungal spore types using bright field microscopy (magnification 300x and 600x). Hayes Microbial participates in the American Industrial Hygiene Association (AIHA) Environmental Microbiology Laboratory Accreditation Program (EMLAP), certification #188863. The Air-O-Cell cassette collects both viable and non-viable fungal spores, and the laboratory can identify some of the collected spores down to the genus level.

TRC collected representative air samples in selected indoor locations and also outdoors, for comparison purposes.

There is currently little information available on total airborne fungal spore dose-response relationships, and there are no recommended allowable exposure limits established for airborne spores. The American Conference of Governmental Industrial Hygienists (ACGIH) publication *Bioaerosols: Assessment and Control*, indicates that an exposure may be considered unusual when indoor concentrations are significantly higher than those outdoors, or when the types of mold detected indoors vs. outdoors differ markedly.

RESULTS

Visual Inspection

On the day of this assessment, no suspect fungal growth was observed in any of the areas inspected. Horizontal surfaces appeared to be clean of any dust or debris.

Indoor Air Quality Measurements

Results of the indoor air quality measurements are presented in the table below. The results are presented in the following units: temperature measurements are presented in degrees Fahrenheit (ºF); relative humidity measurements are presented as percent relative humidity (%); the CO_2, CO and VOC measurements are presented in concentration units of parts per million parts of air, by volume (ppm); and PM_{10} measurements are presented in concentration units of milligrams per cubic meter of air (mg/m^3).

Indoor Air Quality Measurements
Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts
August 25, 2022

Test #	Location	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Airborne PM_{10} (mg/m^3)	Volatile Organic Compounds (ppm)
Roderick L. Ireland Courthouse, 50 State Street, Springfield, MA							
001	Registry of Probate – Check-in Desk	73.2	58.9	548	ND (<3)	0.004	ND (<0.020)
002	PC4A - Probate Courtroom #4 Conference Room A	72.7	61.0	528	ND (<3)	0.001	ND (<0.020)
003	446 - Jury Pool	72.7	58.5	521	ND (<3)	0.002	ND (<0.020)
004	419 – Judges Lobby	69.8	58.0	581	ND (<3)	0.003	ND (<0.020)
005	427 – Employee Lounge	72.9	59.5	550	ND (<3)	0.004	ND (<0.020)

Indoor Air Quality Measurements Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts August 25, 2022							
Test #	**Location**	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Airborne PM_{10} (mg/m^3)	Volatile Organic Compounds (ppm)
006	414A – In Land Registration	71.0	58.7	518	ND (<3)	0.002	ND (<0.020)
007	343 - Office	71.9	58.9	545	ND (<3)	0.006	ND (<0.020)
008	376 – Jury Room	75.3	60.6	584	ND (<3)	0.002	ND (<0.020)
009	347A – Judge's Lobby	74.5	55.8	593	ND (<3)	0.003	ND (<0.020)
010	317A – Judge's Lobby	72.7	58.4	589	ND (<3)	0.002	ND (<0.020)
011	313 – Jury Room	72.3	62.8	586	ND (<3)	0.005	ND (<0.020)
012	309A -	74.3	58.2	650	ND (<3)	0.004	ND (<0.020)
013	244 - Office	71.7	64.7	640	ND (<3)	0.004	ND (<0.020)
014	246B – Judge's Lobby	72.5	61.1	622	ND (<3)	0.008	ND (<0.020)
015	249 – Judge's Lobby	74.5	56.5	620	ND (<3)	0.003	ND (<0.020)
016	228 – Employees Lounge	71.3	54.7	624	ND (<3)	0.003	ND (<0.020)
017	207B – Judge's Lobby	72.2	56.8	603	ND (<3)	0.004	ND (<0.020)
018	District Courtroom #5	71.9	64.2	597	ND (<3)	0.004	ND (<0.020)

Indoor Air Quality Measurements Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts August 25, 2022							
Test #	**Location**	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Airborne PM_{10} (mg/m^3)	Volatile Organic Compounds (ppm)
019	143 – District Court Probate Call Room	72.9	62.9	649	ND (<3)	0.005	ND (<0.020)
020	160 - Office	73.3	59.2	631	ND (<3)	0.002	ND (<0.020)
021	139 - Office	71.3	57.9	681	ND (<3)	0.004	ND (<0.020)
022	111 – Vault	72.7	59.5	664	ND (<3)	0.007	ND (<0.020)
023	109 – Copy Room	72.6	57.8	651	ND (<3)	0.002	ND (<0.020)
024	101 - Office	73.1	62.9	601	ND (<3)	0.005	ND (<0.020)
025	G37 – Carpentry Shop	74.1	61.1	590	ND (<3)	0.011	ND (<0.020)
026	G41 – Outside Room	77.0	54.0	631	ND (<3)	0.005	ND (<0.020)
027	G27A – Mail Room	76.4	52.8	616	ND (<3)	0.004	ND (<0.020)
028	G02A – Janitors Storage	73.6	58.4	598	ND (<3)	0.004	ND (<0.020)
029	G17 – Lock-up	73.5	60.9	703	ND (<3)	0.006	ND (<0.020)
030	G28 – Locker Room	78.4	52.9	528	ND (<3)	0.129	ND (<0.020)
031	Outdoor – North Entrance 50 State Street	84.8	41.0	468	ND (<3)	0.019	ND (<0.020)

Indoor Air Quality Measurements Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts August 25, 2022							
Test #	**Location**	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Airborne PM_{10} (mg/m^3)	Volatile Organic Compounds (ppm)
Springfield Housing & Juvenile Courthouse, 80 State Street, Springfield, MA							
032	Outdoors - Front of 80 State Street	83.9	42.5	444	ND (<3)	0.025	ND (<0.020)
033	314 - Stairwell	73.2	39.5	474	ND (<3)	0.012	ND (<0.020)
034	321 – Conference Room	71.6	44.2	458	ND (<3)	0.013	ND (<0.020)
035	313 – Waiting Area	72.2	50.5	485	ND (<3)	0.012	ND (<0.020)
036	220 – Conference Room	72.1	56.7	499	ND (<3)	0.014	ND (<0.020)
037	211 - Hallway	72.1	54.6	486	ND (<3)	0.015	ND (<0.020)
038	214 - Hallway	72.5	53.9	500	ND (<3)	0.011	ND (<0.020)
039	126 - Office	72.2	56.1	676	ND (<3)	0.015	ND (<0.020)
040	132 – Office of Clerk Magistrate	72.9	55.3	566	ND (<3)	0.009	ND (<0.020)
041	137 - Office	73.9	54.2	605	ND (<3)	0.013	ND (<0.020)
042	135 – Lunch room	74.5	53.9	710	ND (<3)	0.012	ND (<0.020)
043	150 – Waiting Area	73.2	52.7	591	ND (<3)	0.010	ND (<0.020)
044	124 – Waiting Area	72.1	55.2	629	ND (<3)	0.010	ND (<0.020)

Indoor Air Quality Measurements
Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts
August 25, 2022

Test #	Location	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Airborne PM_{10} (mg/m^3)	Volatile Organic Compounds (ppm)
045	151B – Conference Room	72.4	50.7	652	ND (<3)	0.009	ND (<0.020)
046	327 – Common Area	72.7	50.4	551	ND (<3)	0.011	ND (<0.020)
047	324 - Office	72.3	51.0	579	ND (<3)	0.014	ND (<0.020)
048	347 - Office	71.7	51.0	604	ND (<3)	0.009	ND (<0.020)
049	343 – Common Area	71.7	51.8	608	ND (<3)	0.009	ND (<0.020)
050	341 - Office	72.1	50.5	641	ND (<3)	0.012	ND (<0.020)
051	231 – Common Area	71.7	53.2	545	ND (<3)	0.007	ND (<0.020)
052	235 – Housing Court #1	71.3	55.3	530	ND (<3)	0.010	ND (<0.020)
053	246 - Office	67.8	56.1	414	ND (<3)	0.015	ND (<0.020)
054	Stair #3 – Second Floor	69.4	58.3	611	ND (<3)	0.009	ND (<0.020)
055	Stair #2 - Basement	71.0	54.2	635	ND (<3)	0.009	ND (<0.020)
056	B45 - Juvenile	70.6	49.4	553	ND (<3)	0.006	ND (<0.020)
057	B13 – Basement Cubicles	69.8	45.9	532	ND (<3)	0.012	ND (<0.020)

Indoor Air Quality Measurements
Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts
August 25, 2022

Test #	Location	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Airborne PM_{10} (mg/m^3)	Volatile Organic Compounds (ppm)
058	B22 - Kitchen	69.3	43.9	591	ND (<3)	0.004	ND (<0.020)
059	B30 – Conference Room	67.3	43.7	647	ND (<3)	0.003	ND (<0.020)
060	B03 – Janitors Room	66.9	52.7	526	ND (<3)	0.005	ND (<0.020)
Desired Comfort Range		~67 to 82	Less than 60 to 65	Less than 800 to ~1,150	< 5 to < 9	≤ 0.150	≤ 0.140

See Attachment B – Floor Plan for location of measurements

ppm = parts per million parts of air, by volume

mg/m^3 = milligrams per cubic meter of air

ND = non-detect, below reliable limit of quantification or detection

REFERENCE VALUES

Carbon Dioxide (CO_2): ASHRAE maximum recommended CO_2 level indicating adequate supply of outdoor air = outdoor concentration + 700 ppm (i.e.,1,100 ppm); MA DPH maximum recommended CO_2 level = 800 ppm

Carbon Monoxide (CO): USGBC LEED (2009) 9 ppm, if outdoor measurement no greater than 2 ppm above outdoors

Temperature range guidelines based on ASHRAE 55-2020, at various levels of relativehumidity:

Relative Humidity	Winter Temperature	Summer Temperature
< 20%	70 to 79 ºF	76 to 83 ºF
20 to 40%	69 to 78 ºF	75 to 82 ºF
40 to 60%	68 to 77 ºF	74 to 81 ºF

Temperature and Relative Humidity. Temperatures were generally within or slightly below recommended comfort ranges for summer occupancy at the observed relative humidity levels.

All relative humidity measurements collected in the Roderick L. Ireland Courthouse were below 65%, and many of the measurements were below 60%. This is likely due to the lower outdoor temperature and humidity on this date. Corrective actions should still be taken to reduce indoor humidity levels throughout the building to improve occupant comfort and for optimum building conditions and maintenance whenever indoor relative humidity levels are routinely in the 60% to 65% and above range.

All relative humidity measurements in the Housing and Juvenile Courthouse were below 65%. With these relative humidity measurements being below the maximum acceptable range, no corrective measures are required based on the temperature and relative humidity measurements in this building.

Carbon Dioxide. The average CO_2 concentrations throughout the buildings ranged from 414 to 710 ppm and outdoor concentrations of ranged from 444 to 468 ppm. The average CO_2 concentrations during the current occupancy conditions remained below the ASHRAE guideline (i.e., the outdoor concentration of approximately 400 ppm + 700 ppm).

All CO_2 measurements represent favorable findings, reflecting efforts to maintain good ventilation within the buildings. No corrective actions are required based on these measurements.

Carbon Monoxide. The CO measurements were non-detect (< 3 ppm) and were within the recommended indoor air quality guideline. No corrective measures are indicated based on the CO measurements.

Total Volatile Organic Compounds (VOCs)

The VOC measurements throughout the buildings were all non-detect (<0.020 ppm) on this date. No corrective measures are recommended at this time. Note that hand sanitizers and sanitizing wipes may result in a temporary increase in VOC concentrations.

Airborne Particulate Matter

The average PM_{10} measurements throughout the buildings ranged from 0.001 to 0.015 mg/m^3, except for one reading of 0.129 mg/m^3 in the G28 Locker Room of the Roderick L. Ireland Courthouse. All measurements were within the guideline of 0.150 mg/m^3. No corrective measures are indicated based on the PM_{10} measurements.

Microbial Sampling

The results of air sampling for mold are presented in the table below. The air sampling results are presented in concentration units of spores per cubic meter of air (spores/m^3). The laboratory analytical report is included as Attachment A.

Microbial Sampling Results
Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts
August 25, 2022

Sample Number	Location	Sample Type	Mold Detected (spores/m^3)	Interpretation
Roderick L. Ireland Courthouse, 50 State Street, Springfield, MA				
34547354	Registry of Probate	Air	13	See Comment 1
34547338	419 – Judges Lobby	Air	40	See Comment 1
34547360	343 - Office	Air	26	See Comment 1

Microbial Sampling Results Springfield Court Complex, 50 & 80 State Street, Springfield, Massachusetts August 25, 2022				
Sample Number	**Location**	**Sample Type**	**Mold Detected (spores/m³)**	**Interpretation**
34547339	317A – Judges Lobby	Air	13	See Comment 1
34547326	246B – Judges Lobby	Air	27	See Comment 1
34547342	228 – Employee Lounge	Air	26	See Comment 1
34547383	143 – Probation	Air	13	See Comment 1
34547330	111 - Vault	Air	40	See Comment 1
34547325	G37 – Carpentry Shop	Air	1,093	See Comment 1
34547358	Outdoors, Front 50 State Street	Air	1,799	-----
Springfield Housing & Juvenile Courthouse, 80 State Street, Springfield, MA				
34547352	Outdoors, Front 80 State Street	Air	1,547	-----
34547350	220 – Conference Room	Air	27	See Comment 1
34547353	132 – Clerk Management Office	Air	26	See Comment 1
34547348	321 – Conference Room	Air	27	See Comment 1
34547332	150 – Waiting Area	Air	40	See Comment 1
34547349	151B – Conference Room	Air	13	See Comment 1
34547388	324 - Office	Air	40	See Comment 1
34547415	235 Housing Court #1	Air	40	See Comment 1
34547386	B30 – Conference Room	Air	26	See Comment 1
Comment 1 – Indoor concentrations were below the concurrent outdoor concentration, and the types of spores identified were also detected outdoors or are commonly detected outdoors. These results are not suggestive of an indoor mold source.				

In all the test locations, the air sample results indicated total mold spore concentrations were below the concurrent outdoor concentration, and the types of mold detected indoors were similar to spore types detected outdoors, or are commonly detected outdoors. Thus, no indoor mold source was indicated in these areas based on the air sampling results.

This is also true of the Roderick L. Courthouse Room G37 – Carpentry Shop. The *Cladosporium* spores detected in the sample at this location were also found in higher concentrations in both outdoor samples and this is a common outdoor mold. It is possible that this was tracked into the Carpentry Shop or was introduced into the Carpentry Shop by opening doors to the outside in this area of the G level.

It is important to note that construction materials, personal belongings, and indoor environments (including indoor air) are normally not sterile. Therefore, no structure can be completely free of microbial organisms including mold. However, under normal circumstances, commonly accepted industry guidelines suggest that the levels of fungi in the indoor environment should be generally similar to (or lower than) the outdoor air outside of the property. It should be understood that natural dust deposition also contains some amount of fungal spores.

RECOMMENDATIONS

Based on the findings of this assessment, TRC recommends the following for consideration:

1. No corrective measures are required based on measurements of temperature, carbon dioxide, carbon monoxide, PM_{10}, or TVOC's.

2. TRC will continue to observe relative humidity measurements throughout the late summer months and will alert building management if any unusual levels are noted. The relative humidity should continue to be controlled to levels below 65%.

3. Continue to operate ventilation equipment to introduce the greatest amount of outdoor air feasible based on the equipment parameters and seasonal conditions. This will provide the greatest safety for building occupants and will also help to quickly dilute the air when disinfectant wipes, cleaners and hand sanitizers are used. Routine preventative maintenance of heating, ventilating and air-conditioning equipment should also be emphasized.

CONDITIONS AND LIMITATIONS

The visual inspection performed by TRC is limited to representative areas that were accessible at the time of inspection. Destructive and/or invasive inspections were not within the scope of our investigation. The sampling results reflect conditions at the time of sampling.

TRC has performed the tasks set forth above in a thorough and professional manner consistent with industry standards. TRC cannot guarantee and does not warrant that this limited assessment has revealed all potential adverse environmental conditions affecting the site.

No expressed or implied representation or warranty is included in this report except that the services were performed within the limits of the scope of work authorized by the client and the encountered site conditions.

TRC appreciates the opportunity to provide you with consulting services. If you have any questions or comments, please contact us. We look forward to working with you on future endeavors.

Very Truly Yours,
TRC

Denise Houseman

Denise Houseman
Industrial Hygienist

Ann D. Eckmann

Ann D. Eckmann, CIH
Industrial Hygiene Group Leader

Enc.: Attachment A – Laboratory Results and Chain of Custody
Attachment B – Sample Location Drawings

ATTACHMENT A – LABORATORY RESULTS AND CHAIN OF CUSTODY

HAYES MICROBIAL CONSULTING

#22033277

Analysis Report prepared for

TRC Companies

814 Broad Street
Weymouth, MA 02189

Phone: **(781) 337-0016**

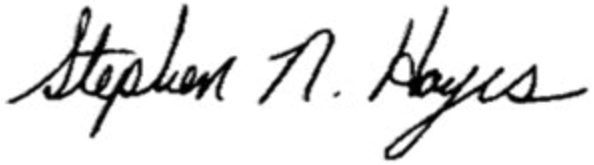
499949
50 & 80 State Street
Springfield

Collected: **August 25, 2022**
Received: **August 29, 2022**
Reported: **August 29, 2022**

We would like to thank you for trusting Hayes Microbial for your analytical needs!
We received 19 samples by FedEx in good condition for this project on August 29th, 2022.

The results in this analysis pertain only to this job, collected on the stated date, and should not be used in the interpretation of any other job. This report may not be duplicated, except in full, without the written consent of Hayes Microbial Consulting, LLC..

This laboratory bears no responsibility for sample collection activities, analytical method limitations, or your use of the test results. Interpretation and use of test results are your responsibility. Any reference to health effects or interpretation of mold levels is strictly the opinion of Hayes Microbial. In no event, shall Hayes Microbial or any of its employees be liable for lost profits or any special, incidental or consequential damages arising out of the use of these test results.



Steve Hayes, BSMT(ASCP)
Laboratory Director
Hayes Microbial Consulting, LLC.

EPA Laboratory ID: VA01419

Lab ID: #188863

DPH License: #PH-0198

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499949
50 & 80 State Street
Springfield

#22033277

Spore Trap
SOP - HMC#101

Sample Number	1	34547354		2	34547338		3	34547360		4	34547339	
Sample Name	**Registry of Probate**			**419 Judges Lobby**			**343 Office**			**317A Judges Lobby**		
Sample Volume	75.00 liter			75.00 liter			75.00 liter			75.00 liter		
Reporting Limit	13 spores/m^3			13 spores/m^3			13 spores/m^3			13 spores/m^3		
Background	2			2			2			2		
Fragments	ND			ND			ND			ND		
Organism	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**
Alternaria												
Ascospores	1	13	100.0%									
Aspergillus|Penicillium												
Basidiospores							1	13	50.0%			
Bipolaris|Drechslera												
Cercospora												
Chaetomium												
Cladosporium				3	40	100.0%						
Curvularia							1	13	50.0%			
Epicoccum												
Fusarium												
Memnoniella												
Myxomycetes												
Pithomyces										1	13	100.0%
Stachybotrys												
Stemphylium												
Torula												
Ulocladium												
Total	1	13	100%	3	40	100%	2	26	100%	1	13	100%

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Aug 25, 2022** Received: **Aug 29, 2022** Reported: **Aug 29, 2022**

HAYES MICROBIAL CONSULTING

Project Analyst: Joseph Lape, Date: **08 - 29 - 2022**

Reviewed By: Steve Hayes, BSMT Date: **08 - 29 - 2022**

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#22033277

Spore Trap
SOP - HMC#101

Sample Number	5	345473216		6	34547342		7	34547383		8	34547330	
Sample Name	**246B Judges Lobby**			**228 Employees Lounge**			**143 Probation**			**111 Vault**		
Sample Volume	75.00 liter			75.00 liter			75.00 liter			75.00 liter		
Reporting Limit	13 spores/m³			13 spores/m³			13 spores/m³			13 spores/m³		
Background	2			2			2			2		
Fragments	ND			ND			ND			ND		
Organism	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**
Alternaria				1	13	50.0%						
Ascospores										1	13	33.3%
Aspergillus|Penicillium	2	27	100.0%									
Basidiospores										2	27	66.7%
Bipolaris|Drechslera												
Cercospora												
Chaetomium												
Cladosporium							1	13	100.0%			
Curvularia												
Epicoccum												
Fusarium												
Memnoniella												
Myxomycetes				1	13	50.0%						
Pithomyces												
Stachybotrys												
Stemphylium												
Torula												
Ulocladium												
Total	2	27	100%	2	26	100%	1	13	100%	3	40	100%

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Aug 25, 2022** Received: **Aug 29, 2022** Reported: **Aug 29, 2022**

Project Analyst: Joseph Lape, Date: **08 - 29 - 2022**

Reviewed By: Steve Hayes, BSMT Date: **08 - 29 - 2022**

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50 & 80 State Street
Springfield

#22033277

Spore Trap
SOP - HMC#101

Sample Number	9	34547325		10	34547358		11	34547352		12	34547350	
Sample Name	G37 Carpentry Shop			Outdoors Front 50 State St.			Outdoors Front 80 State St.			220 Conference Room		
Sample Volume	75.00 liter			75.00 liter			75.00 liter			75.00 liter		
Reporting Limit	13 spores/m³			13 spores/m³			13 spores/m³			13 spores/m³		
Background	2			2			2			2		
Fragments	ND			ND			ND			ND		
Organism	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**
Alternaria				1	13	<1%	2	27	1.7%			
Ascospores				4	53	3.0%	3	40	2.6%			
Aspergillus|Penicillium												
Basidiospores				2	27	1.5%	4	53	3.4%			
Bipolaris|Drechslera												
Cercospora				1	13	<1%	2	27	1.7%			
Chaetomium												
Cladosporium	82	1093	100.0%	127	1693	94.1%	105	1400	90.5%			
Curvularia												
Epicoccum												
Fusarium												
Memnoniella												
Myxomycetes												
Pithomyces										2	27	100.0%
Stachybotrys												
Stemphylium												
Torula												
Ulocladium												
Total	82	1093	100%	135	1799	100%	116	1547	100%	2	27	100%

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Aug 25, 2022** Received: **Aug 29, 2022** Reported: **Aug 29, 2022**

Project Analyst: Joseph Lape, Date: **08 - 29 - 2022**

Reviewed By: Steve Hayes, BSMT Date: **08 - 29 - 2022**

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Spore Trap
SOP - HMC#101

Sample Number	13	34547353		14	34547348		15	34547332		16	34547349	
Sample Name	**132 Clerk Management Office**			**321 Conference Room**			**150 Waiting Area**			**151B Conference Room**		
Sample Volume	75.00 liter			75.00 liter			75.00 liter			75.00 liter		
Reporting Limit	13 spores/m^3			13 spores/m^3			13 spores/m^3			13 spores/m^3		
Background	2			2			2			2		
Fragments	ND			ND			ND			ND		
Organism	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**
Alternaria	1	13	50.0%									
Ascospores	1	13	50.0%									
Aspergillus|Penicillium							3	40	100.0%			
Basidiospores												
Bipolaris|Drechslera										1	13	100.0%
Cercospora												
Chaetomium												
Cladosporium				2	27	100.0%						
Curvularia												
Epicoccum												
Fusarium												
Memnoniella												
Myxomycetes												
Pithomyces												
Stachybotrys												
Stemphylium												
Torula												
Ulocladium												
Total	2	26	100%	2	27	100%	3	40	100%	1	13	100%

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Aug 25, 2022** Received: **Aug 29, 2022** Reported: **Aug 29, 2022**

Project Analyst: Joseph Lape, Date: **08 - 29 - 2022**

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Spore Trap
SOP - HMC#101

Sample Number	17	34547388		18	34547415		19	34547386	
Sample Name	**324 Office**			**235 Housing Court #1**			**B30 Conference Room**		
Sample Volume	75.00 liter			75.00 liter			75.00 liter		
Reporting Limit	13 spores/m^3			13 spores/m^3			13 spores/m^3		
Background	2			2			2		
Fragments	ND			ND			ND		
Organism	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**	**Raw Count**	**Count / m^3**	**% of Total**
Alternaria							1	13	50.0%
Ascospores				2	27	66.7%			
Aspergillus|Penicillium									
Basidiospores							1	13	50.0%
Bipolaris|Drechslera									
Cercospora									
Chaetomium									
Cladosporium				1	13	33.3%			
Curvularia									
Epicoccum	1	13	33.3%						
Fusarium									
Memnoniella									
Myxomycetes	2	27	66.7%						
Pithomyces									
Stachybotrys									
Stemphylium									
Torula									
Ulocladium									
Total	3	40	100%	3	40	100%	2	26	100%

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Aug 25, 2022** Received: **Aug 29, 2022** Reported: **Aug 29, 2022**

Project Analyst: Joseph Lape, Date: **08 - 29 - 2022**

Reviewed By: Steve Hayes, BSMT Date: **08 - 29 - 2022**

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Spore Trap Information

Reporting Limit	The Reporting Limit is the lowest number of spores that can be detected based on the total volume of the sample collected and the percentage of the slide that is counted. At Hayes Microbial, 100% of the slide is read so the LOD is based solely on the total volume. Raw spore counts that exceed 500 spores will be estimated.
Blanks	Results have not been corrected for field or laboratory blanks.
Background	The Background is the amount of debris that is present in the sample. This debris consists of skin cells, dirt, dust, pollen, drywall dust and other organic and non-organic matter. As the background density increases, the likelihood of spores, especially small spores such as those of Aspergillus and Penicillium may be obscured. The background is rated on a scale of 1 to 5 and each level is determined as follows: **NBD:** No background detected due to possible pump or cassette malfunction. Recollect sample. (Field Blanks will display NBD) **1 :** <5% of field occluded. No spores will be uncountable. **2 :** 5-25% of field occluded. **3 :** 25-75% of field occluded. **4 :** 75-90% of field occluded. **5 :** >90% of field occluded. Suggested recollection of sample.
Fragments	Fragments are small pieces of fungal mycelium or spores. They are not identifiable as to type and when present in very large numbers, may indicate the presence of mold amplification.
Control Comparisons	There are no national standards for the numbers of fungal spores that may be present in the indoor environment. As a general rule and guideline that is widely accepted in the indoor air quality field, the numbers and types of spores that are present in the indoor environment should not exceed those that are present outdoors at any given time. There will always be some mold spores present in "normal" indoor environments. The purpose of sampling and counting spores is to help determine whether an abnormal condition exists within the indoor environment and if it does, to help pinpoint the area of contamination. Spore counts should not be used as the sole determining factor of mold contamination. There are many factors that can cause anomalies in the comparison of indoor and outdoor samples due to the dynamic nature of both of those environments.
Water Damage Indicator Common Allergen Slightly Higher than Baseline Significantly Higher than Baseline Ratio Abnormality	**Blue:** These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem. **Green:** Although all molds are potential allergens, these are the most common allergens that may be found indoors. **Orange:** The spore count is slightly higher than the outside count and may or may not indicate a source of contamination. **Red:** The spore count is significantly higher than the baseline count and probably indicates a source of contamination. **Violet:** The types of spores found indoors should be similar to the ones that were identified in the baseline sample. Significant increases (more than 25%) in the ratio of a particular spore type may indicate the presence of abnormal levels of mold, even if the total number of spores of that type is lower in the indoor environment than it was outdoors.
Color Coding	Fungi that are present in indoor samples at levels lower than 200 per cubic meter are not color coded on the report, unless they are one of the water damage indicators.

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Organism Descriptions

Alternaria

Habitat: Commonly found outdoors in soil and decaying plants. Indoors, it is commonly found on window sills and other horizontal surfaces.

Effects: A common allergen and has been associated with hypersensitivity pneumonitis. Alternaria is capable of producing toxic metabolites which may be associated with disease in humans or animals. Occasionally an agent of onychomycosis, ulcerated cutaneous infection and chronic sinusitis, principally in the immunocompromised patient.

Ascospores

Habitat: A large group consisting of more than 3000 species of fungi. Common plant pathogens and outdoor numbers become very high following rain. Most of the genera are indistinguishable by spore trap analysis and are combined on the report.

Effects: Health affects are poorly studied, but many are likely to be allergenic.

Aspergillus|Penicillium

Habitat: The most common fungi isolated from the environment. Very common in soil and on decaying plant material. Are able to grow well indoors on a wide variety of substrates.

Effects: This group contains common allergens and many can cause hypersensitivity pneumonitis. They may cause extrinsic asthma, and many are opportunistic pathogens. Many species produce mycotoxins which may be associated with disease in humans and other animals. Toxin production is dependent on the species, the food source, competition with other organisms, and other environmental conditions.

Basidiospores

Habitat: A common group of Fungi that includes the mushrooms and bracket fungi. They are saprophytes and plant pathogens. In wet conditions they can cause structural damage to buildings.

Effects: Common allergens and are also associated with hypersensitivity pneumonitis.

Bipolaris|Drechslera

Habitat: They are found in soil and as plant pathogens. Can grow indoors on a variety of substrates.

Effects: They may be allergenic and are very commonly involved in allergic fungal sinusitis. They are opportunistic pathogens but occasionally infect healthy individuals, causing keratitis, sinusitis and osteomyelitis.

Cercospora

Habitat: Found on wood and decaying plant matter.

Effects: Health effects are poorly studied.

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Organism Descriptions

Cladosporium

Habitat: One of the most common genera worldwide. Found in soil and plant debris and on the leaf surfaces of living plants. The outdoor numbers are lower in the winter and often relatively high in the summer, especially in high humidity. The outdoor numbers often spike in the late afternoon and evening. Indoors, it can be found growing on textiles, wood, sheetrock, moist window sills and in HVAC supply ducts.

Effects: A common allergen, producing more than 10 allergenic antigens and a common cause of hypersensitivity pneumonitis.

Curvularia

Habitat: They exist in soil and plant debris, and are plant pathogens.

Effects: They are allergenic and a common cause of allergic fungal sinusitis. An occasional cause of human infection, including keratitis, sinusitis, onychomycosis, mycetoma, pneumonia, endocarditis and desseminated infection, primarily in the immunocompromised.

Epicoccum

Habitat: It is found in soil and plant litter and is a plant pathogen. It can grow indoors on a variety of substrates, including paper and textiles and is commonly found on wet drywall.

Effects: It is a common allergen. No cases of infection have been reported in humans.

Myxomycetes

Habitat: Found on decaying plant material and as a plant pathogen.

Effects: Some allergenic properties reported, but generally pose no health concerns to humans.

Pithomyces

Habitat: Common fungus isolated from soil, decaying plant material. Rarely found indoors.

Effects: Allergenic properties are poorly studied. No cases of infection in humans.

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Woburn MA 01801

N

SHIP: FEDEX - BOX 50
DATE: 08-29-2022

8123 4351 7716

MOLD

22033277

Job Number: 499949	Job Name: 50 & 80 State Street Springfield
Collector: Denise Housman	
Date Collected: 8/25/22	

Mobile: 781 281 5582 | Email: dhousman@trccompanies.com

Note:

Analysis Type		Analysis Description	Turnaround	Accepted Media Types
Spore Trap	S	Identification & Enumeration of Fungal Spores	24 Hour	Air Cassettes, Impact Slides
	S+	Spore Trap Analysis with Dander, Fiber, and Pollen counts	24 Hour	Air Cassettes, Impact Slides
Direct ID	D	ID & Semi-Quantative Enumeration of spores and mycelium	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
	D+	Direct Analysis with Fully Quantitative spore count	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
Culture	C1	Identification & Enumeration of Mold only	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C2	Identification & Enumeration of Bacteria only	4 Day	Air Plate, Agar Plate, Swab, Bulk
	C3	Identification & Enumeration of Mold and Bacteria	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C5	Coliform Screen for Sewage Bacteria	2 Day	Agar Plate, Swab, Bulk
Particle	TPA	Total Particulate Analysis, ID & Count (Does Not Include Mold)	24 Hour	Air Cassettes, Impact Slides, Bio-Tape

#	Number	Sample	Analysis	Volume	Notes
AOC 1	34547354	Registry of Probate	S	75L	
2	34547338	419 Judges Lobby	S	75 L	
3	34547360	343 Office	S	75 L	
4	34547339	317A Judges Lobby	S	75L	
5	34547326	246B Judges Lobby	S	75 L	
6	34547342	228 Employees Lounge	S	75L	
7	34547383	143 Probation	S	75L	
8	34547330	111 Vault	S	75L	
9	34547328	G37 Carpentry Shop	S	75L	
10	34547358	Outdoors Front 50 State St	S	75L	
11	34547352	Outdoors Front 80 State St	S	75L	
12	34547350	220 Conference Room	S	75L	
13	34547353	132 Clerk Magistrate Office	S	75L	
14	34547348	321 Conference Room	S	75L	
15	34547332	150 Waiting Area	S	75L	
16	34547349	151B Conference Room	S	75L	

Released by: [signature] Date: 8/25/22

Received By: YH Date: 8/29

HAYES
MICROBIAL CONSULTING

Company: TRC
Address: 300 Wildwood Ave #230
Woburn MA 01801

N

SHIP: FEDEX - BOX SO
DATE: 08-29-2022

8123 4351 7716

MOLD

22033277

Job Number: 499949	Job Name: 30880 State St Springfield
Collector: DH	
Date Collected: 8/25/22	

Mobile:	Email:
Note:	

Analysis Type		Analysis Description	Turnaround	Accepted Media Types
Spore Trap	S	Identification & Enumeration of Fungal Spores	24 Hour	Air Cassettes, Impact Slides
	S+	Spore Trap Analysis with Dander, Fiber, and Pollen counts	24 Hour	Air Cassettes, Impact Slides
Direct ID	D	ID & Semi-Quantative Enumeration of spores and mycelium	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
	D+	Direct Analysis with Fully Quantitative spore count	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
Culture	C1	Identification & Enumeration of Mold only	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C2	Identification & Enumeration of Bacteria only	4 Day	Air Plate, Agar Plate, Swab, Bulk
	C3	Identification & Enumeration of Mold and Bacteria	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C5	Coliform Screen for Sewage Bacteria	2 Day	Agar Plate, Swab, Bulk
Particle	TPA	Total Particulate Analysis, ID & Count (Does Not Include Mold)	24 Hour	Air Cassettes, Impact Slides, Bio-Tape

#	Number	Sample	Analysis	Volume	Notes
A0217	34547388	324 Office	S	75L	
18	34547415	235 Housing Court #1	S	75L	
19	34547386	B30 Conference Room	S	75L	
20			S	75L	
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Released by:	Date:	Received By: YH	Date: 8/29