
LIMITED INDOOR AIR QUALITY (IAQ) REPORT – PERIODIC SURVEY AUGUST 2022

for

**Long Lots Elementary School
13 Hyde Lane
Westport, Connecticut 06880**

Prepared for:

**Mr. Elio Longo, MBA
Chief Financial Officer
Westport Public Schools
110 Myrtle Avenue
Westport, CT 06880**

Prepared By:

**Langan CT, Inc.
555 Long Wharf Drive
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**Matthew A. Myers
M.Sc. in Industrial Hygiene
Senior Project Manager**



**Jamie P. Barr, L.E.P.
Principal/Vice President**

**27 September 2022
140238501**

LANGAN

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1.0 INTRODUCTION AND BACKGROUND

Westport Public Schools engaged Langan CT, Inc. (Langan) to conduct a limited indoor air quality (IAQ) periodic survey throughout the Long Lots Elementary School at 13 Hyde Lane, Westport, CT. This survey was performed on 24 August 2022 and included a visual investigation and air sampling in representative locations throughout the building and outdoor air sampling for background/reference. Previous IAQ surveys throughout the building and limited mold remediation in the auditorium and stage areas occurred in 2021. Classroom 9 and the crawl space(s) are being further evaluated in the context of a building-wide mechanical study and Langan understand that classroom 9 will remain closed to students/faculty for the time being.

The following sections include a summary of Langan’s visual assessment and analytical results from the indoor microbial (mold) air sampling.

PROJECT INFORMATION

Client Name:	Westport Public Schools	Property Visit Date:	24 August 2022
Professional’s project #:	140238501	Construction Dates:	1950s with Additions in 1960s and 1970s
Consultant’s Project Manager:	Matthew A. Myers	No. Buildings:	One
Phone No.:	203-562-5771	No. of Stories:	Two (Approximately 109,000 Square Feet Total)
Email:	mmyers@langan.com		
Property Address:	13 Hyde Lane		
Property Town, State:	Westport, Connecticut	Property Use:	Public Elementary School

2.0 SUMMARY OF VISUAL ASSESSMENT

Langan inspectors, Matthew A. Myers (M.Sc. in Industrial Hygiene) and Pavel Zayenchik, visually assessed representative interior and exterior locations at the school on 24 August 2022. The following items were noted on the day of the visual assessment:

- The building uses several types of Heating, Ventilation and Air Conditioning (HVAC) systems that potentially can create different IAQ conditions/comfort parameter readings

in different areas of the building. The gymnasium HVAC system appears to have a ducted air supply and return and does not have air conditioning (AC). The cafeteria has window AC units with ducted air supply and common return air plenum. The 100 classroom wing (upper and lower floors) has window AC units with return grills in the walls going to the corridors (common return air plenum). The library/main office/auditorium wing (upper and lower floors) has rooftop units with air conditioning and heating ducted air supply and common return air plenums. The 200 classroom wing has perimeter wall unit ventilators for heating and cooling (air supply comes from the exterior ground level through the unit ventilators) and air return grills (common return air plenum);

- Dehumidifiers have been placed in many of the rooms throughout the building and additional “larger – commercial size” dehumidifiers have been placed in corridors and other locations throughout the school;
- Summer cleaning activities were on-going (moving furniture, stripping and waxing floors, etc.); and
- Limited water intrusion issues were reported in classroom 130 and in the corridor adjacent the main office/auditorium and one stained ceiling tile was noted in classroom 130. It was reported that the Town of Westport has been correcting the roofing issues in these areas to eliminate the water intrusion.

3.0 RESULTS OF COMFORT PARAMETER SAMPLING

IAQ sampling was performed on 24 August 2022 from representative interior locations throughout the building and from the exterior. TSI Q-Trak IAQ meter, model number 7575, serial number 7575X1444009 was used to collect temperature, relative humidity, carbon dioxide and carbon monoxide readings within representative locations. Measurements were recorded and compared to applicable standards and/or guidelines that have been promulgated by respected industry organizations.

Thermal comfort is affected by *temperature and relative humidity* levels. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) recommends that indoor temperatures range from 67 to 82 degrees Fahrenheit (ranges can vary based on relative humidity, season, clothing, activity levels and other factors). According to Standard 55-2017 Thermal Environmental Conditions for Human Occupancy, ASHRAE has defined the operative temperature (67°F to 82°F) as that temperature range at which at least 80% of the sedentary or

near sedentary occupants will find the environment thermally acceptable. ASHRAE Standard 62.1-2016 recommends that indoor relative humidity should be maintained at or below 65%. EPA (2012) recommends maintaining indoor relative humidity between 30-60%. Humidity below this range may cause drying of mucous membranes and itchy skin. Humidity above this range may promote the growth of fungi with resultant contamination of the building and/or ventilation system.

Carbon monoxide is a colorless and odorless toxic gas that most often occurs as a by-product of incomplete hydrocarbon fuel combustion. Generally, the most likely sources of CO are from incomplete hydrocarbon fuel combustion inside a building (e.g., from a heating system), and from air intakes placed in, at, or near parking garages or street level that may entrain automotive exhaust gases into the air handling system. Back drafts from boiler flues may also provide a pathway for CO infiltration. In absence of any formal IAQ standard, Langan uses the more conservative National Ambient Air Quality Standard (NAAQS) of 9 parts per million for CO. The Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) for carbon monoxide is 50 parts per million (ppm) as an eight-hour time-weighted-average (8-hr. TWA). The National Institute for Occupational Safety and Health (NIOSH) has established a Recommended Exposure Limit (REL) for carbon monoxide of 35 ppm.

Carbon dioxide is a product of human respiration. Carbon dioxide concentrations in a building are used as a primary indicator of outside air exchange. If elevated concentrations (>1,075–1,200 ppm) are identified, it could indicate that the air in the indoor environment is not being supplemented by adequate outside (make-up) air. Typical ambient (outside) CO₂ concentrations range from 375-500 ppm. ASHRAE Standard 62.1-2016 Ventilation for Acceptable Indoor Air Quality suggests remedial action at a concentration above 1,075-1,200 ppm (indoor concentrations should be within 700 ppm of outdoor concentrations). If concentrations exceed these amounts, complaints of headaches, dizziness and fatigue may occur, but this concentration is **not** considered a health risk; rather, an indicator of human comfort.

The table below is a summary of the measurements collected.

Table 1 - IAQ Temperature, Relative Humidity, Carbon Monoxide and Carbon Dioxide Results

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temperature (°F)	Relative Humidity (%)
24 August 2022				
Gymnasium	426	0.2	79.0	63.2
Classroom 125	415	0.2	73.6	61.1
Office Room 118	478	0.3	74.1	56.0
Classroom 106	495	0.1	73.4	51.8
Classroom 212	435	0	73.0	45.9
Classroom 206	585	0.2	73.2	52.0
Library	475	0.1	73.8	65.6
Main Offices	456	0	72.5	54.2
Corridor Adjacent Main Office/Auditorium	421	0	71.3	57.8
Classroom 105	401	0.5	73.0	65.5
Auditorium	389	0.1	73.4	63.4
Classroom 8A	413	0.2	72.5	59.8
Classroom 6	407	0.1	72.8	57.1
Music Room	414	0.3	74.7	54.7
Classroom 130	458	0.1	70.2	56.5
Exterior (Adjacent Gymnasium)	377	0	83.7	66.0
Exterior (Adjacent Main Office)	392	0.1	84.2	63.2

On 24 August 2022, the interior temperature readings were within the recommended range of 67-82 degrees Fahrenheit. All of the interior carbon monoxide and carbon dioxide readings were within or below the respective guidelines/standards. The interior and exterior relative humidity readings were within or slightly above the recommended 30-60/65% range.

4.0 ANALYTICAL RESULTS OF BIO-AEROSOL (MOLD/FUNGI) SAMPLES

Air Sampling

On 24 August 2022, Langan conducted microbial air sampling in representative locations throughout the building. Outdoor air samples were collected from around the building for background/reference. Air samples for total spore counts were collected on Air-O-Cell brand cassettes at 15.0 liters per minute for 10 minutes each. Vacuum was provided by a standard high-volume air pump calibrated on site with a rotometer. Particulates impacted onto the adhesive strip in the cassette were visually examined under microscope by a trained microscopist at EMSL Analytical, Inc. laboratory in Meriden, Connecticut. Total spore count analysis represents concentrations of both viable and non-viable spores, as the latter can also sometimes affect sensitive occupants.

Air-dispersed fungal particles are common in indoor and outdoor environments. The particles can include spores (air disseminated “seeds” of fungi), yeasts and other particles. Most people do not experience any adverse effects with exposure to normal levels of mold in the air, however, the airborne fungal particles can sometimes cause allergic reactions in susceptible members of the population.

There are no regulatory standards or regulations regarding permissible exposures to mold spores. Airborne mold concentrations may vary with spatial and temporal variations. Reference sources agree that concentrations of certain pathogenic mold species should be as low as possible.

Absent federal or state standards and regulations, the interpretation of microbial air sample results relies on the comparison of indoor versus outdoor concentration results and complaint versus non-complaint area results. In general, indoor airborne microbial counts should be lower than or roughly the same as those found in the outdoor air. The genus/species of any fungi found indoors should generally be similar to those identified in the outdoor air. These are signs of acceptable IAQ. However, a situation may be considered unusual when the airborne microbial concentrations in an indoor/complaint area are significantly higher than those found in an outside/non-complaint area. Interpretation of these results requires a holistic evaluation of the building conditions and considerable professional judgment. Please see Appendix A for analytical results.

On 24 August 2022, the types of spores identified were mostly similar when comparing the indoor and outdoor results. The total overall number of spores/total fungi identified in the outdoor air were significantly higher when compared to the indoor air. The individual number of spore types identified were higher or similar in the outdoor air when compared to the indoor air in all rooms.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Our findings and recommendations are based solely on the analytical data which has been collected in accordance with accepted sampling methodology and industry practice.

Based on the survey(s), the following was noted and recommended:

- Visual Assessments - The visual survey on 24 August 2022 noted the building has several types of HVAC systems that potentially can create different IAQ conditions/IAQ environments throughout different areas of the building. Dehumidifiers have been placed in many of the rooms throughout the building and additional “larger – commercial size” dehumidifiers have been placed in corridors and other locations throughout the school. Limited water intrusion issues were reported in classroom 130 and in the corridor adjacent the main office/auditorium and one stained ceiling tile was noted in classroom 130. It was reported that the Town of Westport has been correcting the roofing issues in these areas to eliminate the water intrusion. The stained ceiling tile in classroom 130 should be removed and replaced.
- Comfort Parameter Sampling - On 24 August 2022, the interior temperature readings were within the recommended range. All of the interior carbon monoxide and carbon dioxide readings were within or below the respective guidelines/standards. The interior relative humidity readings were within or slightly above the recommended 30-60/65% range. Relative humidity readings above the recommended comfort ranges are typically indicative of the seasonal variations found in the exterior air (higher exterior relative humidity present on day of sampling) and possibly from summer cleaning activities.
- Air Sampling - On 24 August 2022, air sampling was performed throughout representative areas of the building and the types of spores identified were mostly similar when comparing the indoor and outdoor results. The total mold spore count for indoor air samples was significantly lower than the total mold spore counts for outdoor air samples. The individual number of spores identified were higher or similar in the

outdoor air when compared to the indoor air in all rooms. The air sampling data from throughout the building is indicative of acceptable IAQ.

6.0 LIMITATIONS

The conclusions and recommendations presented in this report are professional opinions based solely upon Langan’s visual observations, laboratory test data for the dates and times of testing, and current regulatory requirements. These conclusions and recommendations are intended exclusively for the purpose stated herein, at the site indicated, and for the project indicated.

Appendix A

Laboratory IAQ Air Sampling Results



EMSL Analytical, Inc.

165 Gracey Avenue Meriden, CT 06451

Tel/Fax: (203) 284-5948 / (203) 284-5978

<http://www.EMSL.com> / wallingfordlab@emsl.com

EMSL Order: 242204275

Customer ID: LANG78

Customer PO: 140238501

Project ID:

Attention: Matthew Myers
Langan Engineering
Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511

Project: LONG LOTS SCHOOL/ 140238501

Phone: (203) 562-5771

Fax: (203) 789-6142

Collected Date: 08/24/2022

Received Date: 08/24/2022 03:00 PM

Analyzed Date: 08/26/2022

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	242204275-0001			242204275-0002			242204275-0003		
Client Sample ID:	01			02			03		
Volume (L):	150			150			150		
Sample Location:	GYM			RM 125			DR GLAZER OFFICE RM 118		
Spore Types	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
Alternaria (Ulocladium)	-	-	-	-	-	-	3*	20*	0.9
Hyphal Fragment	1	20	-	-	-	-	-	-	-
Ascospores	9	200	8.2	3	70	7.4	3	70	3.2
Aspergillus/Penicillium	8	200	8.2	2	40	4.2	7	200	9.2
Basidiospores	42	920	37.8	14	310	32.7	11	240	11
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	48	1000	41.1	23	500	52.8	71	1500	68.8
Curvularia	-	-	-	1*	7*	0.7	2	40	1.8
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	6	100	4.1	1	20	2.1	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	1*	7*	0.3	-	-	-	1	20	0.9
Rust	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Arthrotrichum	-	-	-	-	-	-	-	-	-
Cercospora++	-	-	-	-	-	-	-	-	-
Dicranidion	-	-	-	-	-	-	-	-	-
Fusicladium/Venturia	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Oidium++	-	-	-	-	-	-	-	-	-
Paecilomyces++	-	-	-	-	-	-	4	90	4.1
Pestalotia++	-	-	-	-	-	-	-	-	-
Polythrincium	1*	7*	0.3	-	-	-	-	-	-
Sporidesmium++	-	-	-	-	-	-	-	-	-
Tetraploa	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	1*	7*	-	-	-	-
Pollen	1	20	-	-	-	-	-	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

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Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	242204275-0001			242204275-0002			242204275-0003		
	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
01 150 GYM				02 150 RM 125			03 150 DR GLAZER OFFICE RM 118		
Spore Types									
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Torula++	-	-	-	-	-	-	-	-	-
Zygothia/Schizothyrium	-	-	-	-	-	-	-	-	-
Total Fungi	115	2434	100	44	947	100	102	2180	100
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	1	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	2	-
Background (1-5)	-	1	-	-	1	-	-	2	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

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Project: LONG LOTS SCHOOL/ 140238501

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	242204275-0004			242204275-0005			242204275-0006		
	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
04 150 RM 106				05 150 RM 212			06 150 RM 206		
Spore Types									
Alternaria (Ullocladium)	-	-	-	1	20	14.6	-	-	-
Hyphal Fragment	1	20	-	-	-	-	1	20	-
Ascospores	9	200	14.6	1*	7*	5.1	-	-	-
Aspergillus/Penicillium	2	40	2.9	1	20	14.6	-	-	-
Basidiospores	40	870	63.5	3	70	51.1	3	70	29.2
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	9	200	14.6	1	20	14.6	6	100	41.7
Curvularia	-	-	-	-	-	-	2*	10*	4.2
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	1	20	1.5	-	-	-	-	-	-
Ganoderma	1	20	1.5	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	1	20	8.3
Pithomyces++	-	-	-	-	-	-	2	40	16.7
Rust	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Arthrotrichum	-	-	-	-	-	-	-	-	-
Cercospora++	-	-	-	-	-	-	-	-	-
Dicranidion	-	-	-	-	-	-	-	-	-
Fusicladium/Venturia	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Oidium++	-	-	-	-	-	-	-	-	-
Paecilomyces++	-	-	-	-	-	-	-	-	-
Pestalotia++	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Sporidesmium++	1	20	1.5	-	-	-	-	-	-
Tetraploa	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-

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Client Sample ID:	04			05			06		
Volume (L):	150			150			150		
Sample Location:	RM 106			RM 212			RM 206		
Spore Types	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Torula++	-	-	-	-	-	-	-	-	-
Zygothiala/Schizothyrium	-	-	-	-	-	-	-	-	-
Total Fungi	63	1370	100	7	137	100	14	240	100
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	2	-
Background (1-5)	-	2	-	-	1	-	-	2	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Samples analyzed by EMSL Analytical, Inc. Orlando, FL AIHA-LAP, LLC-EMLAP Accredited #163563

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EMSL Order: 242204275

Customer ID: LANG78

Customer PO: 140238501

Project ID:

Attention: Matthew Myers
Langan Engineering
Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511

Phone: (203) 562-5771

Fax: (203) 789-6142

Collected Date: 08/24/2022

Received Date: 08/24/2022 03:00 PM

Analyzed Date: 08/26/2022

Project: LONG LOTS SCHOOL/ 140238501

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	242204275-0007			242204275-0008			242204275-0009		
	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
Spore Types									
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Hyphal Fragment	3	70	-	1	20	-	1*	7*	-
Ascospores	-	-	-	4	90	19.3	-	-	-
Aspergillus/Penicillium	2	40	11.5	3	70	15	1	20	18.2
Basidiospores	3	70	20.2	2	40	8.6	3	70	63.6
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	8	200	57.6	9	200	42.8	-	-	-
Curvularia	1	20	5.8	1*	7*	1.5	-	-	-
Epicoccum	1*	7*	2	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	1	20	4.3	1	20	18.2
Myxomycetes++	-	-	-	1	20	4.3	-	-	-
Pithomyces++	2*	10*	2.9	1	20	4.3	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Arthrotrichum	-	-	-	-	-	-	-	-	-
Cercospora++	-	-	-	-	-	-	-	-	-
Dicranidion	-	-	-	-	-	-	-	-	-
Fusicladium/Venturia	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Oidium++	-	-	-	-	-	-	-	-	-
Paecilomyces++	-	-	-	-	-	-	-	-	-
Pestalotia++	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Sporidesmium++	-	-	-	-	-	-	-	-	-
Tetraploa	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1*	7*	-	-	-	-	-	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

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EMSL Order: 242204275
Customer ID: LANG78
Customer PO: 140238501
Project ID:

Attention: Matthew Myers Langan Engineering Long Wharf Maritime Center 555 Long Wharf Drive New Haven, CT 06511 Project: LONG LOTS SCHOOL/ 140238501	Phone: (203) 562-5771 Fax: (203) 789-6142 Collected Date: 08/24/2022 Received Date: 08/24/2022 03:00 PM Analyzed Date: 08/26/2022
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Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	242204275-0007			242204275-0008			242204275-0009		
Client Sample ID:	07			08			09		
Volume (L):	150			150			150		
Sample Location:	LIBRARY			MAIN OFFICE			CORRIDOR (109/AUD)		
Spore Types	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Torula++	-	-	-	-	-	-	-	-	-
Zygothiala/Schizothyrium	-	-	-	-	-	-	-	-	-
Total Fungi	17	347	100	22	467	100	5	110	100
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	2	-
Background (1-5)	-	2	-	-	2	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
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Analyzed Date: 08/26/2022

Project: LONG LOTS SCHOOL/ 140238501

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	242204275-0010			242204275-0011			242204275-0012		
	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
10A 150 AUDITORIUM				10B 150 ROOM 105			11 150 ROOM 8-A		
Spore Types									
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Hyphal Fragment	1	20	-	2	40	-	-	-	-
Ascospores	2	40	16.2	4	90	12.2	7	200	9.2
Aspergillus/Penicillium	-	-	-	1	20	2.7	1	20	0.9
Basidiospores	5	100	40.5	16	350	47.5	10	220	10.1
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	5	100	40.5	7	200	27.1	73	1600	73.7
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	1*	7*	0.9	3	70	3.2
Myxomycetes++	-	-	-	1	20	2.7	-	-	-
Pithomyces++	1*	7*	2.8	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Arthrotrichum	-	-	-	-	-	-	-	-	-
Cercospora++	-	-	-	-	-	-	-	-	-
Dicranidion	-	-	-	-	-	-	-	-	-
Fusicladium/Venturia	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Oidium++	-	-	-	-	-	-	-	-	-
Paecilomyces++	-	-	-	8*	50*	6.8	9*	60*	2.8
Pestalotia++	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Sporidesmium++	-	-	-	-	-	-	-	-	-
Tetraploa	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	1*	7*	-	-	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

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Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	242204275-0010			242204275-0011			242204275-0012		
Client Sample ID:	10A			10B			11		
Volume (L):	150			150			150		
Sample Location:	AUDITORIUM			ROOM 105			ROOM 8-A		
Spore Types	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Torula++	-	-	-	-	-	-	-	-	-
Zygothiala/Schizothyrium	-	-	-	-	-	-	-	-	-
Total Fungi	13	247	100	38	737	100	103	2170	100
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	2	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

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Collected Date: 08/24/2022
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Analyzed Date: 08/26/2022

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	242204275-0013			242204275-0014			242204275-0015		
Client Sample ID:	12			13			14		
Volume (L):	150			150			150		
Sample Location:	ROOM 6			MUSIC ROOM			EXTERIOR AUD/MUSIC AREA		
Spore Types	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total
Alternaria (Ulocladium)	-	-	-	-	-	-	2	40	0.1
Hyphal Fragment	-	-	-	-	-	-	4	90	-
Ascospores	-	-	-	1	20	14.6	72	1600	5.6
Aspergillus/Penicillium	3	70	43.8	1	20	14.6	36	790	2.8
Basidiospores	3	70	43.8	3	70	51.1	759	16600	57.9
Bipolaris++	-	-	-	-	-	-	1*	7*	0
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	1	20	12.5	1	20	14.6	403	8790	30.7
Curvularia	-	-	-	-	-	-	1	20	0.1
Epicoccum	-	-	-	-	-	-	4	90	0.3
Fusarium++	-	-	-	-	-	-	1	20	0.1
Ganoderma	-	-	-	-	-	-	15	330	1.2
Myxomycetes++	-	-	-	-	-	-	2	40	0.1
Pithomyces++	-	-	-	1*	7*	5.1	8	200	0.7
Rust	-	-	-	-	-	-	1	20	0.1
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Arthrotrichum	-	-	-	-	-	-	-	-	-
Cercospora++	-	-	-	-	-	-	1*	7*	0
Dicranidion	-	-	-	-	-	-	-	-	-
Fusicladium/Venturia	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	1	20	0.1
Oidium++	-	-	-	-	-	-	-	-	-
Paecilomyces++	-	-	-	-	-	-	14*	93*	0.3
Pestalotia++	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	1*	7*	0
Sporidesmium++	-	-	-	-	-	-	-	-	-
Tetraploa	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Lab Sample Number:	242204275-0013			242204275-0014			242204275-0015		
Client Sample ID:	12			13			14		
Volume (L):	150			150			150		
Sample Location:	ROOM 6			MUSIC ROOM			EXTERIOR AUD/MUSIC AREA		
Spore Types	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Torula++	-	-	-	-	-	-	-	-	-
Zygothiala/Schizothyrium	-	-	-	-	-	-	-	-	-
Total Fungi	7	160	100	7	137	100	1322	28674	100
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Project: LONG LOTS SCHOOL/ 140238501

Phone: (203) 562-5771
Fax: (203) 789-6142
Collected Date: 08/24/2022
Received Date: 08/24/2022 03:00 PM
Analyzed Date: 08/26/2022

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	242204275-0016			242204275-0017			242204275-0018		
	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
	EXTERIOR OFFICE/AUD			EXTERIOR LIBRARY			EXTERIOR RM 211		
Spore Types	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total
Alternaria (Ulocladium)	5	100	0.4	6	100	0.2	3	70	0.3
Hyphal Fragment	3	70	-	10	220	-	3	70	-
Ascospores	88	1900	7.5	67	1500	2.3	80	1700	6.5
Aspergillus/Penicillium	7	200	0.8	10	220	0.3	37	810	3.1
Basidiospores	572	12500	49.2	737	16100	25	411	8970	34.5
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	396	8640	34	1500	32700	50.8	561	12200	46.9
Curvularia	3	70	0.3	14	310	0.5	12	260	1
Epicoccum	2	40	0.2	6	100	0.2	4	90	0.3
Fusarium++	2	40	0.2	6	100	0.2	3	70	0.3
Ganoderma	16	350	1.4	6	100	0.2	22	480	1.8
Myxomycetes++	3	70	0.3	1	20	0	10	220	0.8
Pithomyces++	4	90	0.4	209	4560	7.1	18	390	1.5
Rust	2	40	0.2	1	20	0	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Arthrotrichum	-	-	-	1	20	0	-	-	-
Cercospora++	1*	7*	0	1*	7*	0	2*	10*	0
Dicranidion	-	-	-	-	-	-	1	20	0.1
Fusicladium/Venturia	-	-	-	-	-	-	1*	7*	0
Nigrospora	1*	7*	0	1	20	0	-	-	-
Oidium++	3	70	0.3	-	-	-	-	-	-
Paecilomyces++	56	1200	4.7	385	8400	13.1	32	700	2.7
Pestalotia++	1	20	0.1	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Sporidesmium++	-	-	-	-	-	-	-	-	-
Tetraploa	-	-	-	1	20	0	-	-	-
Insect Fragment	3	70	-	-	-	-	1*	7*	-
Pollen	-	-	-	8	200	-	2	40	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

No discernable field blank was submitted with this group of samples.

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Samples analyzed by EMSL Analytical, Inc. Orlando, FL AIHA-LAP, LLC-EMLAP Accredited #163563

Initial report from: 08/26/2022 01:54 PM

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EMSL Analytical, Inc.

165 Gracey Avenue Meriden, CT 06451

Tel/Fax: (203) 284-5948 / (203) 284-5978

<http://www.EMSL.com> / wallingfordlab@emsl.com

EMSL Order: 242204275
Customer ID: LANG78
Customer PO: 140238501
Project ID:

Attention: Matthew Myers Langan Engineering Long Wharf Maritime Center 555 Long Wharf Drive New Haven, CT 06511 Project: LONG LOTS SCHOOL/ 140238501	Phone: (203) 562-5771 Fax: (203) 789-6142 Collected Date: 08/24/2022 Received Date: 08/24/2022 03:00 PM Analyzed Date: 08/26/2022
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Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	242204275-0016			242204275-0017			242204275-0018		
	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
	15			16			17		
	150			150			150		
	EXTERIOR OFFICE/AUD			EXTERIOR LIBRARY			EXTERIOR RM 211		
Spore Types									
Unidentifiable Spores	1	20	0.1	1	20	0	1	20	0.1
Torula++	1	20	0.1	1	20	0	-	-	-
Zygothia/Schizothyrium	-	-	-	-	-	-	1*	7*	0
Total Fungi	1164	25384	100	2954	64337	100	1199	26024	100
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	2	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Gloria V. Oriol-Aguilar, Microbiology Director
or other Approved Signatory

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EMSL Order: 242204275

Customer ID: LANG78

Customer PO: 140238501

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Attention: Matthew Myers
Langan Engineering
Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511

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Collected Date: 08/24/2022

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Project: LONG LOTS SCHOOL/ 140238501

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	242204275-0019			242204275-0020		
Client Sample ID:	18			19		
Volume (L):	150			150		
Sample Location:	EXTERIOR RM 206			ROOM 130		
Spore Types	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
Alternaria (Ulocladium)	6	100	0.3	1	20	0.8
Hyphal Fragment	4	90	-	1*	7*	-
Ascospores	125	2730	8.2	4	90	3.7
Aspergillus/Penicillium	12	260	0.8	2	40	1.6
Basidiospores	589	12900	38.9	24	520	21.2
Bipolaris++	2*	10*	0	-	-	-
Chaetomium++	-	-	-	-	-	-
Cladosporium	578	12600	38	52	1100	44.8
Curvularia	25	550	1.7	3	70	2.9
Epicoccum	7	200	0.6	1*	7*	0.3
Fusarium++	8	200	0.6	-	-	-
Ganoderma	23	500	1.5	2	40	1.6
Myxomycetes++	3	70	0.2	1	20	0.8
Pithomyces++	35	760	2.3	9*	60*	2.4
Rust	4*	30*	0.1	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-
Arthrotrichum	-	-	-	-	-	-
Cercospora++	1	20	0.1	-	-	-
Dicranidion	-	-	-	-	-	-
Fusicladium/Venturia	-	-	-	-	-	-
Nigrospora	-	-	-	1*	7*	0.3
Oidium++	-	-	-	-	-	-
Paecilomyces++	101	2200	6.6	22	480	19.6
Pestalotia++	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-
Sporidesmium++	-	-	-	-	-	-
Tetraploa	-	-	-	-	-	-
Insect Fragment	1	20	-	1*	7*	-
Pollen	-	-	-	-	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Client Sample ID:	18			19			
Volume (L):	150			150			
Sample Location:	EXTERIOR RM 206			ROOM 130			
Spore Types	Raw Count	Count/M³	% of Total	Raw Count	Count/M³	% of Total	
Unidentifiable Spores	-	-	-	-	-	-	-
Torula++	-	-	-	-	-	-	-
Zygothia/Schizothyrium	-	-	-	-	-	-	-
Total Fungi	1519	33130	100	122	2454	100	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-
Skin Fragments (1-4)	-	1	-	-	2	-	-
Fibrous Particulate (1-4)	-	2	-	-	2	-	-
Background (1-5)	-	1	-	-	1	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Microbiology Chain of Custody Form

EMSL Order Number / Lab Use Only

CIVIL ANALYTICAL, INC.
200 Route 130 North
Cinnaminson, NJ 08077

PHONE: (800) 220-3675

EMAIL: CinnMicroLab@emsl.com

EMSL ANALYTICAL, INC.
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242204275

If Bill-To is the same as Report-To leave this section blank. Third-party billing requires written authorization.

Customer Information	Customer ID:		Billing Information	Billing ID:	
	Company Name:	Langan CT		Company Name:	
	Contact Name:	Matthew Myers		Billing Contact:	
	Street Address:	355 Long Wharf Drive		Street Address:	same
	City, State, Zip:	New Haven CT 06511		City, State, Zip:	
	Phone:	203 562-5771		Phone:	
Email(s) for Report:	mmyers@langan.com	Email(s) for Invoice:	Langan - Inhouse Capture@concur.solutions.com		

Project Name/No:		Long Lots School	1402 38501	Purchase Order:	
------------------	--	------------------	------------	-----------------	--

EMSL LIMS Project ID:	State Samples Collected:	CT	Zip Code Samples Collected:	06880	State of Connecticut (CT) must select project location:
(If applicable, EMSL will provide)					<input type="checkbox"/> Commercial (Taxable) <input checked="" type="checkbox"/> Residential (Non-taxable)

Sampled By Name:	Sampled By Signature:	No of Samples in Shipment:
Matthew Myers	<i>Matthew Myers</i>	20

Sterile, Sodium Thiosulfate Preserved Bottle Used: Biocida Used in Source (specify)

Public Water Supply Samples: Note: All results may automatically be reported to DOH if required by State.

Turn-Around-Time (TAT) Please call ahead for 24, 32, 48 hours and/or turnaround times 6 Hours or Less. *32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

3 Hour 6 Hour 24 Hour 32* Hour 48 Hour 72 Hour 96 Hour 1 Week 2 Week

MICROBIOLOGY TEST CODES			
M001 Air-O-Cell	M174 MoldSnap	M012 Pseudomonas aeruginosa (PIA***)	M115 Sewage Screen - Water (PIA***)
M030 Micro 5	M032 Allergenco-D	M024 Pseudomonas aeruginosa (MFT*)	M116 Sewage Screen - Water (MPN**)
M041 Fungal Direct Examination		M015 Heterotrophic Plate Count	M117 Sewage Screen - Swab (PIA***)
M169 Pollen ID & Enumeration		M017 Total Coliform & E. Coli (Colilert PIA***)	M013 Sewage Screen - Swab (MFT*)
M280 Dust Characterization Level-1		M018 Total Coliform & E. Coli (MFT*)	M730 Methicillin-resistant Staph. aureus (MRSA)
M281 Dust Characterization Level-2		M114 Total Coliform & E. Coli Enumeration (Colilert MPN**)	M031 Rapid-growing non-TB Mycobacteria Detection & Enumeration
M005 Viable Fungi-Air Samples (Genus ID & Count)		M019 Fecal Coliform (MFT*)	M014 Endotoxin Analysis
M006 Viable Fungi-Air Samples (Includes Penicillium, Aspergillus, Cladosporium, Stachybotrys Species ID & Count)		M020 Fecal Streptococcus (MFT*)	M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
M007 Culturable Fungi-Surface Samples (Genus ID & Count)		M029 Enterococci (MFT*)	M095 Bacteroides
M008 Culturable Fungi-Surface Samples (Includes Penicillium, Aspergillus, Cladosporium, Stachybotrys Species ID & Count)		M129 Enterococci (Enterolert PIA***)	Other - See Analytical Price Guide for Test Code
M009 Bacteria Culture Gram Stain & Count		M180 Real Time qPCR-ERMI 36 Panel	Legionella Analysis Please use EMSL Legionella COC
M010 Bactera Count & ID - 3 Most Prominent		M025 Sewage Screen - Water (MFT*)	
M011 Bacteria Count & ID - 5 Most Prominent			

*MFT= Membrane Filtration Technique
**MPN = Most Probable Number
***PIA = Presence/Absence

Sample #	Sample Location/Description	Sample Type (Matrix)	Potable / Non-Potable (Only for Water)	Test Code	Volume/Area	Date / Time Collected	Temperature (Lab Use Only)
Example: Sample 1	Kitchen	Water	Potable	M011	1500 ml	8/24/22 3:30pm	
01	Gym	Air		M001	150 L	8/24/22 10:43	10:23
02	Rm 125						10:45 - 10:25
03	Rm 118 Dr Glazer office						10:22 - 10:42
04	Rm 106						10:33 - 10:43
05	Rm 212						10:46 - 10:56
06	Rm 206						10:48 - 10:58

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Informed Parcel of samples being sent out 8/24/22

Method of Shipment:	Drop off	Sample Condition Upon Receipt:	
Relinquished by:	Parcel Zayenchuk	Date/Time:	8/24/22
Relinquished by:		Date/Time:	

RECEIVED

AUG 24 2022

BY: *[Signature]*

Controlled Document - COC-34 Micro R13 03/02/2021

AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.



Microbiology Chain of Custody Form

EMSL Order Number / Lab Use Only

242204275

PHONE: (800) 220-3675

EMAIL: CinnMicroLab@emsl.com

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Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Sample #	Sample Location/Description	Sample Type (Matrix)	Potable / Non-Potable (Only for Water)	Test Code	Volume/Area 15CLPM	Date / Time Collected	Temperature (Lab Use Only)
07	Library	Air	[Wavy line]	M001	150L	8/24/22 11:06-11:16	
08	Main Office					11:18-11:18	
09A	Corridor (109/Aud)					11:17-11:27	
10B	Auditorium Room 105					11:30-11:30-10A 11:27-11:47	
11	Room 8-A					11:34-11:44	
12	Room G					11:55-12:05	
13	Music Room					11:57-12:07	
14	Exterior Aud/Music Area					12:19-12:24	
15	Office/Aud					12:30-12:32	
16	Library					12:43-12:52	
17	Rm 211					12:57-1:05	
18	Rm 206					1:00-1:10	
19	Room 130					1:13-1:33	

RECEIVED
AUG 24 2022
BY [Signature]

Method of Shipment: Drop off Sample Condition Upon Receipt:

Relinquished by: Paul Zayentsev Date/Time: 8/24/22 Received by: _____ Date/Time: _____

Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____

AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

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