Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
CINCINNATI, OH 45246

NATIONAL TAB

Comfort. Under control.

Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 05/09/2023

PROJECT

Raymore Commerce Ctr (Raymore, MO)

1200 SOUTH DEAN AVE

RAYMORE, MO 64083

Client

Metro Air Conditioning
8151 McCoy

Shawnee, KS 66227

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

Table Of Contents

Issue List

- MUA Airflow

CERTIFICATION

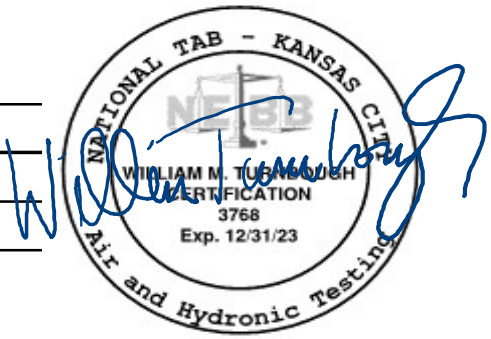
PROJECT: RAYMORE COMMERCE CENTER (RAYMORE, MO)

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems. The measurements shown, and the information given, in this report are certified to be accurate and complete, at the time and date information was gathered. Any variances from design quantities, which exceed NEBB tolerances, are noted in the TAB report project summary.

NEBB TAB FIRM:	National TAB - Kansas City
REGISTRATION NO:	3768
CERTIFIED BY:	Will Turnbough
DATE:	5/9/2023

Submitted and Certified by:

NEBB TAB FIRM:	National TAB - Kansas City
TAB PROFESSIONAL:	Will Turnbough
REGISTRATION NO:	CP-24289
CERTIFICATION EXP:	12/31/2023



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Raymore Commerce Ctr (Raymore, MO)

Project Issue Information

Issue Name : MUA Airflow

Description : Unable to reduce the MUA's to 8500 CFM of OA. When closing all dampers past ~9.5 Vdc, the units tripped off on a "Supply Air Proving Fault". Max pressure across burner per tag is 0.95" and measured pressure drop exceeded this upper limit. Set to lowest setpoint possible and measured OA as is.

Created By : National TAB

Assigned To : National TAB - Will Turnbough

Status : Open

Originated Date : 05/09/2023 - Will Turnbough - National TAB

Project Issue Response Details

- **05/09/2023 National TAB - Will Turnbough**
  - Recommended consulting Rupp to determine next steps. Possibly the pulley could be changed to reduce airflow and therefore reducing the pressure drop across the burner.

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: AHU/RTU

Comfort. Under control.

Asset: MUA1 AREA:

Unit Data		
	Design	**Actual**
MFG	RUPP	RUPP
Serial Num	-	
Model Num	NA	NA
Type	-	
Configuration	-	
Num OA Filters 1	-	
OA Filter Size 1	-	
Num Final Filter 1	-	
Final Filter Size 1	-	
Num Final Filter 2	-	
Final Filter Size 2	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	
Frame	-	
Horsepower	-	
Motor Rpm	-	
Phase	-	
Rated Voltage	-	
Rated Amperage	-	

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	
Fan Sheave Size	-	
Fan Sheave Bore	-	
Belt CL Distance	-	
Num of Belts	-	
Belt Size	-	
Belt Alignment	-	

Test Data		
	Design	**Actual**
SF CFM	37000	
SF RPM	-	
RA CFM	-	
OA CFM	8510	13561
RL Voltage	-	
RL Amperage	-	
SF Rotation	-	
RA Damper Position	-	
Min OA Damper Position	-	9.5VDC
Min OA Damper Type	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	
Fan Suction SP	-	
Fan Discharge SP	-	
Total ESP	across burner	0.93"
Fan Total SP	-	

Completed By: Will Turnbough on

Notes: OA and Pressure across burner taken under windy conditions with 19mph wind gusts.

Date: 05/04/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: AHU/RTU

Comfort. Under control.

Asset: MUA2 AREA:

Unit Data		
	Design	**Actual**
MFG	RUPP	RUPP
Serial Num	-	
Model Num	NA	NA
Type	-	
Configuration	-	
Num OA Filters 1	-	
OA Filter Size 1	-	
Num Final Filter 1	-	
Final Filter Size 1	-	
Num Final Filter 2	-	
Final Filter Size 2	-	

Test Data		
	Design	**Actual**
SF CFM	37000	
SF RPM	-	
RA CFM	-	
OA CFM	8510	12836
RL Voltage	-	
RL Amperage	-	
SF Rotation	-	
RA Damper Position	-	
Min OA Damper Position	-	9.0VDC
Min OA Damper Type	-	
OA Enthalpy Setpt	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	
Frame	-	
Horsepower	-	
Motor Rpm	-	
Phase	-	
Rated Voltage	-	
Rated Amperage	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	
Fan Suction SP	-	
Fan Discharge SP	-	
Total ESP	across burner	0.90"
Fan Total SP	-	

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	
Fan Sheave Size	-	
Fan Sheave Bore	-	
Belt CL Distance	-	
Num of Belts	-	
Belt Size	-	
Belt Alignment	-	

Completed By: Will Turnbough on

Notes: SUPPLY AIR PROVING FAULT AT 9.5VDC OA and Pressure across burner taken under windy conditions with 19mph wind gusts.

Date: 05/04/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: AHU/RTU

Comfort. Under control.

Asset: MUA3 AREA:

Unit Data		
	Design	**Actual**
MFG	RUPP	RUPP
Serial Num	-	
Model Num	NA	NA
Type	-	
Configuration	-	
Num OA Filters 1	-	
OA Filter Size 1	-	
Num Final Filter 1	-	
Final Filter Size 1	-	
Num Final Filter 2	-	
Final Filter Size 2	-	

Test Data		
	Design	**Actual**
SF CFM	37000	
SF RPM	-	
RA CFM	-	
OA CFM	8510	13569
RL Voltage	-	
RL Amperage	-	
SF Rotation	-	
RA Damper Position	-	
Min OA Damper Position	-	9.5VDC
Min OA Damper Type	-	
OA Enthalpy Setpt	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	
Frame	-	
Horsepower	-	
Motor Rpm	-	
Phase	-	
Rated Voltage	-	
Rated Amperage	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	
Fan Suction SP	-	
Fan Discharge SP	-	
Total ESP	across burner	0.94"
Fan Total SP	-	

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	
Fan Sheave Size	-	
Fan Sheave Bore	-	
Belt CL Distance	-	
Num of Belts	-	
Belt Size	-	
Belt Alignment	-	

Completed By: Will Turnbough on

Notes: OA and Pressure across burner taken under windy conditions with 19mph wind gusts.

Date: 05/04/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: AHU/RTU

Comfort. Under control.

Asset: MUA4 AREA:

Unit Data		
	Design	**Actual**
MFG	RUPP	RUPP
Serial Num	-	
Model Num	NA	NA
Type	-	
Configuration	-	
Num OA Filters 1	-	
OA Filter Size 1	-	
Num Final Filter 1	-	
Final Filter Size 1	-	
Num Final Filter 2	-	
Final Filter Size 2	-	

Test Data		
	Design	**Actual**
SF CFM	37000	
SF RPM	-	
RA CFM	-	
OA CFM	8510	13621
RL Voltage	-	
RL Amperage	-	
SF Rotation	-	
RA Damper Position	-	
Min OA Damper Position	-	9.5VDC
Min OA Damper Type	-	
OA Enthalpy Setpt	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	
Frame	-	
Horsepower	-	
Motor Rpm	-	
Phase	-	
Rated Voltage	-	
Rated Amperage	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	
Fan Suction SP	-	
Fan Discharge SP	-	
Total ESP	across burner	0.93"
Fan Total SP	-	

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	
Fan Sheave Size	-	
Fan Sheave Bore	-	
Belt CL Distance	-	
Num of Belts	-	
Belt Size	-	
Belt Alignment	-	

Completed By: Will Turnbough on

Notes: OA and Pressure across burner taken under windy conditions with 19mph wind gusts.

Date: 05/04/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU-1 AREA:OFFICE

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	2622C05880
Model Num	48FCEA05A2A6	48FCEA05A2A6A0A0A0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	14.25X28.25
Num PreFilter 1	-	2
PreFilter Size 1	-	16x25x2

Motor Data		
	Design	**Actual**
Motor MFG	-	UTO
Frame	-	UTO
Horsepower	-	1.1
Motor Rpm	-	UTO
Phase	-	3
Rated Voltage	-	460
Rated Amperage	-	1.5
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	1600	1594
RA CFM	1380	1368
OA CFM	220	226
RL Voltage	-	497/496/499
RL Amperage	-	1.05/1.04/1.05
OA Damper Position	-	0.5" MARKED
Brake Horse Power	-	0.76

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.20"
Fan Suction SP	-	-0.37"
Fan Discharge SP	-	0.62"
Total ESP	0.50"	0.82"
Fan Total SP	-	0.99"

Completed By: Jacob Davidson on 01/26/2023

Notes: [1] MOTOR LABEL NOT ACCESSIBLE. MOTOR INFORMATION TAKEN FROM UNIT LABEL. [2] SPEED SETPOINT AT 7.6VDC POSITION B 35% [3] ECONOMIZER MODULE NOT FUNCTIONING. OA WAS SET MANUALLY.

Date: 01/26/2023

National TAB

Project:Raymore Commerce Ctr (Raymore, MO)

AHU/RTU

Comfort. Under control.

Diffuser Supply (GRD)

RTU-1/OFFICE

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
1-1	OFFICE	SD-1	10"	400	482	398	99.5
1-2	OFFICE	SD-1	10"	400	478	394	98.5
1-3	OFFICE	SD-1	10"	375	427	384	102.4
1-4	OFFICE	SD-2	6"	25	46	36	144.0
1-5	OFFICE	SD-1	10"	400	474	382	95.5

Completed By: Jacob Davidson on 01/26/2023

Asset	Notes	Date
1-4	DAMPER FULLY CLOSED. UNABLE TO LOWER ANYMORE.	01/26/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF-1 AREA:RESTROOM

Unit Data		
	Design	**Actual**
MFG	GREENHECK	COOK
Model Num	SPA-A110	GEMINI 140 SERIES SONEBUSTER
Serial Num	-	NA

Test Data		
	Design	**Actual**
CFM	75	90

Motor Data		
	Design	**Actual**
Motor MFG	-	QUEACE
Horsepower	25W	15W
Motor Rpm	950	1550
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	0.40/0.22

Completed By: Jacob Davidson on 04/06/2023

Notes: UNIT IS TWO SPEED AND SET TO THE LOWEST SPEED POSSIBLE.

Date: 04/06/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF-A1 AREA:FIRE SPRINKLER ROOM

Unit Data		
	Design	**Actual**
MFG	NA	COOK
Model Num	NA	120 ACE 120C15D
Serial Num	-	299sj96172-00/0000701
Type	-	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	-	1100
RL Voltage	-	NOT SAFE
RL Amperage	-	NOT SAFE
Suction ESP	-	-0.80"
Discharge ESP	-	ATM
Total ESP	-	0.80

Motor Data		
	Design	**Actual**
Motor MFG	-	QUEACE
Frame	-	48Y
Horsepower	-	1/4
Motor Rpm	-	1550/1300
Phase	-	1
Voltage (rated)	-	115
Amperage (rated)	-	3.3
Service Factor	-	NL

Completed By: Jacob Davidson on 04/06/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: FAN - Supply

Asset: MAU-1 AREA:WAREHOUSE

Unit Data		
	Design	**Actual**
MFG	NA	RUPP AIR SYSTEMS
Model Num	NA	RAM-M 36
Serial Num	-	5242784
Type	-	GAS FIRED
Configuration	-	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	286T
Horsepower	-	30
Motor Rpm	-	1770
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	69.4/34.7
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	3B5V54
Motor Bore Size	-	1-7/8"
Fan Sheave Size	-	3B5V0250
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	30-1/2"
Num of Belts	-	3
Belt Size	-	5VX-1120
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	**Actual**
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	55
Discharge Air Temp SetPt	-	60
Air Flow Switch SP Actual	-	0.56

Test Data		
	Design	**Actual**
CFM	37000	35573
SF RPM	368	2347
Motor RPM	-	1767
RL Voltage	-	491/493/494
RL Amperage	-	27.8/28.4/29.4
Total ESP	-	UTO
Fan Discharge SP	-	UTO

General		
	Design	**Actual**
Fan Rotation Correct	-	YES

Completed By: Michael Gabbert on

Notes:OA DAMPER SETTING = 9.5 VDC / OA = 13561 CFM / BURNER DIFF PRESSURE = 0.93"

Date:05/09/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: FAN - Supply

Asset: MAU-2 AREA:WAREHOUSE

Unit Data		
	Design	**Actual**
MFG	NA	RUPP AIR SYSTEMS
Model Num	NA	RAM-M 36
Serial Num	-	5242784
Type	-	GAS FIRED
Configuration	-	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	286T
Horsepower	-	30
Motor Rpm	-	1770
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	69.4/34.7
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	3B5V54
Motor Bore Size	-	1-7/8"
Fan Sheave Size	-	3B5V250
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	30-1/2"
Num of Belts	-	3
Belt Size	-	5VX-1120
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	**Actual**
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	55MIN
Discharge Air Temp SetPt	-	120MAX
Air Flow Switch SP Actual	-	0.77"

Test Data		
	Design	**Actual**
CFM	37000	36044
SF RPM	368	2345
Motor RPM	-	1779
RL Voltage	-	493/496/494
RL Amperage	-	24.45/24.89/25.98
Total ESP	-	UTO
Fan Discharge SP	-	UTO

General		
	Design	**Actual**
Fan Rotation Correct	-	YES

Completed By: Michael Gabbert on

Notes:OA DAMPER SETTING = 9.5 VDC / OA = 12836 CFM / BURNER DIFF PRESSURE = 0.90"

Date:05/09/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: FAN - Supply

Asset: MAU-3 AREA:WAREHOUSE

Unit Data		
	Design	**Actual**
MFG	NA	RUPP AIR SYSTEMS
Model Num	NA	RAM-M 36
Serial Num	-	5242784
Type	-	GAS FIRED
Configuration	-	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	286T
Horsepower	-	30
Motor Rpm	-	1770
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	69.4/34.7
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	3B5V54
Motor Bore Size	-	1-7/8"
Fan Sheave Size	-	3B5V250
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	30-1/2"
Num of Belts	-	3
Belt Size	-	5VX-1120
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	**Actual**
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	55MIN
Discharge Air Temp SetPt	-	120MAX
Air Flow Switch SP Actual	-	0.54"

Test Data		
	Design	**Actual**
CFM	37000	36568
SF RPM	368	2349
Motor RPM	-	1764
RL Voltage	-	493/492/494
RL Amperage	-	28.7/29.5/29.7
Total ESP	-	UTO
Fan Discharge SP	-	UTO

General		
	Design	**Actual**
Fan Rotation Correct	-	YES

Completed By: Michael Gabbert on

Notes:OA DAMPER SETTING = 9.5 VDC / OA = 13569 CFM / BURNER DIFF PRESSURE = 0.94"

Date:05/09/2023

National TAB

Project: Raymore Commerce Ctr (Raymore, MO)

System/Unit: FAN - Supply

Asset: MAU-4 AREA:WAREHOUSE

Unit Data		
	Design	**Actual**
MFG	NA	RUPP AIR SYSTEMS
Model Num	NA	RAM-M 36
Serial Num	-	5242784
Type	-	GAS FIRED
Configuration	-	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	286T
Horsepower	-	30
Motor Rpm	-	1770
Phase	-	3
Voltage (rated)	-	230/460
Amperage (rated)	-	69.4/34.7
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	3B5V54
Motor Bore Size	-	1-7/8"
Fan Sheave Size	-	3B5V250
Fan Sheave Bore	-	2-7/16"
Belt CL Distance	-	30-1/2"
Num of Belts	-	3
Belt Size	-	5VX-1120
Belt Alignment Verified	-	VERIFIED GOOD

Gas Heat		
	Design	**Actual**
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	55MIN
Discharge Air Temp SetPt	-	120MAX
Air Flow Switch SP Actual	-	0.47"

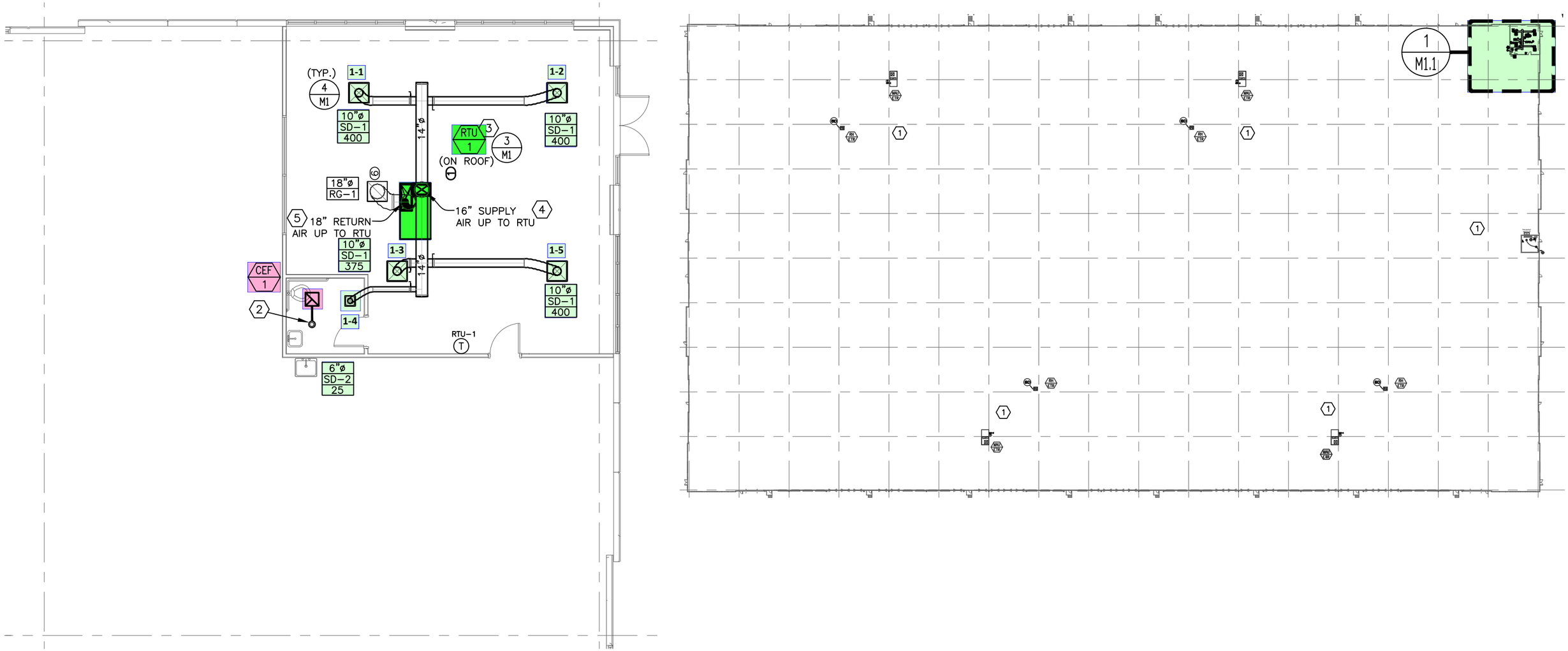
Test Data		
	Design	**Actual**
CFM	37000	35416
SF RPM	368	2339
Motor RPM	-	1771
RL Voltage	-	493/491/492
RL Amperage	-	28.7/29.2/29.7
Total ESP	-	UTO
Fan Discharge SP	-	UTO

General		
	Design	**Actual**
Fan Rotation Correct	-	YES

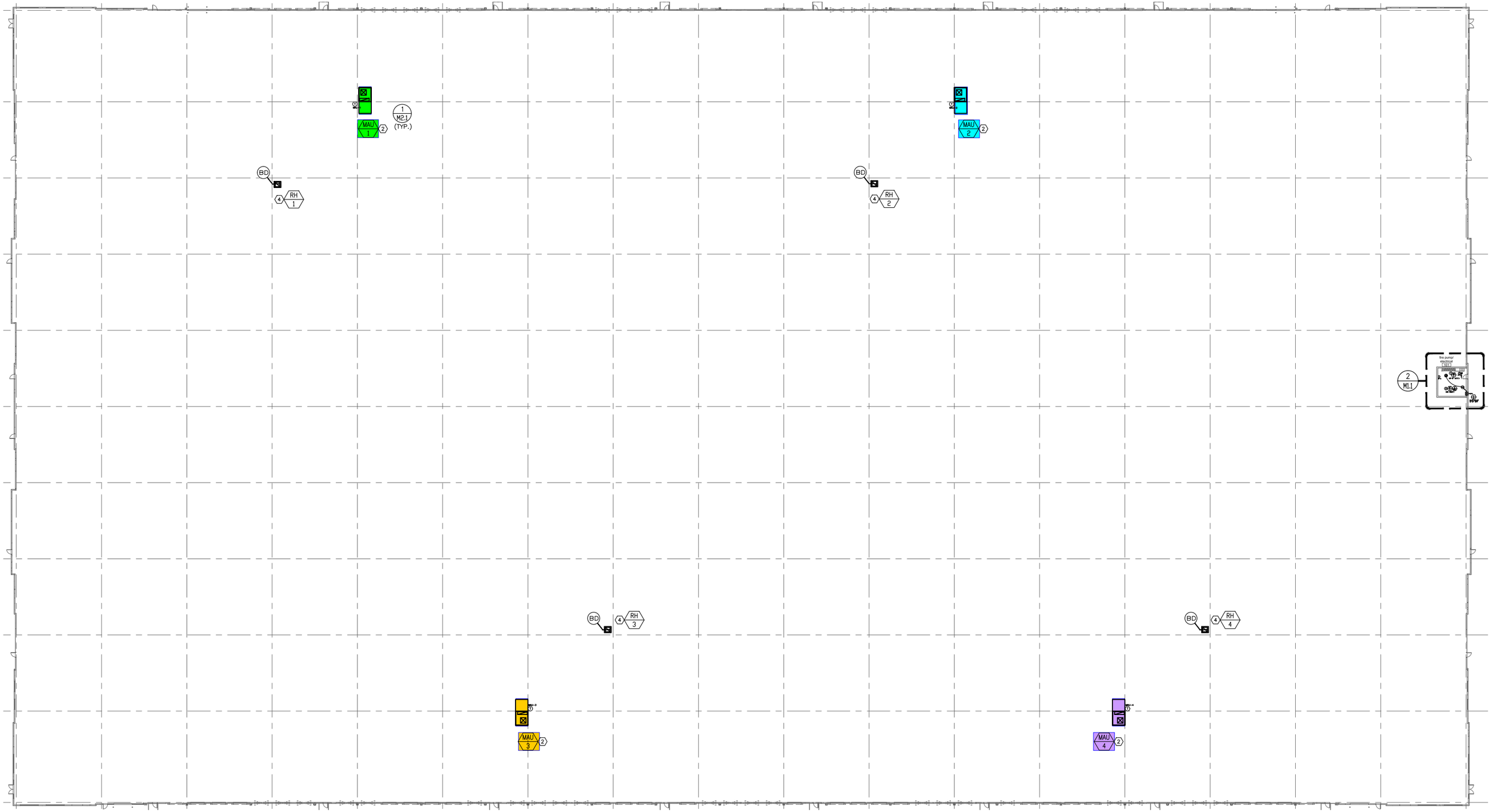
Completed By: Michael Gabbert on

Notes:OA DAMPER SETTING = 9.5 VDC / OA = 13621 CFM / BURNER DIFF PRESSURE = 0.93"

Date:05/09/2023



1 Detail Mechanical Floor Plan



1 Overall Mechanical Floor Plan