

Report By:

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Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 07/31/2024
Completed By: National TAB

PROJECT

10-14-24 WAWA #05803 ROBERTSDALE, AL

21022 HWY 59 BALDWIN

ROBERTSDALE, AL 36567

Client

Wawa

260 West Baltimore Pike

Wawa, PA 19063

National TAB

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Project Summary

The summary below provides a quick understanding of our scope of work and general testing procedures. Enclosed in the report is further detail about your building performance including recommendations, asset data, and pictures. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints.

RTU's (Roof Top Units) w/ Diffusers

Each of the RTU's were measured at their terminal devices or via traverse to establish a total flow for that unit. Each RTU was adjusted to within tolerance of the engineer's design flow. Each outlet was then adjusted to within tolerance of the design flow. Outside air was measured by reading the intake air opening with a velocity grid and multiplying by the free area. The outside air damper was adjusted until the airflow was within the design requirements. Any equipment that fell outside of that tolerance is noted throughout the report.

General Exhaust Fans w/ Grilles

The general exhaust fans were measured by reading each air device with a flow hood. The total airflow for each fan is equivalent to the sum of these readings. Fan speed was then adjusted so that the airflow was within tolerance of design. Each terminal device was balanced to within tolerance of the design volume using the installed volume dampers. Any equipment that fell outside of this tolerance is noted throughout the report.

Ceiling Exhaust Fans

The ceiling exhaust fans were measured using a flow hood. If speed adjustment was provided, the fan speed was adjusted to within design tolerance. Any equipment that fell outside of this tolerance is noted throughout the report.

Final Building Tests

After completing the test and balance the final building pressure was measured. It was confirmed that the building pressure fell within acceptable tolerances and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.

AIR BALANCE SCHEDULE

UNIT	AREA SERVED	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
RTU-1	RETAIL	3400	3338	2790	2710	610	628	17.9%	18.8%						
RTU-2	FOOD SERVICE	4000	4147	3350	3478	650	669	16.3%	16.1%						
RTU-3	RETAIL	3000	3131	2610	2730	390	401	13.0%	12.8%						
EF-1	FOOD SERVICE													1150	1089
EF-2	WATER ROOM													60	102
TOTALS		10400	10616	8750	8918	1650	1698			0	0	0	0	1210	1191

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	1650	1698
TOTAL EXHAUST	1210	1191
NET AIRFLOW	440	507

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H ₂ O)
FRONT	0.008
SIDE	0.009
REAR	0.007
AVERAGE	0.008

FINAL CHECKS

- ACTUAL NET AIRFLOW COINCIDES WITH DESIGN: ✓

- MEASURED PRESSURES COINCIDES WITH ACTUAL NET AIRFLOW: ✓

- PRESSURE FALLS WITHIN IMC TOLERANCE OF +/-0.02" W.C. ✓

NOTES:

CheckList List

- SITE PICTURES



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CheckList Information

Name : SITE PICTURES Status : Not Completed
Assigned Organization : National TAB Asset :
Requesting Organization : National TAB
Created Date : 06/27/2024 - Brianna Biggs - National TAB

CheckList Item Details

STORE FRONT

Comment:



07/11/2024

RTU-1

Comment:



07/11/2024

RTU-2

Comment:



07/11/2024

RTU-3

Comment:



07/11/2024

EF-1

Comment:



07/11/2024

EF-2

Comment:



07/11/2024

CheckList List

- TECH - STEP 1: RTU's/AHU's
- TECH - STEP 2: LENNOX SETUP PARAMETERS
- TECH - STEP 3: SENSOR WIRING (LENNOX)
- TECH - STEP 4: EF'S



10-14-24 WAWA #05803 ROBERTSDALE, AL

CheckList Information

Name : TECH - STEP 1: RTU's/AHU's **Status :** Completed

Assigned Organization : National TAB **Asset :**

Requesting Organization : National TAB

Created Date : 06/27/2024 - Brianna Biggs - National TAB

Completed Date : 07/11/2024 - Mark Johnson - National TAB

CheckList Item Details

RTU's/AHU's

All diffusers and grilles are installed and match design? Pass

Comment:

Clean filters installed? Pass

Comment:

Economizers are assembled and functional? Pass

Comment:

Motors are all operating below the FLA rating? Pass

Comment:

Are belts tight? N/A

Comment:

Direct drive

If direct drive unit is the speed controller working? Pass

Comment:

Is gas piping installed and valves turned on?

N/A

Comment:

Electric heating

Condensate drains are installed?

Pass

Comment:

Unit free of noticeable noise and vibration

Pass

Comment:

Final outside air damper position is marked with permanent marker?

Pass

Comment:

No alarms present?

Pass

Comment:

Any noticeable duct leakage?

Pass

Comment:

Total supply and OA flows are balanced within +/-5% and supply & return diffusers within +/-10%?

Fail

Comment:

Diffuser 1-3 is at 77% design flow. All other supply diffusers, OA flows, and totals are balanced within tolerance.

IN TEST MODE, TEST THE FOLLOWING:

Cooling mode is operational? Record EAT/LAT for each unit:

Pass

Comment:

RTU 1: DAT=65°F, RAT=74°F RTU 2: DAT=66°F, RAT=75°F RTU 3: DAT=64°F, RAT=75°F

Heating mode is operational? Record EAT/LAT for each unit:

Pass

Comment:

RTU 1: DAT=79°F, RAT=76°F RTU 2: N/A RTU 3: DAT=80°F, RAT=77°F

Dehumidification mode is operational? (Feel dehumidification coil with your hand. Is it hot?) Record EAT/LAT for each unit:

Pass

Comment:

RTU 1: DAT=75°F, RAT=74°F RTU 2: DAT=79°F, RAT=77°F RTU 3: DAT=74°F, RAT=76°F



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CheckList Information

Name : TECH - STEP 2: LENNOX SETUP PARAMETERS **Status :** Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 06/27/2024 - Brianna Biggs - National TAB
Completed Date : 07/11/2024 - Mark Johnson - National TAB

CheckList Item Details

UNIT ID CONFIGURATIONS

BACNET CONFIGURATION: GO TO SETTINGS>GENERAL>CONFIGURATION ID1 POSITION 5 SET TO "N". Pass

Comment:

NETWORK CONFIGURATION: GO TO SETUP>NETWORK INTEGRATION, SET TO BACNET IP Pass

Comment:

CONTROL MODE: SET CONTROL MODE TO ROOM SENSOR: CO2, TEMP & HUMIDITY (PER UNIT, AS NEEDED). Pass

Comment:

INDIVIDUAL PARAMETER CONFIGURATIONS (MECHANICAL CONTRACTOR TO DEFINE / AS APPLICABLE):

PARAMETER 105 DEHUMID MODE: 7 NO CONDITIONS Pass

Comment:

PARAMETER 106 DEHUMID SETPOINT: 50, THIS IS A CENTERED SET POINT (+/-) Yes

Comment:

PARAMETER 107 DEHUMID DEADBAND: 3 (DEFAULT) THIS IS THE ACTUAL +/- VALUE Pass

Comment:

PARAMETER 117 CO2 DAMPER MAX OPEN: 50%

Pass

Comment:

PARAMETER 118 CO2 START OPEN PPM: 1500

Pass

Comment:

PARAMETER 119 CO2 MAX OPEN PPM: 1500

Pass

Comment:

PARAMETER 137 OCCHET SET POINT: 68 (BACK UP)

Pass

Comment:

PARAMETER 131 SET TO THE SAME % AS THE MINMIUM OA DAMPER SETPOINT

Pass

Comment:

PARAMETER 139 OCC COOLING SET POINT: 72 (BACK UP)

Pass

Comment:

PARAMETER 154 OCC BLOWER MODE: ON-CONTINUOUS 1

Pass

Comment:

CFM VALUES / MSAV FAN SPEEDS (AIR BALANCER TO DEFINE / IF APPLICABLE):

OA DAMPER SET TO SAME POSITION IN ALL FAN SPEEDS?

Pass

Comment:

ALL FAN SPEEDS SET TO THE SAME CFM VALUE (ENTER SETPOINTS BELOW)

Pass

Comment:

RTU 1: 62% RTU 2: 82% RTU 3: 65%

HEAT CFM VALUE: PER THE HVAC SCHEDULE

Pass

Comment:

HIGH COOL CFM VALUE: THE HIGH COOL CFM VALUE

Pass

Comment:

LOW COOL CFM VALUE: MATCH THE HIGH COOL CFM VALUE

Pass

Comment:

VENTILATION CFM VALUE: MATCH THE HIGH COOL CFM VALUE

Pass

Comment:



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CheckList Information

Name : TECH - STEP 3: SENSOR WIRING (LENNOX) **Status :** Completed

Assigned Organization : National TAB **Asset :**

Requesting Organization : National TAB

Created Date : 06/27/2024 - Brianna Biggs - National TAB

Completed Date : 07/11/2024 - Mark Johnson - National TAB

CheckList Item Details

COMBINATION TEMPERATURE/HUMIDITY SENSOR

Sensors are installed where shown on the drawing? Pass

Comment:

2 conductor shielded cable has one wire landed to Vin, one to GND, and the shield wire is not connected. Pass

Comment:

For second shielded cable, one wire is landed to Vout and the shield wire is not connected. Pass

Comment:

Verify that the CORE or Prodigy controller is sensing a relative humidity (record the reading) Pass

Comment:

RTU 1: 55% RTU 2: 67% RTU 3: 62%



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CheckList Information

Name : TECH - STEP 4: EF'S **Status :** Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 06/27/2024 - Brianna Biggs - National TAB
Completed Date : 07/11/2024 - Mark Johnson - National TAB

CheckList Item Details

EF's

Rotation is correct? Pass

Comment:

Belts are tight (if applicable)? N/A

Comment:

Direct drive

Speed controller installed and functional (if applicable)? Pass

Comment:

There is no major leakage around base of fan? Pass

Comment:

Is the motor operating below the motor FLA rating? Fail

Comment:

EF-1 is above full load amps at all speeds. Required speed for design flow is marked on the speed controller.

Back draft damper installed and can it fully open? Pass

Comment:

Unit free of noticeable noise and vibration?

Pass

Comment:

Total exhaust flow balanced within +/-5% and grilles are within +/-10%?

Fail

Comment:

Bathroom exhaust grilles are at -50% (women's), +30% (men's stall), and -28% (men's urinal). EF-2 is at +70% exhaust flow at minimum speed.



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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

System/Unit: AHU/RTU

Asset: RTU1

AREA:RETAIL

Unit Data		
	Design	Actual
MFG	LENNOX ENLIGHT	LENNOX
Serial Num	-	5623L01920
Model Num	LCT102H4E	LCT102H4EG1Y
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23x14.25
Num Final Filter 1	-	4
Final Filter Size 1	-	20x25x2

Test Data		
	Design	Actual
SF CFM	3400	3338
RA CFM	2790	2710
OA CFM	610	628
RL Voltage	-	212/213/213
RL Amperage	-	3.0/2.4/2.5
SF System SetPt	-	62%
RA Damper Position	-	69%
RA Damper Type	-	ECONOMIZER
OA Damper Position	-	31%
OA Damper Type	-	ECONOMIZER

Motor Data		
	Design	Actual
Motor MFG	-	EBMPAPST
Frame	-	N/A
Horsepower	3.75	3.8
Motor Rpm	-	2200
Phase	3	3
Rated Voltage	208	200-240
Rated Amperage	-	8.7
Service Factor	-	N/A

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.36"
Fan Suction SP	-	-0.69"
Fan Discharge SP	-	0.45"
Total ESP	0.5"	0.81"
Fan Total SP	-	1.14"

Drive Data	
	Actual
Motor Sheave Size	DD
Motor Bore Size	DD
Motor Sheave SetPt	DD
Fan Sheave Size	DD
Fan Sheave Bore	DD
Belt CL Distance	DD
Num of Belts	DD
Belt Size	DD

Completed By: Mark Johnson on 07/11/2024



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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

AHU/RTU

Diffuser Supply (GRD)

RTU1/RETAIL

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	RETAIL	LD1	10"	300	1	429	345	281	93.7
SGRD2	RETAIL	LD1	10"	300	1	428	329	300	100.0
SGRD3	RETAIL	LD1	10"	300	1	267	227	232	77.3
SGRD4	ASSOCIATES	CD1	8"	150	1	178	153	147	98.0
SGRD5	OFFICE	CD1	8"	150	1	201	174	156	104.0
SGRD6	RETAIL	LD1	10"	325	1	512	421	350	107.7
SGRD7	RETAIL	LD1	10"	325	1	463	399	323	99.4
SGRD8	RETAIL	LD1	10"	300	1	289	260	271	90.3
SGRD9	RETAIL	LD1	10"	290	1	344	278	313	107.9
SGRD10	DELIVERY VESTIBULE	CD1	8"	200	1	261	219	192	96.0
SGRD11	RETAIL	LD1	10"	280	1	430	343	295	105.4
SGRD12	RETAIL	LD1	10"	280	1	122	108	285	101.8
SGRD13	REAR VESTIBULE	CD3	6"	100	1	94	87	93	93.0
SGRD14	MENS RR	CD3	6"	50	1	109	99	54	108.0
SGRD15	WOMENS RR	CD3	6"	50	1	120	92	46	92.0
Total				3400		4247	3534	3338	98.18%

Asset	Notes	Date	Written By
SGRD3	Unable to increase airflow to this diffuser without being a detriment to the overall unit performance. Not anticipated to be an issue since it serves an open retail space.	08/01/2024	Will Turnbough



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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

System/Unit: AHU/RTU

Asset: RTU2

AREA:FOOD SERVICE

Unit Data		
	Design	Actual
MFG	LENNOX ENLIGHT	LENNOX
Serial Num	-	5624B06330
Model Num	LCT120H4E	LCT120H4EN1Y
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23x14.25
Num Final Filter 1	-	4
Final Filter Size 1	-	20x25x2

Motor Data		
	Design	Actual
Motor MFG	-	EBMPAPST
Frame	-	N/A
Horsepower	3.75	3.8
Motor Rpm	-	2200
Phase	3	3
Rated Voltage	208	200-240
Rated Amperage	-	8.7
Service Factor	-	N/A

Drive Data	
	Actual
Motor Sheave Size	DD
Motor Bore Size	DD
Motor Sheave SetPt	DD
Fan Sheave Size	DD
Fan Sheave Bore	DD
Belt CL Distance	DD
Num of Belts	DD
Belt Size	DD

Test Data		
	Design	Actual
SF CFM	4000	4147
RA CFM	3350	3478
OA CFM	650	669
RL Voltage	-	211/212/212
RL Amperage	-	5.5/5.5/5.6
SF System SetPt	-	82%
RA Damper Position	-	75%
RA Damper Type	-	ECONOMIZER
OA Damper Position	-	25%
OA Damper Type	-	ECONOMIZER

Performance Data		
	Design	Actual
MA Plenum SP	-	-1.27"
Fan Suction SP	-	-1.66"
Fan Discharge SP	-	0.55"
Total ESP	0.5"	1.82"
Fan Total SP	-	2.21"

Completed By: Mark Johnson on 07/11/2024



National TAB

Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

AHU/RTU

Diffuser Supply (GRD)

RTU2/FOOD SERVICE

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	FOOD SERVICE	LD1	10"	400	1	319	389	418	104.5
SGRD2	FOOD SERVICE	LD1	10"	400	1	335	364	389	97.3
SGRD3	FOOD SERVICE	LD1	10"	400	1	405	391	408	102.0
SGRD4	FOOD SERVICE	LD1	12"	500	1	635	522	539	107.8
SGRD5	FOOD SERVICE	LD1	12"	500	1	368	508	533	106.6
SGRD6	FOOD SERVICE	LD1	12"	500	1	363	420	495	99.0
SGRD7	WASHROOM	LD1	10"	400	1	425	445	411	102.8
SGRD8	BACKROOM	CD1	10"	300	1	493	310	328	109.3
SGRD9	STAGING	CD1	6"	50	1	95	52	52	104.0
SGRD10	ELECTRICAL ROOM	CD1	12"	550	1	524	565	574	104.4
Total				4000		3962	3966	4147	103.68%



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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

System/Unit: AHU/RTU

Asset: RTU3

AREA:RETAIL

Unit Data		
	Design	Actual
MFG	LENNOX ENLIGHT	LENNOX
Serial Num	-	5623L02244
Model Num	LCT092H4E	LCT092H4EG1Y
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23x14.25
Num Final Filter 1	-	4
Final Filter Size 1	-	20x25x2

Motor Data		
	Design	Actual
Motor MFG	-	EBMPAPST
Frame	-	N/A
Horsepower	3.75	3.8
Motor Rpm	-	2200
Phase	3	3
Rated Voltage	208	200-240
Rated Amperage	-	8.7
Service Factor	-	N/A

Drive Data	
	Actual
Motor Sheave Size	DD
Motor Bore Size	DD
Motor Sheave SetPt	DD
Fan Sheave Size	DD
Fan Sheave Bore	DD
Belt CL Distance	DD
Num of Belts	DD
Belt Size	DD

Test Data		
	Design	Actual
SF CFM	3000	3131
RA CFM	2610	2730
OA CFM	390	401
RL Voltage	-	211/212/212
RL Amperage	-	2.9/3.0/3.0
SF System SetPt	-	65%
RA Damper Position	-	77%
RA Damper Type	-	ECONOMIZER
OA Damper Position	-	23%
OA Damper Type	-	ECONOMIZER

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.75"
Fan Suction SP	-	-1.02"
Fan Discharge SP	-	0.46"
Total ESP	0.5"	1.21"
Fan Total SP	-	1.48"

Completed By: Mark Johnson on 07/11/2024



National TAB

Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

AHU/RTU

Diffuser Supply (GRD)

RTU3/RETAIL

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	FRONT VESTIBULE	CD2	12"	590	1	761	597	607	102.9
SGRD2	RETAIL	LD1	10"	310	1	109	402	331	106.8
SGRD3	RETAIL	LD1	10"	300	1	446	253	320	106.7
SGRD4	RETAIL	LD1	10"	300	1	640	285	309	103.0
SGRD5	COFFEE/SPECIALTY BEV	LD1	10"	300	1	110	434	327	109.0
SGRD6	COFFEE/SPECIALTY BEV	LD1	10"	300	1	82	381	319	106.3
SGRD7	COFFEE/SPECIALTY BEV	LD1	10"	300	1	484	309	306	102.0
SGRD8	RETAIL	LD1	10"	300	1	425	265	307	102.3
SGRD9	RETAIL	LD1	10"	300	1	121	282	305	101.7
Total				3000		3178	3208	3131	104.37%



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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

System/Unit: FAN - Exhaust

Asset: EF1

AREA:

Unit Data		
	Design	Actual
MFG	GREENHECK	GREENHECK
Model Num	G-140	G-140-B-4-1-22-X
Serial Num	-	24139800
Type	DOWNBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	N/A
Frame	-	48Y
Horsepower	1/4	1/4
Motor Rpm	-	1140
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	3.2
Service Factor	-	1.00

Test Data		
	Design	Actual
CFM	1150	1064
Fan Rotation	-	CW
System SetPt	-	SPEED CONTROLLER
RL Voltage	-	96
RL Amperage	-	3.0
Total ESP	0.25"	0.42"
Fan Inlet SP	-	-0.42"
Fan Discharge SP	-	ATM

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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF1/

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
EGRD1	FOOD SERVICE	G1	12"	500	1.0	748	493	481	96.2
EGRD2	WASHROOM	G1	10"	300	1.0	455	432	287	95.7
EGRD3	STAGING	G1	6"	100	1.0	31	109	108	108.0
EGRD4	WOMENS RR	G3	6"	100	1.0	62	64	52	52.0
EGRD5	MENS RR	G3	6"	50	1.0	85	82	62	124.0
EGRD6	MENS RR	G3	6"	100	1.0	89	93	74	74.0
Total				1150		1470	1273	1064	92.52%



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Project: 10-14-24 WAWA #05803 ROBERTSDALE, AL

System/Unit: FAN - Exhaust

Asset: EF2

AREA:

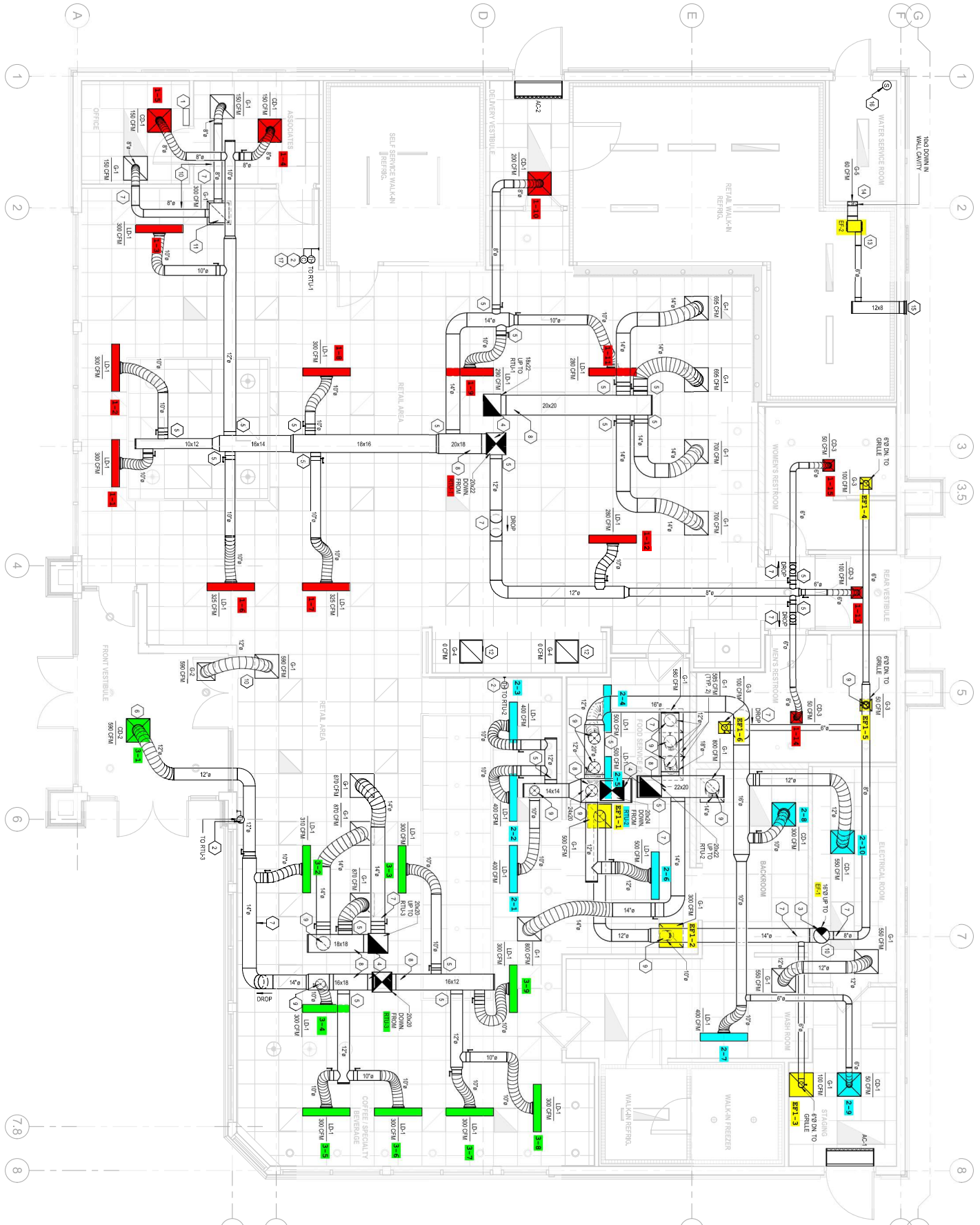
Unit Data		
	Design	Actual
MFG	GREENHECK	GREENHECK
Model Num	CSP-B110	CSP-A110
Serial Num	-	24134467
Type	INLINE	INLINE
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	Actual
CFM	60	102
Fan Rotation	-	CCW
System SetPt	-	MIN
RL Voltage	-	123
RL Amperage	-	0.1

Motor Data		
	Design	Actual
Motor MFG	-	GREENHECK
Frame	-	N/A
Horsepower	21W	N/A
Motor Rpm	-	950
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	0.19
Service Factor	-	N/A

Completed By: Mark Johnson on 07/11/2024

1 HVAC FLOOR PLAN
 1/4" = 1'-0"



- 1 REAR WALL
- 2 REAR WALL
- 3 REAR WALL
- 4 REAR WALL
- 5 REAR WALL
- 6 REAR WALL
- 7 REAR WALL
- 8 REAR WALL
- 9 REAR WALL
- 10 REAR WALL
- 11 REAR WALL
- 12 REAR WALL
- 13 REAR WALL
- 14 REAR WALL
- 15 REAR WALL
- 16 REAR WALL
- 17 REAR WALL