



December 15, 2018

Mr. Robert Christlieb  
Director of Operations  
Chicago Public Schools  
42. West Madison Street  
Chicago, Illinois 60603

**RE: Indoor Air Quality Investigation  
George Washington Elementary School – 3611 E. 114<sup>th</sup> St., Chicago, IL 60617  
Project A620140024-01**

Dear Mr. Christlieb:

The following summarizes results of the Indoor Air Quality Investigation conducted on October 8, 2018 by Carnow, Conibear and Assoc., Ltd. (Carnow Conibear). The investigation was conducted at the Chicago Public School (CPS) George Washington Elementary School. The investigation was performed by Carnow Conibear Industrial Hygienists Mr. Daniel Lyons and Mr. Marcos Iwankiw.

## **BACKGROUND**

Carnow Conibear conducted an Indoor Air Quality Investigation on October 8, 2018. The investigation was performed in response to complaints made by students and staff regarding the air quality in classrooms 206 and 209. See Attachment C for the IAQ Questionnaires completed by the teacher and principal.

## **SCOPE OF WORK**

A visual inspection was conducted within the areas of concern. Observations were made to determine any indications of visible surface dust, and apparent visible microbial growth on building materials or furnishings. Any evidence of moisture, staining, or other signs of water infiltration or any unusual odors that might accompany microbial growth were also evaluated and noted.

Indoor environmental measurements were made with direct reading instruments to determine levels of several constituents selected as indicators or parameters of overall air quality. The substances included: temperature, relative humidity, carbon dioxide, carbon monoxide, airborne particulate matter (PM-10), and volatile organic compounds (VOCs). Readings were collected on October 4, 2018. A total of 60 readings of each parameter (temperature, relative humidity, carbon dioxide, carbon monoxide, PM-10, and VOCs) were obtained during occupancy of rooms 206 and 209. Additional readings were taken in the aforementioned rooms while unoccupied to

provide baseline results.

## **OBSERVATIONS**

The CPS George Washington Elementary School areas of concern primarily consisted of carpeted flooring, suspended acoustical ceiling tiles, and modular walls. Carpeting in several areas of the facility was in poor condition. Many of the vents were covered by staff in hopes to filter out general dust. The “filters”, vents, and surrounding ceiling tiles were observed to be dusty

## **RESULTS**

Results summarized below reflect conditions at the time of the investigation. Background information about indoor air quality is presented in Appendix A. A summary of the indoor environmental measurements is contained in Appendix B. Readings were taken in the morning at various times.

Measurements of carbon monoxide, carbon dioxide, temperature, relative humidity, volatile organic compounds and airborne particulate matter were obtained using the 3M Quest EVM-7 Combination Particulate Monitor, VOC Detector, and IAQ Meter. The direct reading instrument employs an electrochemical sensor for carbon monoxide, a non-dispersive, infrared sensor for carbon dioxide, a junction diode for temperature, and a capacitive sensor for relative humidity. VOCs were determined with a 10.6 eV photoionization detector (PID) to measure concentrations between 0-30 parts per million (ppm) of VOCs with 0.01 ppm (10 parts per billion) resolution. The monitor was calibrated with isobutylene before the investigation. A 90° Light Scattering/Integrating Photometer was used to determine airborne particulate matter.

### Temperature

The temperature readings ranged from 65.4 to 71.6 degrees. Most readings were within the recommended range for thermal comfort for the heating season of approximately 68 to 76 degrees, recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) in Standard 55.

The majority of the temperature readings were within the ASHRAE-recommended temperature range that is based on thermal comfort. There were some readings below the recommended lower limit of the range of 68 degrees and no readings above the recommended upper limit of the range of 76 degrees. However, all of the low temperature readings were obtained while rooms were unoccupied.

#### Relative Humidity

The relative humidity readings ranged from 51% to 64.0%. The readings were below 65% which is recommended for thermal comfort in ASHRAE Standard 55.1 as well as Standard 62.1 which is designed to reduce the potential for microbial growth. ASHRAE does not recommend a lower limit for relative humidity in Standard 55. However, low relative humidity can cause dryness of the eyes, nose, throat, skin, and mucus membranes.

#### Carbon Monoxide

The carbon monoxide readings ranged from 0.0 to 1.0 parts per million (ppm). The indoor carbon monoxide readings were below the recommended limits and guideline levels, including the conservative EPA limit of 9 ppm, and were typical for an indoor school environment.

#### Carbon Dioxide

The carbon dioxide readings ranged from 475 ppm to 2880 ppm. ASHRAE recommends in Standard 62.1 that indoor levels should not exceed 700 ppm above the outdoor level. With outdoor levels generally about 400 ppm, this makes the indoor threshold level approximately 1,100 ppm. The ASHRAE recommendation is not based on health effects. Rather, the basis for the recommended level is to reduce initial perceptions of human source odor by a group of acclimated visitors to a space. Readings above 1,100 ppm may be an indication that there is inadequate outdoor air being provided to the space. Please note that the building was fully occupied at the time of the testing.

#### Total Hydrocarbons (Volatile Organic Compounds) Results

Total hydrocarbon readings ranged from 0.00 to 0.63 ppm at indoor locations. There are no specific limits established by OSHA, ASHRAE, or the EPA for non-industrial indoor environments. No results were above the 1.0 ppm threshold level of concern used for this investigation.

#### Airborne Particulate Matter (PM-10)

Indoor particulate matter readings in the tested locations ranged from 0.004 to 0.013 mg/m<sup>3</sup>. ASHRAE recommends in Standard 62.1 that the indoor PM-10 levels should not exceed the outdoor NAAQS level regulated by the EPA (0.150 mg/m<sup>3</sup> averaged over a 24-hour period).

### **CONCLUSIONS**

The following conclusions regarding the Indoor Air Quality Investigation are based on the information provided, observations, and data obtained during the investigation conducted on October 4, 2018.

1. Carbon monoxide, relative humidity, VOCs, and airborne particulate matter readings were within referenced indoor air quality guidelines and applicable regulations. There were no clear trends observed for example, increasing temperature and/or increasing carbon dioxide levels as the day progressed, which is a favorable finding.

2. The majority of the temperature readings were within the ASHRAE-recommended temperature range that is based on thermal comfort. There 2 readings below the recommended range. However, the low temperature readings were obtained in while rooms were unoccupied. It is important to note that the ASHRAE recommended temperature range is designed to satisfy 80% of building occupants. Thus, ASHRAE concedes that as much as 20% of a population will be dissatisfied with the thermal environment.
3. Carbon dioxide levels were found to be above 1,100 ppm in certain areas.
4. No suspect visible microbial growth on building materials or furnishings or unusual odors was noted in the investigated locations.

## RECOMMENDATIONS

- Carpeting in several areas of the facility was in poor condition and should be replaced.
- The ventilation system is being obstructed and this is disrupting the air exchange system. Someone has placed “filters” at the vents on the classrooms. This can decrease the turnover of the air in the space. This is reflected in the elevated levels of CO2 present during occupancy. These “filters” should be removed and discarded. The air handling system should be checked to ensure that it is operating correctly and providing correct air change. Teachers must be instructed not to tamper with the heating and ventilating systems for the rooms.
- We recommend a more thorough cleaning of the room and observation of conditions after complete. If something changes, dust/odor/irritation returns, further investigation would be warranted.

We appreciate the opportunity to assist you with this project. After you have reviewed the report, please do not hesitate to contact me at (312) 296-0115 if you have any questions, or need additional information.

Sincerely,

**CARNOW, CONIBEAR & ASSOC., LTD.**



Douglas McCormick  
Director, Field Services

Attachments (Appendix A, Appendix B, Attachment C)

**CARNOW  
CONIBEAR**

**APPENDIX A**  
**BACKGROUND INFORMATION ABOUT INDOOR AIR QUALITY**

## **Indoor Air Quality in Non-Industrial, Indoor Environments**

Studies have shown that occupant complaints related to air quality in office buildings and schools are widespread. The Occupational Safety and Health Administration (OSHA) estimates 30 percent of the non-industrial buildings in the United States have indoor air quality problems resulting in documented occupant complaints and medical symptoms. The reported symptoms are diverse and include headache, dizziness, fatigue, irritation and dryness of the eyes, nose or skin, cough, and respiratory irritation. Such health effects have been classified as sick building syndrome. In some cases, specific building related illnesses are associated with a building environment that can be documented by medical diagnosis and laboratory findings. Scientists investigating indoor air problems believe that there are multiple factors that contribute to the complaints. The factors include exposure to low levels of multiple chemical substances, dust, microorganisms, odors, temperature and relative humidity, and various psychosocial factors.

Contaminants that contribute to complaints of poor indoor air quality may be present from indoor sources, outdoor sources, or both. Outdoor contaminants can be brought into a building through ventilation system air intakes, openings in doors, windows, or the building envelope. Sources of internally generated contaminants include building construction materials, office furnishings, equipment and supplies. Human occupancy activities, housekeeping and maintenance tasks also produce contaminants. Poor design or maintenance of building heating, ventilating and air-conditioning (HVAC) systems can contribute to occupant complaints. In fact, the National Institute for Occupational Safety and Health (NIOSH) indicates that most indoor air quality complaints are related to ventilation issues.

### **Indoor Environmental Quality Guideline Levels**

OSHA requires employers to limit employee's exposures to the chemical substance Permissible Exposure Limit (PEL) through engineering controls, administrative controls, or the use of personal protective equipment. OSHA considers health effects as well as technological and economic feasibility when establishing PELs.

The American Conference of Governmental Industrial Hygienists (ACGIH) has established Threshold Limit Values (TLVs) for many chemical substances and physical agents. The TLVs are guideline levels, not regulatory limits. TLVs refer to airborne concentrations of chemical substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day over their working lifetime without adverse effect. TLVs are developed to protect workers who are normal, healthy adults. Because of individual susceptibilities, TLVs will not adequately protect all workers and should not be considered a fine line between healthy or unhealthy work environments.

The regulatory limits established by OSHA and advisory guideline levels established by ACGIH are generally based on animal studies or studies of health effects experienced by

healthy, adult (industrial) workers. Interpretation of air sampling results in non-industrial indoor air quality studies is challenging as levels rarely approach levels found in industrial settings. Currently, the only legally enforceable regulations are OSHA PELs. While employers must comply with the OSHA regulations, merely complying with the regulations or the TLVs will often not resolve occupant complaints attributed to indoor air quality in non-industrial buildings.

## **Carbon Monoxide**

Carbon monoxide is a common air pollutant and is produced during the incomplete combustion of fossil fuels (e.g., heating oil, natural gas, propane, gasoline) and other organic matter. At low concentrations, carbon monoxide produces fatigue and increased chest pain in people with heart disease. Higher levels produce headache, dizziness, nausea and weakness.

The time-weighted average (TWA) Permissible Exposure Limit (PEL) established by OSHA for carbon monoxide is 50 parts per million (ppm). The PEL applies to workers in general industry in the Code of Federal Regulations 29 CFR 1910.1000.

The ACGIH has established a Threshold Limit Value (TLV) for carbon monoxide of 25 ppm as an eight-hour time-weighted average (TWA) concentration. The TLV refers to the concentration to which it is believed that nearly all workers may be repeatedly exposed without adverse effect. Because of individual susceptibilities, the ACGIH indicates that the TLV should not be considered a fine line between safe and unsafe exposure levels.

The EPA National Ambient Air Quality Standard (NAAQS) for carbon monoxide in the outdoor air is 9 ppm averaged over a 24-hour period and 35 ppm averaged over an 8-hour period. In Standard 62.1, ASHRAE recommends that indoor carbon monoxide levels should not exceed the outdoor NAAQS level regulated by the EPA.

## **Carbon Dioxide**

Carbon dioxide is a normal constituent of the atmosphere and is a by-product of respiration and the combustion of organic materials. In rural areas, the typical ambient carbon dioxide level in the atmosphere is approximately 400 ppm, while in urban areas the ambient level may be 500 ppm or more. Carbon dioxide levels are used as an indicator of ventilation adequacy because elevated levels are often employed with inadequate fresh air supply. Elevated carbon dioxide can produce occupant complaints of odor, fatigue, sleepiness and irritation.

The OSHA PEL and ACGIH TLV for carbon dioxide is 5,000 ppm, TWA. The EPA does not regulate airborne levels of carbon dioxide indoors, or outdoors. Within Standard 62.1, ASHRAE recommends that levels of carbon dioxide in buildings should not exceed the background level of carbon dioxide in the ambient air by more than 700 ppm. The ASHRAE guideline for carbon dioxide is designed to reduce complaints from occupants about human-source odor in buildings caused by insufficient outdoor, fresh air.

### **Particulate Matter (PM-10)**

Particulate matter (dust) is ubiquitous in the earth's atmosphere and is also produced from motor vehicle exhaust, cigarette smoke, and industrial sources such as coal-burning power plants. Exposure to airborne particulate matter is associated with irritation of the upper respiratory system and may aggravate or promote the development of lung diseases such as bronchitis and asthma.

The OSHA PEL for general industry for Particulates Not Otherwise Regulated - respirable fraction is 5 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) for an 8 hour TWA. The ACGIH does not have a TLV for respirable particulates, however in an Appendix to the TLV booklet  $3 \text{ mg}/\text{m}^3$  is recommended as an 8-hour TWA. The EPA NAAQS for PM-10 (particulate matter less than 10 microns diameter) in the outdoor air is 150 micrograms per cubic meter ( $0.150 \text{ mg}/\text{m}^3$ ), averaged over a 24-hour period. In Standard 62.1, ASHRAE recommends that indoor PM-10 levels should not exceed the outdoor NAAQS level regulated by the EPA.

### **Temperature, Relative Humidity**

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has established temperature and relative humidity comfort levels for buildings in Standard 55. ASHRAE recommends maintaining the indoor temperature during the heating season between approximately 68 and 76 degrees. ASHRAE recommends maintaining the indoor relative humidity below approximately 65 per cent, based on thermal comfort. The values for temperature and humidity take into consideration type of clothing, air movement, radiant heat, and other complex factors. The values referenced herein are approximations. In Standard 62.1, ASHRAE also recommends controlling humidity to help reduce the potential for growth of microorganisms.

### **Volatile Organic Compounds (VOCs)**

Volatile organic compounds (VOCs) include various hydrocarbons. These chemicals are commonly found in a variety of building construction materials and office products including adhesives, paints, primers, cleaners and degreasers, carpeting, fabrics, and waxes. Hydrocarbons are also found in tobacco smoke and combustion byproducts.



Newer building materials in particular emit high quantities of hydrocarbons (“off-gassing”) that tend to decline over time. Exposure to low levels of hydrocarbons may result in complaints of odor, headache, fatigue, nausea, irritation of the eyes, nose and throat.

There are no specific limits established by OSHA, the ACGIH, ASHRAE or EPA for total VOCs in non-industrial indoor environments. For this investigation, the concentration of 1 ppm or less has been specified as the desired level.

**APPENDIX B**  
**SUMMARY OF INDOOR ENVIRONMENTAL MEASUREMENTS**

Date	Location	Time	Temp	RH	CO	CO2	PM-10	VOCs	Comment
<b>Reccomended Levels</b>			<b>68 - 78</b>	<b>&lt; 60</b>	<b>&lt; 9</b>	<b>&lt; 1000</b>	<b>&lt; 0.050</b>	<b>&lt; 1.0</b>	
10/8/18	Room 209 Unoccupied - Northwest Corner	7:39 AM					0.005		
10/8/18	Room 209 Unoccupied - Northeast Corner	7:39 AM					0.005		
10/8/18	Room 209 Unoccupied - Southeast Corner	7:39 AM					0.005		
10/8/18	Room 209 Unoccupied - Southwest Corner	7:39 AM					0.005		
10/8/18	Room 209 Unoccupied - Center of Room	7:39 AM	65.8	64%	0	572	0.006	0	
10/8/18	Room 209 Unoccupied - Vent	7:39 AM					0.005		
10/8/18	Room 209 Unoccupied - Northwest Corner	7:50 AM					0.006		
10/8/18	Room 209 Unoccupied - Northeast Corner	7:50 AM					0.006		
10/8/18	Room 209 Unoccupied - Southeast Corner	7:50 AM					0.007		
10/8/18	Room 209 Unoccupied - Southwest Corner	7:50 AM					0.006		
10/8/18	Room 209 Unoccupied - Center of Room	7:50 AM	65.4	64%	0	475	0.005	0	
10/8/18	Room 209 Unoccupied - Vent	7:50 AM					0.006		

Date	Location	Time	Temp	RH	CO	CO2	PM-10	VOCs	Comment
<b>Reccomended Levels</b>			<b>68 - 78</b>	<b>&lt; 60</b>	<b>&lt; 9</b>	<b>&lt; 1000</b>	<b>&lt; 0.050</b>	<b>&lt; 1.0</b>	
10/8/18	Room 206 Unoccupied - North Corner	7:15 AM					0.007		
10/8/18	Room 206 Unoccupied - West Corner	7:15 AM					0.005		
10/8/18	Room 206 Unoccupied - South Corner	7:15 AM					0.005		
10/8/18	Room 206 Unoccupied - East Corner	7:15 AM					0.004		
10/8/18	Room 206 Unoccupied - Center	7:15 AM	69	60%	0	2880	0.006	0	
10/8/18	Room 206 Unoccupied - Vent	7:15 AM					0.004		
10/8/18	Room 206 Unoccupied - North Corner	7:30 AM					0.007		
10/8/18	Room 206 Unoccupied - West Corner	7:30 AM					0.007		
10/8/18	Room 206 Unoccupied - South Corner	7:30 AM					0.007		
10/8/18	Room 206 Unoccupied - East Corner	7:30 AM					0.007		
10/8/18	Room 206 Unoccupied - Center	7:30 AM	69.2	59%	0	484	0.008	0	
10/8/18	Room 206 Unoccupied - Vent	7:30 AM					0.007		

Date	Location	Time	Temp	RH	CO	CO2	PM-10	VOCs	Comment
<b>Reccomended Levels</b>			<b>68 - 78</b>	<b>&lt; 60</b>	<b>&lt; 9</b>	<b>&lt; 1000</b>	<b>&lt; 0.050</b>	<b>&lt; 1.0</b>	
10/8/18	Room 206 - Occupied	8:00 AM	70.7	54%	0	961	0.004	0.15	
10/8/18	Room 206 - Occupied	8:01 AM	70.8	54%	0	986	0.004	0.62	
10/8/18	Room 206 - Occupied	8:02 AM	70.8	54%	0	961	0.005	0.57	
10/8/18	Room 206 - Occupied	8:03 AM	70.6	54%	0	958	0.004	0.63	
10/8/18	Room 206 - Occupied	8:04 AM	70.8	54%	0	961	0.004	0.52	
10/8/18	Room 206 - Occupied	8:05 AM	70.9	54%	0	936	0.006	0.47	
10/8/18	Room 206 - Occupied	8:06 AM	70	55%	0	911	0.005	0.46	
10/8/18	Room 206 - Occupied	8:07 AM	70.8	55%	0	886	0.005	0.43	
10/8/18	Room 206 - Occupied	8:08 AM	70.9	54%	0	861	0.006	0.42	
10/8/18	Room 206 - Occupied	8:09 AM	70.8	55%	0	842	0.007	0.44	
10/8/18	Room 206 - Occupied	8:10 AM	71	55%	0	867	0.006	0.41	
10/8/18	Room 206 - Occupied	8:11 AM	71.1	55%	0	871	0.005	0.35	
10/8/18	Room 206 - Occupied	8:12 AM	71	54%	0	868	0.004	0.36	
10/8/18	Room 206 - Occupied	8:13 AM	70.9	54%	0	839	0.004	0.33	
10/8/18	Room 206 - Occupied	8:14 AM	70.8	55%	0	834	0.005	0.34	
10/8/18	Room 206 - Occupied	8:15 AM	70.9	54%	0	839	0.005	0.34	

Date	Location	Time	Temp	RH	CO	CO2	PM-10	VOCs	Comment
<b>Reccomended Levels</b>			<b>68 - 78</b>	<b>&lt; 60</b>	<b>&lt; 9</b>	<b>&lt; 1000</b>	<b>&lt; 0.050</b>	<b>&lt; 1.0</b>	
10/8/18	Room 206 - Occupied	9:05 AM	71.4	52%	0	1121	0.004	0.03	
10/8/18	Room 206 - Occupied	9:06 AM	71.4	52%	0	887	0.004	0.04	
10/8/18	Room 206 - Occupied	9:07 AM	71.3	52%	0	887	0.004	0.04	
10/8/18	Room 206 - Occupied	9:08 AM	71.4	52%	0	1255	0.004	0.04	
10/8/18	Room 206 - Occupied	9:09 AM	71.4	52%	0	1524	0.004	0.03	
10/8/18	Room 206 - Occupied	9:10 AM	71.3	52%	0	1499	0.004	0.03	
10/8/18	Room 206 - Occupied	9:11 AM	71.4	52%	0	1175	0.004	0.02	
10/8/18	Room 206 - Occupied	9:12 AM	71.4	52%	0	1150	0.005	0.02	
10/8/18	Room 206 - Occupied	9:13 AM	71.6	51%	0	1150	0.005	0.03	
10/8/18	Room 206 - Occupied	9:14 AM	71.6	51%	0	1125	0.004	0.03	
10/8/18	Room 206 - Occupied	9:15 AM	71.6	51%	0	1100	0.005	0.04	
10/8/18	Room 206 - Occupied	9:16 AM	71.6	51%	0	1075	0.004	0.04	
10/8/18	Room 206 - Occupied	9:17 AM	71.4	52%	0	1050	0.004	0.03	
10/8/18	Room 206 - Occupied	9:18 AM	71.6	52%	0	1025	0.004	0.03	
10/8/18	Room 206 - Occupied	9:19 AM	71.6	52%	0	1000	0.004	0.03	

Date	Location	Time	Temp	RH	CO	CO2	PM-10	VOCs	Comment
<b>Reccomended Levels</b>			<b>68 - 78</b>	<b>&lt; 60</b>	<b>&lt; 9</b>	<b>&lt; 1000</b>	<b>&lt; 0.050</b>	<b>&lt; 1.0</b>	
10/8/18	Room 209 - Occupied	8:20 AM	69.9	56%	0	899	0.004	0.02	
10/8/18	Room 209 - Occupied	8:21 AM	69.8	56%	1	891	0.004	0.01	
10/8/18	Room 209 - Occupied	8:22 AM	69.8	56%	0	891	0.004	0.01	
10/8/18	Room 209 - Occupied	8:23 AM	69.8	56%	0	886	0.004	0.01	
10/8/18	Room 209 - Occupied	8:24 AM	69.7	56%	0	884	0.005	0.01	
10/8/18	Room 209 - Occupied	8:25 AM	69.8	56%	0	889	0.004	0.02	
10/8/18	Room 209 - Occupied	8:26 AM	69.9	56%	0	887	0.004	0.02	
10/8/18	Room 209 - Occupied	8:27 AM	70	57%	0	888	0.004	0.01	
10/8/18	Room 209 - Occupied	8:28 AM	69.8	56%	0	884	0.005	0.02	
10/8/18	Room 209 - Occupied	8:29 AM	69.8	56%	0	882	0.004	0.02	
10/8/18	Room 209 - Occupied	8:30 AM	69.8	57%	0	882	0.004	0.01	
10/8/18	Room 209 - Occupied	8:31 AM	69.8	56%	0	882	0.004	0.02	

Date	Location	Time	Temp	RH	CO	CO2	PM-10	VOCs	Comment
<b>Reccomended Levels</b>			<b>68 - 78</b>	<b>&lt; 60</b>	<b>&lt; 9</b>	<b>&lt; 1000</b>	<b>&lt; 0.050</b>	<b>&lt; 1.0</b>	
10/8/18	Room 209 - Occupied	9:25 AM	68.3	55%	0	1004	0.009	0.01	
10/8/18	Room 209 - Occupied	9:26 AM	68.3	55%	0	1002	0.008	0.01	
10/8/18	Room 209 - Occupied	9:27 AM	68.3	55%	0	999	0.008	0	
10/8/18	Room 209 - Occupied	9:28 AM	68.3	55%	0	1012	0.009	0	
10/8/18	Room 209 - Occupied	9:29 AM	68.3	55%	0	999	0.008	0	
10/8/18	Room 209 - Occupied	9:30 AM	68.1	55%	0	1004	0.009	0	
10/8/18	Room 209 - Occupied	9:31 AM	68.1	55%	0	1004	0.009	0	
10/8/18	Room 209 - Occupied	9:32 AM	68.1	55%	0	1020	0.01	0.01	
10/8/18	Room 209 - Occupied	9:33 AM	68.1	55%	0	1033	0.01	0.01	
10/8/18	Room 209 - Occupied	9:34 AM	68.1	55%	0	1028	0.011	0	
10/8/18	Room 209 - Occupied	9:35 AM	68	55%	0	1046	0.011	0	
10/8/18	Room 209 - Occupied	9:36 AM	68	55%	0	1056	0.012	0	
10/8/18	Room 209 - Occupied	9:37 AM	68	55%	0	1048	0.013	0	
10/8/18	Room 209 - Occupied	9:38 AM	68.1	56%	0	1051	0.013	0.01	
10/8/18	Room 209 - Occupied	9:39 AM	68.1	56%	0	1051	0.012	0.01	
10/8/18	Room 209 - Occupied	9:40 AM	68	56%	0	1053	0.013	0	



**APPENDIX C  
IAQ QUESTIONNAIRES**



INDOOR ENVIRONMENTAL QUALITY QUESTIONNAIRE  
TEACHER/STAFF

Name Megan Grieshaber Occupation (optional) Teacher Date 5/22/18  
Building George Wash. Elementary Building Address 3611 E 114th St.  
Exact Location in Building Room 209

The purpose of this questionnaire is to facilitate the identification of potential sources of indoor air contaminants or other factors that may contribute to degraded indoor environmental quality, and to identify adverse health effects that may be associated with these factors. With regard to **your experiences while you are at work**, please answer the following questions:

1. Which of the following conditions do you, or have you, experience while at work (please indicate Y or N for each)

temperature too cold  
 temperature too hot  
 lack of air circulation (stuffy feeling)  
 noticeable odors  
 visible mold growth  
 dust in the air  
 disturbing noises  
 other (specify) carpet stains,

2. When do these problems occur? (check all that apply)

morning  daily circulation, dust, odor  
 afternoon  specific days of the week → which day(s) \_\_\_\_\_  
 all day  
 no noticeable trend - temperature, noises  
 other (please explain) \_\_\_\_\_



9. Have you discussed the problem with a doctor?  Yes  No

If yes, have any medical tests been conducted?  Yes  No

10. Do you smoke?  Yes  No

11. Are there others in your immediate vicinity that experience similar symptoms?

Yes  No

12. Is there a location in your building where these symptoms do not occur?

Yes  No

If yes, where? Cafeteria

13. What do you think is the most likely cause of the symptoms you experience?

old carpeting

14. Do any of the following apply to you?

- Wear contact lenses
- Operate computers at least 10% of the work day
- Operate photocopier machines at least 10% of the work day
- Currently taking medication

15. Do you participate in any of the following hobbies or activities regularly in your time away from work?

- Arts and Crafts
- Shooting/Firing Range
- Swimming/Scuba Diving
- Gardening/Lawn Care
- Home Improvement/Plumbing/Electrical
- Painting
- Volunteer Firefighter/EMT
- Second job (please specify) \_\_\_\_\_
- Other (please specify) \_\_\_\_\_

16. Can you offer any other comments or observations concerning your office environment?

My sinuses have bothered me since I started at George Washington. I have had several sinus infections.

Thank you very much for your time.



INDOOR ENVIRONMENTAL QUALITY QUESTIONNAIRE  
CHICAGO PUBLIC SCHOOLS  
SCHOOL QUESTIONNAIRE

Date 5/18/18  
Name Sergio Ramirez  
Title Principal  
School George Washington Elem.  
School Address 3611 E. 114th St.  
Location in building Room 209

The purpose of this questionnaire is to determine if there is a need to evaluate indoor environmental quality factors in the building. We would appreciate it if you would take a few moments to answer a few questions. With regard to your experiences while you are at work, please answer the following questions:

1. Have you had any complaints, symptoms or concerns brought to your attention that you think might be related to the indoor building environment? Please indicate Yes or No, Yes. If Yes, please briefly describe the complaints, symptoms or concerns reported, and proceed with the remaining questions.

A parent has indicated her child having allergic reactions to the air of the room.

2. How many students and teachers experience symptoms? 0 Teachers 1 Students

3. What specific locations are these symptoms experienced? Room 209

4. Which of the following conditions have you experienced while at work (please indicate Y or N for each)

Y temperature too cold  
Y temperature too hot  
N humidity too low  
Y humidity too high  
Y lack of air circulation (stuffy feeling)  
N noticeable odors  
N visible mold growth  
Y dust in the air or on surfaces  
NA other (specify) \_\_\_\_\_

5. When do these conditions occur? (check all that apply)

- morning       daily  
 afternoon       specific days of the week → which day(s) \_\_\_\_\_  
 all day  
 no noticeable trend  
 other (please explain)

*It ranges from week to week  
OUR A/C. Heating systems are not  
consistent*

6. What chemicals are used in the building? List all below.

*I'm not sure*

7. Has any work been done recently at the school?  Yes  No  
8. Have any extensive cleaning activities occurred recently?  Yes  No  
9. Have there been any changes to the location of dumpster, composters or paving in external areas of the school?  Yes  No

10. Do you have any other comments or observations concerning your indoor work environment?

*Only the noticeable inconsistency of  
room temperatures due to AC, possible  
ventilation system not operating @  
100%.*

11. CPS may retain the services of an independent indoor environmental quality consultant to conduct individual, private interviews with building occupants. If that occurs, would you like to be interviewed?

*yes.*