



May 27, 2021

Joe Crelier, Director–Risk Management
Portland Public Schools
501 N Dixon Street
Portland, Oregon

Via email: jcrelier@pps.net

Regarding: COVID Response Indoor Air Quality Testing Report
Ida B. Wells High School
1151 SW Vermont Street
Portland, Oregon
PBS Project 25000.138

Dear Mr. Crelier:

On May 12, 2021, PBS Engineering and Environmental Inc. (PBS) performed indoor air quality testing in Ida B. Wells High School located at the address above. These services were provided to Portland Public Schools (District) to measure air quality parameters before schools and district-owned buildings are opened again for reoccupancy.

As part of these indoor air quality testing services, PBS measured carbon monoxide (CO), carbon dioxide (CO₂), temperature in degrees Fahrenheit (°F), relative humidity (%RH), and airborne particulate (PM2.5 and PM10). Additionally, PBS reviewed and inventoried accessible components of the test rooms' heating, ventilation, and air conditioning (HVAC) systems.

Based on PBS' findings, one room in the investigation tested above the recommended ambient airborne particulate concentrations; however, when compared to the ambient outdoor concentrations these results do not present an actionable condition. The results of the testing and assessment indicates that indoor air quality in the building is good and that the building is acceptable for occupancy.

While PBS observed no measurable indoor air quality concerns in any of the rooms that were tested, PBS did not test every occupiable room in each building. This investigation has been performed in concert with a concerted effort on the part of the District to perform regular inspections and repair of all HVAC mechanical systems throughout the District. Additionally, it is the District's policy that rooms without adequate ventilation will not be utilized moving forward.

VENTILATION PARAMETERS AND AIRBORNE PARTICULATE MONITORING

PBS took spot measurements of ventilation parameters in approximately 20% of the classrooms, offices, and common areas in the building (or each building). The readings were compared to recommendations in the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62.1-2016, Ventilation for Acceptable Indoor Air Quality.

PBS used a TSI VelociCalc 9565 ventilation meter to measure temperature, %RH, CO, and CO₂. A TSI Aerotrak 9306-V2 optical particle counter was used to measure airborne particulate. The table below summarizes the results of the testing. Readings above or below the ASHRAE recommendations are shown in bold.

IAQ Testing Results

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Outdoor (Pre)	0.0	466	64.7	45.2	0.030	0.008	N/A
Boys Locker Room	0.0	465	68.5	43.0	0.009	0.002	Supply & Return
Team Room B	0.0	460	68.3	43.6	0.010	0.005	Supply & Return
Apparatus Room	0.0	506	68.8	43.1	0.004	0.003	Supply & Return, Air Purifier
Wrestling Room	0.0	562	68.9	44.5	0.011	0.006	Supply & Return
Girls Locker Room	0.0	460	68.1	43.2	0.007	0.003	Supply & Return
Team Room E	0.0	465	67.4	44.5	0.012	0.004	Supply & Return
Classroom 24	0.0	462	69.3	42.8	0.011	0.005	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 27	0.0	471	69.9	43.2	0.019	0.008	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 30 Computer Lab	0.0	461	69.4	43.7	0.011	0.006	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 34	0.0	465	68.8	41.9	0.010	0.005	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Health Classroom 19	0.0	459	69.6	43.1	0.007	0.002	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Cafeteria	0.0	467	70.9	41.0	0.025	0.010	Supply & Return, Operable Windows, Radiator Unit

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Kitchen	0.0	461	68.8	42.9	0.007	0.001	Supply & Return, Operable Windows, Hoods
Faculty Dining	0.0	460	66.5	46.8	0.016	0.005	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Metals Classroom 15	0.0	468	67.1	45.0	0.028	0.013	Supply & Return, Operable Windows
Drafting Classroom 8	0.0	479	67.8	43.6	0.005	0.002	Supply & Return, Operable Windows, Air Purifier
Industrial Education Lab	0.0	462	68.8	42.7	0.008	0.004	Supply & Return, Operable Windows
Resource Center Room 118	0.0	461	74.4	38.3	0.008	0.005	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 126	0.0	473	73.2	37.3	0.006	0.003	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 130	0.0	476	73.8	35.7	0.013	0.007	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 132	0.0	467	72.7	38.6	0.006	0.002	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 135	0.0	4888	71.6	38.8	0.012	.004	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
VP Main Office	0.0	476	72.7	39.1	0.012	0.006	Supply & Return, Air Purifier
VP Conference Room	0.0	479	73.1	38.3	0.004	0.002	Supply & Return
Gymnasium	0.0	475	72.4	38.0	0.006	0.003	Supply & Return, Air Purifier

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Typing Room 141	0.0	470	72.5	38.0	0.010	0.004	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Typing Room 143	0.0	466	72.4	37.9	0.014	0.008	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Faculty 145	0.0	461	72.1	38.2	0.002	0.001	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Student Center Room 149	0.0	476	71.3	38.1	0.005	0.002	Supply & Return, Air Purifier
Nurse's Office	0.0	466	71.6	38.3	0.004	0.002	Supply & Return, Air Purifier
Main Office	0.0	478	71.5	38.5	0.003	0.000	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
VP South Office	0.0	473	70.8	39.2	0.003	0.002	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Office South Middle Room	0.0	484	71.9	37.5	0.022	0.014	Operable Windows, Radiator Unit
VP East Office	0.0	477	72.1	38.1	0.007	0.003	Supply & Return, Operable Windows, Radiator Unit
Auditorium	0.0	470	71.4	38.5	0.007	0.003	Supply & Return
Drama Room 108	0.0	467	71.3	38.6	0.004	0.001	Supply & Return, Operable Windows, Radiator Unit
Classroom 101	0.0	466	71.7	39.0	0.004	0.002	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Practice Room	0.0	465	71.7	38.5	0.006	0.002	Supply & Return

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Band Room 104 A	0.0	460	71.3	36.7	0.000	0.000	Supply & Return, Air Purifier
Choral Room 105	0.0	464	71.0	36.8	0.003	0.002	Supply & Return, Air Purifier
Home EC 207	0.0	459	72.9	37.7	0.002	0.000	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 209	0.0	469	72.8	37.2	0.007	0.005	Supply & Return, Air Purifier
Classroom 213	0.0	461	72.5	36.6	0.002	0.000	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 215	0.0	466	72.5	37.0	0.002	0.001	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 246	0.0	473	72.5	37.7	0.005	0.004	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 248	0.0	465	72.8	38.0	0.004	0.002	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Work Room 221	0.0	467	74.6	36.7	0.013	0.008	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Library	0.0	463	73.9	36.4	0.034	0.017	Supply & Return, Operable Windows, Air Purifier
Classroom 224	0.0	465	74.8	36.7	0.007	0.003	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 226	0.0	468	76.7	34.6	0.004	0.002	Supply & Return, Operable Windows, Air Purifier, Radiator Unit

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Biology 232	0.0	477	76.2	35.5	0.010	0.005	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Science 235	0.0	469	75.7	35.2	0.008	0.005	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Science 237	0.0	528	74.7	35.0	0.027	0.008	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 239	0.0	480	73.7	36.1	0.014	0.008	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Classroom 241	0.0	475	74.9	36.8	0.005	0.001	Supply & Return, Operable Windows, Air Purifier, Radiator Unit
Custodial Office	0.0	481	74.0	36.3	0.072	0.031	Supply & Return
Outdoor (Post)	0.0	459	68.7	41.8	0.053	0.027	N/A

CO and CO₂ are presented in parts per million (ppm)

°F: degrees Fahrenheit

%RH: relative humidity

PM: particulate matter

HVAC: visible heating, ventilation, and air conditioning components

CARBON MONOXIDE

CO is produced from the incomplete combustion of carbon-containing fuels, including gasoline, heating oil, and natural gas. CO encountered in a classroom or office environment would likely be the result of proximity to motor vehicles or a malfunctioning heating system exhaust. While ASHRAE recommends that CO levels indoors should not exceed 9 parts per million (ppm), any sustained measurable amount of CO should be investigated.

CARBON DIOXIDE

CO₂ is a normal constituent of exhaled breath and indoor concentrations depend on the number of occupants, duration of occupancy, and air exchanges in a given space. ASHRAE recommends maintaining indoor CO₂ concentrations at less than approximately 1,200 ppm. Given that the building had only limited occupancy during the testing, the reported concentrations are not reflective of conditions during full occupancy.

TEMPERATURE

ASHRAE recommends maintaining indoor temperatures between 68 and 76°F.

RELATIVE HUMIDITY

ASHRAE recommends maintaining relative humidity indoors below 60%. Relative humidity indoors is difficult to regulate and is largely reflective of outdoor conditions.

AIRBORNE PARTICULATE

PM2.5

Airborne particulate matter was measured to assess the effectiveness of the buildings ventilation filtration system. ASHRAE recommends that ambient airborne particulate matter concentrations, measured as PM2.5, should meet National Ambient Air Quality Standards (NAAQS) which for PM2.5 is 0.035 milligrams per cubic meter of air (mg/m^3) as measured and averaged over a period of 24 hours.

PM10

Airborne particulate matter was measured to assess the effectiveness of the buildings ventilation filtration system. ASHRAE recommends that airborne particulate matter concentrations, measured as PM10, should meet NAAQS which for PM10 is $0.150 \text{ mg}/\text{m}^3$ as measured and averaged over a period of 24 hours.

HVAC

The gymnasium, cafeteria, and auditorium are all served by their own individual fan units. The classrooms are served by radiator units.

RECOMMENDATIONS

PBS did not observe any rooms that had neither operable windows nor an obvious mechanical or gravity ventilation system. PBS has no recommendations concerning ambient air quality at this time.

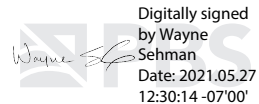
LIMITATIONS OF SCOPE

This study was limited to the tests and locations as indicated above. The site as a whole may have other environmental concerns that will not be characterized by this study. The findings and conclusions of this work are not scientific certainties but probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent conditions on the site or adjoining sites beyond those detected or observed by PBS.

PBS respectfully submits these results of our indoor air quality investigation. Please feel free to contact me at 503.313.9061 or wayne.sehman@pbsusa.com with any questions or comments.

Sincerely,

Digitally signed
by Wayne
Sehman
Date: 2021.05.27
12:30:14 -07'00'



Wayne Sehman
Project Manager

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