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PERALTA COMMUNITY COLLEGE DISTRICT

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Progress Report: Phase I (Qualitative HVAC and Initial Ventilation Assessment)

Presented by:

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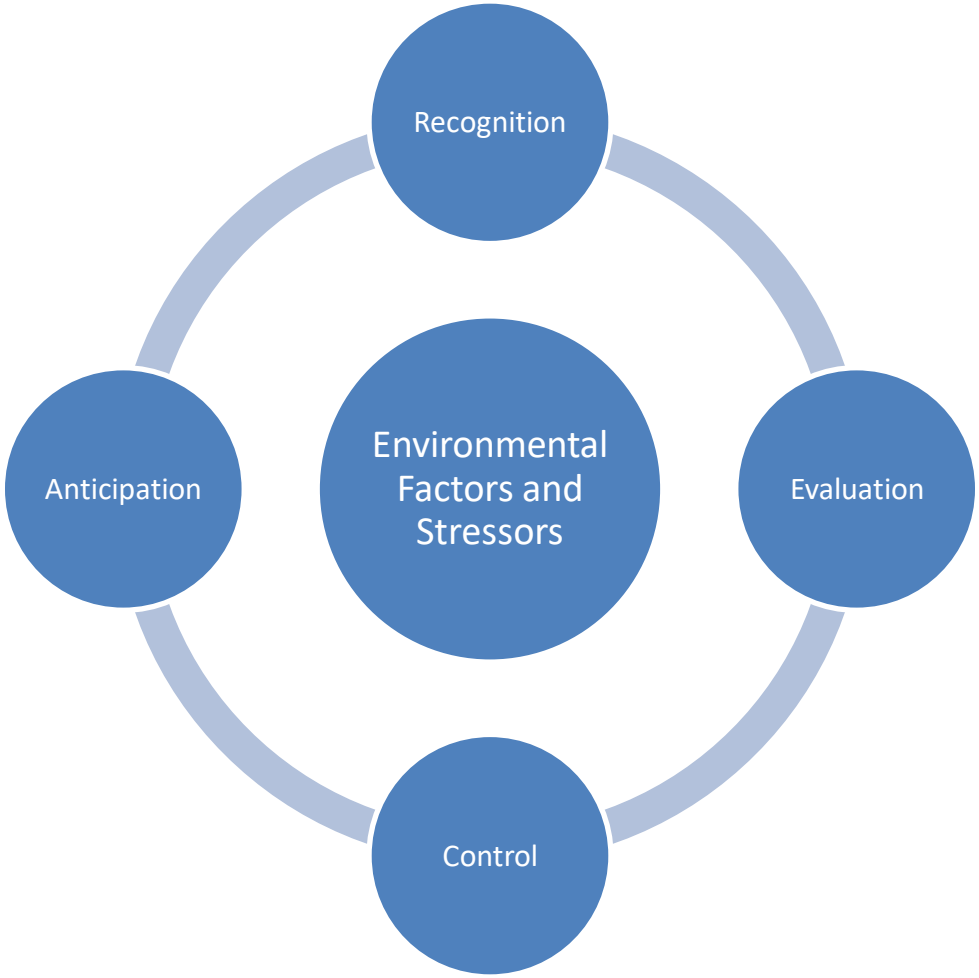
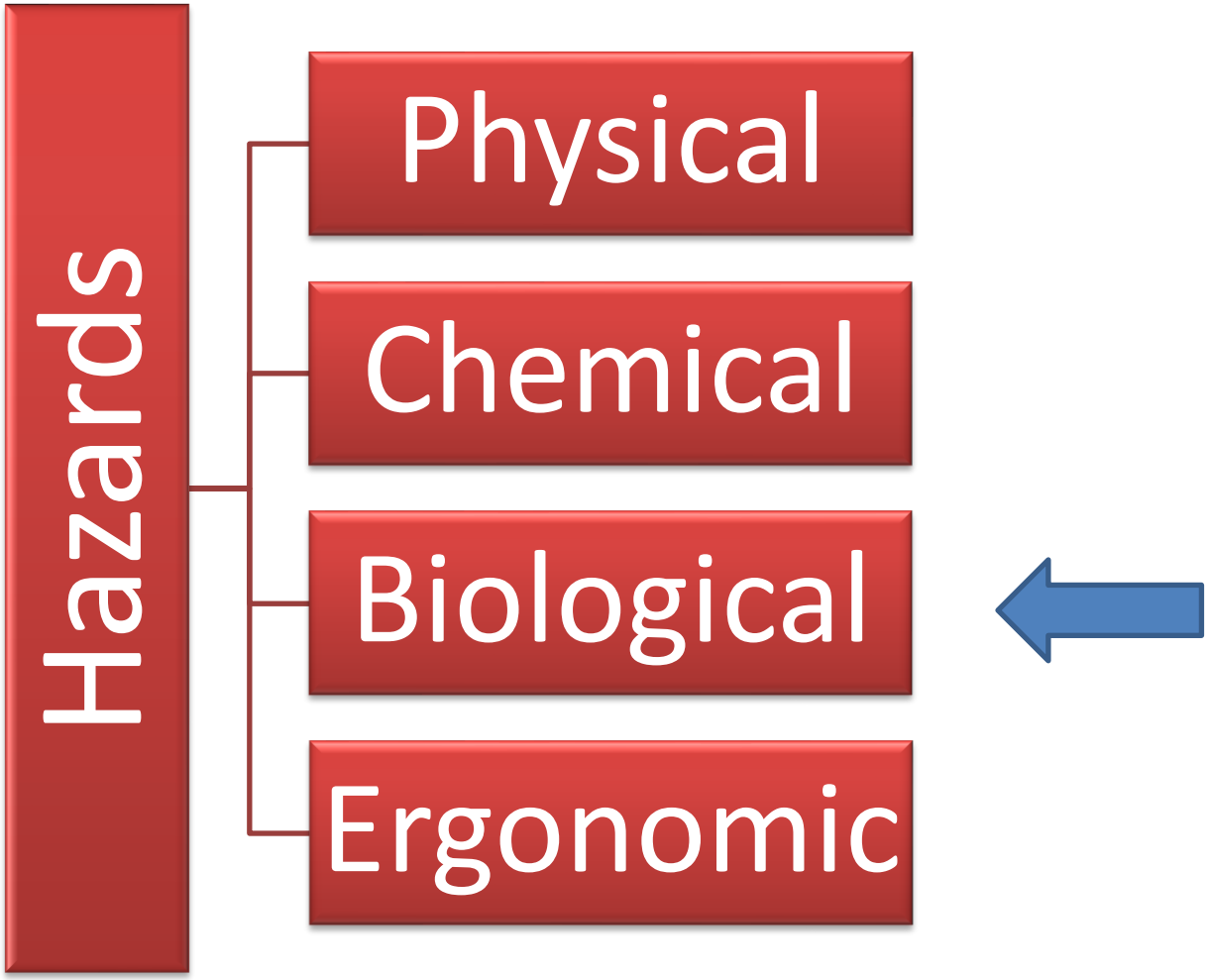
10/04/21

Right People. Right Perspective. Right Now.

What is Industrial Hygiene?



Hazard Risk Assessment



COVID-19 Transmission

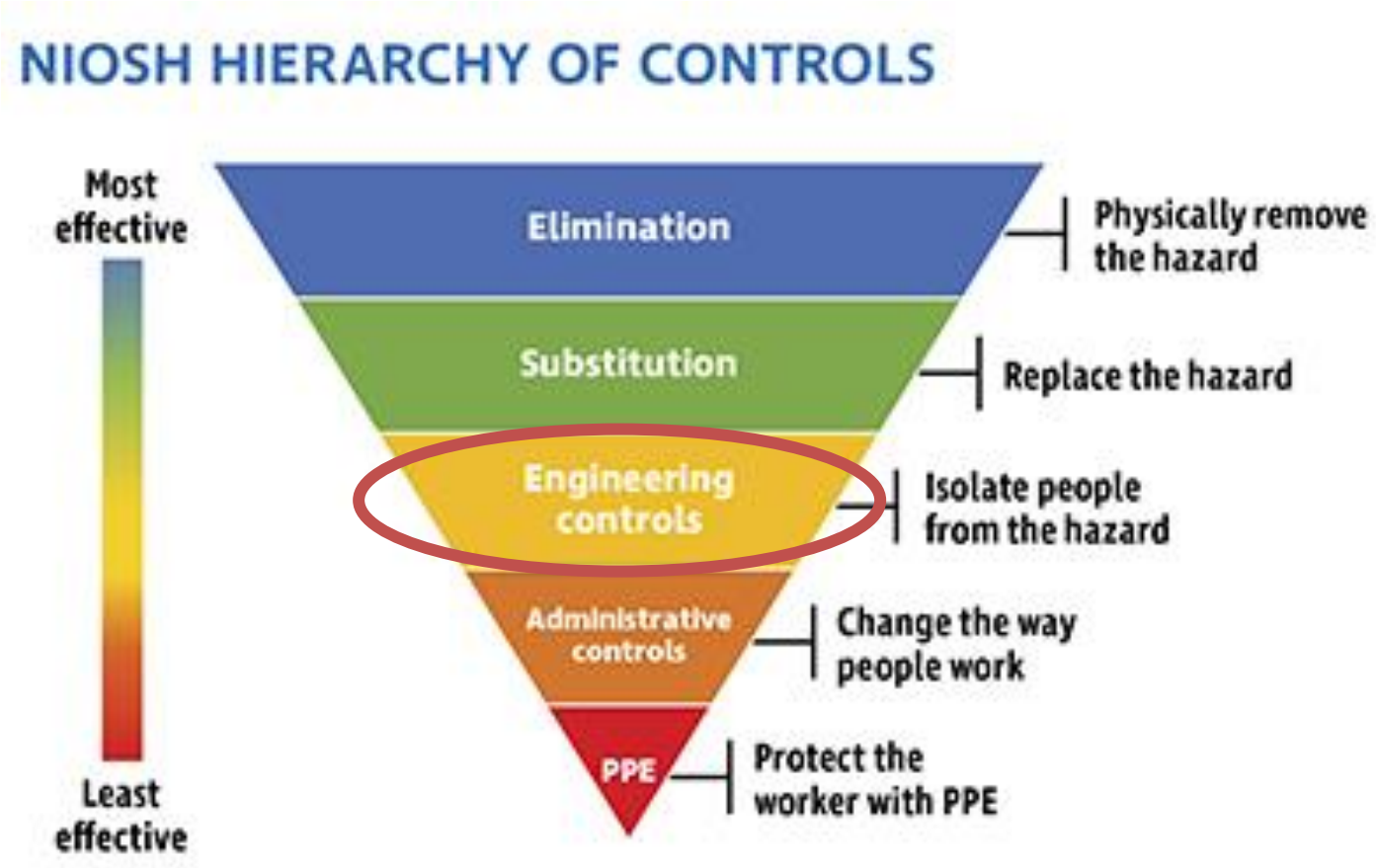
Person-to-person

Airborne

Surface

Primary route

Hierarchy of Controls



Scope of Work

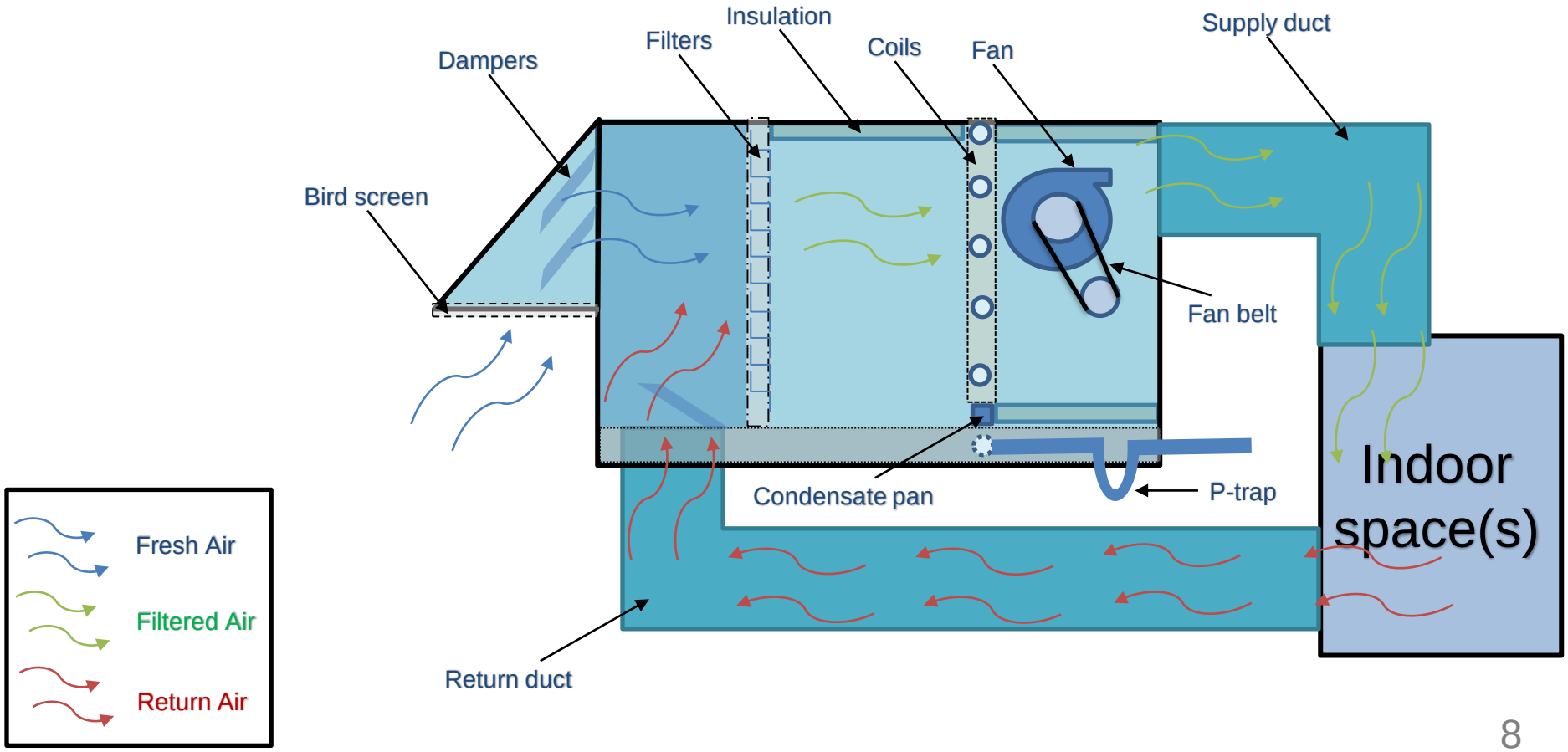
- Phase I:
  - Qualitatively assess condition of the HVAC system.
  - Initial ventilation assessment of identified buildings.

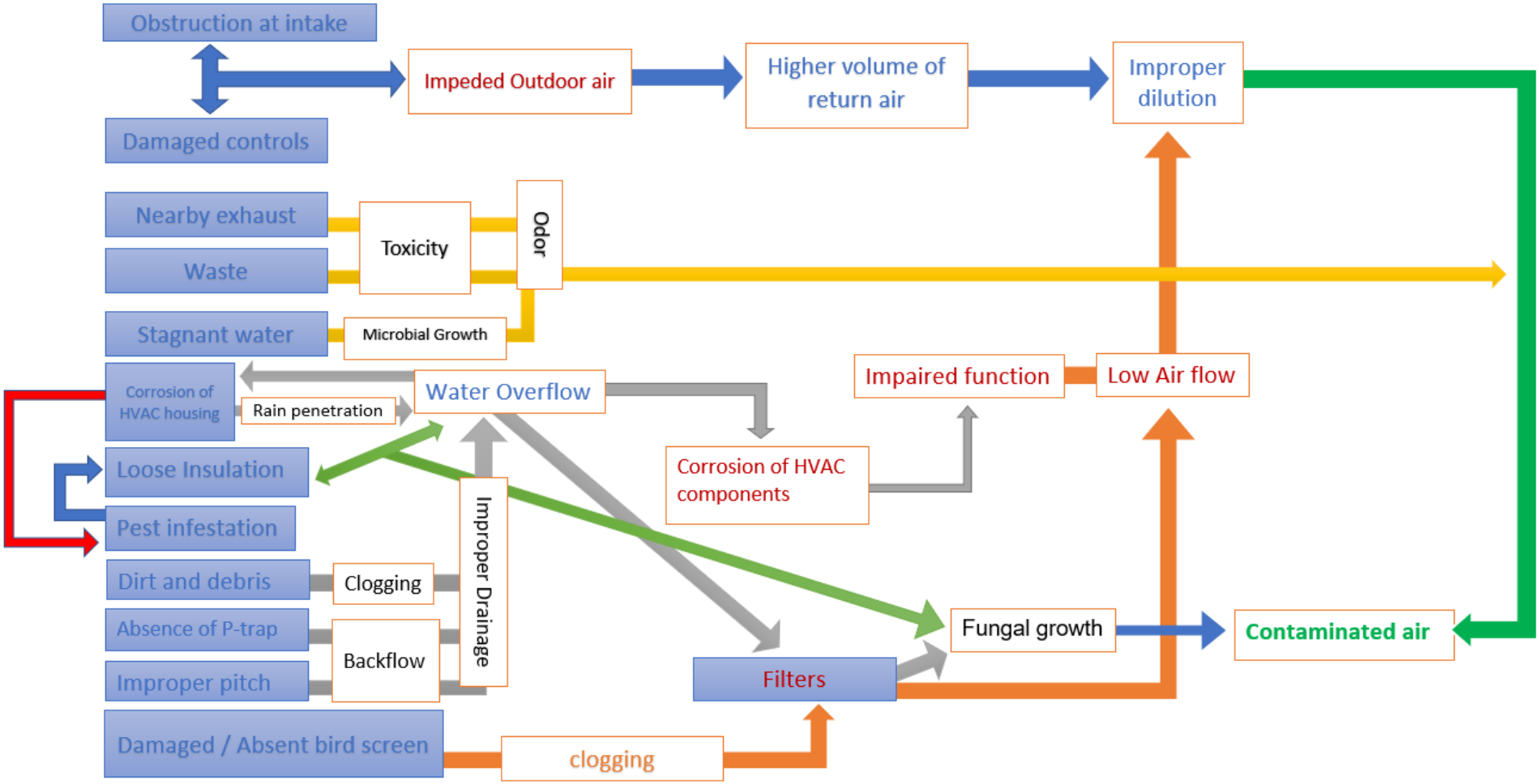
- Phase II:
  - Re-evaluation of HVAC systems.

Site Assessment

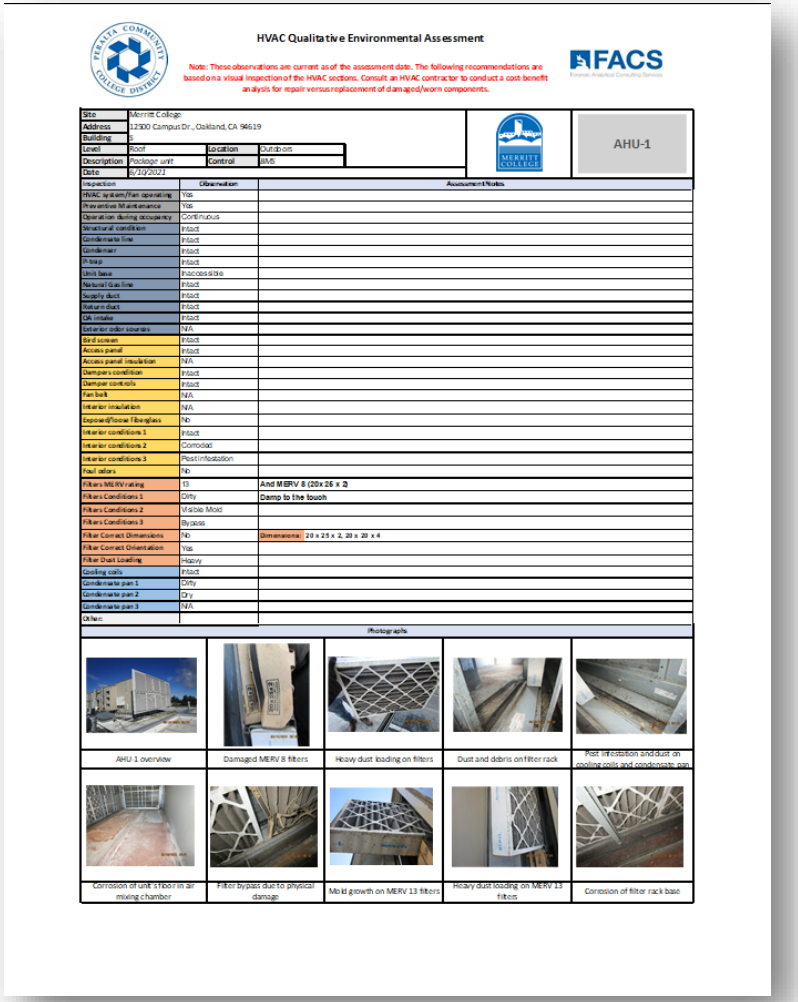
- The following campuses/locations were included in the site assessment:
- College of Alameda (42 units)
- Berkeley City College (5 units)
- Merritt College (40 units)
- Laney College (54 units)
- District Offices (30 units)

Package Unit Typical Concept





HVAC Assessment Tool



HVAC Qualitative Environmental Assessment

Note: These observations are current as of the assessment date. The following recommendations are based on a visual inspection of the HVAC sections. Consult an HVAC contractor to conduct a cost benefit analysis for repair versus replacement of damaged/worn components.

Site	Merritt College		
Address	12500 Campus Dr., Oakland, CA 94619		
Building	5		
Level	Roof	Location	Outdoors
Description	Package unit	Control	BMS
Date	6/10/2021		

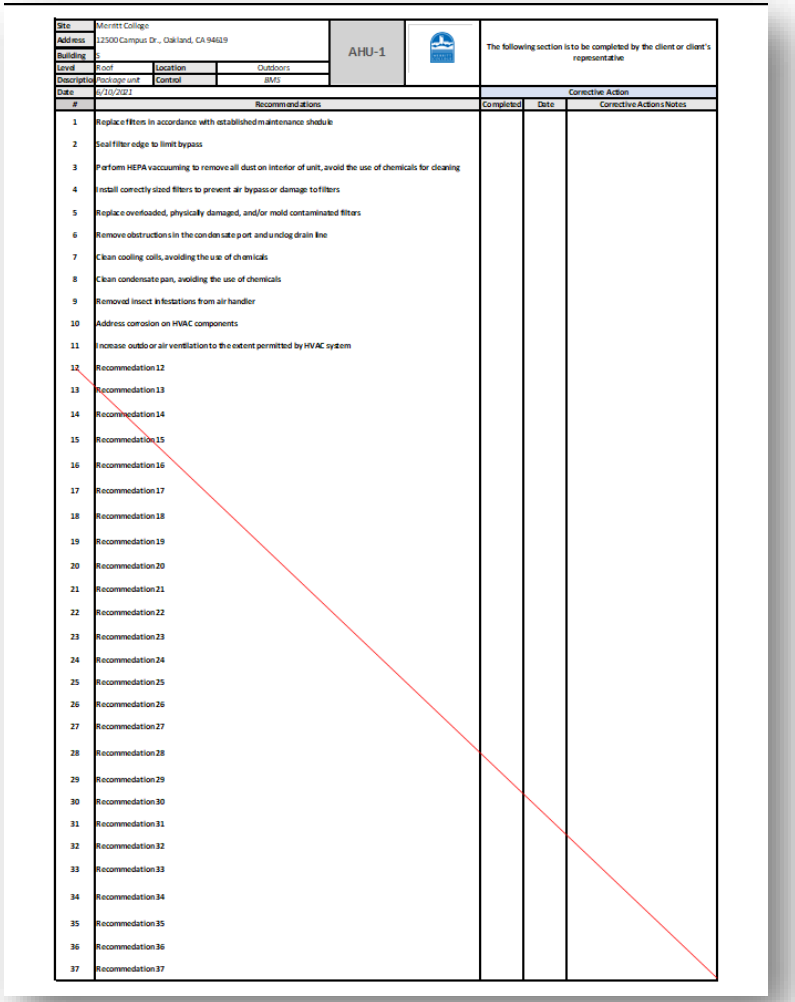
AHU-1

Inspection	Observation	Assessment Notes
HVAC System/Fan operating	Yes	
Preventive Maintenance	Yes	
Operation during occupancy	Continuous	
Structural condition	Intact	
Condensate line	Intact	
Condenser	Intact	
P-trap	Intact	
Unit base	Inaccessible	
Natural Gas line	Intact	
Supply duct	Intact	
Return duct	Intact	
OA intake	Intact	
Exterior odor sources	N/A	
Bird screen	Intact	
Access panel	Intact	
Access panel insulation	N/A	
Dampers condition	Intact	
Damper controls	Intact	
Fan belt	N/A	
Interior insulation	N/A	
Exposed/loose fiberglass	No	
Interior conditions 1	Intact	
Interior conditions 2	Corroded	
Interior conditions 3	Pest infestation	
Foul odors	No	
Filters MERV rating	13	And MERV 8 (20x 26 x 2)
Filters Conditions 1	Dirty	Damp to the touch
Filters Conditions 2	Visible Mold	
Filters Conditions 3	Bypass	
Filter Correct Dimensions	No	Dimensions: 20 x 25 x 2, 20 x 20 x 4
Filter Correct Orientation	Yes	
Filter Dust Loading	Heavy	
Cooling coils	Intact	
Condensate pan 1	Dirty	
Condensate pan 2	Dry	
Condensate pan 3	N/A	
Other:		

Photographs

AHU-1 overview | Damaged MERV 8 filters | Heavy dust loading on filters | Dust and debris on filter rack | Pest infestation and dust on cooling coils and condensate pan

Corrosion of unit's floor in air mixing chamber | Filter bypass due to physical damage | Mold growth on MERV 13 filters | Heavy dust loading on MERV 13 filters | Corrosion of filter rack base



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Level	Roof	Location	Outdoors
Description	Package unit	Control	BMS
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AHU-1

The following section is to be completed by the client or client's representative

#	Recommendations	Corrective Action: Completed	Date	Corrective Actions Notes
1	Replace filters in accordance with established maintenance shedule			
2	Seal filter edge to limit bypass			
3	Perform HEPA vaccuuming to remove all dust on interior of unit, avoid the use of chemicals for cleaning			
4	Install correctly sized filters to prevent air bypass or damage to filters			
5	Replace overloaded, physically damaged, and/or mold contaminated filters			
6	Remove obstructions in the condensate port and unclog drain line			
7	Clean cooling coils, avoiding the use of chemicals			
8	Clean condensate pan, avoiding the use of chemicals			
9	Removal insect infestations from air handler			
10	Address corrosion on HVAC components			
11	Increase outdoor air ventilation to the extent permitted by HVAC system			
12	Recommendation 12			
13	Recommendation 13			
14	Recommendation 14			
15	Recommendation 15			
16	Recommendation 16			
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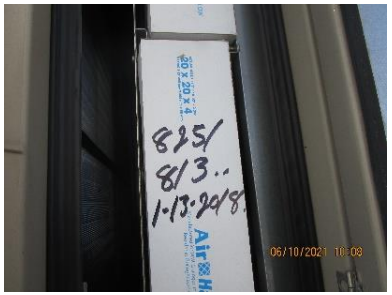
37	Recommendation 37			

Filters












Outdoor Air Intake








Insulation








Mechanical Equipment Rooms








Condensate line and Coils







Corrosion

Fan belts and Expansion Joints








Phase I Summary (System functionality)

Observation	No. of Units	No. of Buildings	No. of Campuses
Overdue filters	121	26	5
Damaged filters	34	17	5
Mold infested filters	5	4	2
Overloaded filters	127	26	5
Damaged/Loose fan belt	30	15	4
Contamination source	21	9	4
Damaged coils	8 ⚠	8	4
Corrosion	114 (8 ⚠)	26	5
Deteriorated insulation	83	25	5
Missing bird screen	12	6	4
Tear in duct	20	10	4

In-house

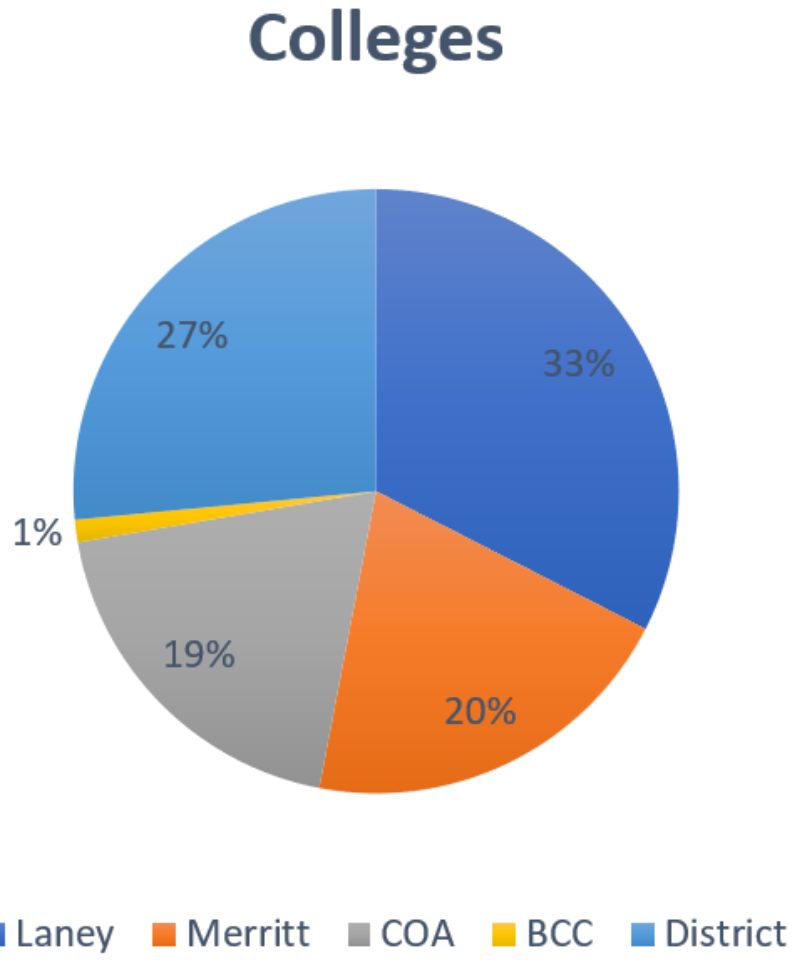
Professional

Mitigation (Filters replacement)

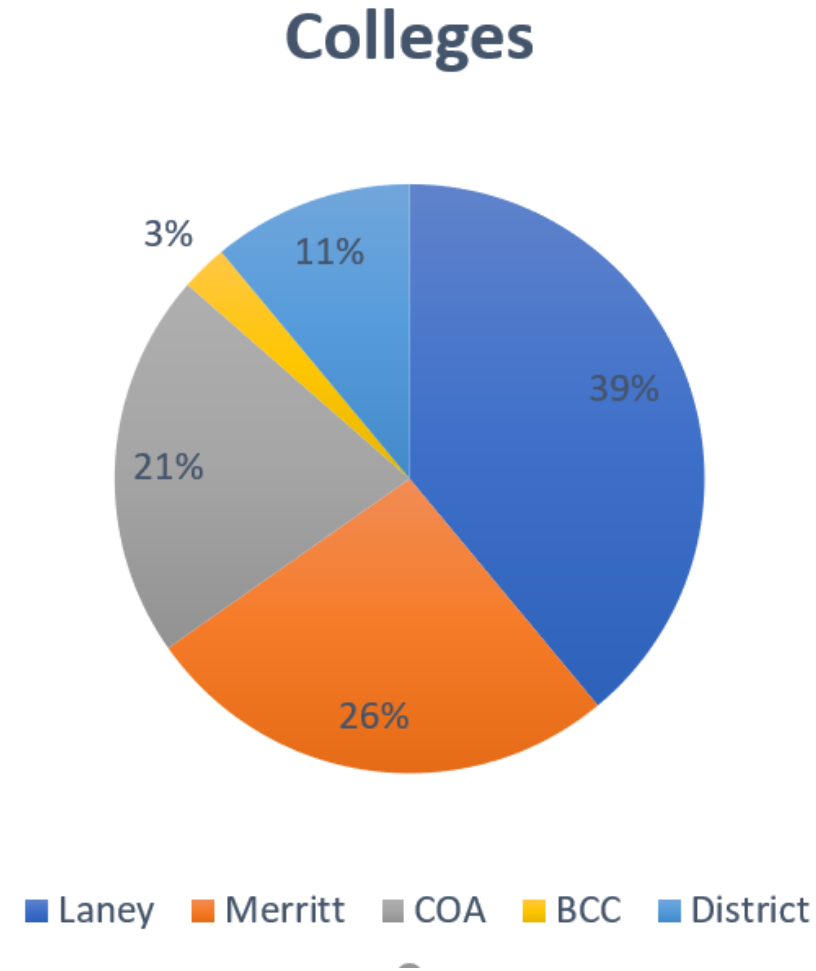
Observation	No. of Units	No. of Buildings	No. of Campuses
Damaged/Loose fan belt	30	15	4
Contamination source	21	9	4
Damaged coils	8 ⚠	8	4
Corrosion	114 (8 ⚠)	26	5
Deteriorated insulation	83	25	5
Missing bird screen	12	6	4
Tear in duct	20	10	4

Professional

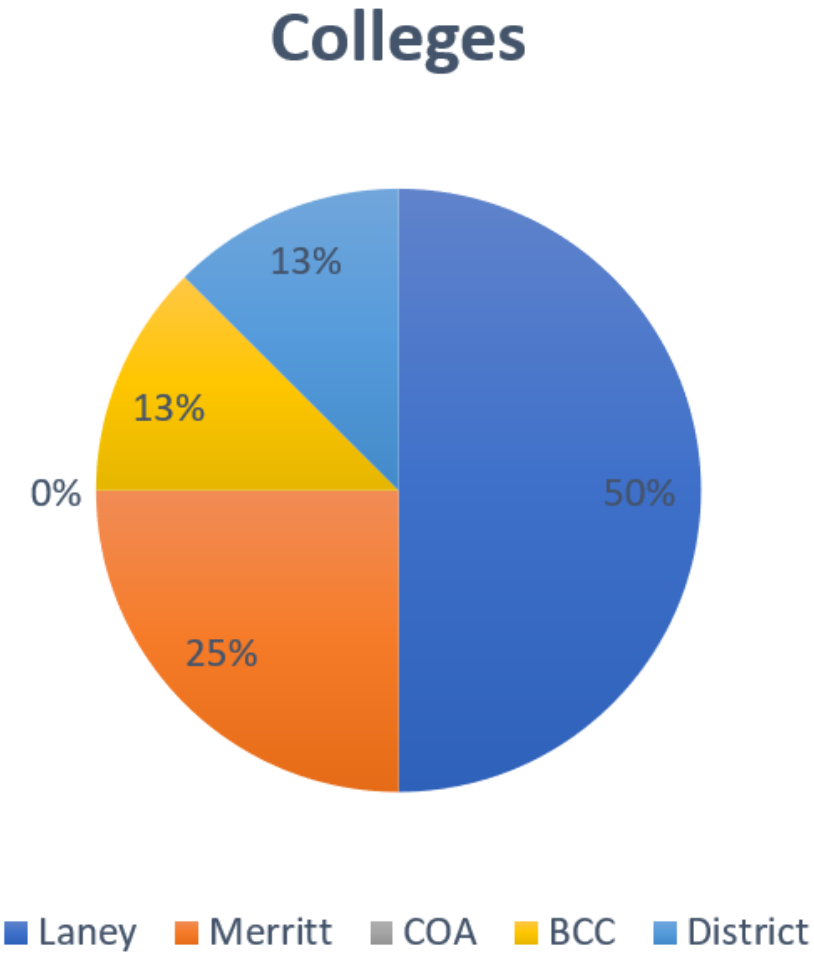
Deteriorated Insulation



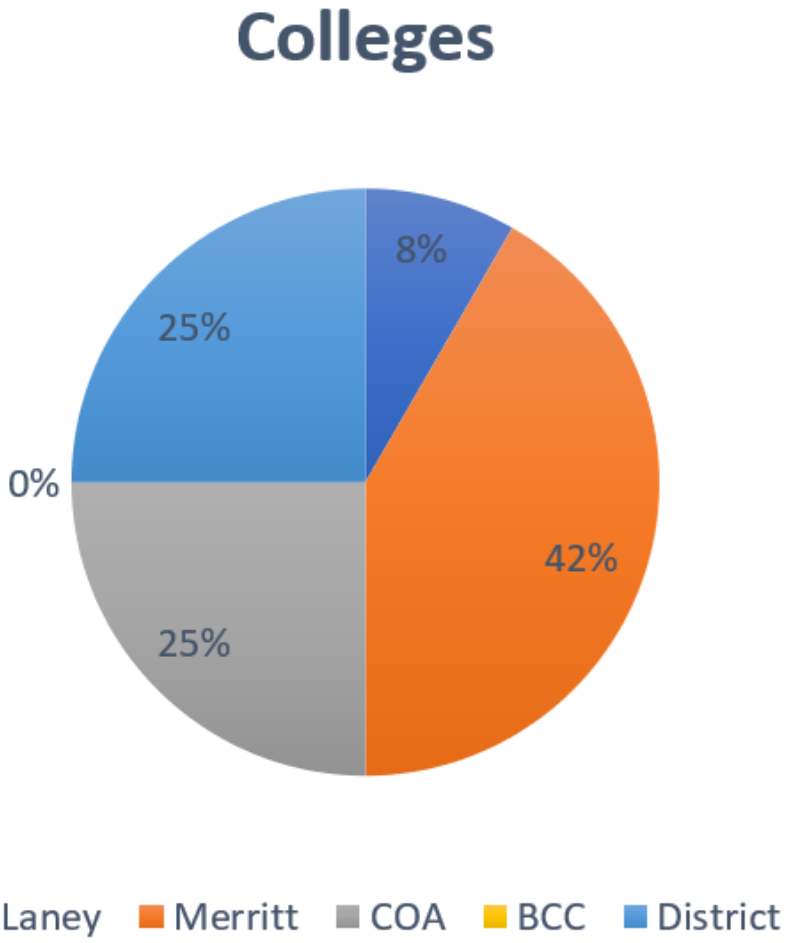
Corrosion



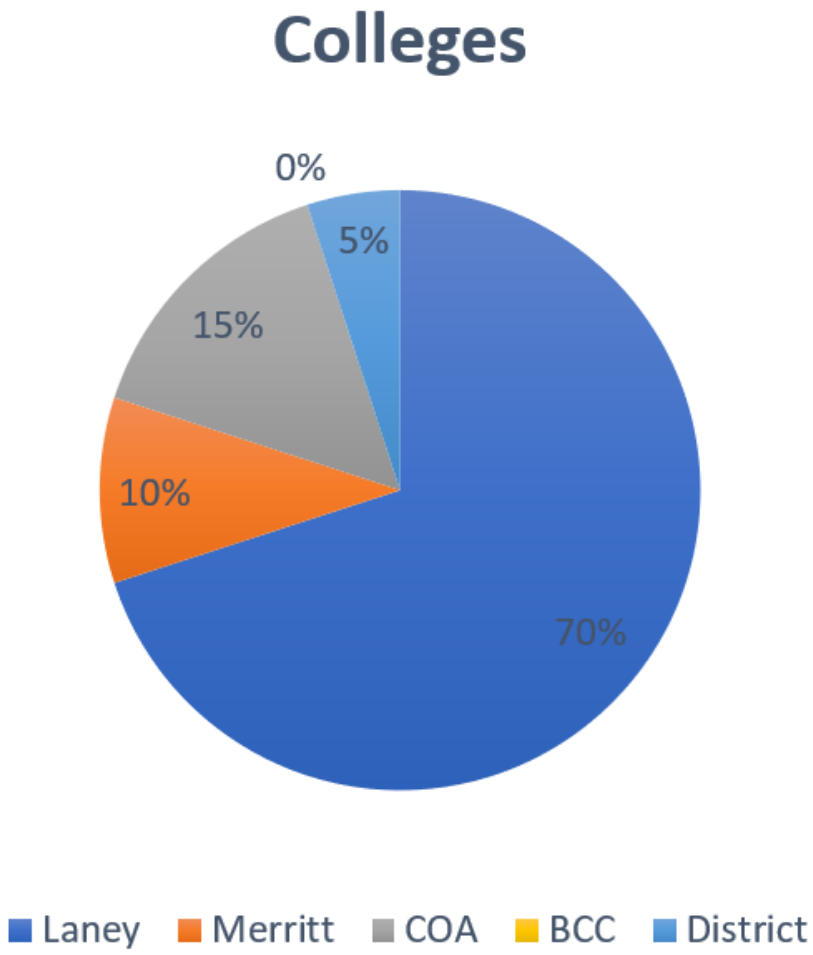
Damaged Coils



Missing bird screen



Tear in Duct



Phase I: Ventilation Assessment

- Ventilation assessment of selective rooms representing different functional spaces in buildings with replaced filters (MERV 13)

- 2 – 3 rooms per building while HVAC system is running – Total of 106 rooms

Ventilation Assessment Tool

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COVID-19 Site Risk Assessment

Note: These practices are current as of the revision date. Since the COVID-19 pandemic is evolving rapidly, extra diligence should be used in watching for updates to these practices. The following recommendations should supplement existing infection prevention and control protocols.

Site	Berkeley City College	Date	9/22/2021
Address	2050 Center Street, Berkeley, CA 94704		
Category	Science Lab		
Room #	513		
Description	Biology Lab		
Area ft²	1110	Ceiling ft	11

Air Changes and Particle Removal				Occupancy:	24
Droplet Nuclei	Time required for airborne contaminant removal (min)			6-feet	50%
Effective Air Changes				15	12
5.2	80				
Natural Ventilation	No	MERV rating	13	Temp	RH%
Outdoor Air	174	Pressure	Out	74.6	52
Total Supply	1160	HEPA CADR	0		

Recommendations

Ventilation (Mechanical)				Occupancy		Target effective ACH
Air Flow Direction	Minimum Total CFM	% outdoor Air	Minimum Outdoor Air CFM (ASHRAE 62.1)	Occupiable Space	Net 6 ft	3
Out	440	100%	440	90%	15	

To achieve 3 ACH with MERV 13 filters, 0 cfm of CADR (clean air delivery rate) are recommended.

Effective Air Changes

- Effective air changes per hour (eACH) are calculated based on the equivalent outdoor air to effectively remove droplet nuclei:
  - MERV rating of installed filters
  - Total supply air (cubic feet per minute – cfm)
  - Outdoor air (percentage of total supply air)

Target Air Changes

- Target air changes are defaulted as 3 ACH or based on the minimum outdoor air requirements for breathing zones as per ASHRAE standard 62.1, whichever is greater.
- 3 ACH = 95% reduction in airborne contaminants (ASHRAE technical resources for building re-occupancy)

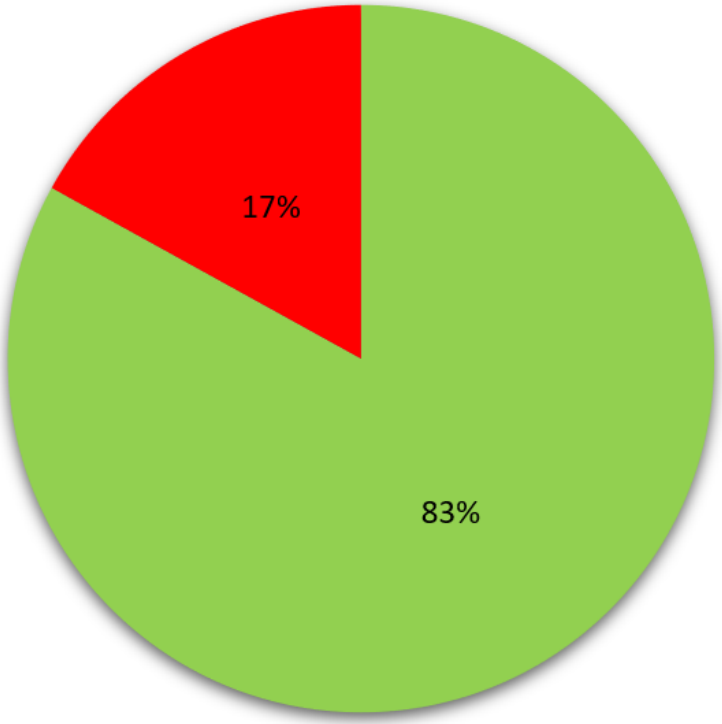
Target Air Changes (cont'd)

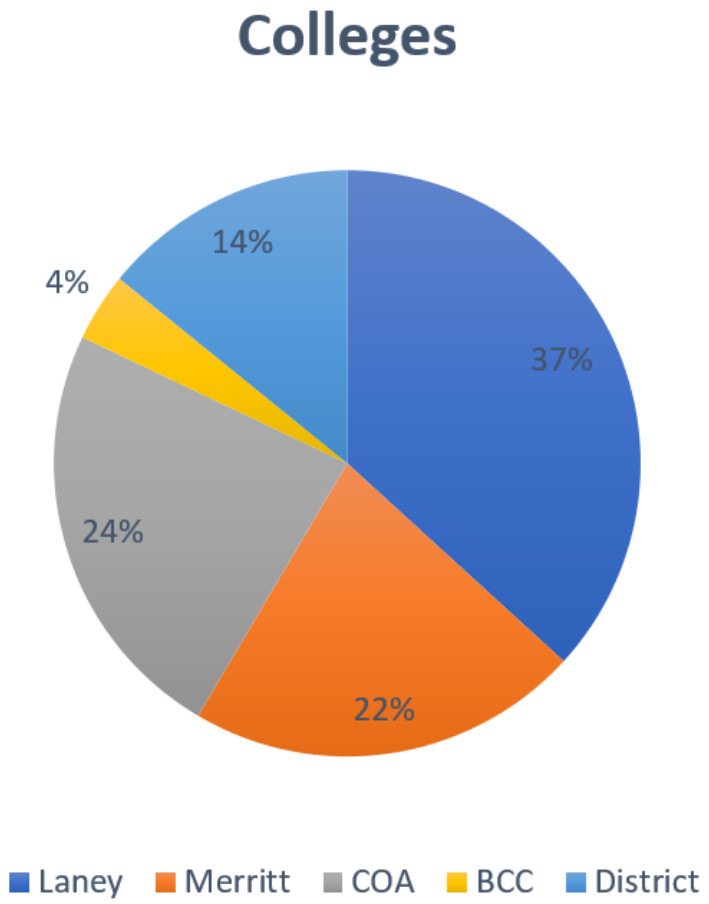
- Minimum requirement for outdoor air as per ASHRAE 62.1 is calculated based on:
  - Square footage of space
  - Occupancy
  - Space category (e.g., classroom, office, conference…etc.)

Locations Breakdown

Space Type	Percentage	Pass rate
Classroom	20%	76%
Science Lab	8.5%	100%
Computer Lab	5%	80%
Offices / Cubicles	40%	88%
Conference rooms	10%	73%
Break rooms	6%	83%
Locker rooms	3%	67%

Ventilation Performance Overview





Phase II

- Expand the ventilation assessment sample
- Post-remediation inspection of HVAC units
- Final report for building readiness

Thank You!

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Right Now.