



Environmental System Performance Specialists

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TEST & BALANCE REPORT

CONTRA COSTA COMMUNITY COLLEGE APPLIED ARTS BUILDING EXISTING SYSTEM SURVEY MARTINEZ, CALIFORNIA SURVEY

CLIENT: **TAYLOR ENGINEERING**

PROJECT NUMBER: 26675-S

DATE: 05/20/2020

TECHNICIAN: GREG ARLIE

TBE: MARIO TURPIN



THIS IS TO CERTIFY THAT RSANALYSIS, INC. HAS BALANCED THE SYSTEM DESCRIBED HEREIN TO THEIR OPTIMUM PERFORMANCE CAPABILITIES, UNLESS OTHERWISE NOTED IN THE PROJECT SUMMARY. THE TESTING AND BALANCING HAS BEEN PERFORMED IN ACCORDANCE WITH THE STANDARD REQUIREMENTS AND PROCEDURES OF THE ASSOCIATED AIR BALANCE COUNCIL AND THE RESULTS OF THESE TESTS ARE HEREIN RECORDED.



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AABC National Performance Guaranty

Pursuant to the agreement between
RSANALYSIS, INC.

AABC Certified Testing & Balancing Agency

TAYLOR ENGINEERING

and _____

Client

All systems shall be tested and balanced in accordance with the project plans and specifications and to the optimum performance capabilities of the equipment. Testing and balancing shall be done in accordance with the standards published by the Associated Air Balance Council.

If the Agency listed above fails to comply with the specifications for any reason other than termination of business by the AABC agency or equipment malfunction or inadequacy which prevents proper balancing of the systems, AABC will investigate and, if warranted, will provide supervisory personnel to assist the member Agency to perform work in accordance with AABC Standards. This supervision will be provided at no additional cost to the building owner.

This Guaranty is valid for one year from the date of submission of a test and balance report, provided the Agency is a current member of AABC, and may only be invoked in writing by the building owner, architect, or engineer of record. The Guaranty is limited to the terms and conditions as stated herein.

Project Name **CONTRA COSTA COMMUNITY COLLEGE APPLIED ARTS BUILDING**

Address **EXISTING SYSTEM SURVEY**

MARTINEZ, CALIFORNIA

Name of Engineer **N/A**

Engineering Firm **N/A**

Email Address **N/A**

Address **N/A**

Date **05/20/2020**

TBE # **94-01-34**

By _____

AABC Certified TBE



AABC

**Associated Air
Balance Council**

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Washington, D.C. 20005
202-737-0202 • Fax 202-638-4833
info@aacb.com • www.aabc.com



Associated Air Balance Council

Annual Certificate

Awarded to

Mario Turpin
RSAnalysis, Inc.

In recognition of his qualifications as a

Certified Test and Balance Engineer

under the rules, regulations, and requirements of the Associated Air Balance Council. The above named is fully authorized to perform total system balance in accordance with the standards as established by the AABC and as a member of the Associated Air Balance Council for the year

2020

*This registration number **94-01-34** is fully recognized by the bylaws and charter of this professional association. Certification is renewable on an annual basis after examination of the agency's record for the preceding year. This certificate expires December 31, 2020.*



Benjiman J. Link, President

Raymond R. Bert, Executive Director



Associated Air Balance Council

hereby certifies that

Greg Arlie

*has met all requirements and passed the necessary examination
to perform testing and balancing as an AABC*

Certified Test & Balance Technician

under the supervision of a certified test and balance engineer for

RSAnalysis, Inc.

*This registration number 160-01-05 is only recognized under the
auspices of the above named AABC member agency. This certificate
expires December 31, 2020 and is renewable on an annual basis.*

Benjiman J. Link, President

Raymond R. Bert, Executive Director



GENERAL NOTES

Date

20-May-20

RSA Job #

26675

- | | |
|---|---|
| 1 | Correction for temperature and altitude have been made on all test results shown in this report. |
| 2 | Ceiling diffusers were measured with a direct CFM read-out meter (see calibration sheet). |
| 3 | Outlets for the fans were numbered with closest to the fan as #1. |
| 4 | All corrections for instruments used for testing and balancing are traceable back to the national bureau of standards and are tested in our own labs. |

SYMBOL SHEET

A	F.S.R. - Floor Supply Register	OPEN - No Terminal Device Installed
AHU - Air Handling Unit	FT. HD. - Feet of Head	OSA Min. - Outside Air Minimum
AC or ACU - Air Conditioning Unit	FTU - Fan Terminal Unit	OAT - Outside Air Temperature
ACCU - Air Cooled Condensing Unit	G	P
ADJ P.D. - Adjusted Pitch Diameter	GPM - Gallons Per Minute	PF - Power Factor
AMP - Amperage	GFH - Gas Fired Heater	PHC - Preheat Coil
AVG. - Average	GFHC - Gas Fired Heating Coil	PH - Phase (s)
B	H	PMP - Circulating Pump
B.H.P - Brake Horsepower	HC - Heating Coil	P.P. - Perforated Plate
C	Heater O.L. - Thermal Overload Protection For Motors	PSI - Pounds Per Square Inch
C.D. - Ceiling Diffuser	HEPA - High Efficiency Particulate Arrestance	P.T. - Pitot Traverse
CFM - Cubic Feet Per Minute	H.F. - Hepa Filter	R
C.E. - Ceiling Exhaust	HOA - Hand/Off/Auto Switch	RA - Return Air
CEF - Ceiling Exhaust Fan	H.P. - Horsepower	RF - Return Air Fan
CH - Chiller	HPS - High Pressure Steam	R.G. - Return Grille
CHWR - Chilled Water Return	HRC - Heat Recovery Coil or Heat Reclaim Coil	RHC - Reheat Coil
CHW or CHWS - Chilled Water Supply	HVAC - Heating, Ventilation & Air Conditioning	RPM - Revolutions Per Minute
C.R. - Ceiling Return	HWR - Hot Water Return or Heating Water Return	S
CT - Cooling Tower	HWS - Hot Water Supply or Heating Water Supply	SA - Supply Air
CWR - Condenser Water Return	HX - Heat Exchanger	SAT - Supply Air Temperature
CW or CWS - Condenser Water Supply	I	S.D. - Supply Diffuser
D	I.D. - Inside Diameter	SEF - Smoke Exhaust Fan
DB - Dry Bulb	L	SF (Air) - Supply Fan
D.D. - Direct Drive	LAT - Leaving Air Temperature	S.F. (Electric) - Service Factor
D.P. - Difference, Net Increase or Decrease	L.D. - Linear Supply Diffuser	SHC - Steam Heating Coil
DIA - Diameter	LPS - Low Pressure Steam	SP "WC" - Static Pressure, Measured in Inches of Water Column
D.N.A. - Data Not Available	L.R.D. - Linear Return Diffuser	S.W.E - Sidewall Exhaust
D.N.L. - Data Not Listed	L.T. - Light Troffer	S.W.R. - Sidewall Return
E	LWG - Low Wall Griller	S.W.S. Sidewall Supply
EAT - Entering Air Temperature	LWR - Low Wall Return	T
EDC - Electric Duct Coil	LWT - Leaving Water Temperature	TAB - Test, Adjust, & Balance
EDH - Eclectic Duct Heater	M	TSP - Total Static Pressure
EF - Exhaust Fan	MAU/MUA - Make Up Air Unit	U
EMCS - Energy Management Control System (s)	MBH - 1000 Btu's Per Hour	UH - Unit Heater
EWT - Entering Water Temperature	N	V
F	N.A. - Not Accessible	V - Volts
FCU - Fan Coil Unit	N.I. - Not Installed	VAV - Variable Air Volume
F.D. - Floor Diffuser	N.T. - Not Taken	VD - Volume Damper
FH - Fume Hood	N.V.L - No Valid Location	VFD - Variable Frequency Drive
FG - Floor Grille	N.Z. - Nozzle	VP - Velocity Pressure
F.E. - Floor Exhaust or Return	O	W
F.L.A. - Full Load Amperage	O.D. - Outside Diameter	W - Watts
FPB - Fan Powered Box		WB - Wet Bulb
FPM - Feet Per Minute		W.G. - Water Gauge
F.S. - Floor Supply		Misc.
		ΔP - Differential (Delta) Pressure
		ΔT - Differential (Delta) Temperature



TEST & BALANCE INSTRUMENTATION

Date	20-May-20	RSA Job #	26675	Technician	Greg Arlie
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THE FOLLOWING INSTRUMENTS WERE USED TO SUCCESSFULLY MEASURE AND SET EACH DEVICE ON THIS PROJECT.

INSTRUMENT	MANUFACTURER	MODEL	SERIAL NO.	CALIBRATION DUE DATE
Flow Hood	Evergreen Telementy	Flow Hood	1900162	-
RVA	Alnor	RVA+	70534120	10/1/2020
AMP Probe	Fluke	323	35000926WS	9/6/2020
Tachometer	Jaquet	253	730779	9/6/2020
Air Data Multimeter	Evergreen Telementy	S-PVF-1	1900410	6/19/2020



Project Summary

Date:	5/20/2020
Project:	Contra Costa Community College – Applied Arts Building – Existing System Survey
Job Number:	26675
Technician:	Greg Arlie/Rase Peters/Mike Nielsen

Scope of Work

RSA to perform a pre-balance survey of the existing fan systems and their corresponding VAV units as outlined by the client's email dated 3/30/2020.

Observations & Outcomes

RSA surveyed and tested all units specified by the client in the email mentioned above to the "Section 230593 Testing, Adjusting and Balancing" Spec that was provided to us. Please see below for deficiencies.

- All existing supply/return fans were tested as required with economizer damper set for 100% outside air and full exhaust mode. Then retested in full return mode with economizer damper closed for total airflow via pitot traverse in each mode. All boxes were set to full cooling during each test. Any existing VAV that did not function was set to the fully open position. The full closed test for all ALC/Reliable boxes was done through the BMS and noted with tested results. The pneumatic VAV's were manually closed and recorded with test results. All supply and return fans appear to show excessive wear on the sheaves and belts. Existing AHU-2-4 was found to have broken belts on the return fan at time of testing. Belts were replaced by the engineering staff to complete testing.
- The existing pneumatic control air system only has 10 PSI at the t-stats. Typical DA t-stats and actuators work best at 15-20 PSI. Oil appears to be in the pneumatic lines found in the thermostat serving classroom 143 on the 1st floor. This may be the cause of repeated failures found throughout the building on other pneumatic VAV's. Some areas of the 1st floor had existing induction style VAV's. The induced air was read and recorded as found with the box in full cooling.
- Existing CW/HW were noted on the type and system design as required. Observations of the existing HW/CC valves and globe valves show signs of corrosion and possible previous leaks in the system.

AHU 1-1:

- 1) Existing AHU-1-1 was unable to be cycled into 100% economizer and full exhaust mode. This fan was found with no damper control from the BMS. The economizer dampers were then tried to be manually adjusted for testing but found to be seized in place due to excessive corrosion and broken blades. The fan was in 100% return mode and was tested as found.

AHU-1-2:

- 1) Existing AHU-1-2 was unable to be cycled into 100% economizer and full exhaust mode through the BMS. The economizer dampers were manually adjusted for each of the test modes required and returned as found.

AHU-1-3:

- 1) Existing AHU-1-3 was unable to be cycled into 100% economizer and full exhaust mode through the BMS. The economizer dampers were manually adjusted for each of the test modes required and returned as found.

AHU-2-1:

- 1) Existing AHU-2-1 was unable to be cycled into 100% economizer and full exhaust mode through the BMS. The economizer dampers were manually adjusted for each of the test modes required and returned as found.

AHU-2-2:

- 1) Existing AHU-2-2 was found to be functional and were cycled as needed for testing.

AHU-2-3:

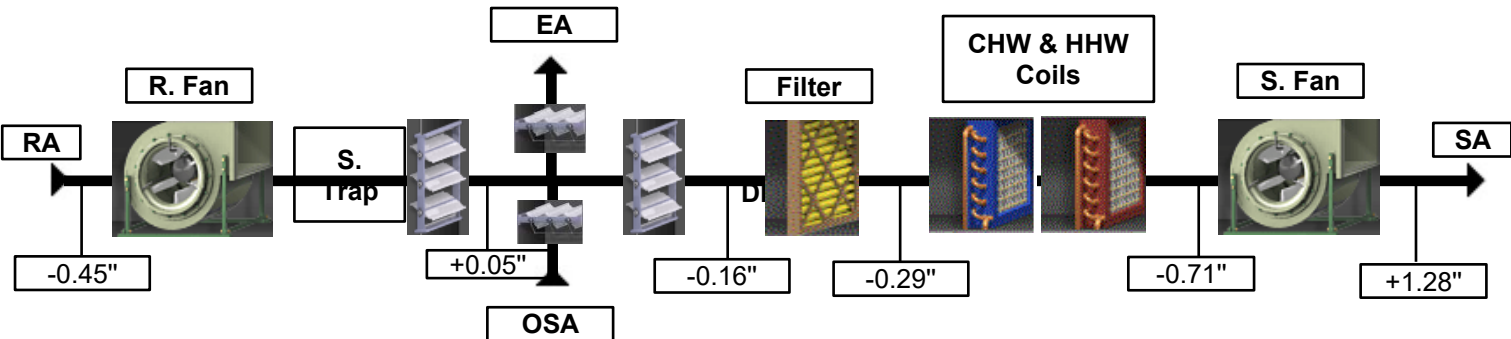
- 1) Existing AHU-2-3 was unable to be cycled into 100% economizer and full exhaust mode through the BMS. The economizer damper on the return fan was found to be slipping on the shaft. RSA corrected the dampers and completed testing of the supply and return fan.

AHU-2-4:

- 1) Existing AHU-2-4 was not shown on the provided prints dated 8-24-1979. RSA saw as-built drawings for the current condition of the mechanical system. Existing economizer dampers found to be functional and cycled as needed for testing.

*In our efforts to constantly improve in all aspects of our performance, we would appreciate any feedback, positive or negative, regarding your experience with the RSA team.
Please click the link below to be directed to our Quality Assurance Survey. Thank you!*
[RSA Quality Assurance](#)

AIR MOVING EQUIPMENT DATA

Date	14-May-20	Area Served	1st Floor		Unit	AHU-1-1		
Unit Information								
Fan Identification		AHU-1-1		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14069		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	7,162 (6)	Fan Sheave		3A7.0 B7.4 2517		
Total S/A CFM	DNL/Outlets	DNL	8,039 (1)	Fan Shaft		1-11/16"		
Total R/A CFM	Traverse	DNL (6)	7,387 (5)	Shaft C/C		32"		
O/A CFM		-	- (6)	Belt Size/Number		B-83/2 (3)		
Fan RPM		DNL	1,450	Motor				
TSP ☐ ESP ☒		DNL	1.44"	Motor Sheave		3MVP55B69		
Inlet SP		-0.16"		Motor Shaft		1-5/8"		
Discharge SP		+1.28"		Sheave Adj.		Max		
Pre / Final Filter ΔP		P	-	F	0.13" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Gould		Specified		Actual		
Motor HP		15		Voltage		460	479	474
Service Factor		1.15		Amperage		20	10.5	10.6
Phase/Hz		3/60		Motor BHP		DNL	7.837	
Heater Size/Rating		-		Motor RPM		1750	1755	
Motor Frame#		254T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
 The diagram illustrates the air flow path through the AHU. It starts at the Return Air (RA) inlet with a pressure of -0.45". The air passes through a Return Fan (R. Fan), a Service Trap (S. Trap), and a supply air duct. It then goes through an Economizer Air (EA) inlet with a pressure of +0.05", followed by an Outdoor Air (OSA) inlet. The air then passes through a Filter with a pressure drop of -0.16", a CHW & HHW Coils section with a pressure drop of -0.29", and a Supply Fan (S. Fan) with a pressure drop of -0.71". Finally, the air exits at the Supply Air (SA) outlet with a pressure of +1.28".								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear.								
(4) Unit does not have BMS static setpoint capabilities. Actual static pressure @ reference point = +1.28"								
(5) Economizer dampers do not function and are stuck in place due to excessive rust/corrosion. Could not adjust manually.								
(6) Existing fan tested in full return mode. Unable to test unit in full OSA mode due to economizer dampers.								

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	14-May-20	Unit	AHU-1-1	Traverse No.	P-1	Traverse Location	Ceiling
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Point	FPM
A1	1,270
A2	1,490
A3	1,611
A4	2,061
A5	2,105
A6	2,005
A7	1,927
A8	1,741
A9	1,591
A10	1,491

Point	FPM
B1	1,782
B2	1,439
B3	1,138
B4	1,512
B5	1,463
B6	1,725
B7	1,699
B8	1,822
B9	2,055
B10	2,093

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
34020		20		1701		3.140		5341

Design Data	
Duct Size I.D.	24
Area Sq. Ft.	3.140
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	24
Duct Size I.D.	24
Area Sq. Ft.	3.140
Centerline S.P. In. W.C.	1.37"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	14-May-20	Unit	AHU-1-1	Traverse No.	P-2	Traverse Location	Ceiling
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Point	FPM
A1	1,685
A2	1,878
A3	1,642
A4	1,515
A5	1,400
A6	1,587
A7	1,603
A8	1,770
A9	1,871
A10	2,138

Point	FPM
B1	1,695
B2	1,896
B3	1,675
B4	1,597
B5	1,531
B6	1,474
B7	1,517
B8	1,697
B9	1,836
B10	2,058

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
34065		20		1704		1.068		1821

Design Data	
Duct Size I.D.	14
Area Sq. Ft.	1.068
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	14
Duct Size I.D.	14
Area Sq. Ft.	1.068
Centerline S.P. In. W.C.	1.30"

[illegible]

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

Date	14-May-20	Unit	(E) AHU-1-1			Flow Spec		-%	-	+	+	-
Unit	Room	Outlet No.	Code	Size	Effective Area	Design		N/A	Initial			
						FPM	CFM		FPM	CFM	%	
VR-1-01	103	1	CD	24X24	-	-	DNL	-	-	377		
VR-1-01	103	2	CD	24X24	-	-	DNL	-	-	427		
VR-1-01	103A	3	CD	24X24	-	-	DNL	-	-	64		
Total VR-1-01							DNL	-		868		
VR-1-02	109	4	CD	24X24	-	-	DNL	-	-	428		
VR-1-02	109	5	CD	24X24	-	-	DNL	-	-	360		
Total VR-1-02							DNL	-		788		
VC-1-03	109	6	CD	24X24	-	-	DNL	-	-	236		
VC-1-03	109	7	CD	24X24	-	-	DNL	-	-	311		
VC-1-03	109A	8	CD	24X24	-	-	DNL	-	-	205		
Total VC-1-03							DNL	-		752		
S/A	111A	9	CD	24X24	-	-	DNL	-	-	58 (1)		
Total S/A							DNL	-		58		
VC-1-04	111	10	CD	24X24	-	-	DNL	-	-	229		
Total VC-1-04							DNL	-		229		
VR-1-05	113	11	CD	24X24	-	-	DNL	-	-	469		
VR-1-05	113	12	CD	24X24	-	-	DNL	-	-	457		
Total VR-1-05							DNL	-		926		
VC-1-06	113A	13	CD	24X24	-	-	DNL	-	-	351		
VC-1-06	113B	14	CD	24X24	-	-	DNL	-	-	69		
VC-1-06	DNL	15	CD	24X24	-	-	DNL	-	-	322		
VC-1-06	DNL	16	CD	24X24	-	-	DNL	-	-	326		
Total VC-1-06							DNL	-		1,068		
VR-1-07	117B	17	SWS	24X10	-	-	DNL	-	-	311		
VR-1-07	117B	18	SWS	24X10	-	-	DNL	-	-	427		
VR-1-07	117B	19	SWS	24X10	-	-	DNL	-	-	695		
VR-1-07	117D	20	CD	14X14	-	-	DNL	-	-	338		
VR-1-07	117D	21	CD	14X14	-	-	DNL	-	-	312		
Total VR-1-07							DNL	-		2,083		

Remarks

(1) Manual damper closed.

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

[illegible]

AIR MOVING EQUIPMENT DATA

Date	14-May-20	Area Served	1st Floor		Unit	AHU-1-1 R/A		
Unit Information								
Fan Identification		AHU-1-1 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14069		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	7,387	Fan Sheave		2B5V70		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		B 1-11/16"		
Fan RPM		DNL	1,375	Shaft C/C		31-1/2"		
TSP ☒ ESP ☐		DNL	0.50"	Belt Size/Number		B78/2 (1)		
Inlet SP		0.45"		Motor				
Discharge SP		+0.05"		Motor Sheave		2VP58		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		X 1-1/8"
Control Set Point		-		Sheave Adj.		Max		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		Westinghouse Life Line				Specified	Actual	
Motor HP		5.0		Voltage		460	474	479
Service Factor		1.0		Amperage		6.5	4.4	4.0
Phase/Hz		3/60		Motor BHP		DNL	3.33	
Heater Size/Rating		-		Motor RPM		1740	1773	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	14-May-20	Unit	AHU-1-1	Traverse No.	P-3	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,364	1,450	1,574	1,502	1,523	1,159						
B	1,569	1,481	1,347	1,355	1,454	1,311						
C	1,520	1,398	1,277	1,450	1,685	1,246						
D	1,332	1,255	1,379	1,242	1,386	972						
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	5,785	5,584	5,577	5,549	6,048	4,688						

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
33,231		24		1,385		5.333		7,387

Design Data			
Duct Size I.D.	32	X	24
Area Sq. Ft.	5.333		
FPM	DNL		
CFM	DNL		

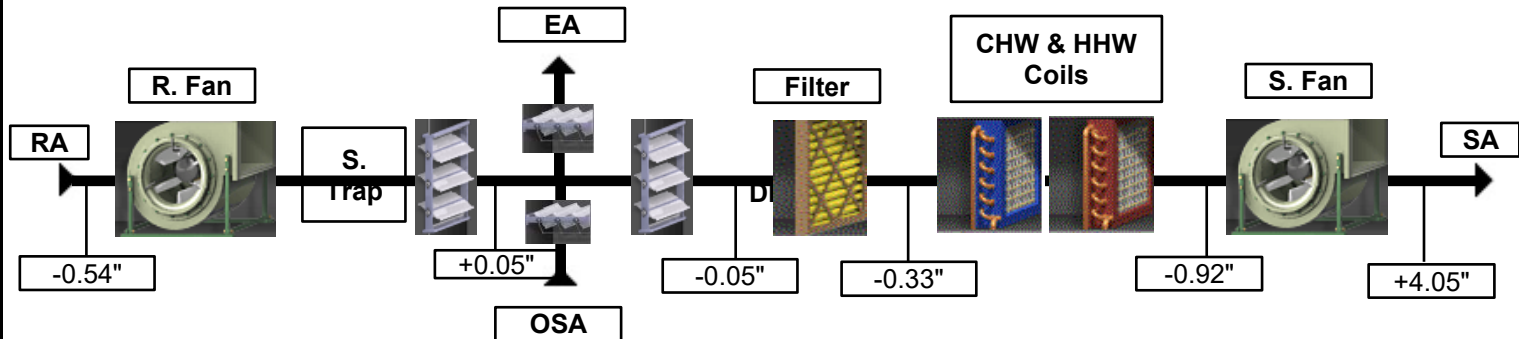
Test Data			
Duct Size O.D.	32	X	24
Duct Size I.D.	32	X	24
Area Sq. Ft.	5.333		
Centerline S.P. In. W.C.	-0.30"		

Remarks

Total & Primary Airflow of Induction Type VAVs

[illegible]

AIR MOVING EQUIPMENT DATA

Date	6-May-20	Area Served	1st Floor		Unit	AHU-1-2		
Unit Information								
Fan Identification		AHU-1-2		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14073		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	27,000	7,681	Fan Sheave		60 2B SDS		
Total S/A CFM	DNL/Outlets	DNL	8,621 (1)	Fan Shaft		1-11/16" SDS		
Total R/A CFM	100% OSA	-	-	Shaft C/C		24.75"		
O/A CFM		100%	100%	Belt Size/Number		5L-710/2 (3)		
Fan RPM		DNL	2,143	Motor				
TSP ☐ ESP ☒		DNL	4.10"	Motor Sheave		7.4X2B SK		
Inlet SP		-0.05"		Motor Shaft		1-3/8"		
Discharge SP		+4.05"		Sheave Adj.		-		
Pre / Final Filter ΔP		P	-	F	0.28" (2)	Fixed Sheave		☒
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Baldor Reliance		Specified		Actual		
Motor HP		10		Voltage		460	473	470
Service Factor		1.0		Amperage		13	12.5	11.8
Phase/Hz		3/60		Motor BHP		DNL	9.683	
Heater Size/Rating		-		Motor RPM		1725	1763	
Motor Frame#		215T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +3.23". Actual static pressure @ reference point = +0.94"								

RECTANGULAR TRAVERSE SHEET (SUPPLY)

Date	6-May-20	Unit	AHU-1-2	Traverse No.	P-1	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,649	1,721	1,607	1,649								
B	2,101	1,932	2,047	2,030								
C	2,234	2,519	2,621	2,744								
D	2,046	2,212	2,669	2,244								
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	8,030	8,384	8,944	8,667								

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
34,025		16		2,127		3.611		7,681

Design Data			
Duct Size I.D.	26	X	20
Area Sq. Ft.	3.611		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	28	X	22
Duct Size I.D.	26	X	20
Area Sq. Ft.	3.611		
Centerline S.P. In. W.C.	4.09"		

Remarks



Terminal Unit Summary Sheet (Supply)														
Date	5-May-20	Unit	(E) AHU-1-2	Constant	Variable	Single	Dual	Flow Spec	-%	-	+%	-		
Terminal Unit	Box Size	Flow Coefficient	Cooling						Heating					
			Design CFM			Actual CFM		%	Design CFM		Actual CFM		%	
			MIN	MAX	↓	MIN	MAX		MIN	MAX	MIN	MAX		
		Cooling V.P.												
VC-1-01 (3)	6"	0.90"	DNL	DNL		-	637		-	-	-	-		
VR-1-02 (4)	10"	0.05"	DNL	DNL		-	215		-	-	-	-		
VR-1-03 (1)	10"	0.42"	DNL	DNL		-	1,917		-	-	-	-		
VR-1-04 (2)	10"	0.41"	DNL	DNL		-	1,495		-	-	-	-		
VR-1-05 (2)	10"	0.04"	DNL	DNL		-	878		-	-	-	-		
VC-1-06 (3)	8"	0.09"	DNL	DNL		-	415		-	-	-	-		
VR-1-07 (2)	5"	1.09"	DNL	DNL		-	640		-	-	-	-		
VR-1-08 (2)	5"	0.12"	DNL	DNL		-	430		-	-	-	-		
VR-1-09 (3)	5"	1.09"	DNL	DNL		-	535		-	-	-	-		
VR-1-10 (3)	8"	1.46"	DNL	DNL		-	1,157		-	-	-	-		
VR-1-11 (2)	4"	0.66"	DNL	DNL		-	302		-	-	-	-		
Remarks														
(1) No thermostat installed. Hot water valve appears to be failed open.														
(2) T-Stat operates actuator.														
(3) Actuator not responding to t-stat cycling.														
(4) DDC controls appear to function.														

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

Date	5-May-20	Unit		(E) AHU-1-2		Flow Spec		-%	-	+%	-
Unit	Room	Outlet No.	Code	Size	Effective Area	Design		N/A	Initial		%
						FPM	CFM		FPM	CFM	
VC-1-01	110	1	CD	24X24	-	-	DNL	-	-	205	
VC-1-01	110	2	CD	24X24	-	-	DNL	-	-	192	
VC-1-01	148	3	CD	24X24	-	-	DNL	-	-	240	
Total VC-1-01							DNL	-		637	
VC-1-06	131	4	CD	24X24	-	-	DNL	-	-	100	
VC-1-06	131	5	CD	24X24	-	-	DNL	-	-	95	
VC-1-06	131	6	CD	24X24	-	-	DNL	-	-	95	
VC-1-06	131	7	CD	24X24	-	-	DNL	-	-	125	
Total VC-1-06							DNL	-		415	
VR-1-07	108	8	CD	24X24	-	-	DNL	-	-	192	
VR-1-07	108	9	CD	24X24	-	-	DNL	-	-	134	
VR-1-07	108	10	CD	24X24	-	-	DNL	-	-	149	
VR-1-07	108	11	CD	24X24	-	-	DNL	-	-	165	
Total VR-1-07							DNL	-		640	
VR-1-08	136	12	CD	24X24	-	-	DNL	-	-	101	
VR-1-08	134	13	CD	24X24	-	-	DNL	-	-	163	
VR-1-08	132	14	CD	24X24	-	-	DNL	-	-	166	
Total VR-1-08							DNL	-		430	
VR-1-09	128	15	LD	2'	-	-	DNL	-	-	230	
VR-1-09	126	16	LD	2'	-	-	DNL	-	-	185	
VR-1-09	124	17	CD	24X24	-	-	DNL	-	-	120	
Total VR-1-09							DNL	-		535	
VR-1-10	106	18	CD	24X24	-	-	DNL	-	-	192	
VR-1-10	127	19	LD	2'	-	-	DNL	-	-	187	
VR-1-10	125	20	LD	2'	-	-	DNL	-	-	193	
VR-1-10	123	21	LD	2'	-	-	DNL	-	-	140	
VR-1-10	121	22	LD	2'	-	-	DNL	-	-	145	
VR-1-10	106	23	CD	24X24	-	-	DNL	-	-	150	
VR-1-10	104	24	CD	24X24	-	-	DNL	-	-	150	
Total VR-1-10							DNL	-		1,157	
Remarks											

[illegible]

AIR MOVING EQUIPMENT DATA

Date	6-May-20	Area Served	1st Floor		Unit	AHU-1-2 R/A		
Unit Information								
Fan Identification		AHU-1-2 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14073		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	6,763	Fan Sheave		64 2B SDS		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1-11/16"		
Fan RPM		DNL	1,188	Shaft C/C		30"		
TSP ☒ ESP ☐		DNL	0.59"	Belt Size/Number		B75/2 (1)		
Inlet SP		-0.54"		Motor				
Discharge SP		+0.05"		Motor Sheave		2VC62		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-11/16"
Control Set Point		-		Sheave Adj.		Minimum		
				Fixed Sheave		☒		
Motor Data								
Motor MFG.		Dayton		Specified		Actual		
Motor HP		5		Voltage		460	474	473
Service Factor		1.15		Amperage		6.7	4.4	4.3
Phase/Hz		3/60		Motor BHP		DNL	3.350	
Heater Size/Rating		-		Motor RPM		1740	1783	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	6-May-20	Unit	AHU-1-2	Traverse No.	P-2	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	649	1,252	1,092	957	1,225	1,149						
B	986	1,220	993	1,215	1,165	1,186						
C	1,209	1,272	1,349	1,317	1,328	1,063						
D	1,201	1,256	1,303	1,327	1,190	1,045						
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	4,045	5,000	4,737	4,816	4,908	4,443						

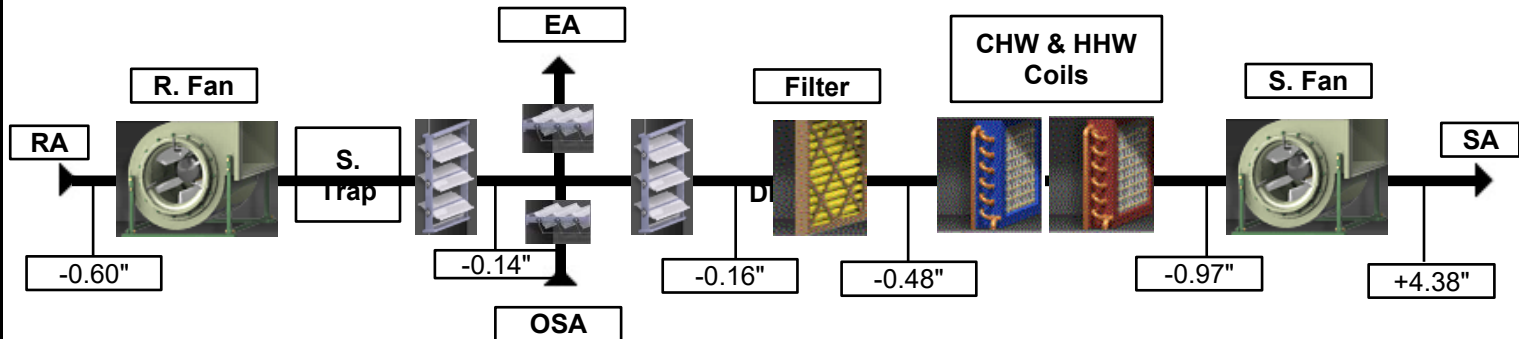
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
27,949		24		1,165		5.806		6,763

Design Data			
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	40	X	24
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
Centerline S.P. In. W.C.	0.55"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	15-May-20	Area Served	1st Floor		Unit	AHU-1-2		
Unit Information								
Fan Identification		AHU-1-2		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14073		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	6,699	Fan Sheave		60 2B SDS		
Total S/A CFM	DNL/DNT	DNL	DNT (1)	Fan Shaft		1-11/16" SDS		
Total R/A CFM	Traverse	DNL	6,566	Shaft C/C		24.75"		
O/A CFM		-	-	Belt Size/Number		5L-710/2 (3)		
Fan RPM		DNL	2,002	Motor				
TSP ☐ ESP ☒		DNL	4.54"	Motor Sheave		7.4X2B SK		
Inlet SP		-0.16"		Motor Shaft		1-3/8"		
Discharge SP		+4.38"		Sheave Adj.		-		
Pre / Final Filter ΔP		P	-	F	0.32" (2)	Fixed Sheave		☒
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Baldor Reliance		Specified		Actual		
Motor HP		10		Voltage		460	476	472
Service Factor		1.0		Amperage		13	12.7	12.8
Phase/Hz		3/60		Motor BHP		DNL	10.032	
Heater Size/Rating		-		Motor RPM		1725	1869	
Motor Frame#		215T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) As advised in "Section 230593 Testing, Adjusting and Balancing" Spec, RSA read unit out for total in full RA mode.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS Static pressure reference point = +3.09". Actual Static pressure @ reference point = +3.13"								

RECTANGULAR TRAVERSE SHEET (SUPPLY)

Date	15-May-20	Unit	AHU-1-2	Traverse No.	P-1	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	953	1,371	1,439	905								
B	1,665	1,673	1,703	1,785								
C	1,756	2,364	2,422	2,327								
D	1,853	2,709	2,652	2,103								
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	6,227	8,117	8,216	7,120								

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
29,680		16		1,855		3.611		6,699

Design Data			
Duct Size I.D.	26	X	20
Area Sq. Ft.	3.611		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	28	X	22
Duct Size I.D.	26	X	20
Area Sq. Ft.	3.611		
Centerline S.P. In. W.C.			

Remarks

AIR MOVING EQUIPMENT DATA

Date	15-May-20	Area Served	1st Floor		Unit	AHU-1-2 R/A		
Unit Information								
Fan Identification		AHU-1-2 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14073		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	6,566	Fan Sheave		64 2B SDS		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1 11/16"		
Fan RPM		DNL	1,240	Shaft C/C		30"		
TSP ☒ ESP ☐		DNL	0.46"	Belt Size/Number		B75/2 (1)		
Inlet SP		-0.60"		Motor				
Discharge SP		-0.14"		Motor Sheave		2VC62		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-11/16"
Control Set Point		-		Sheave Adj.		Minimum		
				Fixed Sheave		☒		
Motor Data								
Motor MFG.		Dayton				Specified	Actual	
Motor HP		5		Voltage		460	476	473 475
Service Factor		1.15		Amperage		6.7	4.3	4.4 3.8
Phase/Hz		3/60		Motor BHP		DNL	3.208	
Heater Size/Rating		-		Motor RPM		1740	1881	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
Static Profile on Next Page								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	15-May-20	Unit	AHU-1-2	Traverse No.	P-2	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	717	942	1,167	1,042	710	840						
B	916	974	1,282	847	1,007	1,282						
C	1,437	1,148	1,448	1,424	1,440	1,231						
D	1,135	1,221	1,402	1,479	1,150	902						
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	4,205	4,285	5,299	4,792	4,307	4,255						

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
27,143		24		1,131		5.806		6,566

Design Data			
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
FPM	DNL		
CFM	DNL		

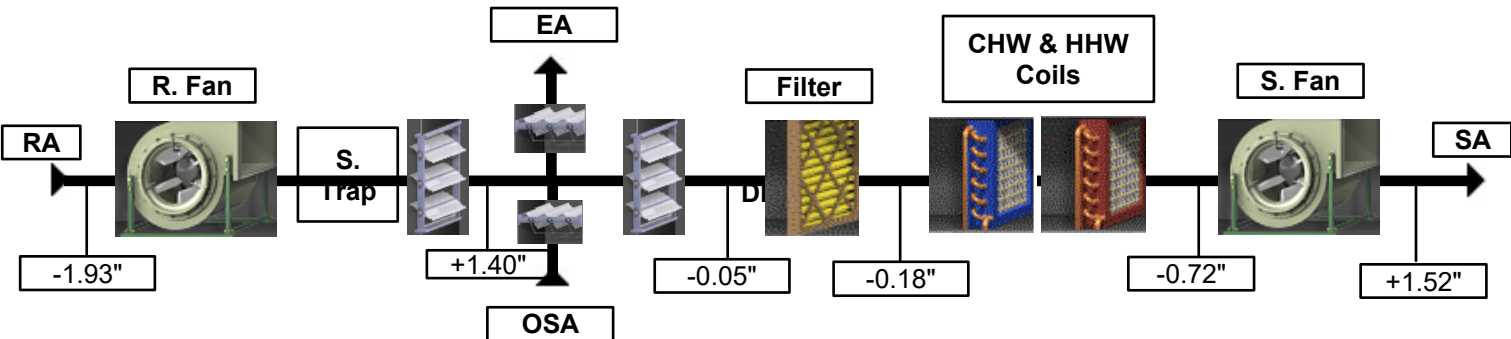
Test Data			
Duct Size O.D.	40	X	24
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
Centerline S.P. In. W.C.	0.62"		

Remarks

VAV Damper Closed Test & Totals

[illegible]

AIR MOVING EQUIPMENT DATA

Date	7-May-20	Area Served	1st Floor		Unit	AHU-1-3		
Unit Information								
Fan Identification		AHU-1-3		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14074		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	6,376	Fan Sheave		2 B8.6 2517		
Total S/A CFM	DNL/Outlets	DNL	7,657 (1)	Fan Shaft		1-11/16"		
Total R/A CFM	100% OSA	-	-	Shaft C/C		26-3/4"		
O/A CFM		100%	100%	Belt Size/Number		B76/2 (3)		
Fan RPM		DNL	1,357	Motor				
TSP ☐ ESP ☒		DNL	1.57"	Motor Sheave		2VP75		
Inlet SP		-0.05"		Motor Shaft		1-3/8"		
Discharge SP		+1.52"		Sheave Adj.		Minimum		
Pre / Final Filter ΔP		P	-	F	0.13" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Century Motors				Specified	Actual	
Motor HP		10		Voltage		460	477	474
Service Factor		1.15		Amperage		12.5	6.6	7.2
Phase/Hz		3/60		Motor BHP		DNL	5.782	
Heater Size/Rating		-		Motor RPM		1750	1815	
Motor Frame#		S215T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Construction filter installed. No actual filter installed.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +0.54". Actual static pressure @ reference point = +0.99"								

RECTANGULAR TRAVERSE SHEET (SUPPLY)

Date	7-May-20	Unit	AHU-1-3	Traverse No.	P-1	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,299	1,278	1,007									
B	1,357	1,766	1,741									
C	1,920	2,221	1,920									
D	2,047	1,895	1,397									
E	2,223	1,458	1,064									
F	1,657	1,333	1,106									
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	10,503	9,951	8,235									

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
28,689		18		1,594		4.000		6,376

Design Data			
Duct Size I.D.	32	X	18
Area Sq. Ft.	4.000		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	34	X	20
Duct Size I.D.	32	X	18
Area Sq. Ft.	4.000		
Centerline S.P. In. W.C.	1.56"		

Remarks



Terminal Unit Summary Sheet (Supply)														
Date	7-May-20	Unit	(E) AHU-1-3	Constant	Variable	Single	Dual	Flow Spec	-%	-	+%	-		
Terminal Unit	Box Size	Flow Coefficient	Cooling						Heating					
			Design CFM			Actual CFM		%	Design CFM		Actual CFM		%	
			MIN	MAX	↓	MIN	MAX		MIN	MAX	MIN	MAX		
		Cooling V.P.												
VC-1-01 (2)	7"	0.59"	DNL	DNL		-	697		-	-	-	-		
VR-1-02 (2)	12"	0.65"	DNL	DNL		-	1,694		-	-	-	-		
VR-1-03 (2)	12"	0.68"	DNL	DNL		-	1,689		-	-	-	-		
VR-1-04 (2)	12"	0.43"	DNL	DNL		-	1,695		-	-	-	-		
VR-1-05 (1)	10"	0.013"	DNL	DNL		-	665		-	-	-	-		
VC-1-06 (3)	7"	0.36"	DNL	DNL		-	583		-	-	-	-		
VR-1-07 (2)	6"	0.23"	DNL	DNL		-	480		-	-	-	-		
VC-1-08 (3)	5"	0.20"	DNL	DNL		-	154		-	-	-	-		
Remarks														
(1) Hot water valve appears to be failed open.														
(2) T-stat operates actuator & HHW valve.														
(3) Actuator not responding to t-stat cycling.														

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

Date	7-May-20	Unit		(E) AHU-1-3		Flow Spec		-%	-	+%	-
Unit	Room	Outlet No.	Code	Size	Effective Area	Design		N/A	Initial		%
						FPM	CFM		FPM	CFM	
VC-1-01	150	1	CD	24X24	-	-	DNL	-	-	146	
VC-1-01	150	2	CD	24X24	-	-	DNL	-	-	144	
VC-1-01	150	3	CD	24X24	-	-	DNL	-	-	123	
VC-1-01	102	4	CD	24X24	-	-	DNL	-	-	146	
VC-1-01	102	5	CD	24X24	-	-	DNL	-	-	138	
Total VC-1-01							DNL	-		697	
VR-1-02	143	6	CD	24X24	-	-	DNL	-	-	575	
VR-1-02	143	7	CD	24X24	-	-	DNL	-	-	580	
VR-1-02	143	8	CD	24X24	-	-	DNL	-	-	539	
Total VR-1-02							DNL	-		1,694	
VR-1-03	142	9	CD	24X24	-	-	DNL	-	-	570	
VR-1-03	142	10	CD	24X24	-	-	DNL	-	-	570	
VR-1-03	142	11	CD	24X24	-	-	DNL	-	-	549	
Total VR-1-03							DNL	-		1,689	
VR-1-04	145	12	CD	24X24	-	-	DNL	-	-	539	
VR-1-04	145	13	CD	24X24	-	-	DNL	-	-	617	
VR-1-04	145	14	CD	24X24	-	-	DNL	-	-	539	
Total VR-1-04							DNL	-		1,695	
VR-1-05	102	15	CD	24X24	-	-	DNL	-	-	415	
VR-1-05	146	16	CD	12X12	-	-	DNL	-	-	75	
VR-1-05	102	17	CD	24X24	-	-	DNL	-	-	175	
Total VR-1-05							DNL	-		665	
VC-1-06	107	18	CD	24X24	-	-	DNL	-	-	112	
VC-1-06	105	19	CD	24X24	-	-	DNL	-	-	86	
VC-1-06	104	20	CD	24X24	-	-	DNL	-	-	121	
VC-1-06	104	21	CD	24X24	-	-	DNL	-	-	140	
VC-1-06	104	22	CD	24X24	-	-	DNL	-	-	124	
Total VC-1-06							DNL	-		583	
Remarks											

AIR MOVING EQUIPMENT DATA

Date	7-May-20	Area Served	1st Floor		Unit	AHU-1-3 R/A		
Unit Information								
Fan Identification		AHU-1-3 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14074		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	7,392	Fan Sheave		64 2B SDS		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1-11/16"		
Fan RPM		DNL	1,398	Shaft C/C		28"		
TSP ☒ ESP ☐		DNL	3.33"	Belt Size/Number		5L750/2 (1)		
Inlet SP		-1.93"		Motor				
Discharge SP		+1.40"		Motor Sheave		2VC60		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-1/8"
Control Set Point		-		Sheave Adj.		-		
				Fixed Sheave		☒		
Motor Data								
Motor MFG.		Baldor Reliance				Specified	Actual	
Motor HP		5		Voltage		460	471	468 471
Service Factor		1.0		Amperage		6.6	6.3	6.0 6.0
Phase/Hz		3/60		Motor BHP		DNL	4.721	
Heater Size/Rating		-		Motor RPM		1725	1741	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	7-May-20	Unit	AHU-1-3	Traverse No.	P-2	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,189	1,174	1,078	1,085	1,343	1,384	1,465	1,419				
B	1,171	1,560	1,378	1,582	1,554	1,561	1,617	1,335				
C	1,034	1,751	1,682	1,417	1,612	1,659	1,523	1,200				
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	3,394	4,485	4,138	4,084	4,509	4,604	4,605	3,954				

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
33,773		24		1,408		5.250		7,392

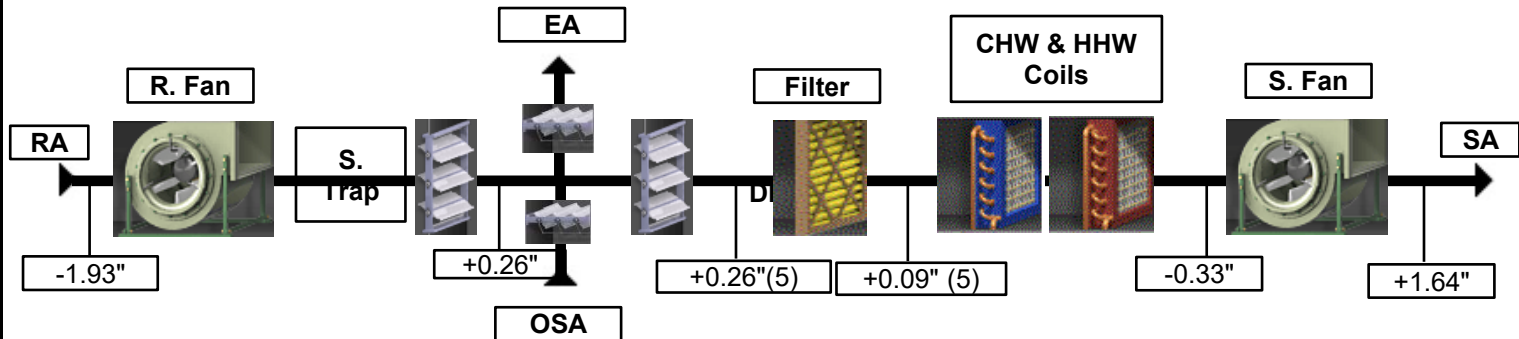
Design Data			
Duct Size I.D.	42	X	18
Area Sq. Ft.	5.250		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	44	X	20
Duct Size I.D.	42	X	18
Area Sq. Ft.	5.250		
Centerline S.P. In. W.C.	1.93"		

Remarks

[illegible]

AIR MOVING EQUIPMENT DATA

Date	18-May-20	Area Served	1st Floor		Unit	AHU-1-3		
Unit Information								
Fan Identification		AHU-1-3		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14074		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	6,188	Fan Sheave		2 B8.6 2517		
Total S/A CFM	DNL/DNT	DNL	DNT (1)	Fan Shaft		1-11/16"		
Total R/A CFM	Traverse	DNL	7,870	Shaft C/C		26-3/4"		
O/A CFM		-	-	Belt Size/Number		B76/2 (3)		
Fan RPM		DNL	1,355	Motor				
TSP ☐ ESP ☒		DNL	1.90"	Motor Sheave		2VP75		
Inlet SP		+0.26"		Motor Shaft		1-3/8"		
Discharge SP		+1.64"		Sheave Adj.		Minimum		
Pre / Final Filter ΔP		P	-	F	0.17" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Century Motors				Specified	Actual	
Motor HP		10		Voltage		460	474	476
Service Factor		1.15		Amperage		12.5	6.7	7.2
Phase/Hz		3/60		Motor BHP		DNL	5.80	
Heater Size/Rating		-		Motor RPM		1750	1780	
Motor Frame#		S215T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Construction filter installed. No actual filter installed.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +4.70". Actual static pressure @ reference point = +4.03"								
(5) Return fan appears to pushing into supply fan.								

RECTANGULAR TRAVERSE SHEET (SUPPLY)

Date	18-May-20	Unit	AHU-1-3	Traverse No.	P-1	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	650	941	650									
B	1,656	1,808	2,275									
C	2,126	2,211	1,601									
D	1,958	1,900	1,225									
E	1,849	1,383	1,265									
F	1,487	1,431	1,429									
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	9,726	9,674	8,445									

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
27,845		18		1,547		4.000		6,188

Design Data			
Duct Size I.D.	32	X	18
Area Sq. Ft.	4.000		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	34	X	20
Duct Size I.D.	32	X	18
Area Sq. Ft.	4.000		
Centerline S.P. In. W.C.	1.77"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	18-May-20	Area Served	1st Floor		Unit	AHU-1-3 R/A		
Unit Information								
Fan Identification		AHU-1-3 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH17MR		
Type/Size		-		Serial Number		14074		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	7,870	Fan Sheave		64 2B SDS		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1-11/16"		
Fan RPM		DNL	1,398	Shaft C/C		28"		
TSP ☒ ESP ☐		DNL	2.19"	Belt Size/Number		5L750/2 (1)		
Inlet SP		-1.93		Motor				
Discharge SP		+0.26"		Motor Sheave		2VC60		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-1/8"
Control Set Point		-		Sheave Adj.		-		
				Fixed Sheave		☒		
Motor Data								
Motor MFG.		Baldor Reliance		Specified		Actual		
Motor HP		5		Voltage		460	472	473 477
Service Factor		1.0		Amperage		6.6	6.1	6.1 6.3
Phase/Hz		3/60		Motor BHP		DNL	4.67	
Heater Size/Rating		-		Motor RPM		1725	1750	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	18-May-20	Unit	AHU-1-3	Traverse No.	P-2	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,593	1,458	1,290	1,478	1,351	1,466	1,501	1,235				
B	1,474	1,761	1,653	1,575	1,617	1,705	1,663	1,353				
C	1,456	1,436	1,676	1,687	1,602	1,557	1,103	1,281				
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	4,523	4,655	4,619	4,740	4,570	4,728	4,267	3,869				

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
35,971		24		1,499		5.250		7,870

Design Data			
Duct Size I.D.	42	X	18
Area Sq. Ft.	5.250		
FPM	DNL		
CFM	DNL		

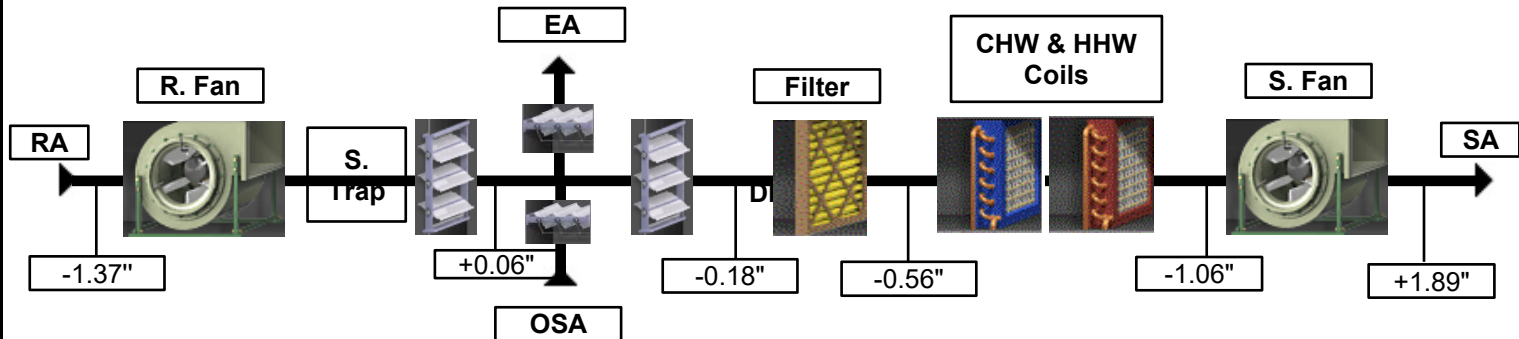
Test Data			
Duct Size O.D.	44	X	20
Duct Size I.D.	42	X	18
Area Sq. Ft.	5.250		
Centerline S.P. In. W.C.	1.93"		

Remarks

VAV Damper Closed Test & Totals

[illegible]

AIR MOVING EQUIPMENT DATA

Date	12-May-20	Area Served	2nd Floor		Unit	AHU-2-1		
Unit Information								
Fan Identification		AHU-2-1		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14070		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	8,970	Fan Sheave		A56B60SD		
Total S/A CFM	DNL/Outlets	DNL	7,919 (1)	Fan Shaft		B 1-11/16"		
Total R/A CFM	100% OSA	-	-	Shaft C/C		32-1/2"		
O/A CFM		100%	100%	Belt Size/Number		B-83 / 3 (3)		
Fan RPM		DNL	1,885	Motor				
TSP ☐ ESP ☒		DNL	2.07"	Motor Sheave		3MVP55B69		
Inlet SP		-0.18"		Motor Shaft		1-5/8"		
Discharge SP		+1.89"		Sheave Adj.		Max		
Pre / Final Filter ΔP		P	-	F	0.38" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Gould				Specified	Actual	
Motor HP		15		Voltage		460	470	477 475
Service Factor		1.15		Amperage		20	13.2	13.2 14.2
Phase/Hz		3/60		Motor BHP		DNL	10.458	
Heater Size/Rating		-		Motor RPM		1750	1749	
Motor Frame#		254T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
 The diagram illustrates the air flow path through the AHU. It starts at the Return Air (RA) inlet, passes through a Return Fan (R. Fan) with a pressure of -1.37". The air then goes through a S. Trap, an Outdoor Air (OSA) intake with a pressure of +0.06", and a Filter with a pressure of -0.18". It then passes through CHW & HHW Coils with a pressure of -0.56", and another Filter with a pressure of -1.06". Finally, it goes through a Supply Fan (S. Fan) with a pressure of +1.89" and exits at the Supply Air (SA) outlet. The diagram also shows the location of the Fan, Filter, and Coils relative to the air flow path.								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS Static pressure reference point = +1.30". Actual Static pressure @ reference point = +1.32"								

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	12-May-20	Unit	AHU-2-1	Traverse No.	P-1	Traverse Location	2nd Floor
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Point	FPM
A1	2,219
A2	3,058
A3	3,041
A4	2,910
A5	1,905
A6	1,848
A7	1,659
A8	1,931
A9	2,714
A10	1,811

Point	FPM
B1	1,248
B2	1,895
B3	2,180
B4	2,788
B5	2,293
B6	2,344
B7	2,525
B8	3,212
B9	3,320
B10	3,349

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
48250		20		2413		3.140		7577

Design Data	
Duct Size I.D.	24
Area Sq. Ft.	3.140
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	24
Duct Size I.D.	24
Area Sq. Ft.	3.140
Centerline S.P. In. W.C.	1.56"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	12-May-20	Unit	AHU-2-1	Traverse No.	P-2	Traverse Location	2nd Floor
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Point	FPM
A1	2,873
A2	2,845
A3	2,865
A4	2,523
A5	2,603
A6	2,283
A7	2,122
A8	2,240
A9	2,007
A10	2,032

Point	FPM
B1	2,475
B2	2,824
B3	2,831
B4	2,927
B5	2,737
B6	2,627
B7	2,597
B8	2,579
B9	2,578
B10	2,528

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
51096		20		2555		0.545		1393

Design Data	
Duct Size I.D.	10
Area Sq. Ft.	0.545
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	10
Duct Size I.D.	10
Area Sq. Ft.	0.545
Centerline S.P. In. W.C.	1.34"

[illegible]



Terminal Unit Summary Sheet (Supply)													
Date	12-May-20	Unit	(E) AHU-2-1	Constant	Variable	Single	Dual	Flow Spec	-%	-	+%	-	
Terminal Unit	Box Size	Flow Coefficient	Cooling						Heating				
			Design CFM			Actual CFM		%	Design CFM		Actual CFM		%
			MIN	MAX	↓	MIN	MAX		MIN	MAX	MIN	MAX	
		Cooling V.P.											
VC-2-01 (3)	10"	1.06"	DNL	DNL		-	1,254		-	-	-	-	
VC-2-02 (2)	10"	0.28"	DNL	DNL		-	706		-	-	-	-	
VC-2-03 (3)	14"	0.91"	DNL	DNL		-	2,528		-	-	-	-	
VC-2-04 (4)	10"	0.27"	DNL	DNL		-	687		-	-	-	-	
VC-2-05 (4)	12"	0.14"	DNL	DNL		-	749		-	-	-	-	
VC-2-06 (4)	8"	0.45"	DNL	DNL		-	572		-	-	-	-	
VC-2-07 (4)	10" (5)	0.007"	DNL	DNL		-	108		-	-	-	-	
VC-2-08 (3)	8"	0.63"	DNL	DNL		-	647		-	-	-	-	
VC-2-09 (1)	7"	0.72"	DNL	DNL		-	668		-	-	-	-	
CC-1	-	0.13"	-	DNL		-	0		-	-	-	-	
CC-2	-	0.17"	-	DNL		-	0		-	-	-	-	
CC-3	-	0.51"	-	DNL		-	0		-	-	-	-	
HC-4/CC-4	-	0.34"	-	DNL		-	0		-	-	-	-	
Remarks													
(1) T-stat line found cut at the wall. Actuator has no control at this time. (5) 12" Flex ran to a 10" inlet VAV.													
(2) T-stat operates actuator.													
(3) Actuator not responding to t-stat cycling.													
(4) DDC controls appear to function.													

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

[illegible]

(1) Manual damper closed.

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

Date	12-May-20	Unit		(E) AHU-2-1		Flow Spec		-%	-	+%	-
Unit	Room	Outlet No.	Code	Size	Effective Area	Design		N/A	Initial		%
						FPM	CFM		FPM	CFM	
VC-2-06	210E	24	CD	24X24	-	-	DNL	-	-	229	
VC-2-06	210D	25	CD	24X24	-	-	DNL	-	-	343	
Total VC-2-06							DNL	-		572	
VC-2-07	210L	26	CD	24X24	-	-	DNL	-	-	0 (1)	
VC-2-07	210A	27	CD	24X24	-	-	DNL	-	-	50 (1)	
VC-2-07	210B	28	CD	24X24	-	-	DNL	-	-	33 (1)	
VC-2-07	210C	29	CD	24X24	-	-	DNL	-	-	25 (1)	
Total VC-2-07							DNL	-		108	
VC-2-08	215D	30	CD	24X24	-	-	DNL	-	-	338	
VC-2-08	215D	31	CD	24X24	-	-	DNL	-	-	170	
VC-2-08	215E	32	CD	24X24	-	-	DNL	-	-	139	
Total VC-2-08							DNL	-		647	
VC-2-09	215A	33	CD	24X24	-	-	DNL	-	-	285	
VC-2-09	215A	34	CD	24X24	-	-	DNL	-	-	246	
VC-2-09	215B	35	CD	24X24	-	-	DNL	-	-	137	
Total VC-2-09							DNL	-		668	
Remarks											
(1) Manual damper closed.											

AIR MOVING EQUIPMENT DATA

Date	12-May-20	Area Served	2nd Floor		Unit	AHU-2-1 R/A		
Unit Information								
Fan Identification		AHU-2-1 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14070		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	6,924	Fan Sheave		2A64		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1-11/16"		
Fan RPM		DNL	1,415	Shaft C/C		30-1/8"		
TSP ☒ ESP ☐		DNL	1.43"	Belt Size/Number		B78 / 2 (1)		
Inlet SP		-1.37"		Motor				
Discharge SP		+0.06"		Motor Sheave		2VP62		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-1/16"
Control Set Point		-		Sheave Adj.		Max		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		GE Motors		Specified		Actual		
Motor HP		5		Voltage		460	478	474
Service Factor		1.15		Amperage		6.3	5.8	5.9
Phase/Hz		3 / 60		Motor BHP		DNL	4.863	
Heater Size/Rating		-		Motor RPM		1755	1755	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	12-May-20	Unit	AHU-2-1	Traverse No.	P-3	Traverse Location	2nd Floor
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,016	1,141	1,292	1,179	1,181	1,494						
B	1,018	1,648	1,743	1,752	1,784	1,982						
C	700	1,041	1,553	1,538	1,448	1,932						
D	520	1,159	1,187	1,162	1,155	1,366						
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	3,254	4,989	5,775	5,631	5,568	6,774						

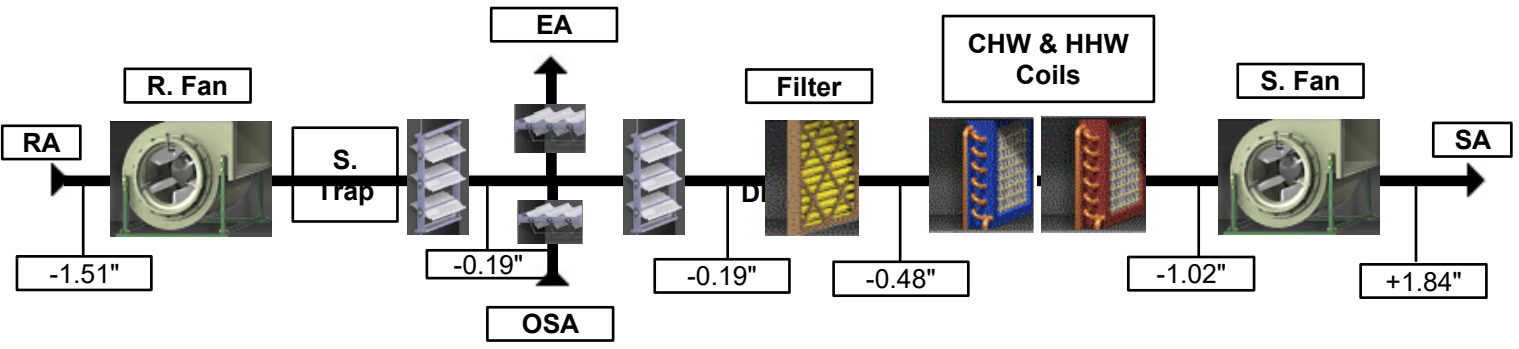
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
31,991		24		1,333		5.194		6,924

Design Data			
Duct Size I.D.	34	X	22
Area Sq. Ft.	5.194		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	34	X	22
Duct Size I.D.	34	X	22
Area Sq. Ft.	5.194		
Centerline S.P. In. W.C.	0.94"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	20-May-20	Area Served	2nd Floor		Unit	AHU-2-1		
Unit Information								
Fan Identification		AHU-2-1		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14070		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	9,573 (1)	Fan Sheave		A56B60SD		
Total S/A CFM	DNL/DNT	DNL	DNT	Fan Shaft		B 1-11/16"		
Total R/A CFM	Traverse	DNL	8,275 (1)	Shaft C/C		32.5"		
O/A CFM		-	-	Belt Size/Number		B-83 / 3 (3)		
Fan RPM		DNL	1,883	Motor				
TSP ☐ ESP ☒		DNL	2.03"	Motor Sheave		3MVP55B69		
Inlet SP		-0.19"		Motor Shaft		1 5/8"		
Discharge SP		+1.84"		Sheave Adj.		Max		
Pre / Final Filter ΔP		P	-	F	0.29" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Gould		Specified		Actual		
Motor HP		15		Voltage		460	476	478
Service Factor		1.15		Amperage		20	13.4	13.5
Phase/Hz		3/60		Motor BHP		DNL	10.447	
Heater Size/Rating		-		Motor RPM		1750	1742	
Motor Frame#		254T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) As advised in "Section 230593 Testing, Adjusting and Balancing" Spec, RSA read unit out for total in full RA mode.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +1.24". Actual static pressure @ reference point = +1.23"								

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	20-May-20	Unit	AHU-2-1	Traverse No.	P-1	Traverse Location	2nd Floor
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	-----------

Point	FPM
A1	3,017
A2	3,105
A3	3,187
A4	3,208
A5	2,472
A6	2,184
A7	2,130
A8	1,753
A9	2,165
A10	3,093

Point	FPM
B1	2,167
B2	1,969
B3	2,119
B4	2,170
B5	2,827
B6	2,664
B7	2,363
B8	2,274
B9	2,526
B10	3,492

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
50885		20		2545		3.140		7991

Design Data	
Duct Size I.D.	24
Area Sq. Ft.	3.140
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	24
Duct Size I.D.	24
Area Sq. Ft.	3.140
Centerline S.P. In. W.C.	1.28"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	20-May-20	Unit	AHU-2-1	Traverse No.	P-2	Traverse Location	2nd Floor
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Point	FPM
A1	3,317
A2	3,190
A3	3,246
A4	3,091
A5	3,024
A6	3,001
A7	2,928
A8	2,701
A9	2,713
A10	2,513

Point	FPM
B1	2,268
B2	3,032
B3	2,975
B4	2,937
B5	2,934
B6	2,937
B7	2,894
B8	3,065
B9	3,122
B10	2,122

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT. LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).										
Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
58010		20		2901		0.545		1581

Design Data	
Duct Size I.D.	10
Area Sq. Ft.	0.545
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	10
Duct Size I.D.	10
Area Sq. Ft.	0.545
Centerline S.P. In. W.C.	0.98"

[illegible]

AIR MOVING EQUIPMENT DATA

Date	20-May-20	Area Served	2nd Floor		Unit	AHU-2-1 R/A		
Unit Information								
Fan Identification		AHU-2-1 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14070		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	8,275	Fan Sheave		2A64		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1-11/16"		
Fan RPM		DNL	1,416	Shaft C/C		30-1/8"		
TSP ☐ ESP ☒		DNL	1.32"	Belt Size/Number		B78 / 2 (1)		
Inlet SP		-1.51"		Motor				
Discharge SP		-0.19"		Motor Sheave		2VP62		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-1/16"
Control Set Point		-		Sheave Adj.		Max		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		GE Motors				Specified	Actual	
Motor HP		5		Voltage		460	477	472
Service Factor		1.15		Amperage		6.3	5.9	5.9
Phase/Hz		3 / 60		Motor BHP		DNL	4.848	
Heater Size/Rating		-		Motor RPM		1755	1747	
Motor Frame#		184T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	20-May-20	Unit	AHU-2-1	Traverse No.	P-3	Traverse Location	2nd Floor
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,046	1,427	1,284	1,363	1,247	1,822						
B	1,257	1,631	1,780	1,613	1,677	1,984						
C	1,489	1,522	1,874	1,901	2,007	2,019						
D	1,226	1,539	1,879	1,777	1,516	1,343						
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	5,018	6,119	6,817	6,654	6,447	7,168						

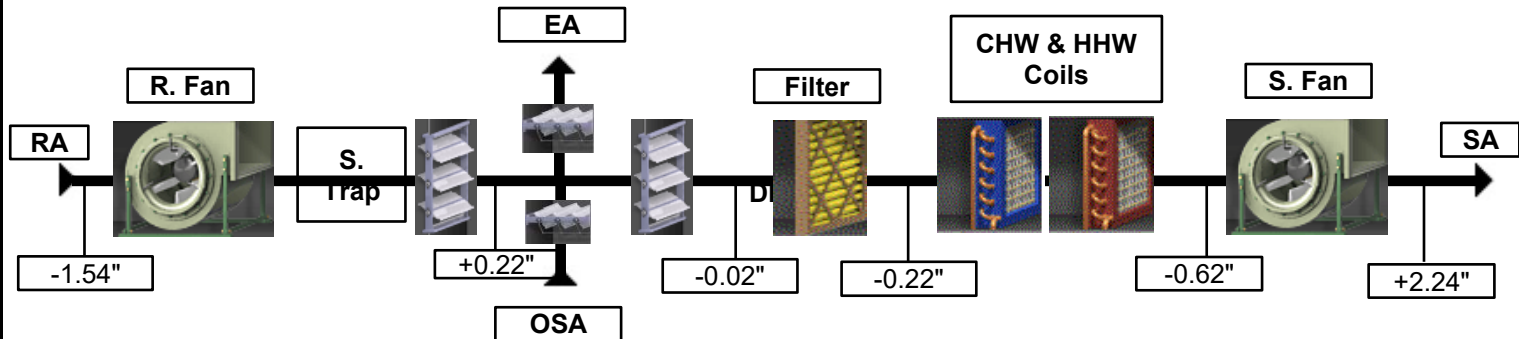
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
38,223		24		1,593		5.194		8,275

Design Data			
Duct Size I.D.	34	X	22
Area Sq. Ft.	5.194		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	34	X	22
Duct Size I.D.	34	X	22
Area Sq. Ft.	5.194		
Centerline S.P. In. W.C.	1.08"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	13-May-20	Area Served	2nd Floor		Unit	AHU-2-2		
Unit Information								
Fan Identification		AHU-2-2		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH12MR		
Type/Size		-		Serial Number		14072		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	4,285	Fan Sheave		A42B46SDS		
Total S/A CFM	DNL/Outlets	DNL	4,091 (1)	Fan Shaft		1 3/8"		
Total R/A CFM	100% OSA	-	-	Shaft C/C		24"		
O/A CFM		100%	100%	Belt Size/Number		5L-650/2 (3)		
Fan RPM		DNL	2,060	Motor				
TSP ☐ ESP ☒		DNL	2.26"	Motor Sheave		2VP68		
Inlet SP		-0.02"		Motor Shaft		1 3/8"		
Discharge SP		+2.24"		Sheave Adj.		Max		
Pre / Final Filter ΔP		P	-	F	0.20" (2)	Fixed Sheave		☒
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		US Electrical Motors		Specified		Actual		
Motor HP		7.5		Voltage		460	476	472
Service Factor		1.15		Amperage		9.5	5.8	5.7
Phase/Hz		3/60		Motor BHP		DNL	4.57	
Heater Size/Rating		-		Motor RPM		1760	1773	
Motor Frame#		213T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +1.48". Actual static pressure @ reference point = +1.64".								

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	13-May-20	Unit	AHU-2-2	Traverse No.	P-1	Traverse Location	2nd Floor Room 216
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	--------------------

Point	FPM
A1	1,774
A2	1,863
A3	1,885
A4	1,923
A5	1,933
A6	2,125
A7	2,381
A8	2,576
A9	2,782
A10	2,732

Point	FPM
B1	1,867
B2	2,015
B3	1,909
B4	1,989
B5	2,010
B6	2,450
B7	2,568
B8	1,787
B9	1,490
B10	1,172

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
41231		20		2062		1.766		3642

Design Data	
Duct Size I.D.	18
Area Sq. Ft.	1.766
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	18
Duct Size I.D.	18
Area Sq. Ft.	1.766
Centerline S.P. In. W.C.	1.77"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	13-May-20	Unit	AHU-2-2	Traverse No.	P-2	Traverse Location	2nd Floor Room 216
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Point	FPM
A1	1,654
A2	1,766
A3	1,813
A4	1,903
A5	1,937
A6	2,000
A7	2,058
A8	2,013
A9	-
A10	-

Point	FPM
B1	1,580
B2	1,217
B3	1,777
B4	1,878
B5	1,938
B6	1,993
B7	1,970
B8	1,992
B9	-
B10	-

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
29489		16		1844		0.349		643

Design Data	
Duct Size I.D.	8
Area Sq. Ft.	0.349
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	8
Duct Size I.D.	8
Area Sq. Ft.	0.349
Centerline S.P. In. W.C.	1.72"

[illegible]

TERMINAL UNIT SUMMARY SHEET (SUPPLY)

Date	13-May-20	Unit	(E) AHU-2-2		Constant ☐	Variable ☒	Single ☒	Dual ☐	Flow Spec	-%	-	+%	-
Terminal Unit	Box Size	Flow Coefficient	Cooling						Heating				
			Design CFM			Actual CFM		%	Design CFM		Actual CFM		%
			MIN	MAX	↓	MIN	MAX		MIN	MAX	MIN	MAX	
		Cooling V.P.											
VC-2-01 (1)	6"	0.30"	DNL	DNL		-	342		-	-	-	-	
VC-2-02 (1)	5"	0.51"	DNL	DNL		-	247		-	-	-	-	
VC-2-03 (1)	6"	0.71"	DNL	DNL		-	150		-	-	-	-	
VC-2-04 (1)	6"	1.24"	DNL	DNL		-	472		-	-	-	-	
VC-2-05 (1)	14"	1.51"	DNL	DNL		-	2,213		-	-	-	-	
VC-2-06 (1)	8"	0.67"	DNL	DNL		-	667		-	-	-	-	
									-	-	-	-	
									-	-	-	-	
HC-7/CC-7	-	0.12"	-	DNL		-	0		-	-	-	-	
CC-8	-	0.43"	-	DNL		-	0		-	-	-	-	
HC-9/CC-9	-	1.00"	-	DNL		-	0		-	-	-	-	
HC-10/CC-10	-	0.47"	-	DNL		-	0						
HC-11/CC-11	-	0.69"	-	DNL		-	0						
Remarks													
		(1) Actuator not responding to t-stat cycling. Actuator found failed open at time of testing.											

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

Date	13-May-20	Unit		(E) AHU-2-2		Flow Spec		-%	-	+%	-
Unit	Room	Outlet No.	Code	Size	Effective Area	Design		N/A	Initial		%
						FPM	CFM		FPM	CFM	
VC-2-01	216	1	CD	24X24	-	-	DNL	-	-	342	
Total VC-2-01							DNL	-		342	
VC-2-02	295	2	CD	24X24	-	-	DNL	-	-	247	
Total VC-2-02							DNL	-		247	
VC-2-03	217	3	CD	24X24	-	-	DNL	-	-	90	
VC-2-03	217A	4	CD	24X24	-	-	DNL	-	-	60	
Total VC-2-03							DNL	-		150	
VC-2-04	295	5	CD	24X24	-	-	DNL	-	-	158	
VC-2-04	218	6	CD	24X24	-	-	DNL	-	-	170	
VC-2-04	220	7	CD	24X24	-	-	DNL	-	-	144	
Total VC-2-04							DNL	-		472	
VC-2-05	219E	8	CD	24X24	-	-	DNL	-	-	476	
VC-2-05	219A	9	CD	24X24	-	-	DNL	-	-	486	
VC-2-05	219A	10	CD	24X24	-	-	DNL	-	-	476	
VC-2-05	219D	11	CD	24X24	-	-	DNL	-	-	646	
VC-2-05	219B	12	CD	24X24	-	-	DNL	-	-	129	
Total VC-2-05							DNL	-		2,213	
VC-2-06	224	13	CD	24X24	-	-	DNL	-	-	132	
VC-2-06	294	14	CD	24X24	-	-	DNL	-	-	130	
VC-2-06	226	15	CD	24X24	-	-	DNL	-	-	140	
VC-2-06	228	16	CD	24X24	-	-	DNL	-	-	120	
VC-2-06	294	17	CD	24X24	-	-	DNL	-	-	145	
Total VC-2-06							DNL	-		667	
Remarks											

AIR MOVING EQUIPMENT DATA

Date	13-May-20	Area Served	2nd Floor		Unit	AHU-2-2 R/A		
Unit Information								
Fan Identification		AHU-2-2 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH12MR		
Type/Size		-		Serial Number		14072		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	4,687	Fan Sheave		6" OD		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		X 1-7/16"		
Fan RPM		DNL	1,704	Shaft C/C		24-7/16"		
TSP ☒ ESP ☐		DNL	1.76"	Belt Size/Number		B64 / 2 (1)		
Inlet SP		-1.54"		Motor				
Discharge SP		+0.22"		Motor Sheave		2VC60		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-1/4"
Control Set Point		-		Sheave Adj.		Max		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		Gould				Specified	Actual	
Motor HP		3		Voltage		460	475	471 472
Service Factor		1.15		Amperage		5	4.2	4.2 3.9
Phase/Hz		3 / 60		Motor BHP		DNL	2.59	
Heater Size/Rating		-		Motor RPM		1745	1767	
Motor Frame#		S182T		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	13-May-20	Unit	AHU-2-2	Traverse No.	P-3	Traverse Location	Roof
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	------

Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,347	1,131	963	1,340								
B	1,931	1,572	1,095	2,008								
C	1,931	1,764	1,370	1,864								
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	5,209	4,467	3,428	5,212								

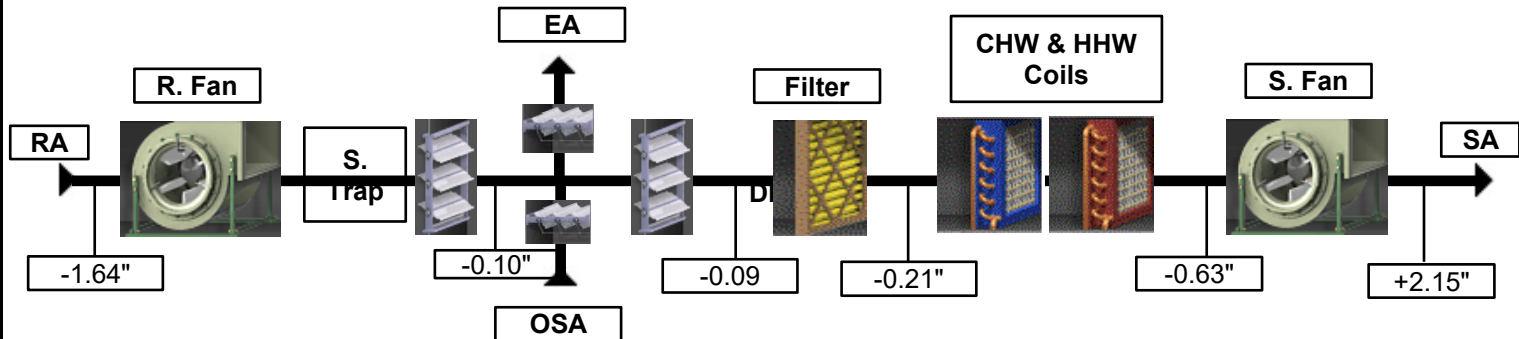
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
18,316		12		1,527		3.069		4,687

Design Data			
Duct Size I.D.	26	X	17
Area Sq. Ft.	3.069		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	28	X	19
Duct Size I.D.	26	X	17
Area Sq. Ft.	3.069		
Centerline S.P. In. W.C.	1.58"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	20-May-20	Area Served	2nd Floor		Unit	AHU-2-2		
Unit Information								
Fan Identification		AHU-2-2		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH12MR		
Type/Size		-		Serial Number		14072		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	3,806	Fan Sheave		A42B46SDS		
Total S/A CFM	DNL/DNT	DNL	DNT (1)	Fan Shaft		1 3/8"		
Total R/A CFM	Traverse	DNL	5,114	Shaft C/C		24"		
O/A CFM		100%	100%	Belt Size/Number		5L-650/2 (3)		
Fan RPM		DNL	2,063	Motor				
TSP ☐ ESP ☒		DNL	2.24"	Motor Sheave		2VP68		
Inlet SP		-0.09"		Motor Shaft		1 3/8"		
Discharge SP		+2.15"		Sheave Adj.		Max		
Pre / Final Filter ΔP		P	-	F	0.12" (2)	Fixed Sheave		☒
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		US Electrical Motors		Specified		Actual		
Motor HP		7.5		Voltage		460	477	480
Service Factor		1.15		Amperage		9.5	5.6	5.7
Phase/Hz		3/60		Motor BHP		DNL	4.323	
Heater Size/Rating		-		Motor RPM		1760	1788	
Motor Frame#		213T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) As advised in "Section 230593 Testing, Adjusting and Balancing" Spec, RSA read unit out for total in full RA mode.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +1.39". Actual static pressure @ reference point = +1.57".								

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	20-May-20	Unit	AHU-2-2	Traverse No.	P-1	Traverse Location	2nd Floor Room 216
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Point	FPM
A1	1,085
A2	1,059
A3	1,112
A4	1,319
A5	1,399
A6	1,729
A7	2,071
A8	2,450
A9	2,635
A10	2,671

Point	FPM
B1	1,921
B2	1,907
B3	1,909
B4	1,733
B5	1,696
B6	1,501
B7	1,646
B8	1,871
B9	2,073
B10	2,374

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
36161		20		1809		1.766		3195

Design Data	
Duct Size I.D.	18
Area Sq. Ft.	1.766
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	18
Duct Size I.D.	18
Area Sq. Ft.	1.766
Centerline S.P. In. W.C.	1.75"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	20-May-20	Unit	AHU-2-2	Traverse No.	P-2	Traverse Location	2nd Floor Room 216
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Point	FPM
A1	1,436
A2	1,775
A3	1,710
A4	1,774
A5	1,888
A6	1,895
A7	2,044
A8	2,101
A9	-
A10	-

The diagram shows a circular cross-section with a vertical centerline. Points A1 through A10 are located on the left half-circle, and points B1 through B10 are located on the right half-circle. The points are numbered 1 through 10 along the top and bottom arcs. The top arc points are labeled 1 through 10 from left to right, and the bottom arc points are labeled 1 through 10 from right to left. The points are numbered 1 through 10 along the top and bottom arcs. The top arc points are labeled 1 through 10 from left to right, and the bottom arc points are labeled 1 through 10 from right to left.

Point	FPM
B1	1,538
B2	1,537
B3	1,629
B4	1,538
B5	1,662
B6	1,741
B7	1,848
B8	1,916
B9	-
B10	-

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
28032		16		1752		0.349		611

Design Data	
Duct Size I.D.	8
Area Sq. Ft.	0.349
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	8
Duct Size I.D.	8
Area Sq. Ft.	0.349
Centerline S.P. In. W.C.	1.67"

[illegible]

AIR MOVING EQUIPMENT DATA

Date	20-May-20	Area Served	2nd Floor		Unit	AHU-2-2 R/A		
Unit Information								
Fan Identification		AHU-2-2 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH12MR		
Type/Size		-		Serial Number		14072		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	5,114	Fan Sheave		6" OD		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		X 1-7/16"		
Fan RPM		DNL	1,705	Shaft C/C		24-7/16"		
TSP ☒ ESP ☐		DNL	1.54"	Belt Size/Number		B64 / 2 (1)		
Inlet SP		-1.64"		Motor				
Discharge SP		-0.10"		Motor Sheave		2VC60		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1-1/4"
Control Set Point		-		Sheave Adj.		Max		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		Gould				Specified	Actual	
Motor HP		3		Voltage		460	480	477 474
Service Factor		1.15		Amperage		5	4.1	3.9 4.2
Phase/Hz		3 / 60		Motor BHP		DNL	2.530	
Heater Size/Rating		-		Motor RPM		1745	1766	
Motor Frame#		S182T		Speed (VFD)		-	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	20-May-20	Unit	AHU-2-2	Traverse No.	P-3	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,244	1,194	1,100	1,601								
B	2,085	1,656	1,210	1,744								
C	2,236	2,017	1,891	2,008								
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	5,565	4,867	4,201	5,353								

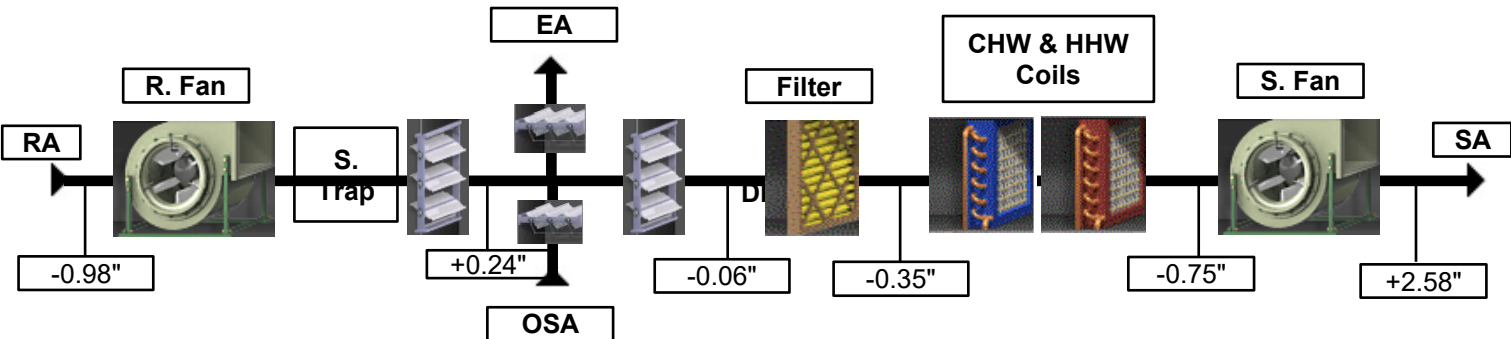
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
19,986		12		1,666		3.069		5,114

Design Data			
Duct Size I.D.	26	X	17
Area Sq. Ft.	3.069		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	28	X	19
Duct Size I.D.	26	X	17
Area Sq. Ft.	3.069		
Centerline S.P. In. W.C.	1.71"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	11-May-20	Area Served	2nd Floor		Unit	AHU-2-3		
Unit Information								
Fan Identification		AHU-2-3		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14071		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	8,248	Fan Sheave		3B2AE5		
Total S/A CFM	DNL/Outlets	DNL	8,170 (1)	Fan Shaft		1 11/16"		
Total R/A CFM	100% OSA	-	-	Shaft C/C		33"		
O/A CFM		100%	100%	Belt Size/Number		B83/2 (3)		
Fan RPM		DNL	1,767	Motor				
TSP ☐ ESP ☒		DNL	2.64"	Motor Sheave		3MVP55B69		
Inlet SP		-0.06"		Motor Shaft		1 5/8"		
Discharge SP		+2.58"		Sheave Adj.		Minimum		
Pre / Final Filter ΔP		P	-	F	0.29" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Gould				Specified	Actual	
Motor HP		15		Voltage		460	480	476 477
Service Factor		1.15		Amperage		20	13.9	14.0 13.6
Phase/Hz		3/60		Motor BHP		DNL	10.76	
Heater Size/Rating		-		Motor RPM		1750	1741	
Motor Frame#		254T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +2.41". Actual static pressure @ reference point = +1.80"								

RECTANGULAR TRAVERSE SHEET (SUPPLY)

Date	11-May-20	Unit	AHU-2-3	Traverse No.	P-1	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,463	1,547	1,875	2,543								
B	1,047	878	1,604	2,009								
C	1,033	1,024	955	1,871								
D	1,134	1,054	1,407	2,125								
E	779	961	1,052	2,021								
F	1,010	804	1,549	2,170								
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	6,466	6,268	8,442	12,739								

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
33,915		24		1,414		5.833		8,248

Design Data			
Duct Size I.D.	35	X	24
Area Sq. Ft.	5.833		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	37	X	26
Duct Size I.D.	35	X	24
Area Sq. Ft.	5.833		
Centerline S.P. In. W.C.	3.11"		

Remarks



TERMINAL UNIT SUMMARY SHEET (SUPPLY)													
Date	11-May-20	Unit	(E) AHU-2-3	Constant	Variable	Single	Dual	Flow Spec	-%	-	+%	-	
Terminal Unit	Box Size	Flow Coefficient	Cooling						Heating				
			Design CFM			Actual CFM		%	Design CFM		Actual CFM		%
			MIN	MAX	↓	MIN	MAX		MIN	MAX	MIN	MAX	
		Cooling V.P.											
VC-2-01 (4)	8"	1.60"	DNL	DNL		-	926		-	-	-	-	
VC-2-02 (4)	5"	1.61"	DNL	DNL		-	350		-	-	-	-	
VC-2-03 (4)	8"	1.39"	DNL	DNL		-	581		-	-	-	-	
VC-2-04 (1)	7"	1.11"	DNL	DNL		-	493		-	-	-	-	
VC-2-05 (4)	14"	0.66"	DNL	DNL		-	1,581		-	-	-	-	
VC-2-06 (2)	10"	0.93"	DNL	DNL		-	1,147		-	-	-	-	
VR-2-07 (4)	12"	0.46"	DNL	DNL		-	1,241		-	-	-	-	
VR-2-08 (4)	6"	1.38"	DNL	DNL		-	436		-	-	-	-	
VR-2-09 (3)	8"	1.15"	DNL	DNL		-	905		-	-	-	-	
VR-2-10 (2)	9"	0.46"	DNL	DNL		-	510		-	-	-	-	
HC/CC-17	-	0.22"	-	DNL		-	0		-	-	-	-	
HC/CC-18	-	0.22"	-	DNL		-	0		-	-	-	-	
HC/CC-19	-	0.20"	-	DNL		-	0		-	-	-	-	
CC-20	-	0.54"	-	DNL		-	0		-	-	-	-	
Remarks													
(1) Unable to locate t-stat. RSA loses the pneumatic lines in the spline ceiling that has no access. RSA failed open by applying main air to actuator.													
(2) T-stat operates actuator.													
(3) Actuator not responding to t-stat cycling.													
(4) DDC controls appear to function.													

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

[illegible]

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

Date	11-May-20	Unit	(E) AHU-2-3			Flow Spec		-%	-	+%	-
Unit	Room	Outlet No.	Code	Size	Effective Area	Design		N/A	Initial		%
						FPM	CFM		FPM	CFM	
VC-2-06	212	19	CD	24X24	-	-	DNL	-	-	71	
VC-2-06	212	20	CD	24X24	-	-	DNL	-	-	123	
VC-2-06	212B	21	CD	24X24	-	-	DNL	-	-	127	
VC-2-06	212A	22	CD	24X24	-	-	DNL	-	-	130	
VC-2-06	212A	23	CD	24X24	-	-	DNL	-	-	112	
VC-2-06	296	24	CD	24X24	-	-	DNL	-	-	150	
VC-2-06	296	25	CD	24X24	-	-	DNL	-	-	149	
VC-2-06	296	26	CD	24X24	-	-	DNL	-	-	151	
VC-2-06	296	27	CD	24X24	-	-	DNL	-	-	134	
Total VC-2-06							DNL	-		1,147	
VR-2-07	203	28	CD	24X24	-	-	DNL	-	-	323	
VR-2-07	203	29	CD	24X24	-	-	DNL	-	-	281	
VR-2-07	203	30	CD	24X24	-	-	DNL	-	-	311	
VR-2-07	203	31	CD	24X24	-	-	DNL	-	-	326	
Total VR-2-07							DNL	-		1,241	
VR-2-08	204	32	CD	24X24	-	-	DNL	-	-	299	
VR-2-08	296	33	CD	24X24	-	-	DNL	-	-	137	
Total VR-2-08							DNL	-		436	
VR-2-09	205	34	CD	24X24	-	-	DNL	-	-	458	
VR-2-09	205	35	CD	24X24	-	-	DNL	-	-	447	
Total VR-2-09							DNL	-		905	
VR-2-10	207	36	CD	24X24	-	-	DNL	-	-	255	
VR-2-10	207	37	CD	24X24	-	-	DNL	-	-	255	
Total VR-2-10							DNL	-		510	
Remarks											

AIR MOVING EQUIPMENT DATA

Date	11-May-20	Area Served	2nd Floor		Unit	AHU-2-3 R/A		
Unit Information								
Fan Identification		AHU-2-3 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14071		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	9,202	Fan Sheave		2B5V70		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1 11/16"		
Fan RPM		DNL	1,336	Shaft C/C		30"		
TSP ☒ ESP ☐		DNL	1.22"	Belt Size/Number		B78/2 (1)		
Inlet SP		-0.98"		Motor				
Discharge SP		+0.24"		Motor Sheave		2VP62		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1 1/8"
Control Set Point		-		Sheave Adj.		Minimum		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		Westinghouse		Specified		Actual		
Motor HP		5		Voltage		460	476	474 477
Service Factor		1.0		Amperage		6.5	5.6	5.7 5.4
Phase/Hz		3/60		Motor BHP		DNL	4.41	
Heater Size/Rating		-		Motor RPM		1740	1893	
Motor Frame#		DNL		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	11-May-20	Unit	AHU-2-3	Traverse No.	P-2	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,787	1,811	1,461	1,090	578							
B	1,654	1,423	1,399	1,301	139							
C	1,629	2,306	940	1,168	908							
D	1,036	611	2,552	1,968	1,842							
E	2,371	2,104	1,734	2,521	1,952							
F	1,952	1,667	1,418	2,099	2,116							
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	10,429	9,922	9,504	10,147	7,535							

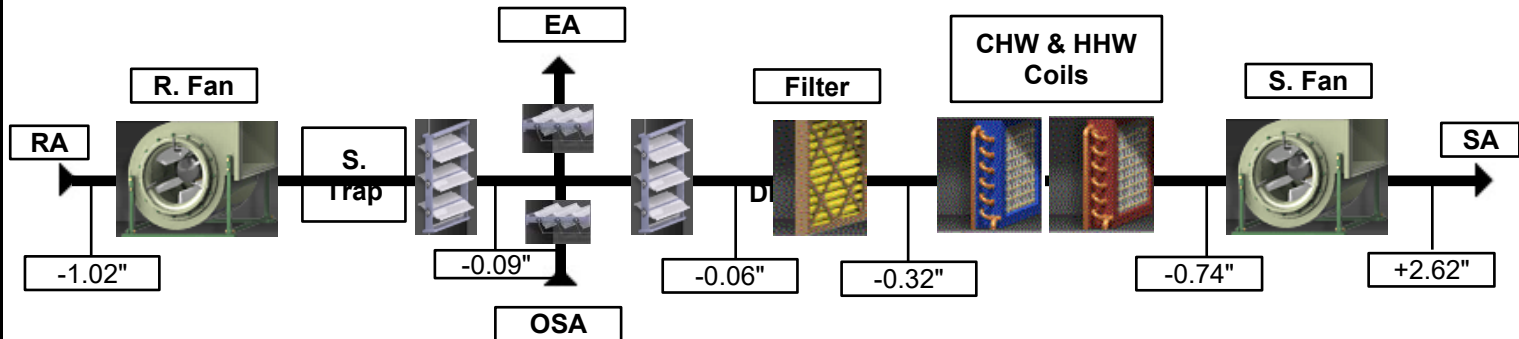
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
47,537		30		1,585		5.806		9,202

Design Data			
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	40	X	24
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
Centerline S.P. In. W.C.	0.55"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	19-May-20	Area Served	2nd Floor		Unit	AHU-2-3		
Unit Information								
Fan Identification		AHU-2-3		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14071		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	12,221	Fan Sheave		3B2AE5		
Total S/A CFM	DNL/DNT	DNL	DNT (1)	Fan Shaft		1 11/16"		
Total R/A CFM	Traverse	DNL	8,766	Shaft C/C		33"		
O/A CFM		-	-	Belt Size/Number		B83/2 (3)		
Fan RPM		DNL	1,730	Motor				
TSP ☐ ESP ☒		DNL	2.68"	Motor Sheave		3MVP55B69		
Inlet SP		-0.06"		Motor Shaft		1 5/8"		
Discharge SP		+2.62"		Sheave Adj.		Minimum		
Pre / Final Filter ΔP		P	-	F	0.26" (2)	Fixed Sheave		☐
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		Gould		Specified		Actual		
Motor HP		15		Voltage		460	478	473
Service Factor		1.15		Amperage		20	14.1	14.3
Phase/Hz		3/60		Motor BHP		DNL	10.849	
Heater Size/Rating		-		Motor RPM		1750	1760	
Motor Frame#		254T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) As advised in "Section 230593 Testing, Adjusting and Balancing" Spec, RSA read unit out for total in full RA mode.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +1.78". Actual static pressure @ reference point = +2.09"								

RECTANGULAR TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU-2-3	Traverse No.	P-1	Traverse Location	Roof
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Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,888	2,222	2,686	2,846								
B	2,217	2,571	2,535	1,608								
C	1,804	1,941	2,097	2,063								
D	1,481	2,123	2,334	1,121								
E	2,398	2,601	2,685	2,269								
F	2,231	2,001	2,030	521								
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	12,019	13,459	14,367	10,428								

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
50,273		24		2,095		5.833		12,221

Design Data			
Duct Size I.D.	35	X	24
Area Sq. Ft.	5.833		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	37	X	26
Duct Size I.D.	35	X	24
Area Sq. Ft.	5.833		
Centerline S.P. In. W.C.	2.61"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	19-May-20	Area Served	2nd Floor		Unit	AHU-2-3 R/A		
Unit Information								
Fan Identification		AHU-2-3 R/A		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH21MR		
Type/Size		-		Serial Number		14071		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	8,766	Fan Sheave		2B5V70		
Total R/A CFM	DNT	DNL	DNT	Fan Shaft		1 11/16"		
Fan RPM		DNL	1,335	Shaft C/C		30"		
TSP ☒ ESP ☐		DNL	0.93"	Belt Size/Number		B78/2 (1)		
Inlet SP		-1.02"		Motor				
Discharge SP		-0.09"		Motor Sheave		2VP62		
Pre / Final Filter ΔP		P	-	F	-	Motor Shaft		1 1/8"
Control Set Point		-		Sheave Adj.		Minimum		
				Fixed Sheave		☐		
Motor Data								
Motor MFG.		Westinghouse		Specified		Actual		
Motor HP		5		Voltage		460	474	472 478
Service Factor		1.0		Amperage		6.5	5.5	5.2 5.5
Phase/Hz		3/60		Motor BHP		DNL	4.286	
Heater Size/Rating		-		Motor RPM		1740	1757	
Motor Frame#		DNL		Speed (VFD)		Single	Single	
Fan Static Profile								
See Supply Static Profile								
Remarks								
(1) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	19-May-20	Unit	AHU 2-3	Traverse No.	P-2	Traverse Location	Roof
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	------

Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,952	1,225	1,309	1,048	686							
B	1,292	1,101	1,521	1,203	669							
C	1,075	1,209	1,847	1,431	1,717							
D	1,107	829	880	1,363	2,064							
E	2,324	2,347	1,542	1,956	2,598							
F	2,396	1,713	907	2,134	1,854							
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	10,146	8,424	8,006	9,135	9,588							

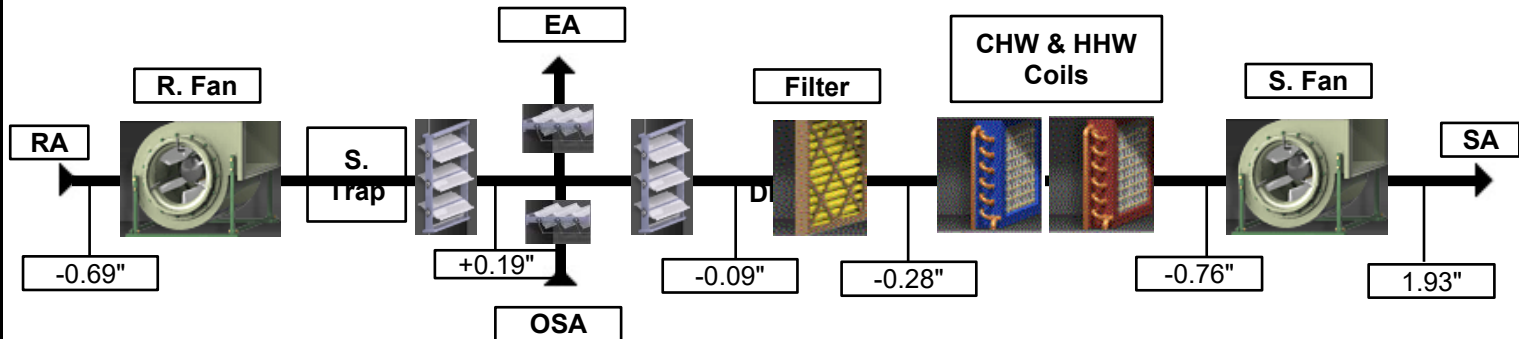
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
45,299		30		1,510		5.806		8,766

Design Data			
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	40	X	24
Duct Size I.D.	38	X	22
Area Sq. Ft.	5.806		
Centerline S.P. In. W.C.	1.15"		

[illegible]

AIR MOVING EQUIPMENT DATA

Date	19-May-20	Area Served	2nd Floor		Unit	AHU-2-4		
Unit Information								
Fan Identification		AHU-2-4		Equipment MFG		Temtrol		
Equipment Location		Roof		Model Number		DH12MR		
Type/Size		-		Serial Number		14523		
Fan Data								
Measurement	Method	Specified	Actual	Fan				
Total Fan CFM	Traverse	DNL	5,220	Fan Sheave		42 2B SDS		
Total S/A CFM	DNL/Outlets	DNL	4,184 (1)	Fan Shaft		1 7/16"		
Total R/A CFM	100% OSA	-	-	Shaft C/C		22 3/4"		
O/A CFM		100%	100%	Belt Size/Number		5L-650 G (3)		
Fan RPM		DNL	2,202	Motor				
TSP ☐ ESP ☒		DNL	2.02"	Motor Sheave		2VP68		
Inlet SP		-0.09"		Motor Shaft		1 5/16"		
Discharge SP		+1.93"		Sheave Adj.		Minimum		
Pre / Final Filter ΔP		P	-	F	0.21" (2)	Fixed Sheave		☒
Control Set Point		-		(4)				
Motor Data								
Motor MFG.		U.S. Electrical				Specified	Actual	
Motor HP		7.5		Voltage		460	477	478 480
Service Factor		1.15		Amperage		10.3	6.6	6.6 6.4
Phase/Hz		3/60		Motor BHP		DNL	4.946	
Heater Size/Rating		-		Motor RPM		1745	1750	
Motor Frame#		213T		Speed (VFD)		Single	Single	
Temperature Data								
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-	
Fan Static Profile								
								
Remarks								
(1) Airflow total includes induction air. See following primary air sheet for excluded induction airflows at VAVs.								
(2) Filters dirty.								
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.								
(4) BMS static pressure reference point = +0.58". Actual static pressure @ reference point = +0.97"								

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU 2-4	Traverse No.	P-1	Traverse Location	Ceiling
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	---------

Point	FPM
A1	2,949
A2	2,649
A3	2,528
A4	2,561
A5	2,533
A6	2,572
A7	2,550
A8	2,883
A9	2,825
A10	2,785

The diagram shows a circle with a horizontal diameter and a vertical diameter intersecting at the center. There are 20 points marked on the circle's circumference, labeled A1 through A10 and B1 through B10. Points A1 through A10 are located on the horizontal diameter, and points B1 through B10 are located on the vertical diameter. The points are numbered 1 to 10 from the center outwards on each axis. The labels A1 through A10 are placed to the left of the horizontal axis, and B1 through B10 are placed to the right of the vertical axis.

Point	FPM
B1	2,022
B2	2,281
B3	2,496
B4	2,717
B5	2,693
B6	3,188
B7	3,171
B8	2,559
B9	2,958
B10	3,057

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
53977		20		2699		0.545		1471

Design Data	
Duct Size I.D.	10
Area Sq. Ft.	0.545
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	10
Duct Size I.D.	10
Area Sq. Ft.	0.545
Centerline S.P. In. W.C.	1.23"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU 2-4	Traverse No.	P-2	Traverse Location	Ceiling
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	---------

Point	FPM
A1	2,337
A2	2,554
A3	2,673
A4	2,691
A5	2,735
A6	2,783
A7	2,812
A8	2,829
A9	2,762
A10	2,738

Point	FPM
B1	2,614
B2	2,686
B3	2,764
B4	2,766
B5	2,701
B6	2,755
B7	2,778
B8	2,731
B9	2,765
B10	2,767

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
54241		20		2713		1.068		2899

Design Data	
Duct Size I.D.	14
Area Sq. Ft.	1.068
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	14
Duct Size I.D.	14
Area Sq. Ft.	1.068
Centerline S.P. In. W.C.	1.00"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU 2-4	Traverse No.	P-3	Traverse Location	Ceiling
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	---------

Point	FPM
A1	2,615
A2	2,485
A3	2,489
A4	2,450
A5	2,403
A6	2,439
A7	2,439
A8	2,571
A9	-
A10	-

Point	FPM
B1	2,107
B2	2,445
B3	2,271
B4	2,308
B5	2,562
B6	2,595
B7	2,436
B8	2,340
B9	-
B10	-

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
38955		16		2435		0.349		850

Design Data	
Duct Size I.D.	8
Area Sq. Ft.	0.349
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	8
Duct Size I.D.	8
Area Sq. Ft.	0.349
Centerline S.P. In. W.C.	1.43"

[illegible]



Terminal Unit Summary Sheet (Supply)														
Date	19-May-20	Unit	(E) AHU-2-4	Constant	Variable	Single	Dual	Flow Spec	-%	-	+%	-		
Terminal Unit	Box Size	Flow Coefficient	Cooling						Heating					
			Design CFM			Actual CFM		%	Design CFM		Actual CFM		%	
			MIN	MAX	↓	MIN	MAX		MIN	MAX	MIN	MAX		
		Cooling V.P.												
VC-2-01 (1)	10"	0.63"	DNL	DNL		-	913		-	-	-	-		
VR-2-02 (2)	8"	0.41"	DNL	DNL		-	616		-	-	-	-		
VR-2-03 (2)	8"	0.36"	DNL	DNL		-	514		-	-	-	-		
VR-2-04 (2)	6"	0.77"	DNL	DNL		-	365		-	-	-	-		
VR-2-05 (2)	14"	0.54"	DNL	DNL		-	1,776		-	-	-	-		
HC/CC-12	10"	0.46"	DNL	DNL		-	0		-	-	-	-		
HC/CC-15	8"	0.48"	DNL	DNL		-	0		-	-	-	-		
Remarks														
(1) Actuator not responding to t-stat cycling.														
(2) DDC controls appear to function.														

DIFFUSER & GRILLE TEST SHEET (SUPPLY)

[illegible]

(1) Thermostat does not operate the actuator. Opened manually for testing.

[illegible]

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	19-May-20	Unit	AHU-2-4	Traverse No.	P-4	Traverse Location	Roof
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	------

Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,039	991	448	829	1,038							
B	918	541	448	521	1,123							
C	1,152	1,331	1,466	1,491	1,642							
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	3,109	2,863	2,362	2,841	3,803							

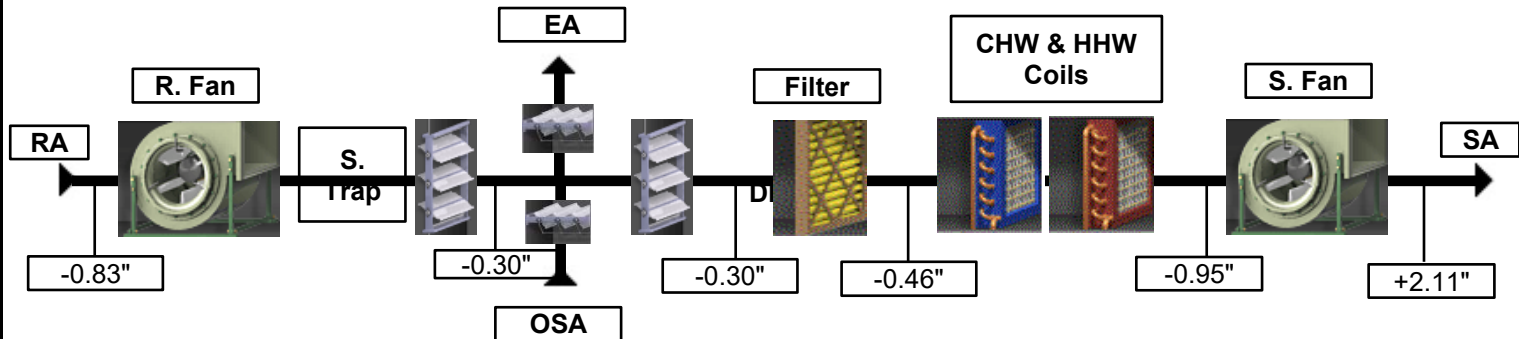
Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
14,978		15		999		3.750		3,746

Design Data			
Duct Size I.D.	30	X	18
Area Sq. Ft.	3.750		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	32	X	20
Duct Size I.D.	30	X	18
Area Sq. Ft.	3.750		
Centerline S.P. In. W.C.	0.71"		

Remarks

AIR MOVING EQUIPMENT DATA

Date	19-May-20	Area Served	2nd Floor		Unit	AHU-2-4			
Unit Information									
Fan Identification		AHU-2-4		Equipment MFG		Temtrol			
Equipment Location		Roof		Model Number		DH12MR			
Type/Size		-		Serial Number		14523			
Fan Data									
Measurement	Method	Specified	Actual	Fan					
Total Fan CFM	Traverse	DNL	4,601	Fan Sheave		42 2B SDS			
Total S/A CFM	DNL/DNT	DNL	DNT (1)	Fan Shaft		1 7/16"			
Total R/A CFM	Traverse	DNL	4,241	Shaft C/C		22 3/4"			
O/A CFM		-	-	Belt Size/Number		5L-650 G (3)			
Fan RPM		DNL	2,200	Motor					
TSP ☐ ESP ☒		DNL	2.43"	Motor Sheave		2VP68			
Inlet SP		-0.30"		Motor Shaft		1 5/16"			
Discharge SP		+2.11"		Sheave Adj.		Minimum			
Pre / Final Filter ΔP		P	-	F	(2)	Fixed Sheave		☒	
Control Set Point		-		(4)					
Motor Data									
Motor MFG.		U.S. Electrical		Specified		Actual			
Motor HP		7.5		Voltage		460	476	480	477
Service Factor		1.15		Amperage		10.3	6.6	6.3	6.3
Phase/Hz		3/60		Motor BHP		DNL		4.839	
Heater Size/Rating		-		Motor RPM		1745		1780	
Motor Frame#		213T		Speed (VFD)		Single		Single	
Temperature Data									
Clg E.A.T.	-	Clg L.A.T.	-	Htg E.A.T.	-	Htg L.A.T.	-		
Fan Static Profile									
									
Remarks									
(1) As advised in "Section 230593 Testing, Adjusting and Balancing" Spec, RSA read unit out for total in full RA mode.									
(2) Filters dirty.									
(3) Fan sheaves and belt shows excessive signs of wear. Cracked and missing chunks of belt as well as other debris inside fan cabinet.									
(4) BMS static pressure reference point = +0.54". Actual static pressure @ reference point = +0.93"									

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU 2-4	Traverse No.	P-1	Traverse Location	Ceiling
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	---------

Point	FPM
A1	2,334
A2	2,320
A3	2,221
A4	2,115
A5	2,011
A6	2,043
A7	2,088
A8	2,346
A9	2,262
A10	2,118

Point	FPM
B1	1,716
B2	1,686
B3	1,713
B4	1,817
B5	1,692
B6	1,993
B7	2,216
B8	2,252
B9	2,413
B10	2,474

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
41830		20		2092		0.545		1140

Design Data	
Duct Size I.D.	10
Area Sq. Ft.	0.545
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	10
Duct Size I.D.	10
Area Sq. Ft.	0.545
Centerline S.P. In. W.C.	1.27"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU 2-4	Traverse No.	P-2	Traverse Location	Ceiling
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	---------

Point	FPM
A1	2,550
A2	2,566
A3	2,493
A4	2,530
A5	2,579
A6	2,674
A7	2,587
A8	2,624
A9	2,658
A10	2,657

Point	FPM
B1	2,526
B2	2,572
B3	2,672
B4	2,619
B5	2,680
B6	2,689
B7	2,727
B8	2,711
B9	2,682
B10	2,667

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT.
LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).

Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
52463		20		2624		1.068		2804

Design Data	
Duct Size I.D.	14
Area Sq. Ft.	1.068
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	14
Duct Size I.D.	14
Area Sq. Ft.	1.068
Centerline S.P. In. W.C.	0.94"

[illegible]

ROUND DUCT TRAVERSE SHEET (SUPPLY)

Date	19-May-20	Unit	AHU 2-4	Traverse No.	P-3	Traverse Location	Ceiling
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	---------

Point	FPM
A1	1,651
A2	1,605
A3	1,706
A4	1,786
A5	1,916
A6	2,143
A7	2,093
A8	2,019
A9	-
A10	-

Point	FPM
B1	1,747
B2	2,009
B3	1,968
B4	1,911
B5	1,882
B6	2,005
B7	1,949
B8	1,743
B9	-
B10	-

CONSTANTS MULTIPLIED BY DUCT DIAMETER FOR DISTANCES OF PITOT TUBE TIP FROM INSIDE OF DUCT. LOCATION OF POINTS FOR EQUAL AREA (POINT A AND B).										
Points in one Diameter	1	2	3	4	5	6	7	8	9	10
6 Points	-	-	0.0435	0.1465	0.2965	0.7041	0.8535	0.9564	-	-
8 Points	-	0.0323	0.1047	0.1938	0.3232	0.6768	0.8052	0.8953	0.9677	-
10 Points	0.0257	0.0817	.1465	0.2265	0.3491	0.6581	0.7738	0.8535	0.9133	0.9743

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
30133		16		1884		0.349		657

Design Data	
Duct Size I.D.	8
Area Sq. Ft.	0.349
FPM	DNL
CFM	DNL

Test Data	
Duct Size O.D.	8
Duct Size I.D.	8
Area Sq. Ft.	0.349
Centerline S.P. In. W.C.	1.43"

[illegible]

AIR MOVING EQUIPMENT DATA

[illegible]

RECTANGULAR TRAVERSE SHEET (RETURN)

Date	19-May-20	Unit	AHU-2-4	Traverse No.	P-4	Traverse Location	Roof
-------------	-----------	-------------	---------	---------------------	-----	--------------------------	------

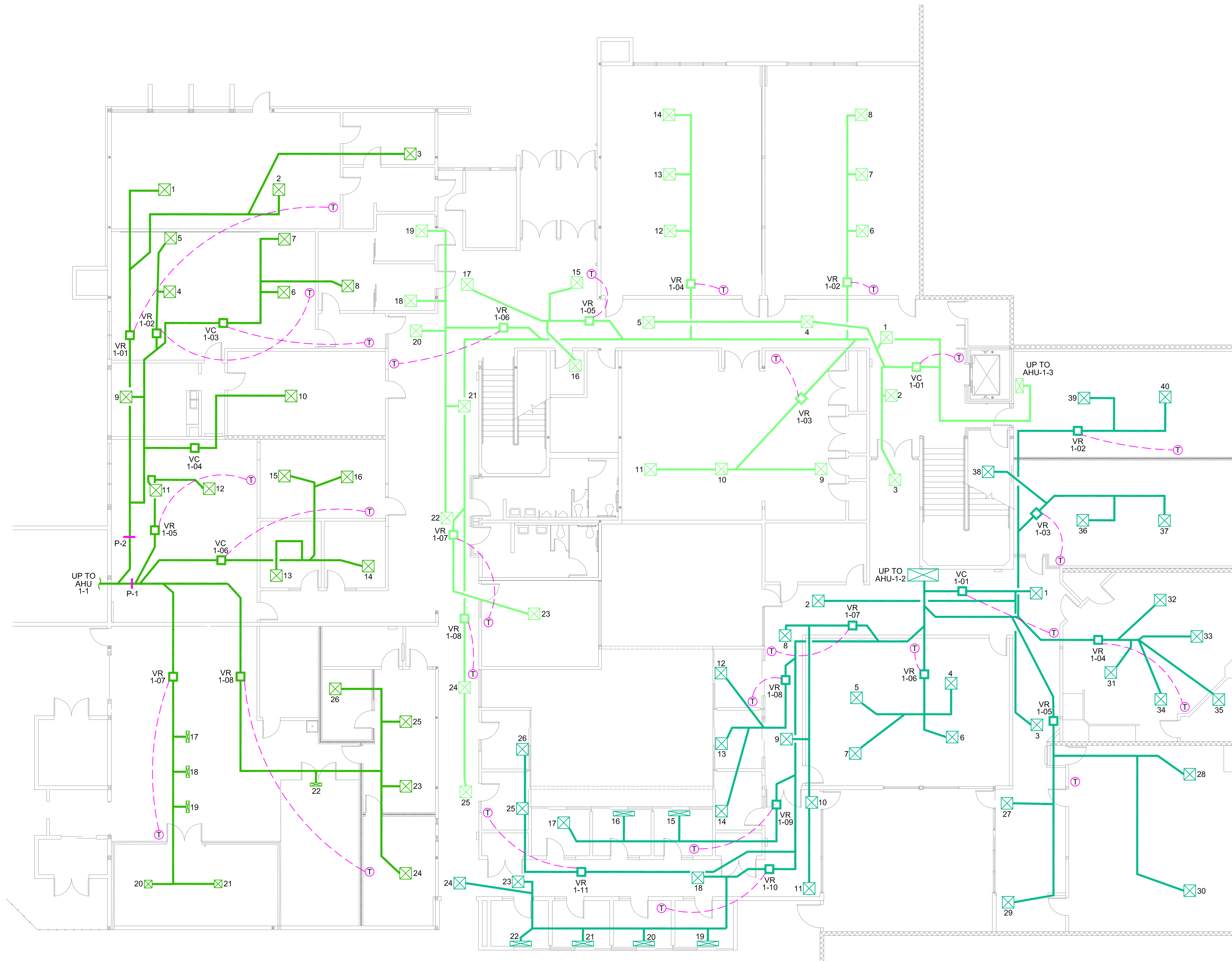
Point No.	1	2	3	4	5	6	7	8	9	10	11	12
A	1,098	936	813	651	753							
B	1,289	1,075	563	924	989							
C	1,504	1,578	1,377	1,706	1,703							
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
N												
Sub Total	3,891	3,589	2,753	3,281	3,445							

Total FPM	÷	No. of Readings	=	Avg. FPM	X	Area	=	Total CFM
16,959		15		1,131		3.750		4,241

Design Data			
Duct Size I.D.	30	X	18
Area Sq. Ft.	3.750		
FPM	DNL		
CFM	DNL		

Test Data			
Duct Size O.D.	32	X	20
Duct Size I.D.	30	X	18
Area Sq. Ft.	3.750		
Centerline S.P. In. W.C.	0.84"		

Remarks



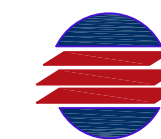
FIRST FLOOR



ENVIRONMENTAL SYSTEM TEST & BALANCE

1035 SUNCAST LN. STE. 130
EL DORADO HILLS, CA., 95762
PH: 888-330-1935
FAX: 916-358-5673

ASSOCIATED AIR BALANCE COUNCIL



AABC
CA. LIC. 748756

DATE: REVISIONS:

PROJECT NAME:
CONTRA COSTA COMMUNITY COLLEGE
APPLIED ARTS BUILDING - EXISTING SYSTEM SURVEY
MARTINEZ, CA
SURVEY

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HVAC PLAN

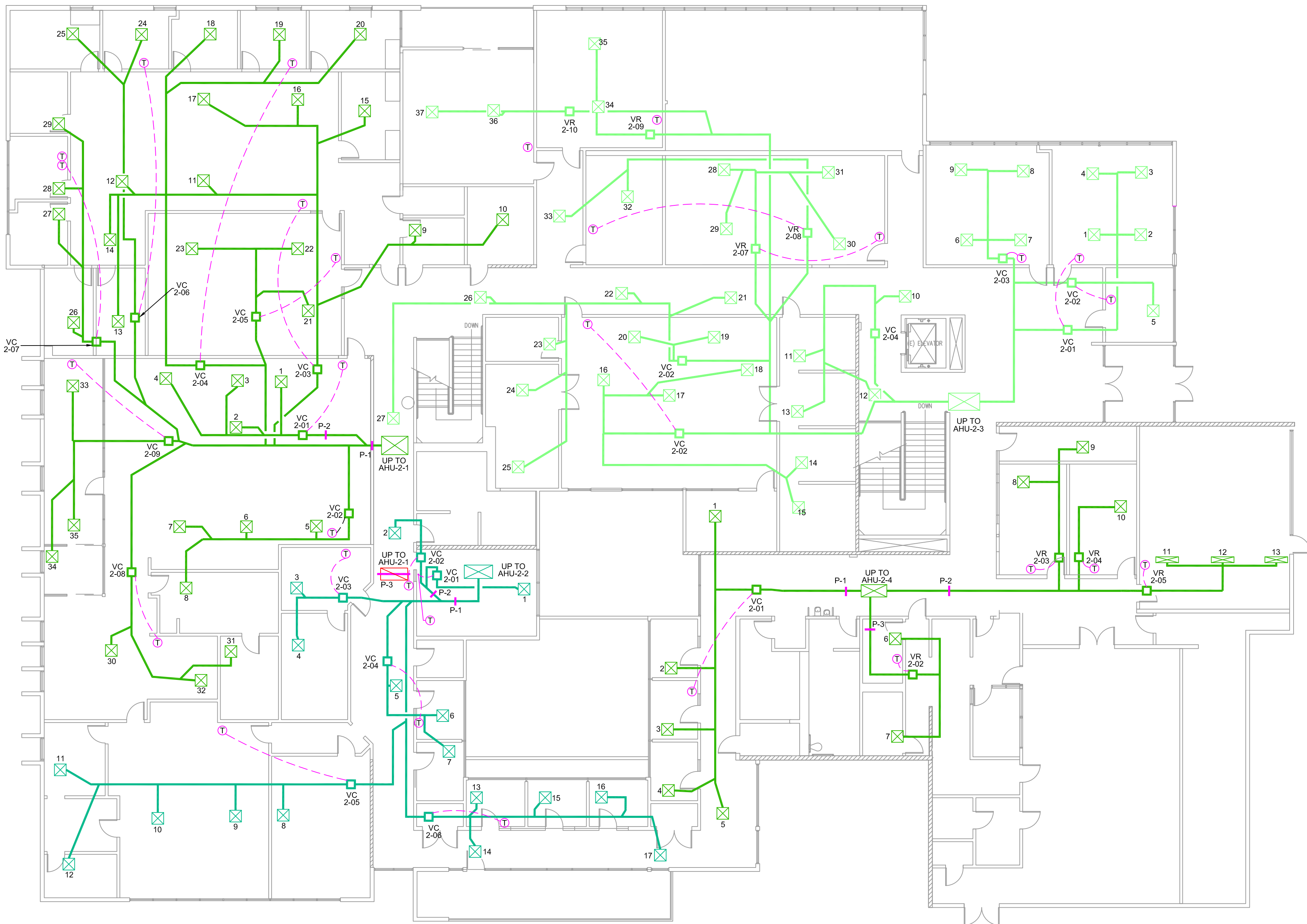
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5-20-20 M.LOBERG M.LOBERG

SCALE: NTS

JOB# 26675-S

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M2.1



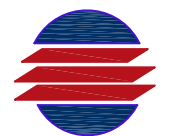
SECOND FLOOR



ENVIRONMENTAL SYSTEM TEST & BALANCE

1035 SUNCAST LN. STE. 130
EL DORADO HILLS, CA., 95762
PH: 888-330-1935
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ASSOCIATED AIR BALANCE COUNCIL



AABC
CA. LIC. 748756

DATE: REVISIONS:

PROJECT NAME:
CONTRA COSTA COMMUNITY COLLEGE
APPLIED ARTS BUILDING - EXISTING SYSTEM SURVEY
MARTINEZ, CA
SURVEY

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