



May 25, 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
Blanchard Education Service Center
501 N Dixon Street
Portland, Oregon
PBS Project 25000.138

Dear Mr. Crelier:

On May 11, 2021, PBS Engineering and Environmental Inc. (PBS) performed indoor air quality testing in Blanchard Education Service Center 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 (PM_{2.5} and PM₁₀). Additionally, PBS reviewed and inventoried accessible components of the test rooms' heating, ventilation, and air conditioning (HVAC) systems.

Based on PBS' findings, nine rooms tested below the recommended range for indoor temperatures. PBS observed rooms with open windows throughout the school which likely led to the decreased temperature readings. Additionally, four rooms 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 Air South, AM (Pre)	0.0	468	57.7	51.3	0.129	0.051	N/A
Outdoor Air West, AM (Pre)	0.0	463	55.0	64.4	0.178	0.061	N/A
Outdoor Air North, AM (Pre)	0.0	457	53.0	68.4	0.103	0.033	N/A
Outdoor Air East, AM (Pre)	0.0	464	56.9	55.5	0.064	0.024	N/A
Special Ed Offices 100	0.0	493	66.7	44.8	0.003	0.002	Supply and Return Air
Special Ed SE Corner Office	0.0	476	67.7	42.9	0.002	0.001	Supply and Return Air
Special Ed NE Corner Office	0.0	477	67.8	42.7	0.000	0.000	Supply and Return Air
Special Ed Conference Room	0.0	478	68.0	42.0	0.004	0.002	Supply and Return Air
Offices 130	0.0	515	68.6	42.3	0.026	0.016	Supply and Return Air
Offices 140	0.0	502	68.6	41.8	0.003	0.002	Supply and Return Air
Office Electrical Shop	0.0	505	69.9	40.1	0.008	0.004	Supply and Return Air
Electrical Shop Storage/Work Room	0.0	509	70.9	38.5	0.008	0.005	Supply and Return Air
Engineering Commons	0.0	532	73.4	36.5	0.010	0.005	Supply and Return Air
Lighting Specialists	0.0	505	72.8	36.1	0.004	0.002	Supply and Return Air
Carpenter's Offices	0.0	570	73.1	36.7	0.016	0.007	Supply and Return Air
Trades Lunchroom	0.0	546	73.6	36.1	0.005	0.002	Supply and Return Air
Machine Shop	0.0	542	72.6	36.6	0.008	0.005	Supply and Return Air

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Facilities Offices	0.0	673	73.5	37.7	0.058 & 0.0087	0.030 & 0.044	Supply and Return Air
2nd Floor Machine Shop Break Room	0.0	520	74.1	35.3	0.004	0.001	Supply and Return Air
Glazing Shop	0.0	553	73.2	35.8	0.008	0.002	Supply and Return Air
Carpentry Shop	0.0	518	72.9	35.9	0.031	0.012	Supply and Return Air
2nd Floor Offices 250	0.0	495	70.5	39.0	0.004	0.002	Supply and Return Air
2nd Floor Offices 230 – Chief of Schools	0.0	494	70.7	38.9	0.008	0.005	Supply and Return Air
West Side 2nd Floor Mid-Office	0.0	488	70.5	39.2	0.001	0.000	Supply and Return Air
2nd Floor Offices 225	0.0	494	70.3	39.6	0.005	0.002	Supply and Return Air
West Conference Room	0.0	489	70.2	39.5	0.001	0.000	Supply and Return Air
2nd Floor Offices 263	0.0	485	69.7	40.4	0.003	0.002	Supply and Return Air
2nd Floor Offices 266	0.0	492	70.3	39.8	0.003	0.003	Supply and Return Air
2nd Floor Offices 280	0.0	478	70.4	39.4	0.011	0.006	Supply and Return Air
2nd Floor Offices 270	0.0	474	70.5	39.6	0.002	0.001	Supply and Return Air
2nd Floor Offices Risk Management	0.0	480	70.4	39.8	0.005	0.002	Supply and Return Air
2nd Floor Offices 255	0.0	482	70.5	39.4	0.006	0.002	Supply and Return Air
2nd Floor Elevator Conference Room	0.0	484	69.9	39.9	0.007	0.005	Supply and Return Air
2nd Floor Offices 200	0.0	490	70.2	39.9	0.006	0.002	Supply and Return Air
2nd Floor Offices 203	0.0	484	70.3	39.6	0.003	0.002	Supply and Return Air
2nd Floor Conference Room, HR	0.0	480	70.5	39.8	0.002	0.001	Supply and Return Air
2nd Floor Offices 205	0.0	501	70.4	39.5	0.004	0.002	Supply and Return Air

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
2nd Floor Kitchen	0.0	517	69.7	40.2	0.003	0.002	Supply and Return Air, Exhaust Hoods
2nd Floor Offices 295	0.0	479	70.0	40.1	0.001	0.000	Supply and Return Air
2nd Floor "Windows" Conference Room	0.0	478	70.1	40.4	0.015	0.011	Supply and Return Air
Fingerprinting	0.0	548	70.5	40.5	0.080 & 0.028	0.048 & 0.017	Supply and Return Air
Lower Level 1 Info Tech Conference Room, East Side	0.0	481	69.3	40.7	0.002	0.001	Supply and Return Air
Lower Level 1 Info Tech, East Side	0.0	500	69.0	41.4	0.008	0.002	Supply and Return Air
Lower Level 1 Info Tech, NW Mid Office	0.0	492	68.9	41.3	0.006	0.002	Supply and Return Air
Lower Level 1 Info Tech, NW Side	0.0	490	67.9	42.2	0.016	0.006	Supply and Return Air
Lower Level 1 Info Tech, Chief Tech Office	0.0	480	68.3	42.1	0.005	0.003	Supply and Return Air
Lower Level 1 Info Tech, SW Side	0.0	490	66.7	43.8	0.001	0.000	Supply and Return Air
Lower Level 1 Info Tech, S Side	0.0	487	66.5	44.2	0.005	0.003	Supply and Return Air
Lower Level 1, WYeast Conference Room	0.0	482	67.5	43.4	0.008	0.004	Supply and Return Air
Lower Level 1, Nutrition Services	0.0	519	69.0	41.5	0.022	0.011	Supply and Return Air
Lower Level 1, Multnomah County Offices, North	0.0	480	68.6	41.4	0.005	0.003	Supply and Return Air
Lower Level 1, Multnomah County Offices, South	0.0	478	68.3	42.2	0.000	0.000	Supply and Return Air
Lower Level 2, A.V. Library, Middle	0.0	484	69.0	41.5	0.008	0.005	Supply and Return Air

Commented [M01]: They have a fingerprinting room? At a school district office?!

Commented [M02]: I do not understand what this is supposed to me. Will they?

Room	CO	CO ₂	Temp. (°F)	%RH	PM2.5	PM10	HVAC
Lower Level 2, Records Management	0.0	488	69.2	41.2	0.001	0.000	Supply and Return Air
Lower Level 2, Pony Mail Room	0.0	514	69.4	40.8	0.009	0.005	Supply and Return Air
Lower Level 2, Central Kitchen, Middle	0.0	504	68.8	40.6	0.007	0.003	Supply and Return Air
Lower Level 2, North East Office	0.0	513	68.3	42.1	0.003	0.001	Supply and Return Air
Lower Level 2, Central Warehouse West	0.0	482	67.5	42.7	0.122 & 0.120	0.041 & 0.044	Supply and Return Air, Exterior Roll-up Doors
Lower Level 2, Central Warehouse East	0.0	490	67.1	42.9	0.079 & 0.076	0.031 & 0.028	Supply and Return Air, Exterior Roll-up Doors
Outdoor (Post)	0.0	459	68.5	47.0	0.038	0.014	N/A
Outdoor, East	0.0	465	74.8	26.2	0.038	0.021	N/A
Outdoor, South	0.0	476	78.9	24.4	0.038	0.018	N/A
Outdoor, West	0.0	485	78.4	21.9	0.032	0.015	N/A
Outdoor, Parking Garage	0.8	522	78.0	22.9	0.040	0.018	N/A
Outdoor, North	0.0	514	79.2	23.8	0.038	0.018	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 building shares one boiler system and is served by fan 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 503.417.7724 or marli.heininger@pbsusa.com with any questions or comments.

Sincerely,

 Marli Heininger
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Marli Heininger
Industrial Hygienist

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