

BUILDING DYNAMICS, LLC

www.building-dynamics.com

INDUSTRIAL HYGIENE

1216 Ashton Road
Ashton, MD 20861
240.899.6926 (mobile)
elight@building-dynamics.com



HVAC ENGINEERING

703.963.0824 (mobile)
jbailey@building-dynamics.com

Deep Run Elementary School: Indoor Air Quality Assessment

July 19, 2016

Prepared by: Ed Light, CIH

Prepared for: Howard County Public School System

Building Dynamics, LLC (BDL) was asked by Howard County Public School System (HCPSS) to evaluate staff IAQ concerns at Deep Run Elementary School (DRES). To accomplish this, BDL:

- Reviewed HCPSS documentation related to environmental conditions at DRES.
- Interviewed staff regarding health status and observed conditions
- Inspected the building and portables
- Accessed behind walls, ceilings and bookcases in previously water-damaged areas
- Evaluated ongoing renovation
- Reviewed past pest control activities

BDL was onsite at DRES on June 13, 16 and 17 and July 7, 2016.

In summary:

- **No health hazards were observed.**
- **Ventilation deficiencies in Pod Two have been typical for older schools.**
- **Both of these conditions will be resolved by this summer's renovation.**
- **Renovation work has generally been isolated from occupied areas, although construction-related dust and odor has occasionally been detected.**
- **During the final phase of occupied building renovation this fall, HCPSS should ensure that all openings from the construction area are fully sealed and that occupied space is not negatively pressurized relative to the construction area.**
- **While BDL's study identified minor IAQ deficiencies, reported symptoms patterns do not suggest building-related illness.**
- **If any staff members continue to have health concerns, they should review BDL's findings with their personal physician and request additional consideration by HCPSS, if needed.**

1.0 Health Concerns

In some situations, IAQ may impact occupant health (typically short-term allergy or irritation in sensitive individuals). However, causation is difficult to establish because these symptoms are also associated with many other factors.

Several DRES teachers (primarily in Pod Two) are concerned that they may be experiencing symptoms associated with their work environment. BDL interviewed DRES staff and reviewed documentation to determine if the nature and timing of reported symptoms were likely to be related to be IAQ-related.

- Some symptoms reported by DRES staff are unlikely to be associated with IAQ (i.e., [REDACTED], [REDACTED], arthritis, respiratory viruses).
- While some health concerns reported by DRES staff may be associated with IAQ (i.e., headache, fatigue, sore throat, nausea), these are common, non-specific symptoms with many potential non-environmental causes.
- Reported symptom patterns did not appear to be consistent with mold-related illness.

- School nurses have not observed any student or staff health issues likely to be building-related and have not been contacted by parents or physicians in this regard.

2.0 General Environmental Conditions

2.1 Pod Two

- Measured IAQ parameters mid-day on June 16 were within the comfort range (~74 °F; 60% relative humidity; carbon dioxide ~900 parts per million). Measurements of these parameters in May, 2016 by Aria Environmental for HCPSS were also within the comfort range.
- BDL found surfaces dusty in Pod Two, but this was at a time when contents were being packed up for renovation.
- Dust and odor from adjacent construction has occasionally migrated into Pod Two since April, 2016. This does not present a health hazard, but sensitive individuals may experience irritation-type symptoms under such conditions.
- In May 2016, HCPSS checked the ventilation in Pod Two and found reduced air flow at several ceiling vents. These were adjusted, making the rooms more comfortable.
- Particulate was discharged from these vents the day that air flow was increased. This was dust and debris typically present in ducts and is not considered a health hazard. HCPSS cleaned affected surfaces and there has been no particulate discharge has been noted since.
- In the past, Pod Two has been subject to HVAC deficiencies typical of older schools (i.e., erratic temperatures, stuffy). Pod Two is being renovated this summer, and inspection of DRES areas already renovated indicates that these issues are being resolved (see section 2.2).
- No other significant sources of airborne contaminants were observed in Pod Two.

2.2 Other Areas

- Classrooms outside of Pod Two have been renovated.
- Measured temperature and carbon dioxide on June 16 in renovated classrooms were within the comfort range (~73 °F; carbon dioxide ~700 parts per million).
- Relative humidity was elevated (~70%), potentially affecting comfort. Note that mold growth is not a concern until relative humidity continuously exceeds 80%.
- Measurements of these parameters in May, 2016 by Aria Environmental and HCPSS in June 2016 were consistent with BDL's findings.
- Teachers in new classrooms reported intermittent discomfort since renovation. HVAC systems in these areas are still being adjusted and such fluctuations are typical until systems are fully commissioned.
- BDL found renovated classrooms to be free of odors, suspect growth and, with the exception of occasional dust from construction activities (see section 4.0), no other sources of unusual indoor air contaminants were observed.

3.0 Mold Evaluation

BDL assessed exposure to mold growth based on a detailed inspection and moisture

measurements in areas potentially impacted by excess moisture. Inspection included cutting holes into wall and ceiling cavities and lifting carpets. Mold sampling results have not been found to correlate with health risk and there are no accepted standards for measured concentrations. BDL's

procedure was consistent with guidance from public health agencies, which recommend that mold assessment be based on inspection and that any visible growth be remediated.

3.1 Pod Two

- Several square inches of suspect growth was found on drywall inside a bulkhead by recent roof leak (repaired by HCPSS). This was dry and not exposed to occupants
- Several square inches of suspect growth was also observed on contents against Ms. Pruett's exterior wall. This was also dry and not exposed to occupants. It was apparently associated with past leaks (there was no standing water against the outside wall following a rain).
- BDL inspected inside wall cavities, above ceilings and under carpets in affected areas and found all these surfaces to be dry and free of suspect growth.
- All other Pod Two surfaces were dry and free of suspect growth.

3.2 Other Areas

- The staff lounge and adjacent offices were impacted a few years ago by a pipe leak from a roof-top air-conditioning unit and a bathroom flood.
- HCPSS repaired these areas and then cleared affected surfaces as dry and free of mold growth.
- BDL found all exposed surfaces in the lounge area on June 16, 2016 to be dry and free of suspect growth with the exception of several square inches of suspect spotting on the wall in Ms. Pollit's office (dry, less than one square foot).
- BDL inspected inside wall cavities, above ceilings and under carpets in affected areas and found all these surfaces to be dry and free of suspect growth.
- Attached bookcases in flooded offices were left in place during water damage restoration. When these were removed for renovation, adjacent floor and wall surfaces showed no sign of water damage.
- There was a ceiling leak into the Media Center during recent roofing work. This had been repaired and affected surfaces were dry and free of suspect growth,
- HCPSS found several square inches of suspect growth on the ceiling of the Boys' Bathroom across from Pod Two (dry) and remediated this (wiped with sanitizer). BDL inspected above this ceiling and found it dry and free of suspect growth.

4.0 Pest Control

- Some staff were concerned that they may have been exposed to pesticide treatments at DRES
- HCPSS has not applied pesticides at DRES over the past six years.
- Termite control treatments prior to that time were not exposed to building occupants.

5.0 Renovation Impacts

- DRES has been under renovation since 2014, with non-work areas remaining occupied.

-4-

- Materials used for this renovation are low-emitting in compliance with LEED.
- Pod Three teachers report increased dust when an addition was being built adjacent to their area two years ago.
- The contractor has taken precautions to protect students and staff from exposure to demolition and construction inside the building while occupied, including sealing doors and erecting temporary walls, using portable fans to exhaust work areas to the outside, and scheduling activities generating significant dust and odor after-hours
- BDL found potential for intermittent migration of dust and odor from construction areas through unsealed openings to occupied space.
- BDL found work areas to be positively pressurized in the construction area versus occupied space at times. Temporary modification of HVAC systems contributed to pressurization.
- BDL observed localized construction dust settled on adjacent surfaces in Pod Two.
- DRES custodians report increased dust near areas undergoing renovation.

BDL President, Ed Light, CIH, holds degrees in Environmental Science from the University of Massachusetts (B.S.) and Marshall University (M.S.), is a Senior Fellow of the American Industrial Hygiene Association, has authored over 40 scientific publications on assessment and control of the indoor environment and chaired several national scientific committees. In the 1980s, Mr. Light established the West Virginia Department of Health IAQ Program, pioneering efforts to resolve exposure issues related to formaldehyde, asbestos, and termiticides. In the 1990's, he developed widely used protocols for addressing IEQ complaints (published by EPA, NIOSH and ISIAQ) and managing air quality in occupied buildings under construction (now an ANSI standard). As a consultant, Mr. Light has directed more than 1000 multi-disciplinary IEQ investigations, ranging from the White House to the South Pole Station.