Report By:

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

NATIONAL TAB

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Report: TAB RPT
Function: Test, Adjust, & Balance
Date: 7/1/2022

PROJECT

05-16 CULVERS - INDIANAPOLIS, IN (SHEAR AVE)

5115 SHEAR AVE

INDIANAPOLIS, IN

Client

Campbell Construction

810 Swan Dr, Suite A

Mukwonago, WI 53149

National TAB

Project: 05-16 CULVERS - INDIANAPOLIS, IN (SHEAR AVE)

Table Of Contents

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Project Summary

Preface

The summary below provides a quick understanding of how well your HVAC systems balanced in respect to the design criteria. The summary concludes with a quick understanding of your building environment and suggestions for each of your systems after testing has been performed. 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. Our focus is 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. Also, enclosed are pictures of building assets and items listed below that will provide your team with more insight

Facility Identification and TAB Requirements

The mechanical equipment to be tested, adjusted, and balanced includes: All Roof Top Units (RTU), All Exhaust Fans (EF), All Kitchen Hoods, and all associated air devices.

RTU's

Each of the RTU’s were measured at their terminal devices utilizing a flow hood. The sum of these readings is equal to the total flow for that particular unit. The total flow of each RTU was then adjusted to +/-10% of the specified design. Each terminal diffuser was balanced to within +/-10% of the engineer’s design volume utilizing the provided hand damper located at the takeoff of the main & branch trunk line(s). Any equipment that fell outside of this tolerance is noted throughout the report.

Kitchen Exhaust Hood & Associated Fans

Each kitchen exhaust fan was measured at the hood filter bay utilizing a velocity matrix and a manufacturer’s correction factor. Each filter velocity is multiplied by the manufacturer’s corrected area. The sum of these readings equals the total flow of the exhaust fans. The total flow of the exhaust was then adjusted to +/-10% of the engineer’s design flow.

General Exhaust Fans

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 +/-10% of design. Each terminal device was balanced to within +/-10% of the design volume using the installed volume dampers. 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 of -0.02" WC to +0.02" WC and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.

The hood capture was tested at the perimeter of the hood and the cook top level with the equipment heat on to ensure satisfactory hood capture and containment.

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05-16 CULVERS - INDIANAPOLIS, IN (SHEAR AVE)

Project Issue Information

Issue Name : DIFFUSER 2-7 IS ABOVE THE CEILING AND NOT INSTALLED IN THE GRID

Description : Diffuser is above ceiling and needs to be installed in the grid. Diffuser 2-8 is installed where 2-7 would go. Ceiling grid may be too small to install a 2'x2' diffuser. May need to install a 1'x2' perforated diffuser. There is some smoke loss out right side of fryer hood as a result.

Created By : National TAB **Assigned To :** National TAB - Will Turnbough

Status : Open

Originated Date : 05/20/2022 - Will Turnbough - National TAB

Project Issue File Details

Screenshot_2022_05_20_110820.png

Project Issue Response Details

- **05/20/2022 National TAB - Will Turnbough**
  - DIFFUSER NOMENCLATURE

Screenshot_2022_05_20_11 1140.png

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Project Issue Information

Issue Name : leakage source

Description : Located above the light near the triple sink the collar is disconnected from the main trunk for the back of the house diffusers

Created By : National TAB **Assigned To :** National TAB - Tyler Youells

Status : Open

Originated Date : 05/20/2022 - Tyler Youells - National TAB

Project Issue File Details

FuseITf6b6481ed3924d39837f676ce96b7376.jpeg

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Project Issue Information

Issue Name : RTU-2 CURB ADAPTER

Description : Curb adapter does not place the supply fans centered above the main duct drop.

Created By : National TAB **Assigned To :** National TAB - Tyler Youells

Status : Open

Originated Date : 05/20/2022 - Tyler Youells - National TAB

Project Issue File Details

FuseITddb2542e8c0249bb93ca345f42e7c85f.jpeg

FuseITbe39cad71028464a9a5d678abe6ce405.jpeg

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Project Issue Information

Issue Name : RTU-2 Duct drop

Description : RTU-2 drop is 20X28". Per the drawing the unit should have a 24x16 and a 28X16" drop from the unit.

Created By : National TAB **Assigned To :** National TAB - Tyler Youells

Status : Open

Originated Date : 05/20/2022 - Tyler Youells - National TAB

Project Issue File Details

FuseIT6f02c8b4e89d4fb3b2d00b7fb259583b.jpeg

NATIONAL TAB

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	DINING	6150	6064	4150	4126	2000	1938	32.5%	32.0%						
RTU-2	KITCHEN	6000	5371	4000	3651	2000	1720	33.3%	32.0%						
PRV-1	RESTROOMS													375	372
PRV-2	HD1 GRILL											1500	1475		
PRV-3	HD2 FRYER											1500	1567		
PRV-4	CONDENSATE											350	339		
EF-1	MOP ROOM													75	72
EF-2	EMPLOYER													75	77
TOTALS		12150	11435	8150	7777	4000	3658			0	0	3350	3381	525	521

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	4000	3658
TOTAL EXHAUST	3875	3902
NET AIRFLOW	125	-244

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
FRONT	-0.004
SIDE	-0.032
REAR	-0.001
AVERAGE	**-0.0123**

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:

[1] Pressure on the side door reading higher a negagtive due to wind gusting on the side of the building

CULVERS INDIANAPOLIS, IN

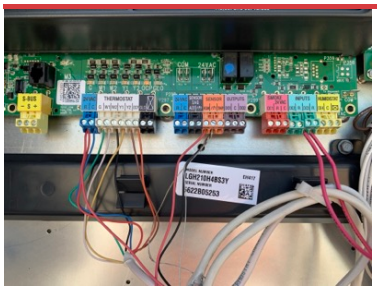
Friday, May 20, 2022

10 Remarks Identified

STOREFRONT

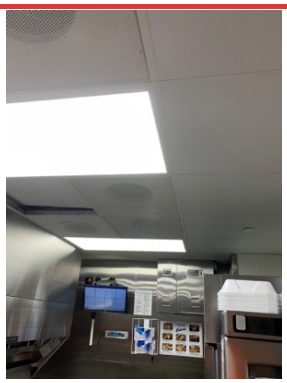
RTU-2

Note curb adaptor



RTU-2 PRODIGY WIRING IS CORRECT

FOUND DIFFUSER 2-8 ABOVE THE CEILING



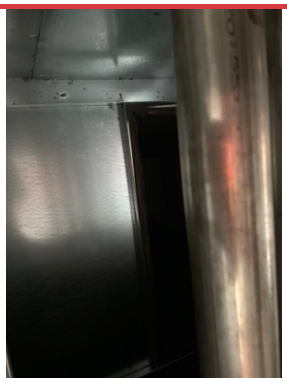
MOVED DIFFUSER 2-8 DOWN FOR TESTING TOTAL FLOW

RTU-2 MAIN DROP

21X29” subtracting the Internal liner gives flow area of 20x28”

CURB ADAPTOR/ DUCT DROP ALIGNMENT

Marked in blue are the fan discharges, note the fan on the bottom is not aligned near the duct drop. For best performance red duct drop should be centered between the two fan discharges in blue.



SHOWN IS DUCT DROP ALIGNED DIRECTLY UNDER FAN 2

INSTALLING DIFFUSER 2-8

Diffuser 2-8 needs to be installed where drawn to improve the hood capture. This is done preferably by installing a 12”x24” diffuser in front of the ansul cabinet inline with the other diffusers. If that’s not possible moving the diffuser to the spot marked in blue is the next best option. The missing diffuser is allowing smoke to escape out the right side of the fryer hood

LEAKAGE SOURCE

Located above the light that is above the triple sink. Branch duct that is connected to main TRUNKLINE

CULVERS INDIANAPOLIS, IN

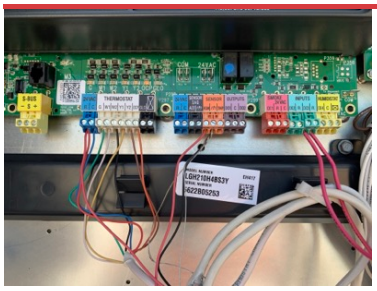
Friday, May 20, 2022

10 Remarks Identified

STOREFRONT

RTU-2

Note curb adaptor



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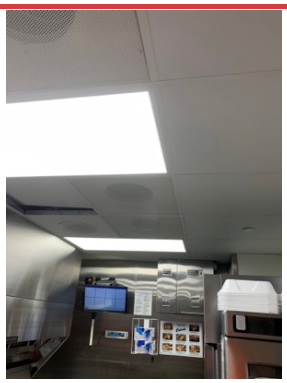

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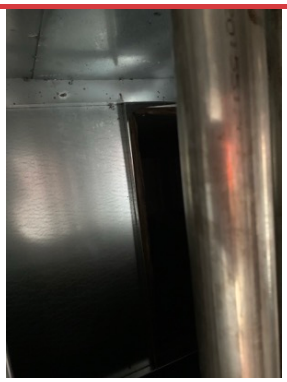

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05-16 CULVERS - INDIANAPOLIS, IN (SHEAR AVE)

CheckList Information

Name :	TECH - STEP 1: INITIAL WALKTHROUGH	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

INITIAL SITE WALKTHROUGH

All diffusers and grilles are installed and match design?	No
Perforated diffusers are installed on the cook line? (4-ways will disrupt hood capture)	Yes
All hood filters installed and accounted for?	Yes
Hoods are wired and have power?	Yes
Thermostats have power?	Yes
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	YES
On the cookline diffusers neck is there 18" (12" minimum) straight rigid duct run attached?	NO

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 2: UNIT DATA AND EVAL	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

UNIT DATA AND EVALUATION WHILE GATHERING UNIT DATA CHECK THE FOLLOWING:

RTU's/AHU's	
Economizers are assembled and functional?	Yes
Thermostat wire run from OCP on the RTU to the Ec terminal at the thermostat? If no, jumper can be installed from R to OCP temporarily. (The economizers will not open without OCP being energized.)	Yes
Motors are all operating below the FLA rating?	Yes
Are belts tight?	yes
If direct drive unit is the speed controller working.	
Is gas piping installed and valves turned on?	Yes
Unit free of noticeable noise and vibration	Yes
EF's	
Rotation is correct?	Yes
Belts are tight?	
Grease cup installed on hood fan?	Yes
Hinge kit installed installed on hood fan?	Yes
Lean grease rated fans back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?	Yes

Flex conduit is long enough so that fan can be completely tilted back?	Yes
There is no major leakage around base of fan?	Yes
Is the motor operating below the motor FLA rating?	Yes
For restroom fan(s) is the back draft damper installed and can it fully open?	Yes
Unit free of noticeable noise and vibration?	Yes
The hood exhaust fans are installed in correct positions and are not switched?	Yes
HOODS	
Kitchen equipment installed in proper places?	Yes
Can kitchen equipment be turned on for final smoke test?	Yes
Second stage Grease Grabber filters are installed on the griddle hood?	Yes
DOCUMENTATION	
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	Yes

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 3: TEST, ADJUST AND BALANCE	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

TEST, ADJUST, AND BALANCE ALL EQUIPMENT:

DURING TESTING MAKE NOTE OF THE FOLLOWING:

Is space free of drafting?	Yes
Is space comfortable in all areas?	Yes
Is the space free of ventilation noise?	Yes
If deviations from design were necessary to resolve 1-3 what were they? Otherwise put "NA".	n/a

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 4: FINAL TESTS	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

FINAL TESTS	
HOOD CAPTURE TEST	
List equipment turned on for testing	All equipment on
List smoke candle type used	45 sec smoke
Smoke test capture - Perimeter of hood	Griddle hood 100%, Fryer Hood 100%
Smoke test capture - Top of cooking surface	Griddle Hood 100%, Fryer Hood 90%
WITNESS	
Date test was completed	05/20/2022
TAB tech name / Firm	Tyler/NTAB
Site super name / Firm	n/a
Owner representative name / Firm (if Applicable)	n/a
Building pressure at front & back doors (All Systems On)	Yes
ADDITIONAL	
Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)	Yes
Thermostats are programmed?	Yes
PRODIGY SETTINGS FOR RTU'S	
Parameter 65 set to 0	Yes

Parameter 78 set to 0	Yes
Parameter 105 set to 6	Yes
Parameter 156 set to 70 (Dining unit only)	Yes
Parameter 156 set to 65 (Kitchen Unit Only)	Yes
Parameter 170 set to 75 (Dining Unit Only)	Yes
Parameter 170 set to 70 (Kitchen Unit Only)	Yes
Parameter 131 set to the same % as OA minimum position?	Yes
Parameter 117 set to the same % as OA minimum position?	Yes

Notes/Comments :

National TAB

Project: 05-16 CULVERS - INDIANAPOLIS, IN (SHEAR AVE)

System/Unit: AHU/RTU

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Asset: RTU2 AREA:

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622B05253
Model Num	LGH210H4B	LGH210H4B
Type	-	RTU
Configuration	-	VERTICAL
Num OA Filters 1	-	3
OA Filter Size 1	-	25X16
Num Final Filter 1	-	6
Final Filter Size 1	-	24X24X2

Motor Data		
	Design	**Actual**
Motor MFG	-	US MOTOR
Frame	-	184TZ
Horsepower	-	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	13.8

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50
Motor Bore Size	-	1.125”
Motor Sheave SetPt	-	0 Turns Out
Fan Sheave Size	-	BK100
Fan Sheave Bore	-	1.1875”
Belt CL Distance	-	20.75”
Num of Belts	-	1
Belt Size	-	BX61
Belt Alignment	-	GOOD

Test Data		
	Design	**Actual**
SF CFM	6000	5371
SF RPM	847	883
RA CFM	4000	3651
OA CFM	2000	1720
RL Voltage	-	209.6/210.7/211.1
RL Amperage	-	9.7/10.0/10.1
SF Rotation	-	CCW
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	47%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	10ma

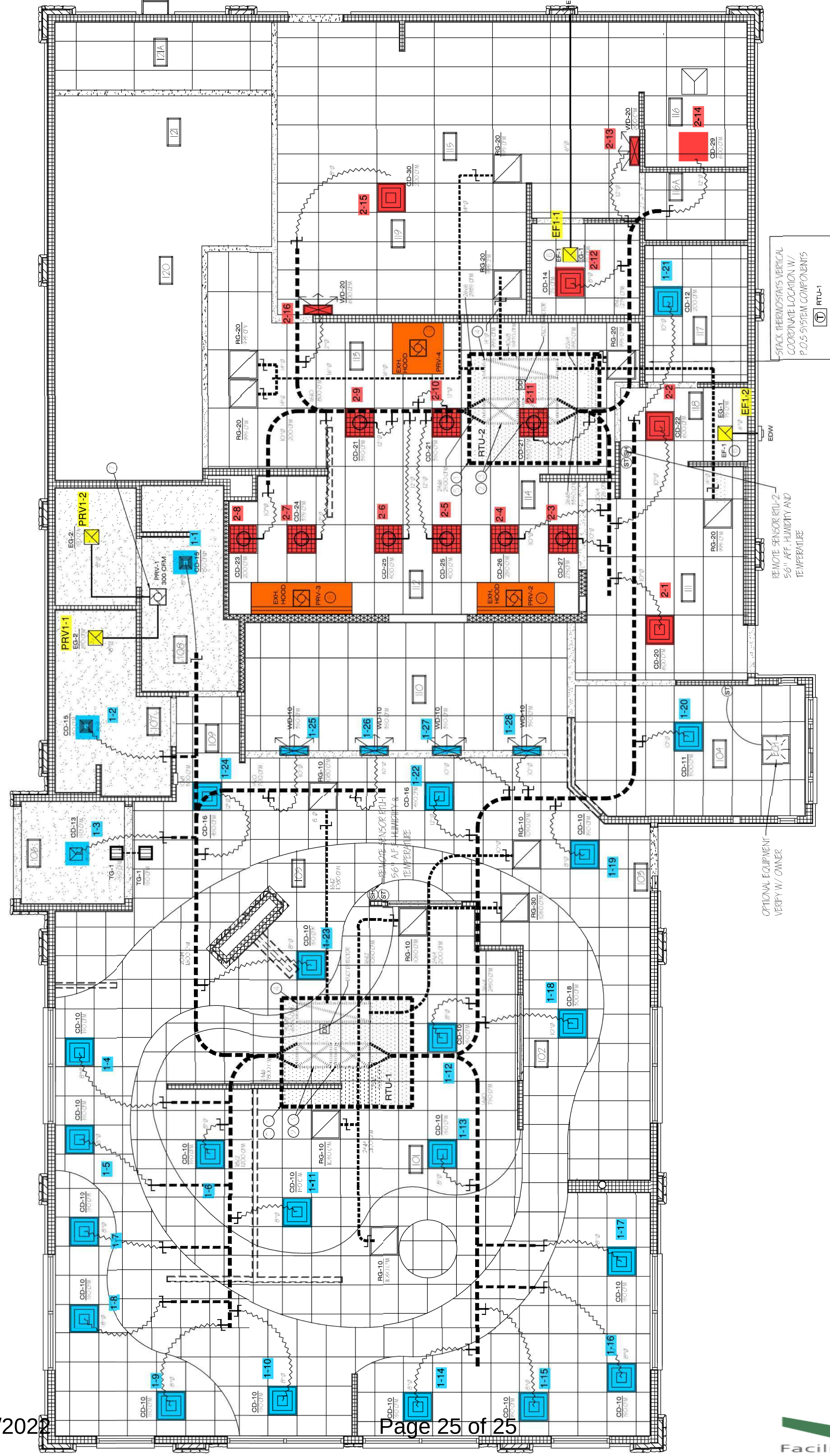
Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.56”
Fan Suction SP	-	-0.95”
Fan Discharge SP	-	0.55”
Total ESP	0.75"	1.11”
Fan Total SP	-	1.5”

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

Completed By: Tyler Youells

Notes:

Asset	Notes


EF1-1
EF1-2
PRV1-1
PRV1-2
PRV-1
300 CFM
PRV-2
PRV-3
PRV-4
EXH. HOOD
RTU-1
RTU-2
EDW
2-1
2-2
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