03/19/2021

Mission Hill Middle School
Attn: Trevor Miller
425 King St
Santa Cruz, CA 95060

ACCO Project Number: 60510052
Project Name: Santa Cruz City Schools Ventilation Survey – Mission Hill Middle
INTERIM REPORT

Dear Mr. Miller,

ACCO has performed a field survey of the existing HVAC units across the Mission Hill Middle campus. With this information and provided as-built drawings, an engineering analysis has been conducted to determine methods for improving indoor air flowrate and filtration given each building's HVAC system type. The following table identifies each building that was surveyed and its HVAC system configuration. Subsequent sections of this report include recommendations for improving indoor air quality for each HVAC system type. Please note that the listed filter recommendations are based on the product specifications included in the report's appendices.

For each room summarized in this report, a color-coded designation has been applied to describe the current status of its HVAC system:

- Green – Continuous 100% outside air during occupied hours and MERV-13 filtration are achievable with existing HVAC infrastructure
- Blue – Increased outside airflow and/or MERV-10 or higher filtration are achievable with existing HVAC infrastructure
- Orange – Existing HVAC equipment does not have means for providing outside air or filtered air; therefore, improvements to outside airflow or MERV rating are not possible. Consider providing portable filtration devices.
- White – Existing HVAC equipment is an exhaust fan that is only intended to draw air out of the space; thus, adjustments to outside airflow and filtration are not applicable.

Room Information			HVAC Information		
Name	Purpose	Type	Configuration	Filter Recommendation	Outside Air / Total Air %
Girls' Locker & Adjacent Rooms	Gym	Permanent	C	MERV-13	100%
Large Gym	Gym	Permanent	B	MERV-10	46%
Boys' Locker & Adjacent Rooms	Gym	Permanent	C	MERV-13	100%
Small Gym	Gym	Permanent	B	MERV-10	53%
1	Classroom	Permanent	A	MERV-10	55%
2	Classroom	Permanent	A	MERV-10	49%
3	Classroom	Permanent	A	MERV-10	49%
4	Classroom	Permanent	A	MERV-10	50%
7	Classroom	Permanent	A	MERV-10	56%
20	Classroom	Permanent			
8	Classroom	Permanent	C	MERV-13	100%
Kitchen	Admin	Permanent			
9	Classroom	Permanent	A	MERV-10	58%
10	Classroom	Permanent	A	MERV-10	48%
11	Classroom	Permanent	A	MERV-10	51%
12	Classroom	Permanent	A	MERV-10	51%
13	Classroom	Permanent	A	MERV-10	55%
14	Classroom	Permanent	A	MERV-10	55%
Computer Lab 21A	Classroom	Permanent	A	MERV-10	51%
Computer Lab 21B			A	MERV-10	TBD
22	Classroom	Permanent	A	MERV-10	52%
23	Classroom	Permanent	A	MERV-10	50%
24A	Classroom	Permanent	A	MERV-10	43%
24B	Classroom	Permanent	A	MERV-10	55%
25	Classroom	Permanent	A	MERV-10	51%
26	Classroom	Permanent	A	MERV-10	49%
27	Classroom	Permanent	A	MERV-10	51%
Art	Classroom	Permanent	B	MERV-10	53%
Food Service	Classroom	Permanent			
Music	Assembly	Permanent	A	MERV-10	48%
Science Office & RTI	Admin	Permanent	A	MERV-10	50%
Administration	Admin	Permanent	A	MERV-10	55%
Staff Lounge & Work Room	Admin	Permanent	A	MERV-10	53%
Counseling	Admin	Permanent	A	MERV-10	47%
Library	Assembly	Permanent	A	MERV-13	48%
Multipurpose	Assembly	Permanent	A	MERV-10	48%
1	Classroom	Portable	A	MERV-10	49%
2	Classroom	Portable	A	MERV-10	52%
3	Classroom	Portable	A	MERV-10	50%
30	Classroom	Permanent	B	MERV-13	51%
30 Restroom	Toilet	Permanent	D	N/A	N/A
31	Classroom	Permanent	A	MERV-13	51%
32	Classroom	Permanent	B	MERV-13	44%
33	Classroom	Permanent	B	MERV-13	46%
Men's & Custodian - 1st Floor	Toilet	Permanent	A	MERV-13	100%
Women's & Copy - 1st Floor	Toilet	Permanent	B	MERV-10	49%
Health Office	Toilet	Permanent	D	N/A	N/A
Unisex & Custodian - 2nd Floor	Toilet	Permanent	D	N/A	N/A
Boys' & Girls' (Near Art) - 1st Floor	Toilet	Permanent	D	N/A	N/A

Configuration A

Room is served by a standalone air conditioning unit. The unit has a fan to draw air into the room, but no means of controlling airflow out.

- Maintain outside air damper position at 100% open to improve indoor air quality
    - If the room temperature is colder (in winter) or hotter (in summer) than desired, outside air damper may be closed incrementally until acceptable room temperature is achieved. This incremental approach is recommended to ensure that maximum airflow is being provided.
- If room has operable windows and/or doors to the building exterior, consider opening them to encourage airflow out of the room
- Replace existing air filter with MERV-10 filter
    - Airflow into room may be reduced, but is not expected to affect AC unit operation
    - If AC unit cannot operate with increased filter rating, revert to MERV-8 filter

Configuration B

Room is served by an air conditioning unit drawing air into the room, and an exhaust system drawing air out of the room.

- Maintain outside air damper position at 100% open to improve indoor air quality
    - If the room temperature is colder (in winter) or hotter (in summer) than desired, outside air damper may be closed incrementally until acceptable room temperature is achieved. This incremental approach is recommended to ensure that maximum airflow is being provided.
- Operate the exhaust fan at full speed
    - If there are dampers within the exhaust duct system, set them at 100% open
- Replace existing air filter with MERV-10 filter
    - Airflow into room may be reduced, but is not expected to affect AC unit operation
    - If AC unit cannot operate with increased filter rating, revert to MERV-8 filter

Configuration C

Room is served by an air conditioning unit drawing air into the room, and an exhaust fan that draws all the air out of the room. In this configuration, air that is supplied to the room will not be returned back to the HVAC supply unit.

- If supply air fan speed can be increased while maintaining existing airflow rate, install MERV-13 filter
    - If fan cannot operate with increased filter rating, revert to a MERV-10 or MERV-8 filter

Configuration D

Room has a fan to draw air out of the room, but no means of supplying air into it.

- Operate exhaust fans at full speed
    - If there are dampers within the exhaust duct system, set them at 100% open

- If room has operable windows and/or doors to the building exterior, consider opening them to encourage airflow out of the room

The recommendations in this report are based on observed site conditions and proposed filter product data. If further modifications are desired, ACCO would be happy to continue working with Mission Hill Middle on its HVAC systems.

Sincerely,

Wendy Wang, PE
ACCO Engineered Systems
Design Engineer