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January 29, 2016

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Re: **Francis X Hegarty Elementary School - Crawl Space**

Dear Dr. Bovino:

Attached please find results of sampling performed at the above referenced location. If you should have any questions, please feel free to contact me.

Sincerely,



Bart Gallagher

Enclosures: 6

Island Park Hegarty Crawl Space Photos Dic.
Microbial Air Sample Results
Microbial Air Sample Results, Crawlspace
Clearance Microbial Air Sample Results
Clearance Microbial Air Sample Results, Crawlspace
3rd Microbial Air Sample Results

Island Park Schools

Francis X Hegarty Elementary School - Crawl Space

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Job # 13211

PROJECT SUMMARY

FRANCIS X HEGARTY ELEMENTARY SCHOOL - CRAWL SPACE

Prepared for: ISLAND PARK SCHOOLS
Dr. Rosmarie Bovino
99 Radcliffe Road
Island Park, NY 11558

Prepared by: ENVIROSCIENCE CONSULTANTS, INC.

Project Manager: *Bart Gallagher*
Bart Gallagher

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>
1.0	Executive Summary
2.0	Methods & Results
3.0	Conclusion
Appendices:	Appendix A - Photo Log
	Appendix B - Air Sample and IAQ Results, 12/19/15
	Appendix C - Air Sample and IAQ Results - Crawl Space, 12/19/15
	Appendix D - Clearance Air Sample and IAQ Results, 12/30/15
	Appendix E - Clearance Air Sample and IAQ Results - Crawl Space, 12/30/15
	Appendix F - Air Sample and IAQ Results - Building Occupied, 1/14/16

1.0 Executive Summary

In response to continued complaints regarding indoor air quality, and concerns that conditions in the crawl space could influence air quality in the occupied spaces of the Francis X. Hegarty Elementary School, Enviroscience Consultants, Inc. conducted air quality testing and an inspection of the crawl space. The inspection uncovered several conditions that required correction, detailed below. The recommended repairs should be completed even though testing inside the crawl space and in the occupied spaces of the building indicate that the present conditions are not affecting indoor air quality. A photo log of the work that was performed over the holiday break is in Appendix A.

Three rounds of air quality testing were performed. Testing was done prior to cleaning the crawl space, and after the crawl space was cleaned but before school resumed following the Christmas holiday. The third round of testing was done on a regular school day, while students and staff occupied the building. Air quality testing indicates that conditions in the crawl space are not adversely influencing air quality in the occupied areas of the school. Following the cleaning, all areas tested were within acceptable guideline limits. Results indicate normal concentrations of common environmental organisms.

Inspection and Corrective Action

Bart Gallagher, accompanied by Mike Sheenan and Jim Hall of Belfor Property Restoration, performed the crawl space inspection on December 8, 2015. All accessible areas of the Hegarty School crawl space were inspected. The following conditions were identified and several conditions were repaired:

- The crawl space is separate from the occupied spaces of the building. It is isolated from the first floor by a thick structural concrete floor. Communication between the crawl space and the occupied spaces is minimal. Where found, voids in the concrete, such as chases for piping, were sealed. The crawl space has a dirt floor. It is not intended to be occupied. Air samples collected inside the crawlspace had normal concentrations of common environmental organisms.
- A sewage leak was found under the gymnasium - photos 5 and 6. The toilets contributing to this condition were immediately closed. During the Christmas break, a vacuum truck was used to remove contaminated soil, and the soiled crawl space area was treated with lime – photos 7 – 12. The leak was repaired and the toilets are functioning.
- A steam leak was found in a heating pipe in the north crawl space - Photo 13. This leak was immediately repaired by the District's mechanical contractor, Ultimate Power, Inc. The area in the vicinity of the leak is now dry – photo 16.

- Debris and trash, primarily wood, was found throughout the crawl space – photos 15 – 18. The entire crawl space was cleaned over the Christmas holiday. The building was further isolated with plastic sheeting at the crawl space access hatches, and the crawl space was placed under a negative pressure environment using high-efficiency particulate air (HEPA) equipped negative air machines to clean contaminated air within the work area and exhaust the filtered air to the exterior of the building. As a precaution, HEPA filtered air scrubbers were placed throughout the first floor – photo 3. The negative air microtraps and the HEPA air scrubbers ran continuously during the project. Wood, trash, and debris were removed thru exterior hatches and was placed directly into trucks for off-site disposal - photo 19. Remaining wood cribbing was treated with an anti-microbial encapsulant – photos 20 – 26.

In conjunction with the project, Enviroscience performed microbial spore trap sampling and indoor air quality assessments at the Hegarty School on three occasions in December and January. Testing was done prior to cleaning the crawl space, immediately after the crawl space was cleaned before students and staff returned, and again on a normal school day while the building was occupied. The purpose of this sampling was to identify what impact, if any, indoor air quality might be having on the health and/or comfort of the building occupants, and to monitor the occupied areas and the crawl space before and after the crawl space was cleaned.

The first round of testing was on December 19, 2015, prior to the crawl space remediation. Results of sampling and inspection indicated elevated concentrations of common microbial organisms in the Faculty Room 111. All other areas tested on December 19 were within acceptable guideline limits.

All areas tested on December 30 (including Room 111), after the crawl space cleaning, and again on January 14, 2016 during the school day while the building was occupied, were within acceptable guideline limits.

After the cleaning, a dirt-like odor was observed in the front, south entrance vestibule and in the rear north vestibule. The metal hatch doors that access the crawl space do not fully seal. Adding weather stripping gaskets to these small hatch doors should improve this condition.

Regarding the occupied spaces, there are no other recommendations for any corrective actions at this time.

Remaining issues

1. There is a roof drain leak inside the south crawl space at the west end, under the Girl's Toilet and Room 102. The drainpipe is disconnected and allows rainwater to drain directly onto the dirt floor. Plumbers were not able to repair this leak at this time. The leak remains active and was observed to be releasing rainwater into the crawl space - photo 27.

2. A second roof drain in the south crawl space by the rear outdoor storage room also needs repair. Further investigation to determine where these drains terminate and how they may be repaired is needed. BBS Architects & Engineers, PC have begun the investigation to facilitate repairs.
3. In the crawl space, in the vicinity of north classrooms 108 and 109, there are two locations along the north exterior foundation wall where the concrete is wet at the crawl space ceiling / wall junction – photo 31. The classrooms above appear to be dry, but visibility behind the unit ventilators and built-in casework is limited. Investigate for possible leakage at the unit ventilator exterior wall mounted louvers. Ultimate Power, Inc. has been contacted and will inspect the unit ventilators.
4. Rain water was observed to be leaking into the crawl space under the north east (front) vestibule. The most eastern exterior foundation wall of this space was wet during a significant rain event - photo 32. Weatherproofing the concrete joints at the steps / building foundation junction may improve this condition.

These issues should be corrected even though they are not affecting indoor air quality in the occupied areas of the building.

2.0 Air Quality Testing Methods

Testing for airborne mold and other allergens was conducted to identify airborne spore levels in areas of concern using spore traps. Air samples were collected using allergen collection media and high-volume electric sampling pumps. These samples undergo laboratory analysis for mold types and concentrations and for other indicators through microscopy as the analytical method.

There are currently no regulatory guidelines outlining ‘safe’ or ‘unsafe’ levels of airborne mold. An individual’s reaction to airborne mold ultimately depends upon that individual’s sensitivity, allergies, and general health.

Generally speaking, total concentrations for indoor airborne microbial spores of common environmental organisms should not exceed those found outdoors, or 3,000 spores per cubic meter (spr/m³). However, buildings with little or no ventilation (HVAC) filtration may have airborne fungal counts higher than those outdoors. Results of sampling within complaint areas should be higher than those in non-complaint areas, if fungal growth is an issue. A comparison of fungal spore type, indoor versus outdoor, and complaint versus non-complaint areas is also made. All should generally be similar. Results strikingly different may indicate areas of concern with respect to fungal growth.

Marker or signature fungal spores may also indicate cause for concern. *Chaetomium*, *Stachybotrys*, *Memnoniella*, *Ulocladium*, and *Eurotium* may be associated with water damage. *Chaetomium*, *Stachybotrys*, *Memnoniella*, and *Ulocladium* thrive in moisture-rich environments. *Eurotium* indicates persistent high relative humidity, poor ventilation

and condensation problems. Spores and structures of these fungi may also come from outdoors, but the probability is low. *Aspergillus/Penicillium-like* (or *Asp/Pen-like*) spores are common indoors and outdoors at ground level. If the prevalence of *Aspergillus/Penicillium-like* spores indoors is consistently higher than those outdoors, then the difference may be indicative of a water-damaged environment.

Allergen, Mold and IAQ Results

December 19, 2015

The first round of testing was done prior to repairing the sewage leak and cleaning the crawl space. The steam leak in the north section of the crawl space was repaired before this testing, immediately after it was discovered. Air samples and other indoor air quality data were collected throughout representative areas of the building, including in spaces where concerns were noted. Also, four samples were collected inside the crawl space.

Faculty Room 111 had elevated airborne concentrations of common environmental organisms (*Penicillium/Aspergillus* 5,173 spr/m³). This level is above adjacent areas and the generally accepted limit of 3,000 spr/m³. The *Penicillium/Aspergillus* level inside the crawl space in the vicinity of Room 111 on December 19 was only 480 spr/m³, which suggests that other factors, such as housekeeping, or a spill caused the amplified reading. A void in the concrete wall under the sink for the sink drainpipe was sealed with fireproof foam prior to beginning the crawl space cleaning - photo 4. Subsequent testing of the Faculty Room on December 30 and January 14 yielded acceptable results. The *Penicillium/Aspergillus* spore concentration on December 30 was 107 spr/m³, and no airborne *Penicillium/Aspergillus* spores were detected on January 14.

All other areas tested on December 19 were within acceptable guideline limits. These results are in Appendix B. Results for the crawl space are in Appendix C.

December 30, 2015

The second round of air quality testing was done after the sewage-contaminated soil was removed, the crawl space was cleaned of wood debris, and the sanitary system was repaired. This testing was done before students and staff returned from the Christmas holiday break to determine if the school was safe for occupancy. Four samples were again collected inside the crawl space.

All areas tested on December 30 were within acceptable guideline limits. These results can be found in Appendix D. Results for the crawl space are in Appendix E.

January 14, 2016

The District requested a third round of testing to be done during an ordinary school day, while students and staff occupied the building. This testing was done on January 14, with the building under normal occupied conditions.

All areas tested with the building occupied were within acceptable guideline limits, with normal concentrations of common environmental organisms.

Results of the January 14 Building Occupied testing are in Appendix F.

During each round of testing, an indoor air quality monitor was used to measure temperature, relative humidity, and carbon dioxide at the spore trap sampling locations. The indoor air quality monitor is a real-time direct-read digital instrument that measures and displays air quality parameters at one-second intervals. Measured temperature, relative humidity, and carbon dioxide levels were compared with standards 55-1992 and 62-2001 of the American Society of Heating Refrigerating, and Air Conditioning Engineers (ASHRAE). These standards state the following:

- Acceptable indoor temperatures during the winter season range from 68°F to 74°F.
- Acceptable indoor temperatures during the summer season range from 73°F to 79°F.
- Acceptable indoor relative humidity levels range from 30% to 60%. Outdoor RH on January 14 measured 36.2%. As would be expected for the indoor environment with higher temperatures, relative humidity values inside the building were low. Relative humidity is dependent on outdoor conditions; there is little the District can do to increase indoor relative humidity.
- Acceptable indoor carbon dioxide levels should be no greater than 700 ppm above outside levels.

Temperature, relative humidity, and carbon dioxide results can be found for their respective rounds of testing in appendices B, C, D, E, and F.

3.0 Conclusions

Inspection and air quality testing indicate that conditions in the crawl space are not adversely influencing air quality in the occupied areas of the school. All areas tested during a normal school day, while the school was occupied by students and staff were within acceptable guideline limits. The samples had normal concentrations of common environmental fungal organisms. The remaining issues in the crawl space should be corrected even though they are not affecting indoor air quality in the occupied areas of the building.

The District's mechanical contractor repaired a leaking steam heating pipe before the holiday. Over the December school break, Belfor Property Restoration removed the sewage-contaminated soil and repaired the leaking sanitary lines. Wood debris was removed from the crawl space and remaining wood support cribbing was encapsulated with an antimicrobial coating.

The repair of the two roof drains could not be completed at this time. Further investigation is needed to determine where the outflow of this piping is located and to recommend repair methods. BBS Architects & Engineers have begun this investigation.

To alleviate any odors from the crawl space, install weather stripping to the metal hatch doors. These access hatches are in the entrance vestibules at the four corners of the building. No other action is needed.

The crawl space is not intended to be occupied. It is passively vented to the outdoors through grates in the foundation wall. The walls and ceiling are concrete and the floor is dirt. The crawl space may receive water from time to time because of the high water table and significant storm events. We recommend that the crawl space be visually inspected periodically, so that any adverse conditions, such as plumbing leaks, could be identified and corrected in a timely manner.

As with any air quality tests, the results of Enviroscience's sampling are relevant to the sampling period and the parameters tested for and are only indicators of overall conditions in the area of sampling. Standardized measurements and biological markers of exposure to mold are largely unknown. Because of this it is not possible to determine 'safe' or 'unsafe' levels of exposure for people in general. An individual's reaction to mold ultimately depends upon that individual's sensitivity and allergies and should be taken into account when assessing indoor air quality.