

03/03/2021

Westlake Elementary School  
Attn: Trevor Miller  
1000 High St  
Santa Cruz, CA 95060

ACCO Project Number: 60510050

Project Name: Santa Cruz City Schools Ventilation Survey – Westlake Elementary

## **FINAL REPORT**

Dear Mr. Miller,

ACCO has performed a field survey of the existing HVAC units across the Westlake Elementary 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		
Number	Purpose	Type	Configuration	Filter Recommendation	Outside Air / Total Air %
1	Classroom	Permanent	B	MERV-10	39%
2	Classroom	Permanent	B	MERV-10	43%
3	Classroom	Permanent	B	MERV-10	47%
4	Classroom	Permanent	B	MERV-10	70%
5	Classroom	Permanent	B	MERV-10	51%
6	Classroom	Permanent	B	MERV-10	90%
7	Classroom	Permanent	B	MERV-10	50%
8	Classroom	Permanent	B	MERV-10	38%
9	Classroom	Permanent	B	MERV-10	48%
10	Classroom	Permanent	B	MERV-10	51%
11	Classroom	Permanent	B	MERV-10	49%
12	Classroom	Permanent	B	MERV-10	57%
13	Classroom	Permanent	B	MERV-10	57%
14	Classroom	Permanent	B	MERV-10	49%
15	Classroom	Permanent	B	MERV-10	71%
16	Classroom	Permanent	B	MERV-10	51%
17	Classroom	Permanent	B	MERV-10	63%
18	Classroom	Permanent	B	MERV-10	54%
19 (Kindergarten)	Classroom	Permanent	B	MERV-10	38%
20 (Kindergarten)	Classroom	Permanent	B	MERV-10	46%
22	Classroom	Portable	A	MERV-13 <sup>1</sup>	52%
23	Classroom	Portable	A	MERV-13 <sup>1</sup>	32%
24	Classroom	Portable	A	MERV-13 <sup>1</sup>	35%
25	Classroom	Portable	A	MERV-13 <sup>1</sup>	50%
26	Classroom	Portable	A	MERV-13 <sup>1</sup>	57%
27	Classroom	Portable	A	MERV-13 <sup>1</sup>	57%
28	Classroom	Portable	A	MERV-13 <sup>1</sup>	49%
29	Classroom	Portable	A	MERV-13 <sup>1</sup>	56%
30	Classroom	Portable	A	MERV-13 <sup>1</sup>	51%
31	Classroom	Portable	A	MERV-13 <sup>1</sup>	55%
32	Classroom	Portable	A	MERV-13 <sup>1</sup>	48%
33	Classroom	Portable	A	MERV-13 <sup>1</sup>	54%
Campus Kids A	Classroom	Portable	A	MERV-13 <sup>1</sup>	55%
Campus Kids B	Classroom	Portable	A	MERV-13 <sup>1</sup>	56%
Multipurpose & Kitchen	Assembly	Permanent	C	MERV-13	96%
Library	Assembly	Permanent	A	MERV-10	30%
Library Kitchen	Admin	Permanent	D	N/A	N/A
Admin Areas	Admin	Permanent	C	MERV-13	36%
Boys' (Upper Field)	Toilet	Permanent	D	N/A	N/A
Girls' (Upper Field)	Toilet	Permanent	D	N/A	N/A
Unisex (Upper Field)	Toilet	Permanent	D	N/A	N/A
Wing 1 Restrooms	Toilet	Permanent	D	N/A	N/A
Wing 2 Restrooms	Toilet	Permanent	D	N/A	N/A
Unisex (Multipurpose)	Toilet	Permanent	D	N/A	N/A

<sup>1</sup>Filter installed may be a higher MERV rating than filter recommended due to inventory limitations

### **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 central air conditioning unit that also serves other rooms, 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 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
- Replace existing air filter with MERV-13 filter

- Airflow into room may be reduced, but should not affect AC unit operation
- If AC unit cannot operate with increased filter rating, install MERV-10 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 Westlake Elementary on its HVAC systems.

Sincerely,

Wendy Wang, PE  
ACCO Engineered Systems  
Design Engineer