



Airflow Testing Report

Prepared for

Portland Public Schools

September 2021





9700 SW Capitol Hwy, Suite 110
Portland, OR 97219
ameresco.com

PROJECT OVERVIEW

As part of the continuing process to ensure a safe return to in-person learning, Portland Public Schools has contracted with Ameresco to test the airflow and ventilation of all educational and office spaces in each school. The data is reviewed by both Ameresco and PPS personnel to identify any potential shortcomings in the airflow from the HVAC systems. To accomplish this task, Ameresco has partnered with a local NEBB certified Test-Adjust-Balance (TAB) firm, Neudorfer Engineers, who will measure the airflow to each zone with calibrated measurement equipment in accordance with current testing standards and procedures. As part of this effort, HVAC professionals will review the operation of the HVAC equipment serving every educational and office space in each school.

Ameresco is pleased to have partnered with PPS over the last decade as the district's Energy Services Company (ESCO) on six energy efficiency construction projects, four service projects, and numerous energy audits. Our partnership has resulted in reducing over 3,000 tons of CO₂ and other GHG emissions and over \$1,000,000 in utility cost savings per year. Ameresco appreciates this opportunity to play a small role in the safe reopening of schools.

About Ameresco, Inc.

Founded in 2000, Ameresco, Inc. (NYSE:AMRC) is a leading cleantech integrator and renewable energy asset developer, owner and operator. Our comprehensive portfolio includes energy efficiency, infrastructure upgrades, asset sustainability and renewable energy solutions delivered to clients throughout North America and the United Kingdom. Ameresco's sustainability services in support of clients' pursuit of Net Zero include upgrades to a facility's energy infrastructure and the development, construction, and operation of distributed energy resources. Ameresco has successfully completed energy saving, environmentally responsible projects with Federal, state and local governments, healthcare and educational institutions, housing authorities, and commercial and industrial customers. With its corporate headquarters in Framingham, MA, Ameresco has more than 1,000 employees providing local expertise in the United States, Canada, and the United Kingdom. For more information, visit www.ameresco.com.

Explanation of ASHRAE Total Effective Air Changes per Hour (ACH_e) Calculation

ASHRAE has been updating their Building Readiness document to reflect the most current understanding in the engineering community for how to operate and maintain buildings during the pandemic. Their update on 4/27/2021 provided an explanation of the impact air filters and air cleaning devices have on the air in buildings. They provided the methodology, formulas, and an Excel-based tool for determining the equivalent outside air a space is receiving by having a mix of outside air, filtered recirculated air, and additional air filtration or cleaning devices in the room. Here is the explanation from ASHRAE:

Epidemic Conditions in Place



Equivalent Outdoor Air:

The equivalent outdoor air calculation indicates that the outdoor air can be calculated by using the combination of the actual outdoor air, impact of filtration or air cleaning technologies on recirculated air, and the impact of air cleaning technologies in the space.

This is using the principal of filters in series and the effectiveness at reducing particles. For items in series, the initial item would see the recirculated airflow to clean. The second item in the series would see the “cleaned” air from Item 1 and so the impact of Item 1 must be accounted for in Item 2.

As part of the airflow testing project that Portland Public Schools has partnered with Ameresco to complete, we are including the calculation of the Total Effective Air Changes per Hour (ACH_e) to show the impact of the air filtration that is active in nearly all spaces in the PPS schools. The formula for doing so is:

$$ACH_e = (ACH_{oa} + ACH_f) * E_z + ACH_{ir}$$

where:

- ACH_{oa} = air changes per hour of outside air = outside airflow in cubic feet per minute * 60 minutes per hour / room volume in cubic feet
- ACH_f = air changes per hour of clean air from filtered recirculated air with filters of the specified MERV rating as determined by ASHRAE
- E_z = Zone Air Distribution Effectiveness = how effective the HVAC system is at circulating and mixing the air to distribute the clean air throughout the room
- ACH_{ir} = the air changes per hour of clean air from portable air filters in the room = number of filters * CADR * 60 minutes per hour / room volume in cubic feet
 - CADR = Clear Air Delivery Rate = the CFM of clean air as specified by the manufacturer of the air filter

In order to include these calculations in the airflow testing reports, Ameresco and PPS have made the following assumptions as not all the variables are known:

1. PPS is in process of upgrading the air filters in their HVAC systems to MERV 13 and plans to be complete with that project for the start of the '21-'22 school year. In this report and for the sake of the ACH_e calculation, we are using the filters that are in place at the time of the measurements, so some of them are still MERV 8.
2. ASHRAE has guidelines for what should be used for the Zone Air Distribution Effectiveness (E_z) based on the HVAC system configuration, but they do not provide a value for every HVAC system and room configuration. For the majority of PPS rooms, an E_z of 0.8 – 1.0 would be most appropriate, so we have made the conservative assumption of using 0.8 for every space as that yields the lower ACH_e.
3. The CADR for a given air filter is from manufacturer ratings and is based on certain conditions (fan speed, particulate size, filter cleanliness, etc.) that change with operating conditions.



NEUDORFER ENGINEERS INC.

TEST REPORT TYPE: SURVEY REPORT

**Portland Public Schools Airflow Testing
Cleveland HS
3400 SE 26th Ave, Portland, OR 97202**

Job Number: 2021-0297

Project Completion Date: September 2021

Revision Date:

-

Revision Number:

-



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Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



www.NeudorferEngineers.com

**Portland Public Schools Airflow Testing
Cleveland HS**

TABLE OF CONTENTS

Title Sheet	3
Report Certification	4
Terms	5
Instrument Calibration	6
Report Summary	7
Airflow Survey Report	8
TAB Notes	17
Floor Layout	18



Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



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REPORT TITLE

CERTIFIED TEST: SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Cleveland HS

NEI Job#: 2021-0297

Mechanical Engineer: NA

Architect: NA

HVAC Contractor: NA

TAB Firm: Neudorfer Engineers Inc
Test Engineer: Zach Mayer



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CERTIFICATION

Portland Public Schools Airflow Testing

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems. Any variances from design quantities, which exceed NEBB tolerances, are noted in the Test-Adjust-Balance Report Project Summary.

Significant / Noteworthy Remarks are noted on the General Remarks and General Field Notes pages. Other remarks are noted on individual test sheets.

Noted deficiencies are not the TAB firms responsibility to repair. Prior to issuance of this report, Deficiency Reports are forwarded to our contracted agent.

Warranty is limited to one year from date of this report. Within that time, any discrepancies, ambiguities, or omissions found in this report will be retested, adjusted, or balanced as needed. A written notification will be required.

Submitted and Certified by:

NEBB TAB Firm: **Neudorfer Engineers Inc**

Certification No: **3414**

Expiration Date: **March 31, 2023**

Certification Date: **March 31, 2021**

(Date completed) Signed and Sealed by:

NEBB Supervisor: **Mike Vawter P.E.**

NEBB Supervisor: **Eric Stotts**





Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



www.NeudorferEngineers.com

TERMS AND ABBREVIATIONS

Project: Portland Public Schools Airflow Testing

AC or ACU Air Conditioner or Air Conditioning Unit	HEPA High Efficiency Particulate Arrestance
AH or AHU Air Handler or Air Handling Unit	HP Horsepower
AVG Average	HVAC Heating Ventilation and Air Conditioning
BHP Brake Horsepower	HWS Heating Water Supply
CAV Constant Air Volume	HWR Heating Water Return
CBV Calibrated Balancing Valve (Circuit Setter)	HX Heat Exchanger
CC Cooling Coil	HZ Hertz, cycle per second
CD Ceiling Diffuser	in. inches
CFM Cubic Feet per Minute	in.w.g. inches of water gauge
CH Chiller	Kfactor Correction factor to the free area need to calculate CFM.
CHWS Chilled Water Supply	KW Kilowatts
CHWR Chilled Water Return	LAT Leaving Air Temperature
CP Circulating Pump	LWG Low Wall Grille
CR Ceiling Register	LWR Low Wall Register
CRAC Computer Room Air Conditioner	LWT Leaving Water Temperature
CRU Computer Room Unit	MAU Make-up Air Hanging Unit
CT Cooling Tower	MBH 1,000 BTUH
CU Condenser Unit	N/A Not Applicable
CUH Cabinet Unit Heater	OSA Outside Air
CWS Condenser Water Supply	OBD Opposed Blade Damper
CWR Condenser Water Return	ΔP Pressure Drop.
DAT Discharge Air Temperature	PH Phase
DB Dyr Bulb	PSI Pounds per Square Inch
DD Direct Drive	RA Return Air
DDC Direct Digital Controls: EMS Control System for the HVAC	RAD Radiator
Des. Design	RAT Return Air Temperature
Dia. Diameter	RF Return Fan
Disch. Discharge	RH Relative Humidity
EA Exhaust Air	RHC Reheat Coil
EAT Entering Air Temperature	RPM Revolutions per Minute
Economizer Controls and components that allow an air handler to logically utilize outdoor air for cooling as opposed to the use of mechanical cooling.	RTU Roof Top Unit
EF Exhaust Fan	SA Supply Air
EG Exhaust Grille	SAT Supply Air Temperature
EMCS Energy Management Control System	S.F. Service Factor
ERU Energy Recovery Unit	SF Supply Fan
E.S.P. External Static Pressure	SFD Smoke/Fire Damper
HRC Heat Recovery Coil	SP Static Pressure
EWT Entering Water Temperature	sq.ft. square feet
FCU Fan Coil Unit	Suct. Suction
FD Fire Damper	SWG Sidewall Grille
FLA Full Load Amperage: Maximum amperage a motor can draw.	SWR Sidewall Register
Flow Hood Instrument that captures air and converts the reading to CFM.	TAB Test; Adjust; and Balance
FHT Fume Hood Test	TSP Total Static Pressure: Difference between the entering and leaving static pressure of a fan.
FPB Fan Powered Box	UH Unit Heater
FPM Feet per Minute	VAV Variable Air Volume; box that contains a motorized damper that modulates airflow.
FR Field Report	VD Volume Damper
FT Foot, Feet	VFD Variable Frequency Drive
FTU Fan Terminal Unit	Velgrid Instrument that reads used to read velocity in feet per minute.
GPM Gallons per Minute	VVT Variable Volume Terminal
HC Heating Coil	WC Water Column
TDH Pressure Difference across the entering and leaving side of a pump.	W.G. Water Gauge
	WB Wet Bulb

INSTRUMENT CALIBRATIONS

Portland Public Schools Airflow Testing

Instrument Type	Air Data Meter with Flowhood	Instrument Serial #	M00475
Instrument Manufacturer	Shortridge	Calibration Date	11/4/2020
Instrument Model Number	ADM 870	Calibration Due	11/4/2021
Instrument Type	Differential Pressure Water Meter	Instrument Serial #	W14090
Instrument Manufacturer	Shortridge	Calibration Date	10/16/2020
Instrument Model Number	HDM-250	Calibration Due	10/16/2021
Instrument Type	Psychrometer	Instrument Serial #	8084305
Instrument Manufacturer	Extech	Calibration Date	10/13/2020
Instrument Model Number	RH390	Calibration Due	10/13/2021
Instrument Type	Tachometer	Instrument Serial #	B185B5022P
Instrument Manufacturer	Nidec	Calibration Date	10/11/2020
Instrument Model Number	MT-200	Calibration Due	10/11/2021
Instrument Type	Amp Probe	Instrument Serial #	33380179WS
Instrument Manufacturer	Fluke	Calibration Date	10/9/2020
Instrument Model Number	323 Clamp Meter	Calibration Due	10/9/2021
Instrument Type	Digital Thermometer	Instrument Serial #	45400509WS
Instrument Manufacturer	Fluke	Calibration Date	10/9/2020
Instrument Model Number	52 II	Calibration Due	10/9/2021
Instrument Type	Manometer	Instrument Serial #	M00475
Instrument Manufacturer	Shortridge	Calibration Date	11/4/2020
Instrument Model Number	ADM 870	Calibration Due	11/4/2021
Instrument Type	Thermal Anemometer	Instrument Serial #	AVM440742003
Instrument Manufacturer	Alnor Instruments	Calibration Date	11/9/2020
Instrument Model Number	AVM 440	Calibration Due	11/9/2021
Instrument Type	Ultrasonic Flow Meter	Instrument Serial #	N5K1435T
Instrument Manufacturer	Fuji	Calibration Date	10/14/2020
Instrument Model Number	Portaflow-C	Calibration Due	10/14/2021



PROJECT	Portland Public Schools Airflow Testing
LOCATION	Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202

REPORT SUMMARY

This project has been surveyed per plans and specifications using the National Environmental Balancing Bureau (NEBB) standards and procedures.

The scope of work for this project was to assess the current airflows for each classroom, office, and special purpose space. Air changes per hour were calculated along with the % of OSA for the spaces and any deficiencies found for each piece of equipment has been noted in the following report.

All ventilation equipment was commanded to run by the BMS system. Ventilation units were measured with a flowhood on the supply outlets. Outside air was recorded with a flowhood on the OSA louvre where accessible. AK factors were calculated from flowhood readings. The remaining OSA values were recorded with a velgrid. AHU supply air was recorded by a summation of the outlets as recorded by flowhood or velgrid when appropriate. Outside air was recorded with a velgrid or airfoil and calculated by the free area method.

The measured airflows in this report represent the performance of the equipment at the time of measurement, which vary over time based on operating conditions. There are factors outside the control of Neudorfer that impact airflow, and variance in those factors is expected and normal. One significant factor is the MERV rating and condition of the air filters on the equipment. During the summer of 2021, PPS began upgrading the filters on all their fan systems to MERV 13. Those upgraded filters are more effective at capturing particles but also impact the amount of airflow from the equipment. These filter changes were occurring while the airflow measurement project was happening, so some schools had the new filters, and some had the old filters at the time of measurement. On the data page included this report, there is a line stating whether or not the upgraded filters were in place at the time of measurement.



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
First Floor																
Rm 119	UV	UV	29.4	23.0	676	12.0	8,114	625	25	4%	4.6	0.2	1	10.4	3.3	
Rm 125	UV	UV	35.6	22.9	815	12.0	9,783	820	55	7%	5.0	0.3	1	9.5	3.6	
Rm 127	UV	UV	33.7	22.9	772	12.0	9,261	705	14	2%	4.6	0.1	1	9.4	3.3	
Rm 129	UV	UV	36.1	22.9	827	12.0	9,920	605	70	12%	3.7	0.4	1	8.4	2.7	
133	-	-	22.9	13.4	307	12.0	3,682	-	-	-	0.0	0.0	1	15.5	0.0	Ventilation provided by adjacent spaces.
Rm 135	UV	UV	33.8	22.8	771	12.0	9,248	535	100	19%	3.5	0.6	1	8.7	2.5	
137	Boys Lkr FCU	FCU	26.2	26.0	681	9.5	6,471	50	50	100%	0.5	0.5	0	N/A	0.4	Not ducted for return.
137-2	Boys Lkr FCU	FCU	15.0	9.7	146	9.0	1,310	50	50	100%	2.3	2.3	0	N/A	1.8	Not ducted for return.
137G	-	-	30.0	7.9	237	8.7	2,062	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
137C	Boys Lkr FCU	FCU	36.8	34.4	364	10.6	3,858	50	50	100%	0.8	0.8	0	N/A	0.6	Non-rectangular room. Not ducted for return.
163E	173 FCU	FCU	11.5	9.0	104	9.2	952	155	65	42%	9.8	4.1	1	67.2	7.4	
163D	173 FCU	FCU	9.1	6.3	57	9.2	527	95	40	42%	10.8	4.5	1	116.2	8.1	
163C	173 FCU	FCU	9.0	6.8	61	9.2	563	110	46	42%	11.7	4.9	1	110.1	8.8	
163G	173 FCU	FCU	10.0	8.7	87	8.1	705	75	32	42%	6.4	2.7	1	85.7	4.8	
163	173 FCU	FCU	35.7	22.9	493	8.1	3,997	585	246	42%	8.8	3.7	1	20.9	6.6	Non-rectangular room
163B	173 FCU	FCU	7.6	4.6	35	8.0	280	115	48	42%	24.7	10.4	1	222.4	18.6	
163A	173 FCU	FCU	11.6	9.2	107	8.0	854	100	42	42%	7.0	3.0	1	72.1	5.3	
173	173 FCU	FCU	32.2	16.5	531	10.0	5,313	45	19	42%	0.5	0.2	1	11.1	0.4	
162-1	-	-	11.9	8.0	95	11.6	1,104	-	-	-	0.0	0.0	1	51.6	0.0	Ventilation provided by adjacent spaces.
162-2	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0	N/A	0.0	Walk-in fridge.
162-3	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0	N/A	0.0	Walk-in fridge.
162	MAU-1	MAU	81.7	29.5	2,036	11.7	23,824	335	335	100%	0.8	0.8	1	3.1	0.7	Non-rectangular room.
162G	MAU-1	MAU	26.2	19.5	381	10.3	3,923	3,390	3,390	100%	51.8	51.8	1	56.0	41.5	Non-rectangular room.
Cafeteria 112	Café-1, 2 & 3	FCUs	132.6	74.3	9,326	12.8	119,375	2,740	438	16%	1.4	0.2	2	2.0	1.0	Non-rectangular room.

Date: 9/3/2021

Readings By: Mayer



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
First Floor																
132	-	-	38.7	25.4	983	12.8	12,582	-	-	-	0.0	0.0	1	4.5	0.0	Ventilation provided by adjacent spaces.
130	HVU-2	FCU	24.8	16.4	407	13.8	5,613	440	9	2%	4.7	0.1	1	13.5	3.4	
126	HVU-2	FCU	59.8	24.8	1,483	13.8	20,466	1,460	29	2%	4.3	0.1	1	5.9	3.1	
120	-	-	15.9	12.1	192	12.0	2,309	-	-	-	0.0	0.0	1	24.7	0.0	Ventilation provided by adjacent spaces.
120A	-	-	22.9	13.0	298	12.0	3,572	1,000	395	39%	16.8	6.6	1	28.6	12.6	
120B	-	-	15.9	10.5	167	12.0	2,003	-	-	-	0.0	0.0	1	28.5	0.0	
116	UV	UV	23.0	14.1	232	12.0	2,788	370	0	0%	8.0	0.0	1	26.2	5.7	Non-rectangular room. OSA damper is closed.
116A	-	-	18.5	11.5	213	12.0	2,553	-	-	-	0.0	0.0	1	22.3	0.0	Ventilation provided by adjacent spaces.
116B	-	-	18.5	11.2	207	12.0	2,486	-	-	-	0.0	0.0	1	22.9	0.0	Ventilation provided by adjacent spaces.
Rm 110	UV	UV	37.2	22.9	852	12.0	10,223	605	140	23%	3.6	0.8	1	8.2	2.6	
Rm 106	UV	UV	37.2	27.0	1,004	12.0	12,053	710	40	6%	3.5	0.2	1	7.3	2.6	
Rm 109	UV	UV	37.2	23.0	856	12.0	10,267	655	70	11%	3.8	0.4	1	8.3	2.8	
Rm 115	UV	UV	35.8	23.0	823	12.0	9,881	820	155	19%	5.0	0.9	1	9.4	3.7	
Rm 113	UV	UV	41.8	22.9	957	12.0	11,487	1,000	465	47%	5.2	2.4	1	8.9	4.0	
Rm 117	UV	UV	37.5	23.0	863	12.0	10,350	745	0	0%	4.3	0.0	1	8.6	3.1	OSA damper is closed.
184a	EF	EF	11.9	9.9	118	9.4	1,107	-140	0	0%	7.6	0.0	1	56.9	5.5	Exhaust fan provides air changes.
G33A	V-11	FCU	29.9	16.9	505	10.0	5,053	485	485	100%	5.8	5.8	1	15.9	4.6	Not ducted for return.
G33	V-11	FCU	84.9	40.5	2,236	8.5	19,009	1,795	1,795	100%	5.7	5.7	1	7.5	4.5	Not ducted for return. Non-rectangular room.
G20	V-11	FCU	14.4	10.6	153	9.0	1,374	95	95	100%	4.1	4.1	1	44.8	3.3	Not ducted for return.
G34	-	-	5.4	4.4	24	9.0	214	-	-	-	0.0	0.0	1	266.6	0.0	Ventilation provided by adjacent spaces.
G21	-	-	9.5	6.8	65	8.9	575	-	-	-	0.0	0.0	1	99.1	0.0	Ventilation provided by adjacent spaces.
G32	V-7	FCU	49.7	30.4	1,511	6.9	10,425	1,725	1,725	100%	9.9	9.9	1	13.4	7.9	Not ducted for return
G30	-	-	9.9	7.5	74	8.8	653	-	-	-	0.0	0.0	1	87.2	0.0	Ventilation provided by adjacent spaces.
G 07	-	-	12.7	6.3	80	9.0	720	-	-	-	0.0	0.0	1	79.2	0.0	Ventilation provided by adjacent spaces.

Date: 9/3/2021

Readings By: Mayer



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First Floor																
G28	V-9	FCU	48.7	26.7	1,238	10.0	12,383	1,680	1,680	100%	8.1	8.1	1	11.1	6.5	
G28A	-	-	9.8	6.6	65	8.0	517	-	-	-	0.0	0.0	1	110.2	0.0	Ventilation provided by adjacent spaces.
G25A	-	-	30.0	16.9	507	9.5	4,816	-	-	-	0.0	0.0	1	11.8	0.0	Ventilation provided by adjacent spaces.
STR05	-	-	15.4	4.5	69	10.9	755	-	-	-	0.0	0.0	1	75.5	0.0	Ventilation provided by adjacent spaces.
G29	V-7	FCU	60.4	49.7	3,002	16.9	50,732	1,725	1,725	100%	2.0	2.0	1	2.8	1.6	Not ducted for return.
G29A	-	-	6.0	4.6	28	9.1	251	-	-	-	0.0	0.0	1	226.9	0.0	Ventilation provided by adjacent spaces.
G25	V-8	FCU	94.2	39.6	1,681	9.5	15,971	455	455	100%	1.7	1.7	1	4.9	1.4	
G13	V-8	FCU	14.6	10.8	158	8.9	1,403	135	135	100%	5.8	5.8	1	45.2	4.6	
G12	V-8	FCU	14.5	10.4	151	9.0	1,357	100	100	100%	4.4	4.4	1	45.5	3.5	
G10	-	-	15.3	6.9	106	12.4	1,309	-	-	-	0.0	0.0	1	43.5	0.0	Ventilation provided by adjacent spaces.
G09	-	-	15.3	9.0	138	12.3	1,694	-	-	-	0.0	0.0	1	33.7	0.0	Ventilation provided by adjacent spaces.
G14	V-6	FCU	24.3	23.9	581	9.5	5,517	650	650	100%	7.1	7.1	1	16.0	5.7	Not ducted for return.
G15	-	-	16.2	6.1	99	10.0	988	-	-	-	0.0	0.0	1	57.7	0.0	Ventilation provided by adjacent spaces.
G16	V-6	FCU	24.4	24.3	593	9.5	5,633	780	780	100%	8.3	8.3	1	16.8	6.6	Not ducted for return.
G06	-	-	21.9	16.7	366	8.8	3,218	-	-	-	0.0	0.0	1	17.7	0.0	Ventilation provided by adjacent spaces.
G35	-	-	34.2	6.4	219	16.9	3,699	-	-	-	0.0	0.0	1	15.4	0.0	Ventilation provided by adjacent spaces.
G23	-	-	21.8	16.6	362	8.8	3,185	-	-	-	0.0	0.0	1	17.9	0.0	Ventilation provided by adjacent spaces.
Second Floor																
Rm 219	UV	UV	22.9	29.2	669	10.3	6,887	610	405	66%	5.3	3.5	1	12.4	4.1	
Rm 225	UV	UV	22.9	35.5	813	12.0	9,755	925	145	16%	5.7	0.9	1	10.0	4.2	
Rm 227	UV	UV	38.6	22.8	880	12.0	10,561	870	60	7%	4.9	0.3	1	9.0	3.6	
Rm 231	UV	UV	36.5	22.9	836	12.0	10,030	610	24	4%	3.6	0.1	1	8.3	2.6	
Rm 235	UV	UV	33.7	22.8	768	12.0	9,220	610	195	32%	4.0	1.3	1	9.1	3.0	
Rm 263	263 FCU	FCU	41.7	22.5	938	12.0	11,259	835	835	100%	4.4	4.4	1	8.6	3.6	Not ducted for return.

Date: 9/3/2021

Readings By: Mayer



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
Second Floor																
263A	-	-	49.4	26.1	1,289	12.1	15,601	-	-	-	0.0	0.0	1	3.7	0.0	Ventilation provided by adjacent spaces.
265	HVU-2R	FCU	16.4	12.8	210	8.9	1,868	270	270	100%	8.7	8.7	1	37.4	6.9	Note #2
275A	HVU-2R	FCU	10.5	14.0	147	9.0	1,323	55	55	100%	2.5	2.5	1	45.1	2.0	Note #2
254	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0	N/A	0.0	This is the exterior loading dock.
Auditorium 201	Aud Fan	AHU	84.4	80.7	6,811	36.2	293,285	39,300	39,300	100%	6.5	6.5	0	N/A	5.2	Note #2. Balcony volume added for ACH Calc.
Stage 273	-	-	61.2	35.6	2,179	33.0	71,898	-	-	-	-	-	-	-	-	Open and shared with auditorium.
266B	-	-	12.7	9.4	119	12.0	1,433	-	-	-	0.0	0.0	1	39.8	0.0	Ventilation provided by adjacent spaces.
Rm 266	UV	UV	31.6	22.8	720	12.0	8,646	815	440	54%	5.7	3.1	1	10.9	4.3	
Rm 277	HVU-7R	FCU	30.3	25.6	776	11.1	8,610	1,360	1,360	100%	9.5	9.5	1	14.2	7.6	Note #2
Rm 279	HVU-7R	FCU	30.5	25.7	784	11.2	8,779	315	315	100%	2.2	2.2	1	8.2	1.7	Note #2
Rm 268	HVU-7R	FCU	35.9	32.5	1,167	11.6	13,534	805	805	100%	3.6	3.6	1	7.1	2.9	Note #2
Rm 232	VU	VU	22.9	32.2	737	10.0	7,374	705	84	12%	5.7	0.7	1	11.9	4.2	
234-8	HVU-2A	FCU	22.0	12.7	279	8.8	2,459	275	275	100%	6.7	6.7	1	28.6	5.4	Note #2
Rm 234	HVU-1A	FCU	36.1	52.0	1,877	20.0	37,544	2,680	2,680	100%	4.3	4.3	1	4.9	3.4	Note #2
234-7	HVU-2A	FCU	11.5	12.8	147	8.8	1,295	205	205	100%	9.5	9.5	1	51.6	7.6	Note #2
Rm 236	HVU-3A	FCU	36.0	29.9	1,076	20.0	21,528	2,270	2,270	100%	6.3	6.3	1	7.7	5.1	Note #2
Rm 248	HVU-4A	FCU	55.2	36.3	2,004	16.9	33,864	2,435	1,800	74%	4.3	3.2	1	5.0	3.4	
248A	-	-	8.0	6.0	48	7.4	355	-	-	-	0.0	0.0	1	160.5	0.0	Ventilation provided by adjacent spaces.
250	HVU-6A	FCU	23.5	28.9	679	16.5	11,206	1,620	1,400	86%	8.7	7.5	1	11.9	6.8	
252T	-	-	6.4	8.4	54	7.3	392	-	-	-	0.0	0.0	1	145.2	0.0	Ventilation provided by adjacent spaces.
252A	HVU-5A	FCU	36.2	55.0	1,991	16.8	33,449	2,485	2,485	100%	4.5	4.5	1	5.3	3.6	Note #2
252B	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0	N/A	0.0	252A and 252B are the same room
252S	-	-	6.8	11.0	75	8.0	598	-	-	-	0.0	0.0	1	95.3	0.0	Ventilation provided by adjacent spaces.
Rm P1	UV	UV	31.0	30.0	930	10.7	9,951	202	202	100%	1.2	1.2	1	6.7	1.0	

Date: 9/3/2021

Readings By: Mayer



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
Second Floor																
Rm P2	UV	UV	31.0	23.0	713	10.7	7,629	198	198	100%	1.6	1.6	1	8.7	1.2	
230	AHU-1	AHU	14.4	9.6	138	9.5	1,313	215	215	100%	9.8	9.8	1	51.3	7.9	Not ducted for return.
230A	AHU-1	AHU	8.0	12.8	102	12.0	1,229	85	85	100%	4.2	4.2	1	49.7	3.3	Not ducted for return.
228	AHU-1	AHU	8.0	10.0	80	12.0	960	215	215	100%	13.4	13.4	1	70.1	10.8	Not ducted for return.
Conf. Rm 226P	-	-	4.5	4.4	20	8.5	168	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
226Q	AHU-1	AHU	8.0	10.0	80	8.3	664	95	95	100%	8.6	8.6	1	92.7	6.9	Not ducted for return.
226R	AHU-1	AHU	7.8	10.0	78	8.2	640	75	75	100%	7.0	7.0	1	94.7	5.6	Not ducted for return.
226S	AHU-1	AHU	8.0	10.0	80	8.3	664	75	75	100%	6.8	6.8	1	91.3	5.4	Not ducted for return.
Conf. Rm 226L	AHU-1	AHU	9.4	12.9	121	12.0	1,455	185	185	100%	7.6	7.6	1	45.3	6.1	Not ducted for return.
226K	AHU-1	AHU	8.9	7.7	69	12.0	822	75	75	100%	5.5	5.5	1	73.7	4.4	Not ducted for return.
226J	AHU-1	AHU	8.9	9.2	82	12.0	983	75	75	100%	4.6	4.6	1	61.7	3.7	Not ducted for return.
226M	AHU-1	AHU	8.0	8.1	65	8.3	538	105	105	100%	11.7	11.7	1	115.4	9.4	Not ducted for return.
226N	AHU-1	AHU	10.0	8.2	82	8.3	681	110	110	100%	9.7	9.7	1	91.5	7.8	Not ducted for return.
226 H	AHU-1	AHU	8.9	7.7	69	12.0	822	105	105	100%	7.7	7.7	1	75.4	6.1	Not ducted for return.
226G	AHU-1	AHU	8.9	9.2	82	12.0	983	115	115	100%	7.0	7.0	1	63.6	5.6	Not ducted for return.
226F	AHU-1	AHU	8.9	7.8	69	12.0	833	120	120	100%	8.6	8.6	1	75.3	6.9	Not ducted for return.
Conf. Rm 226E	AHU-1	AHU	8.6	16.3	140	8.7	1,220	105	105	100%	5.2	5.2	1	50.9	4.1	Not ducted for return.
226	AHU-1	AHU	29.0	45.6	1,322	8.3	11,672	1,555	1,555	100%	8.0	8.0	1	11.3	6.4	Not ducted for return. Non-rectangular room.
226A	AHU-1	AHU	7.8	10.0	78	8.2	640	55	55	100%	5.2	5.2	1	93.2	4.1	Not ducted for return.
226B	AHU-1	AHU	8.0	10.0	80	8.3	664	35	35	100%	3.2	3.2	1	88.4	2.5	Not ducted for return.
226C	AHU-1	AHU	8.1	11.3	92	8.3	760	50	50	100%	3.9	3.9	1	78.2	3.2	Not ducted for return.
Conf. Rm 224	AHU-1	AHU	22.9	13.3	305	12.0	3,655	205	205	100%	3.4	3.4	1	18.3	2.7	Not ducted for return.
Rm 220	UV	UV	22.8	29.3	668	12.0	8,016	770	246	32%	5.8	1.8	1	11.4	4.3	
218D	-	-	8.0	8.6	69	12.0	826	-	-	-	0.0	0.0	1	69.0	0.0	Note #1

Date: 9/3/2021

Readings By: Mayer



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
Second Floor																
218B	210 FCU	FCU	8.0	15.6	125	12.0	1,498	80	80	100%	3.2	3.2	1	40.6	2.6	Note #1
218C	-	-	-	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	Rooms 218B & 218C are one room.
218F	-	-	10.0	6.2	62	12.0	744	-	-	-	0.0	0.0	1	76.6	0.0	
218G	-	-	10.0	6.2	62	12.0	744	-	-	-	0.0	0.0	1	76.6	0.0	Note #1
218	210 FCU	FCU	10.4	9.8	102	11.0	1,121	85	85	100%	4.5	4.5	1	54.5	3.6	Note #1
218A	210 FCU	FCU	7.8	12.0	94	12.0	1,123	125	125	100%	6.7	6.7	1	56.1	5.3	
218I	210 FCU	FCU	9.9	12.0	119	12.0	1,426	95	95	100%	4.0	4.0	1	43.2	3.2	
218H	210 FCU	FCU	5.7	8.5	48	12.0	581	65	65	100%	6.7	6.7	1	103.4	5.4	
210	210 FCU	FCU	9.5	32.3	307	9.9	3,038	270	270	100%	5.3	5.3	1	23.0	4.3	
210A	210 FCU	FCU	13.2	12.7	168	12.0	2,012	45	45	100%	1.3	1.3	1	29.4	1.1	
210C	210 FCU	FCU	9.3	12.9	120	12.0	1,440	105	105	100%	4.4	4.4	1	43.1	3.5	
Main Office 206	UV	UV	25.0	21.7	543	12.0	6,510	225	27	12%	2.1	0.2	1	10.3	1.5	
Main Office 200C	-	-	6.7	3.5	23	8.4	197	-	-	-	0.0	0.0	1	289.4	0.0	Ventilation provided by adjacent spaces.
200	UV	UV	13.4	20.5	275	11.8	3,241	205	40	20%	3.8	0.7	1	20.4	2.8	
214	UV	UV	43.0	22.9	985	12.0	11,816	1,625	1,135	70%	8.3	5.8	1	11.2	6.4	
207	-	-	16.4	13.9	228	11.8	2,690	-	-	-	0.0	0.0	1	21.2	0.0	Ventilation provided by adjacent spaces. This is part of 207.
207A	-	-	3.9	18.2	71	9.0	639	-	-	-	0.0	0.0	0	N/A	0.0	
Rm 209	UV	UV	23.0	25.4	584	12.0	7,010	635	102	16%	5.4	0.9	1	12.1	4.0	
Rm 211	UV	UV	23.0	24.3	559	12.0	6,707	870	244	28%	7.8	2.2	1	14.3	5.8	
213	-	-	18.6	23.5	437	12.0	5,245	-	-	-	0.0	0.0	1	10.9	0.0	Ventilation provided by adjacent spaces.
Rm 215	UV	UV	22.9	24.5	561	10.0	5,611	595	315	53%	6.4	3.4	1	15.0	4.8	
Rm 217	UV	UV	22.9	24.5	561	12.0	6,733	490	370	76%	4.4	3.3	1	11.9	3.4	
Gym G101	V-1, 2, 3, 4	AHUs	109.8	115.6	12,693	27.8	352,862	19,795	19,795	100%	3.4	3.4	2	3.0	2.7	Not ducted for return.
G100C	V-10	AHU	-	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	No access to space.

Date: 9/3/2021

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AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
Second Floor																
G2	-	-	15.4	7.8	120	11.9	1,429	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
G3	-	-	9.2	7.7	71	8.0	567	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
G4	-	-	6.7	4.9	33	8.0	263	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
G5	-	-	9.2	7.7	71	7.9	560	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
G6	-	-	14.3	7.8	112	11.9	1,327	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.
Third Floor																
Rm 319	UV	UV	29.3	22.9	671	10.3	6,911	855	60	7%	7.4	0.5	1	13.6	5.4	
Rm 325	UV	UV	24.2	23.0	557	10.2	5,677	740	470	64%	7.8	5.0	1	16.1	6.0	
Rm 327	UV	UV	22.9	24.4	559	10.4	5,811	295	0	0%	3.0	0.0	1	12.0	2.2	OSA damper is closed.
Rm 329	329 FCU	FCU	22.9	27.6	632	10.0	6,320	685	685	100%	6.5	6.5	1	14.2	5.2	
331	329 FCU	FCU	17.5	23.5	411	10.2	4,195	470	470	100%	6.7	6.7	1	19.0	5.4	
Rm 333	UV	UV	22.9	24.5	561	10.3	5,779	635	0	0%	6.6	0.0	1	14.6	4.7	OSA damper is closed.
Rm 335	UV	UV	23.2	33.7	782	10.3	8,053	615	115	19%	4.6	0.9	1	10.4	3.4	
337	-	-	12.0	24.1	289	10.1	2,921	-	-	-	0.0	0.0	1	19.5	0.0	Ventilation provided by adjacent spaces.
Rm 363	363 FCU	AHU	22.9	45.8	1,049	9.7	10,174	364	364	100%	2.1	2.1	1	7.3	1.7	
Rm 355	HVU-1R	FCU	25.8	35.2	908	10.7	9,717	550	550	100%	3.4	3.4	1	8.6	2.7	Note #2
355A	HVU-1R	FCU	11.7	15.2	178	9.0	1,601	170	170	100%	6.4	6.4	0	N/A	5.1	Note #2
Rm 357	HVU-3R	FCU	30.8	43.1	1,327	10.7	14,204	805	805	100%	3.4	3.4	1	6.7	2.7	Note #2
357A	HVU-3R	FCU	14.4	15.9	229	10.7	2,450	150	150	100%	3.7	3.7	0	N/A	2.9	Note #2
Rm 359	HVU-3R	FCU	28.3	34.9	988	10.7	10,568	915	915	100%	5.2	5.2	1	9.5	4.2	Note #2
361	HVU-5R	FCU	20.2	24.4	493	10.7	5,274	237	237	100%	2.7	2.7	1	13.0	2.2	Note #2
367	HVU-5R	FCU	15.0	23.2	348	10.7	3,724	185	185	100%	3.0	3.0	1	17.7	2.4	Note #2
367A	HVU-5R	FCU	10.2	13.1	134	10.6	1,416	175	175	100%	7.4	7.4	0	N/A	5.9	Note #2
367B	HVU-5R	FCU	10.0	23.2	232	10.6	2,459	205	205	100%	5.0	5.0	1	27.2	4.0	Note #2

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AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
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Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
Third Floor																
Rm 370	HVU-6R	FCU	22.0	30.7	675	10.6	7,159	655	655	100%	5.5	5.5	1	12.4	4.4	Note #2
Rm 368	HVU-6R	FCU	18.8	30.6	575	10.7	6,155	520	520	100%	5.1	5.1	1	13.3	4.1	Note #2. Sloped ceiling.
Rm 360	HVU-6R	FCU	48.1	30.8	1,481	10.7	18,495	865	865	100%	2.8	2.8	1	5.3	2.2	Note #2. Sloped ceiling. Non rectangular room.
Rm 378	East Wing MZU	AHU	24.3	43.4	1,102	10.4	11,461	1,205	1,205	100%	6.3	6.3	1	10.0	5.0	Note #2. Non-rectangular room
Rm 280	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0	N/A	0.0	This is part of room 378.
381A	East Wing MZU	AHU	10.5	23.1	243	10.5	2,547	960	960	100%	22.6	22.6	0	N/A	18.1	Note #2. This open to 281.
Rm 281	East Wing MZU	AHU	41.9	28.2	939	10.5	9,860	980	980	100%	6.0	6.0	1	10.6	4.8	Note #2. Non-rectangular room.
Rm 282	East Wing MZU	AHU	28.2	31.3	883	10.5	9,268	390	390	100%	2.5	2.5	1	8.2	2.0	Note #2
Rm 283	East Wing MZU	AHU	29.4	44.2	1,299	10.5	13,645	1,010	1,010	100%	4.4	4.4	1	7.7	3.6	Note #2
Rm 284	East Wing MZU	AHU	29.2	31.3	914	10.5	9,597	1,125	1,125	100%	7.0	7.0	1	11.6	5.6	Note #2
Rm 285	East Wing MZU	AHU	29.2	42.0	1,226	10.6	13,000	970	970	100%	4.5	4.5	1	8.0	3.6	Note #2
Rm 286	East Wing MZU	AHU	29.1	31.2	908	10.6	9,624	725	725	100%	4.5	4.5	1	9.5	3.6	Note #2
286A	East Wing MZU	AHU	28.3	31.2	883	10.5	9,271	970	970	100%	6.3	6.3	1	11.2	5.0	Note #2. 286A is a classroom.
Rm 287	East Wing MZU	AHU	28.2	42.0	1,184	10.5	12,436	755	755	100%	3.6	3.6	1	7.5	2.9	Note #2
Rm 336	Science MZU-1	AHU	32.2	37.3	1,201	11.1	13,332	1,217	1,217	100%	5.5	5.5	1	8.7	4.4	
Rm 366	Science MZU-1	AHU	44.5	28.9	1,215	11.2	13,609	1,440	1,440	100%	6.3	6.3	1	9.3	5.1	Non-rectangular room.
Rm 344	Science MZU-1	AHU	17.2	27.3	470	11.0	12,595	1,500	1,500	100%	7.1	7.1	1	10.2	5.7	Additional volume of 7430 ft.
344B	Science MZU-1	AHU	8.2	19.7	162	11.0	1,777	115	115	100%	3.9	3.9	0	N/A	3.1	
332	Science MZU-1	AHU	18.2	25.4	462	11.0	5,085	620	620	100%	7.3	7.3	1	17.1	5.9	
Rm 328	Science MZU-1	AHU	36.5	43.0	1,570	11.0	17,265	1,290	1,290	100%	4.5	4.5	1	6.9	3.6	
314	Science MZU-2	AHU	13.9	30.9	430	11.0	4,725	370	70	19%	4.7	0.9	1	15.5	3.5	
Rm 320	Science MZU-2	AHU	55.5	26.0	1,443	11.0	15,873	2,770	526	19%	10.5	2.0	1	11.3	7.7	
Rm 308	Science MZU-2	AHU	58.4	29.1	1,699	11.0	18,694	2,070	393	19%	6.6	1.3	2	11.0	4.9	
Rm 306	Science MZU-2	AHU	35.4	25.5	903	11.0	11,210	1,220	232	19%	6.5	1.2	1	9.9	4.8	

Date: 9/3/2021

Readings By: Mayer

Project:	Portland Public Schools Airflow Testing
Location:	Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202
Filter Status:	Upgraded

Date: 9/3/2021 Readings By: Mayer



Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



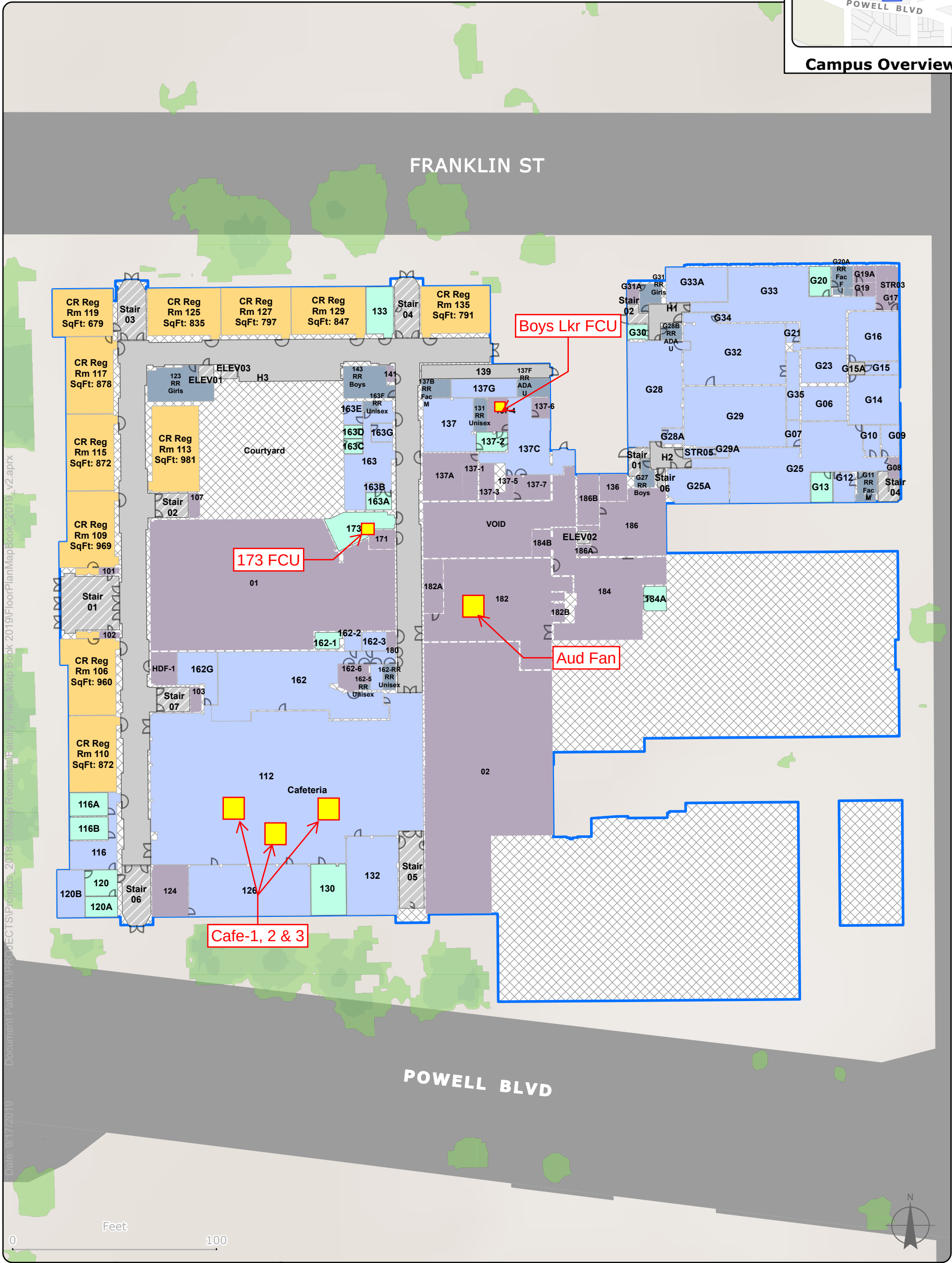
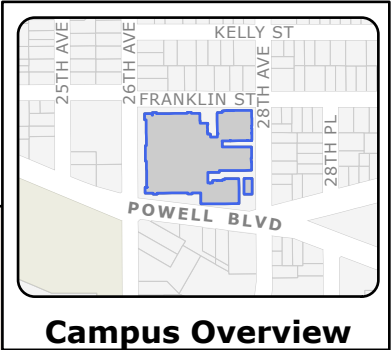
www.NeudorferEngineers.com

Project: Portland Public Schools Airflow Testing

Location: Cleveland HS; 3400 SE 26th Ave, Portland, OR 97202

NOTE #	NOTE DESCRIPTION
1	Rooms 218, 218B, 218C, 218D, 218G, 218F & 218E are all open ceiling and thus share a few supply grilles.
2	OSA damper is 100% open. Return damper is 0% open.

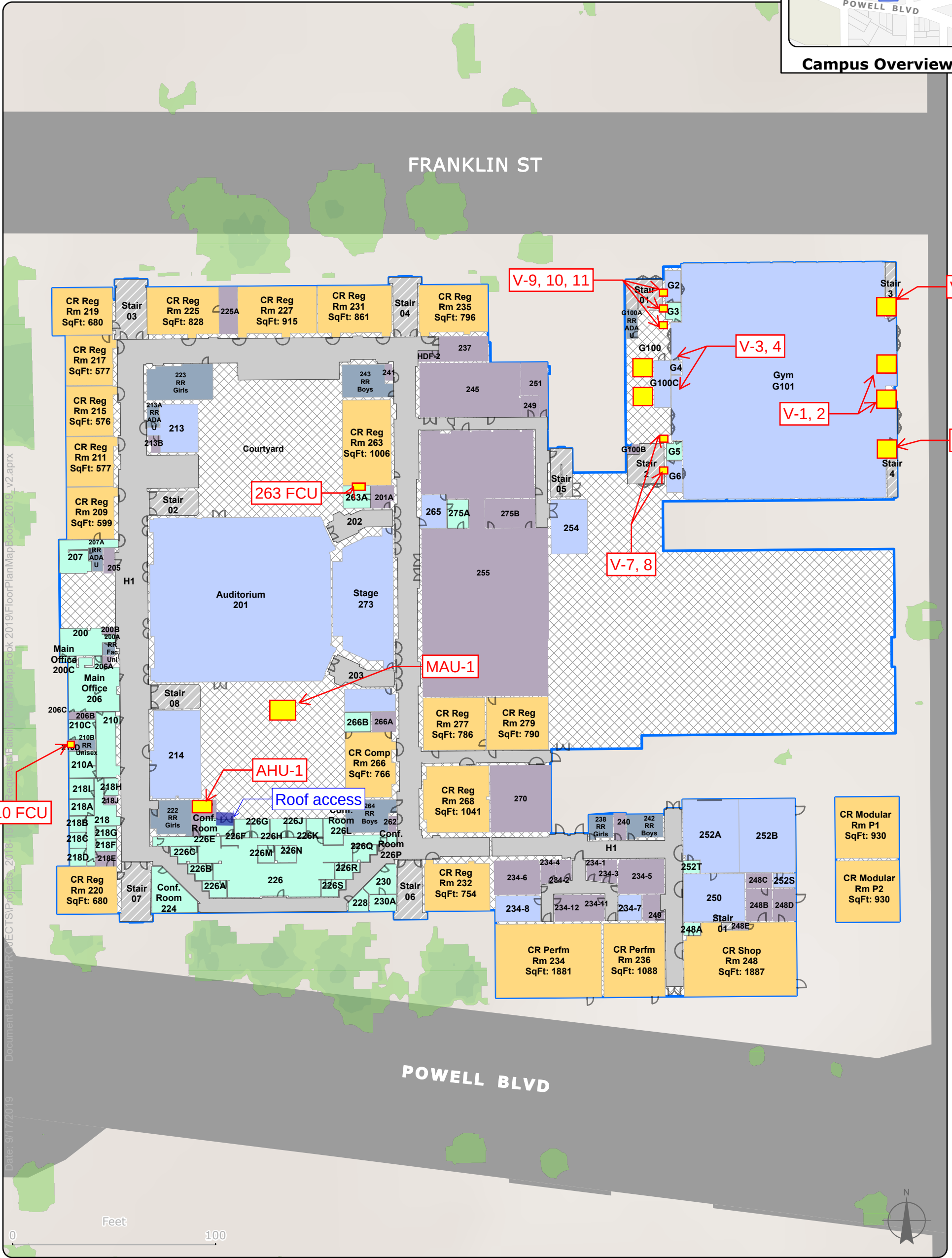
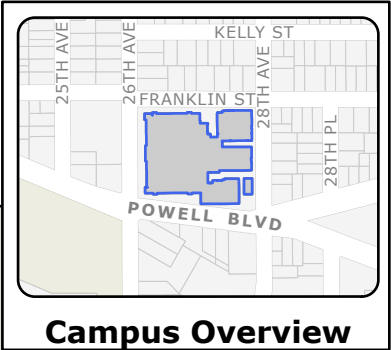
CLEVELAND: First Floor



Space Use	School Grounds
Classroom	Campus Footprints
Office	Athletic Field
Rest Room	Playground: Paved
Special Purpose	Playground: Unpaved
Corridor	Streets
Other	Doors
Stairs/Elevator	

Total Number Of Rooms By Classification			
Classrooms: 11		Special Purpose: 39	
Office Spaces: 16		Storage: 26	

CLEVELAND: Second Floor

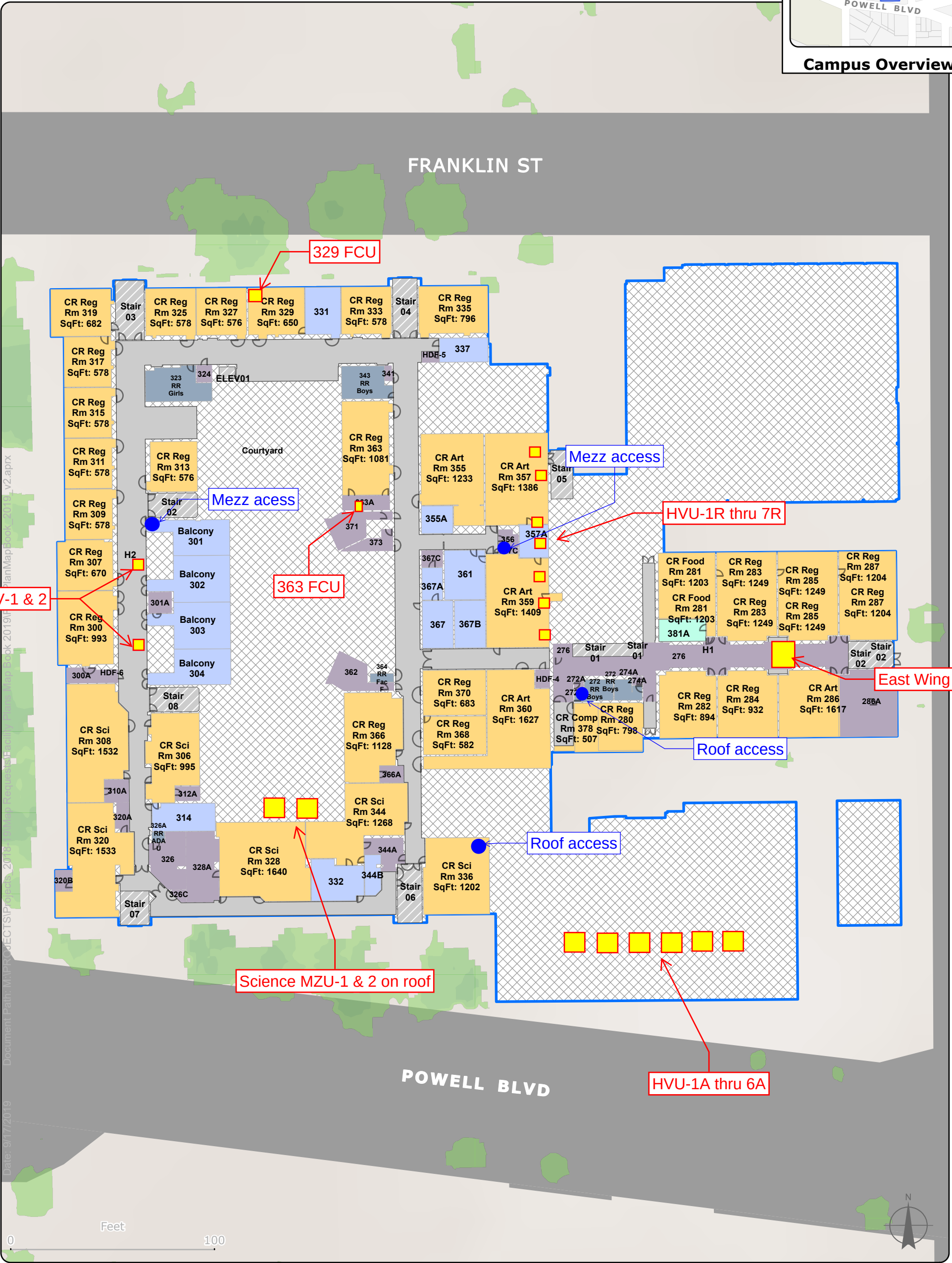
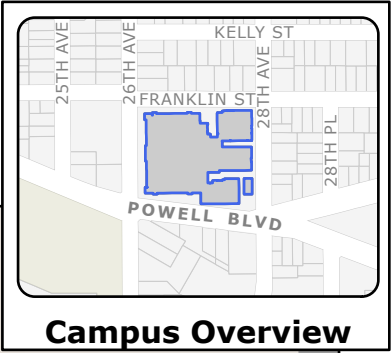


Space Use	School Grounds
Classroom	Campus Footprints
Office	Athletic Field
Rest Room	Playground: Paved
Special Purpose	Playground: Unpaved
Corridor	Streets
Other	Doors
Stairs/Elevator	

Total Number Of Rooms By Classification

Classrooms: 21	Special Purpose: 18
Office Spaces: 44	Storage: 33

CLEVELAND: Third Floor



Space Use		School Grounds	
	Classroom		Campus Footprints
	Office		Athletic Field
	Rest Room		Playground: Paved
	Special Purpose		Playground: Unpaved
	Corridor		Streets
	Other		Doors
	Stairs/Elevator		

Total Number Of Rooms By Classification

Classrooms: 44	Special Purpose: 15
Office Spaces: 1	Storage: 24