

IEA, INC.

2023 - 2024 Ventilation Assessment



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Saint Paul Public Schools Phalen Lake Elementary School

Assessment Date:
Wednesday, April 12, 2023

Project Description

IEA conducted a ventilation inspection in Phalen Lake Elementary School by IEA representative, Eddie Anderson, with the intent of gathering visual observations and overall ventilation information which will assist the District in making informed and proactive decisions to improve and maintain acceptable air quality in the building. This inspection is based upon the Environmental Protection Agency's (EPA's) Tools for Schools IAQ guidelines and the recommended Minnesota Department of Education (MDE) portion of a school district's IAQ management plan. Ventilation verification is also recommended by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Some observations gathered during the inspection may identify issues which may require additional testing, evaluation, further investigation, or maintenance on the ventilation systems.

The findings, conclusions and recommendations presented herein are believed to be accurate and representative of the building on the date and time of the inspection.

GENERAL COMMENTS

The analysis and opinions expressed in this report are based upon data obtained from Saint Paul Public Schools at the indicated locations. This report does not reflect variations in conditions that may occur across the site, property, or facility. Actual conditions may vary and may not become evident without further assessment.

The report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted indoor air quality practices. Other than as provided in the preceding sentence, no warranties are extended or made.

Building Information

General information regarding the building was collected by IEA during an interview with building maintenance staff. The information gathered during this process is a vital component, as it is helpful in determining how these items may play a role in possible IAQ related issues.

Below is a summary of the information gathered during the interview:

- Automation controls are managed internally.
- A Building Automation System is present. The automation control software program is Tridium and controls can not be accessed remotely.
- Schedules:

Ventilation operation:

Day:	Occupied?	Start Time:	End Time:
Monday-Friday	Yes	9:00 AM	5:00 PM
Saturday	No		
Sunday	No		
Holiday	No		

Typical occupancy:

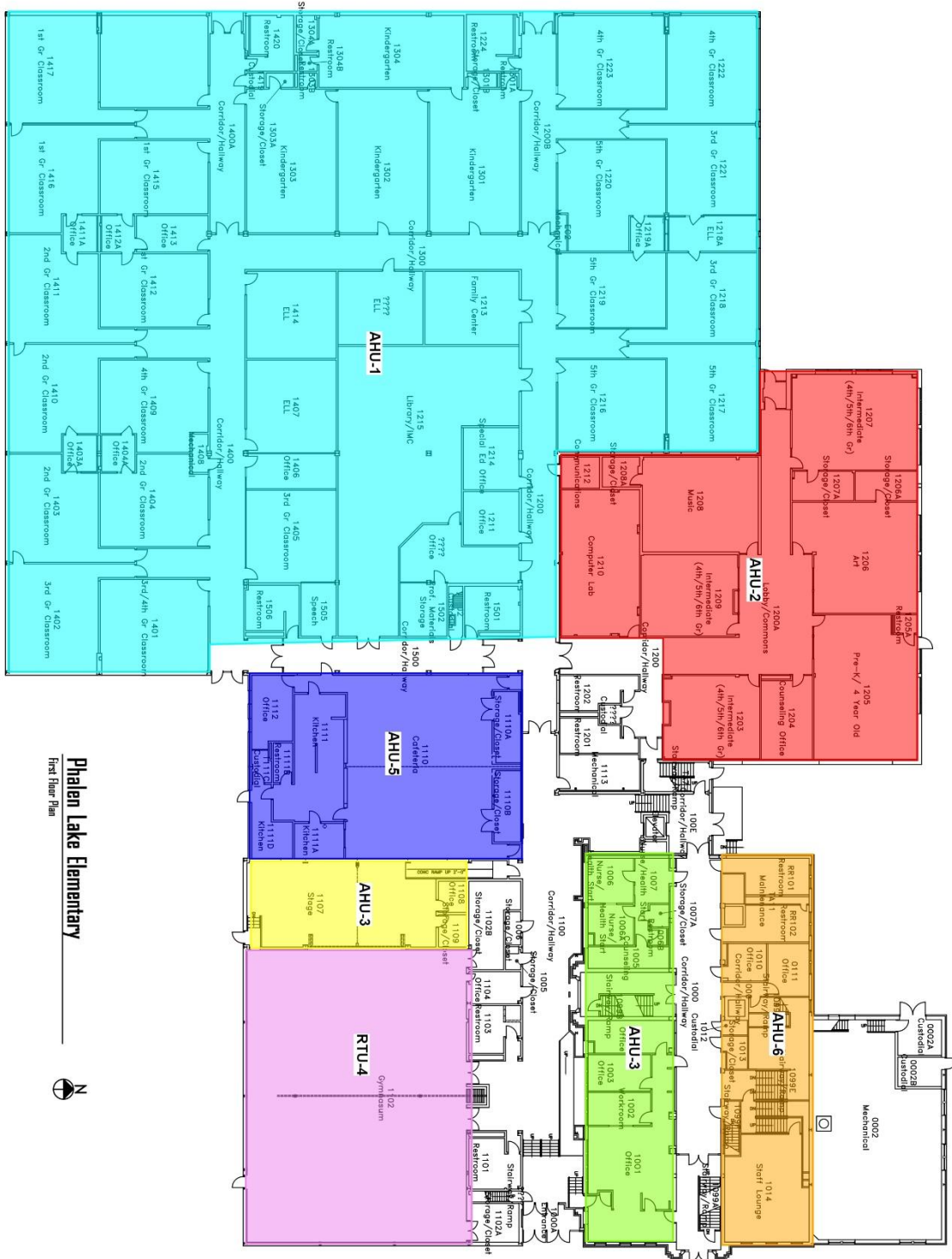
Day:	Occupied?	Start Time:	End Time:
Monday-Friday	Yes	9:30 AM	4:30 PM
Saturday	No		
Sunday	No		
Holiday	No		

- CO2 sensors are associated with the ventilation system. They are located within duct work. The highest CO2 setpoint is unknown.
- VAVs are present. They are not fan powered.
- Building has variable frequency drives (VFD).
- The heating system is a steam boiler.
- A cooling system is not present.
- Filters used are:

Filter Type	MERV Rating
Pleated	MERV 11
Pleated	MERV 13
Pleated	MERV 8
Pleated	N/A

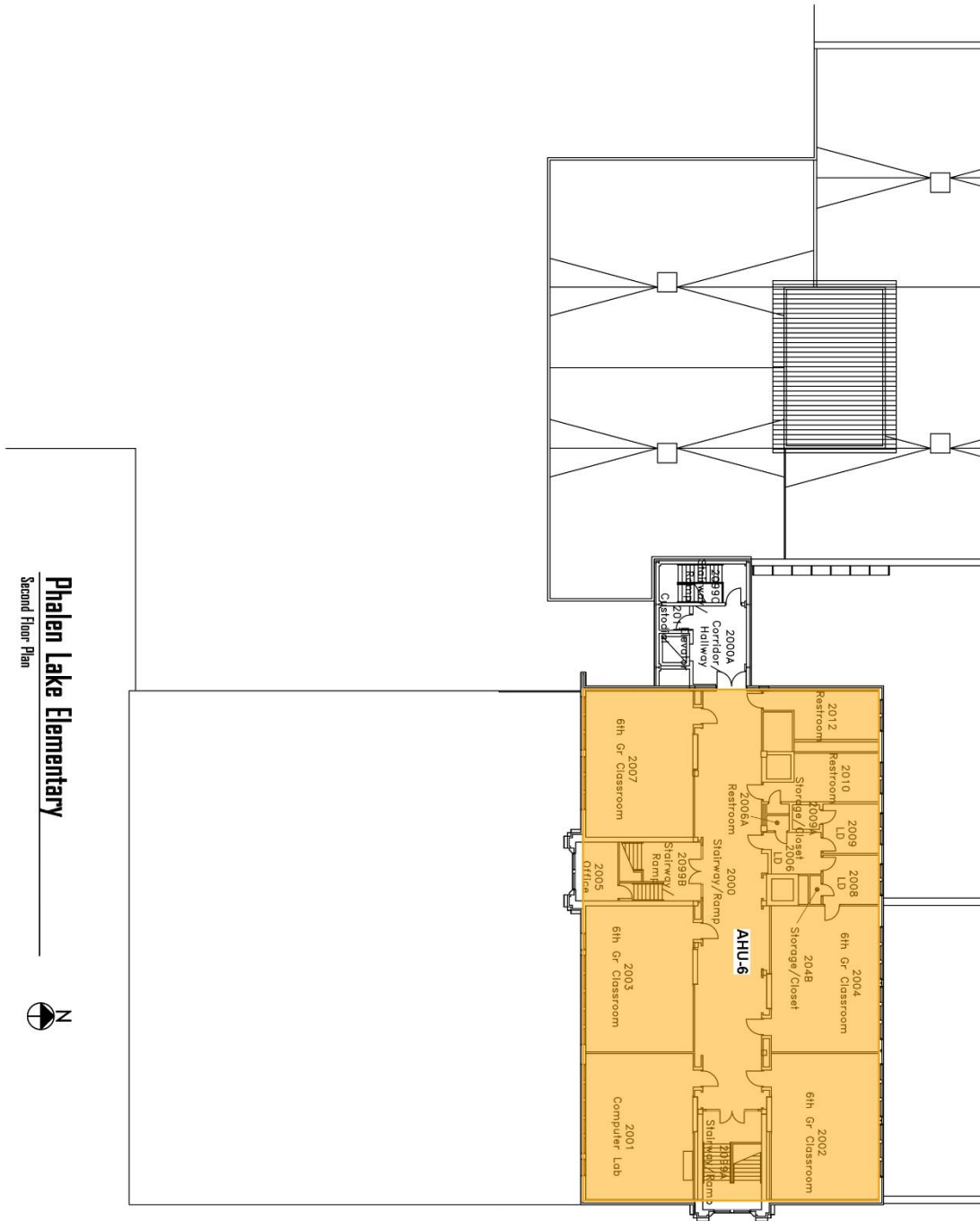
- Filters are changed quarterly.
- Energy Recovery Units are present.
- Units do not contain system Enhancements.
- Personal air purifiers are supplied for individual rooms. They are of unknown make or model.
- It is not known whether or not the building was commissioned during the original construction.

Air Handling Unit Designations & Service Zones: 1st Floor



Phalen Lake Elementary
1st Floor Plan

Air Handling Unit Designations & Service Zones: 2nd Floor



Assessment

Ventilation System

The following information was gathered by IEA on Wednesday, April 12, 2023 with support from the district building representative during the on-site interview. The type of heating, ventilating and air-conditioning (HVAC) system and its assessment is included for each unit below:

Unit Designation:	AHU 01	
Location of Unit:	Mechanical Room Penthouse	
Areas Served:	West Wing See attached map	
System Enhancements:	None	
Supply System	Outdoor Air	Cleanliness and Observations
Type <ul style="list-style-type: none"> Supply System - VAV Heating - Hot Water Cooling - None Energy Recovery Unit (ERU) - Fixed Plate 	<p>Outdoor air intake is inaccessible</p> <p>Outdoor air intake is located on the roof.</p> <p>It is not known if there are nearby pollution sources.</p>	<p>Outdoor air pre-filters are not present. Outdoor air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Outdoor air main filters are installed correctly.</p> <p>Return air pre-filters are of unknown cleanliness and fit is unknown. Return air pre-filters are installed but it is unknown whether they are installed correctly. Return air main filters are somewhat dirty and on the border of needing replacement (scoring 3 out of 5) and fit well. Return air main filters are installed correctly.</p>
Filter Type - Outdoor <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 8 	<p>Condition of the outdoor air intake is not known.</p>	<p>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Mixed air main filters are installed correctly.</p> <p>Drain pans are not plugged. Drain pan condition is good.</p> <p>Heating coils are clean.</p> <p>Heat wheels are clean.</p> <p>Exterior ducting is visible. Exterior ducting insulation is in good condition.</p> <p>Interior ducting is not visible. Interior ducting insulation is in good condition. Interior ducting is of unknown cleanliness.</p> <p>Air handling room is free of trash/chemicals.</p> <p>Outside damper is open, and its condition is good.</p> <p>Return damper is inaccessible, and its condition is not known.</p> <p>The general condition of the unit is good.</p>
Filter Type - Return <ul style="list-style-type: none"> Pre-filter: Inaccessible Main filter: Pleated, N/A 		
Filter Type - Mixed <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 11 		

Unit Designation:	AHU 02	
Location of Unit:	Mechanical Room Penthouse	
Areas Served:	Classroom Addition See attached map	
System Enhancements:	None	
Supply System	Outdoor Air	Cleanliness and Observations
Type <ul style="list-style-type: none"> Supply System - VAV Heating - Hot Water Cooling - None Energy Recovery Unit (ERU) - None 	<p>Outdoor air intake is inaccessible</p> <p>Outdoor air intake is located on the roof.</p> <p>It is not known if there are nearby pollution sources.</p>	<p>Outdoor air filters are not present.</p> <p>Return air filters are not present.</p> <p>Mixed air filters are of unknown cleanliness and fit is unknown. Mixed air filters are installed but it is unknown whether they are installed correctly.</p> <p>Drain pans are not applicable or not present. Drain pan condition is not known.</p>
Filter Type - Mixed <ul style="list-style-type: none"> Pre-filter: Inaccessible Main filter: Inaccessible 	<p>Outdoor air intake is in good condition.</p>	<p>Heating coils are inaccessible.</p> <p>Heat wheels are not present.</p> <p>Exterior ducting is visible. Exterior ducting insulation is in good condition.</p> <p>Interior ducting is not visible. Interior ducting insulation is not present. Interior ducting is clean.</p> <p>Air handling room is free of trash/chemicals.</p> <p>Outside damper is open, and its condition is good.</p> <p>Return damper is closed, and its condition is good.</p> <p>The general condition of the unit is good.</p>

Unit Designation:	AHU 05	
Location of Unit:	Mechanical room fan room	
Areas Served:	Music Room See attached map	
System Enhancements:	None	
Supply System	Outdoor Air	Cleanliness and Observations
Type <ul style="list-style-type: none"> Supply System - VAV Heating - Hot Water Cooling - None Energy Recovery Unit (ERU) - Fixed Plate 	<p>Outdoor air intake is inaccessible</p> <p>Outdoor air intake is located on the roof.</p> <p>It is not known if there are nearby pollution sources.</p>	<p>Outdoor air pre-filters are not present. Outdoor air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Outdoor air main filters are installed correctly.</p> <p>Return air pre-filters are not present. Return air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Return air main filters are installed correctly.</p>
Filter Type - Outdoor <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 8 	Outdoor air intake is in good condition.	<p>Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Mixed air main filters are installed correctly.</p>
Filter Type - Return <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 11 		<p>Drain pans are not plugged. Drain pan condition is good.</p> <p>Heating coils are clean.</p> <p>Heat wheels are clean.</p>
Filter Type - Mixed <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 13 		<p>Exterior ducting is visible. Exterior ducting insulation is in good condition.</p> <p>Interior ducting is not visible. Interior ducting insulation is not present. Interior ducting is of unknown cleanliness.</p> <p>Air handling room is free of trash/chemicals.</p> <p>Outside damper is open, and its condition is good.</p> <p>Return damper is closed, and its condition is good.</p> <p>The general condition of the unit is good.</p>

Unit Designation:	AHU 03	
Location of Unit:	Mechanical room fan room	
Areas Served:	Cafeteria See attached map	
System Enhancements:	None	
Supply System	Outdoor Air	Cleanliness and Observations
Type <ul style="list-style-type: none"> Supply System - VAV Heating - Hot Water Cooling - None Energy Recovery Unit (ERU) - Fixed Plate 	Outdoor air intake is inaccessible Outdoor air intake is located on the roof. It is not known if there are nearby pollution sources.	Outdoor air pre-filters are not present. Outdoor air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Outdoor air main filters are installed incorrectly. Return air pre-filters are not present. Return air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Return air main filters are installed correctly.
Filter Type - Outdoor <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 8 	Outdoor air intake is in good condition.	Mixed air pre-filters are not present. Mixed air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Mixed air main filters are installed incorrectly.
Filter Type - Return <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 8 		Drain pans are not plugged. Drain pan condition is good. Heating coils are clean. Heat wheels are clean.
Filter Type - Mixed <ul style="list-style-type: none"> Pre-filter: None Main filter: Pleated, MERV 13 		Exterior ducting is visible. Exterior ducting insulation is in good condition. Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness. Air handling room is free of trash/chemicals. Outside damper is open, and its condition is good. Return damper is open, and its condition is good. The general condition of the unit is good.

Unit Designation:	AHU 06	
Location of Unit:	Mechanical room room 0008 (Below Boiler Room)	
Areas Served:	Gymnasium See attached map	
System Enhancements:	None	
Supply System	Outdoor Air	Cleanliness and Observations
Type <ul style="list-style-type: none"> Supply System - VAV Heating - Hot Water Cooling - None Energy Recovery Unit (ERU) - Wheel 	Outdoor air intake is inaccessible Outdoor air intake is located in an unknown location. It is not known if there are nearby pollution sources.	Outdoor air filters are not present. Return air filters are not present. Mixed air filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Mixed air filters are installed correctly. Drain pans are not plugged. Drain pan condition is good.
Filter Type - Mixed <ul style="list-style-type: none"> Pre-filter: Pleated, MERV 8 Main filter: Pleated, MERV 13 	Outdoor air intake is in good condition.	Heating coils are clean. Heat wheels are clean. Exterior ducting is visible. Exterior ducting insulation is in good condition. Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness. Air handling room is free of trash/chemicals. Outside damper is inaccessible, and its condition is not known. Return damper is inaccessible, and its condition is not known. The general condition of the unit is good.

Unit Designation:	RTU-04	
Location of Unit:	Rooftop	
Areas Served:	Gymnasium See attached map.	
System Enhancements:	None	
Supply System	Outdoor Air	Cleanliness and Observations
Type <ul style="list-style-type: none"> • Supply System - Unknown • Heating - Hot Water • Cooling - None • Energy Recovery Unit (ERU) - None 	<p>Outdoor air intake is accessible</p> <p>Outdoor air intake is located on the unit.</p> <p>No nearby pollution sources were found.</p> <p>Outdoor air intake is in good condition.</p>	<p>Outdoor air filters are not present.</p> <p>Return air filters are not present.</p> <p>Mixed air pre-filters are clean and not in need of replacement (scoring 2 out of 5) and fit well. Mixed air pre-filters are installed correctly. Mixed air main filters are clean and not in need of replacement (scoring 1 out of 5) and fit well. Mixed air main filters are installed correctly.</p> <p>Drain pans are not applicable or not present. Drain pan condition is not known.</p> <p>Heating coils are clean.</p> <p>Heat wheels are not present.</p> <p>Exterior ducting is not visible. Exterior ducting insulation is in an unknown condition.</p> <p>Interior ducting is not visible. Interior ducting insulation is in an unknown condition. Interior ducting is of unknown cleanliness.</p> <p>Air handling room is free of trash/chemicals.</p> <p>Outside damper is open, and its condition is good.</p> <p>Return damper is open, and its condition is good.</p> <p>The general condition of the unit is good.</p>
Filter Type - Mixed <ul style="list-style-type: none"> • Pre-filter: Pleated, MERV 8 • Main filter: Pleated, MERV 13 		

Recommendations

Dirty or poorly fitting filters were observed in units AHU 03 and AHU 06 during the ventilation inspection.

Recommendation: The operations and maintenance program for filter changes should be reviewed and revised to ensure proper filter changes to optimize filtration capacity.

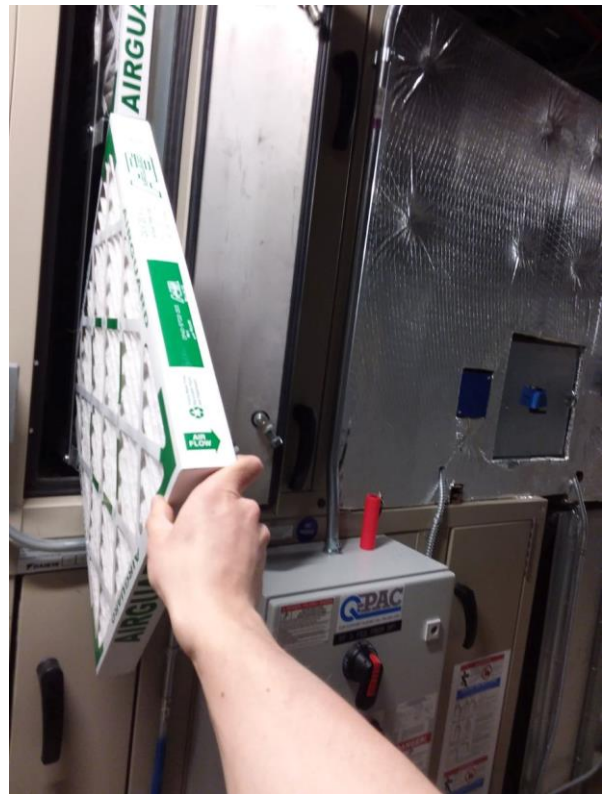
Appendix A

Photo Documentation



AHU 01

Return Main Filter Cleanliness



AHU 03

Outdoor Main Filter Installation



AHU 03

Outdoor Main Filter Installation



AHU 03

Mixed Main Filter Installation



AHU 06

Mixed Main Filter Installation