Report By:

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

Report: CERTIFIED TAB REPORT

Function: Test, Adjust, & Balance

Date: 11/27/2024

Completed By: National TAB

PROJECT

PROJECT MAVERICK (FALLON, NV)

1221 NEW RIVER PARKWAY

FALLON, NV 89406

Client

PANATONNI DEVELOPMENT COMPANY, INC.

National TAB

Project: PROJECT MAVERICK (FALLON, NV)

Table Of Contents

CERTIFICATION

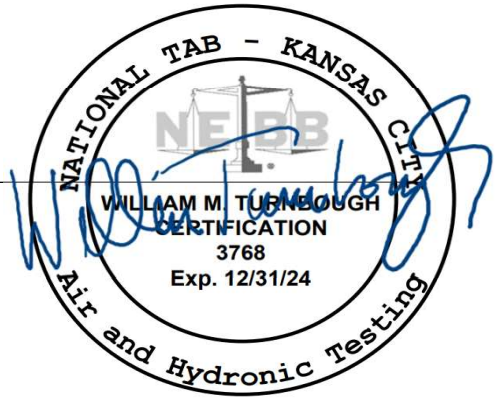
PROJECT: Project Maverick (Fallon, NV)

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: 12/2/2024

Submitted and Certified by:

NEBB TAB FIRM: National TAB - Kansas City
TAB PROFESSIONAL: Will Turnbough
REGISTRATION NO: CP-24289
CERTIFICATION EXP: 12/31/2024



Project Summary

RTU-1 was measured at each diffuser with a flow hood to establish a total flow for that unit. The total airflow is below design but couldn't be increased due to the BMS not being started up. The diffusers were balanced proportionally low. 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 manually set.

RTU-2 was measured by taking a total traverse on the unit. The individual diffusers could not be adjusted due to racks in the way. The unit serves an open warehouse and is not expected to cause any issue since the total flow is within design. 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 manually set.

EF-1 was measured by reading each grille with a flow hood. The total flow was then adjusted to within tolerance and the individual diffusers were balanced to design.

EF-2 was measured at the intake. The total flow was initially very low due to an issue with the backdraft damper. This was resolved and airflow is now within design.

Issue List

- RTU OA dampers
- RTU-1 supply airflow is low

PROJECT MAVERICK (FALLON, NV)

Project Issue Information

Issue Name :	RTU OA dampers		
Description :	The RTU OA dampers are not functional since the BMS was not started up yet. Unable to set the OA damper position through the controller. Manually set the dampers during balancing.		
Created By :	National TAB	**Assigned To :**	National TAB - Will Turnbough
Status :	Open		
Priority :	High	**Asset Tag :**	
Originated Date :	12/02/2024 - Will Turnbough - National TAB		

PROJECT MAVERICK (FALLON, NV)

Project Issue Information

Issue Name :	RTU-1 supply airflow is low		
Description :	Airflow is below design at 60 Hz. There is amperage left on the motor to increase speed but BMS was not started up yet. Fan speed needs to be increased to 68.3 Hz to achieve 90% of design or 76 Hz to achieve 100% of design. Diffusers were proportionally balanced.		
Created By :	National TAB	**Assigned To :**	National TAB - Will Turnbough
Status :	Open		
Priority :	High	**Asset Tag :**	RTU1
Originated Date :	12/02/2024 - Will Turnbough - National TAB		

National TAB

Project: PROJECT MAVERICK (FALLON, NV)

System/Unit: AHU/RTU

Asset: RTU1 AREA:EMPLOYEE AREAS

Unit Data		
	Design	**Actual**
MFG	AAON	AAON
Serial Num	-	202410-ANEH32304
Model Num	RN-008	RN-008-3-0-E80E-133
Type	RTU	RTU
Configuration	HORIZONTAL DISCHARGE	HORIZONTAL
Num OA Filters 1	-	1
OA Filter Size 1	-	32X17
Num Final Filter 1	-	4
Final Filter Size 1	-	16X20X2
Num Final Filter 2	-	
Final Filter Size 2	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	2	2
Motor Rpm	1760	1760
Phase	3	3
Rated Voltage	460	460
Rated Amperage	-	3.4

Electrical	
	Actual
VFD Max Setpt	60HZ

Test Data		
	Design	**Actual**
SF CFM	2500	1976
SF RPM	2130	1760
RA CFM	-	1474
OA CFM	515	502
ABS MIN OA	215	233
ABS MIN OA DAMPER POSITION	-	~8%
RL Voltage	-	488/488/487
RL Amperage	-	2.1/2.0/1.9
SF Rotation	-	CCW
RA Damper Position	-	~80%
Min OA Damper Position	-	~20%
Min OA Damper Type	-	MOTORIZED

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.98""
Fan Suction SP	-	-1.35"
Fan Discharge SP	-	0.33"
Total ESP	1.00"	1.31"

General	
	Actual
Fan Rotation Correct	YES
Unit Filters Clean	YES

Completed By: Zack Eismin on 11/26/2024

Notes:
AIRFLOW IS BELOW DESIGN AT 60HZ. THERE IS AMPERAGE LEFT ON THE MOTOR TO INCREASE SPEED BUT BMS WAS NOT STARTED UP YET. FAN SPEED NEEDS TO BE INCREASED TO 68.3 HZ TO ACHIEVE 90% OF DESIGN OR 76 HZ TO ACHIEVE 100% OF DESIGN.

OA DAMPER MANUALLY SET. BMS NOT STARTED UP.

Written By: Will Turnbough on 12/02/2024

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Project:PROJECT MAVERICK (FALLON, NV)

AHU/RTU

Diffuser Supply (GRD)

RTU1/EMPLOYEE AREAS

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	104 OFFICE	CSD1	8"	150	1	105	115	115	76.7
SGRD2	116 SPACE	CSD2	8"	150	1	141	111	111	74.0
SGRD3	122 MULTI-FAITH ROOM	CSD2	8"	150	1	109	117	117	78.0
SGRD4	100 ASSOCIATE ENTRY	CSD2	10"	350	1	309	279	279	79.7
SGRD5	102 BREAKROOM	CRG1	14"	425	1	341	341	341	80.2
SGRD6	102 BREAKROOM	CRG1	14"	425	1	333	333	333	78.4
SGRD7	102 BREAKROOM	CRG1	14"	425	1	329	329	329	77.4
SGRD8	102 BREAKROOM	CRG1	14"	425	1	355	351	351	82.6
Total				2500		2022	1976	1976	79.04%

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Project: PROJECT MAVERICK (FALLON, NV)

System/Unit: AHU/RTU

Asset: RTU2 AREA:WAREHOUSE

Unit Data		
	Design	**Actual**
MFG	AAON	AAON
Serial Num	-	202410-BNEP32308
Model Num	RNA-020	RNA-020-C-A-3-DJB0C-B06FY
Type	RTU	RTU
Configuration	HORIZONTAL DISCHARGE	HORIZONTAL
Num OA Filters 1	-	1
OA Filter Size 1	-	52X29
Num Final Filter 1	-	6
Final Filter Size 1	-	20X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	10 HP	10
Motor Rpm	1170	1170
Phase	3	3
Rated Voltage	460	460
Rated Amperage	-	14

Electrical	
	Actual
VFD Max Setpt	60HZ

Test Data		
	Design	**Actual**
SF CFM	9600	9298
SF RPM	1306	1170
MOTOR RPM	-	1170
RA CFM	-	7357
OA CFM	1935	1941
ABS MIN OA	1935	1941
ABS MIN OA DAMPER POSITION	-	~20%
RL Voltage	-	488/488/488
RL Amperage	-	9.8/9.9/9.8
SF Rotation	-	CCW
RA Damper Position	-	~80%
Min OA Damper Position	-	~20%
Min OA Damper Type	-	MOTORIZED

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.36"
Fan Suction SP	-	-0.55"
Fan Discharge SP	-	0.18"
Total ESP	0.50"	0.54"

General	
	Actual
Fan Rotation Correct	YES
Unit Filters Clean	YES

Completed By: Zack Eismin on 11/26/2024

Notes:
TOTAL FLOW SET FOR THE UNIT. UNABLE TO BALANCE INDIVIDUAL DIFFUSERS DUE TO RACKS IN THE WAY. SERVES OPEN WAREHOUSE AREA AND NOT ANTICIPATED TO CAUSE ANY COMFORT ISSUES.

DAMPER POSITION MANUALLY SET. BMS NOT STARTED UP YET.

Written By: Will Turnbough on 12/02/2024

National TAB

Project: PROJECT MAVERICK (FALLON, NV)

System/Unit: FAN - Exhaust

Asset: EF1 AREA:RESTROOMS

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	SQ-120-VG	SQ-120-VG
Serial Num	-	25563354
Type	UPBLAST	INLINE
Configuration	VERTICAL	HORIZONTAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	1/2	0.5
Motor Rpm	1725	1725
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	6.4
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	675	729
Fan RPM	1107	1035
Fan Rotation	-	CCW
Motor RPM	-	1035
System SetPt	-	6
RL Voltage	-	NA
RL Amperage	-	NA
Total ESP	0.5"	0.56"
Fan Inlet SP	-	-0.56"
Fan Discharge SP	-	ATM

Completed By: Zack Eismin on 11/26/2024

National TAB

Project:PROJECT MAVERICK (FALLON, NV)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF1/RESTROOMS

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EGRD1	CEG1	10"	250	1	630	273	273	109.2
EGRD2	CEG1	10"	250	1	536	267	267	106.8
EGRD3	CEG1	8"	175	1	322	189	189	108.0
Total			675		1488	729	729	108%

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Project: PROJECT MAVERICK (FALLON, NV)

System/Unit: FAN - Exhaust

Asset: EF2 AREA:119 FIRE RISER

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	GB-180	GB-180
Serial Num	-	25432292
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	VARI-GREENGREEN
Frame	-	NL
Horsepower	1	1
Motor Rpm	-	1750
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	11.5
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	2730	2653
Fan RPM	906	1225
Fan Rotation	-	CCW
Motor RPM	-	1225
System SetPt	-	7
RL Voltage	-	NA
RL Amperage	-	NA
Total ESP	0.50"	0.44"
Fan Inlet SP	-	-0.44"
Fan Discharge SP	-	ATM

Completed By: Zack Eismin on 11/26/2024

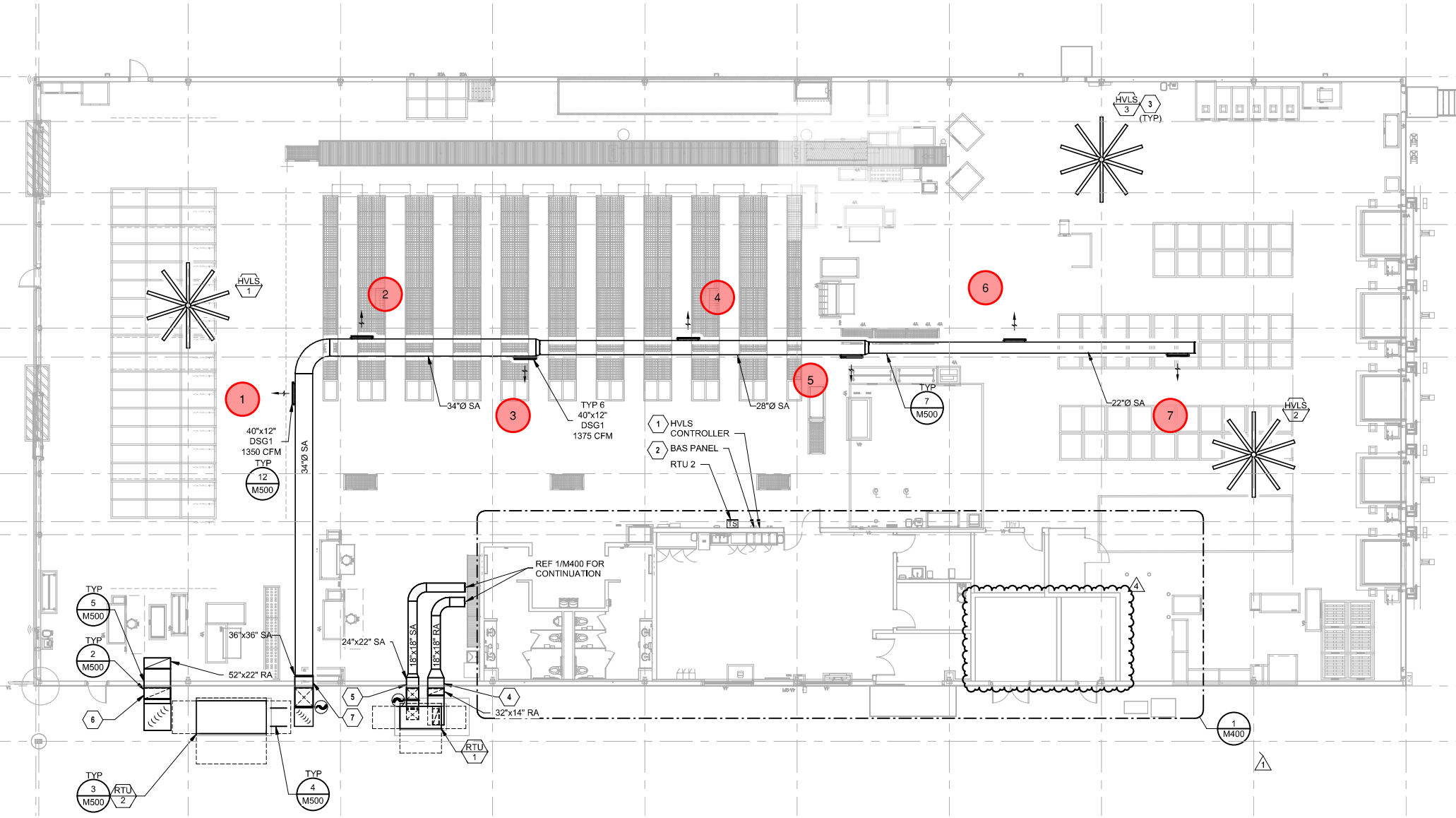
Abbreviation List

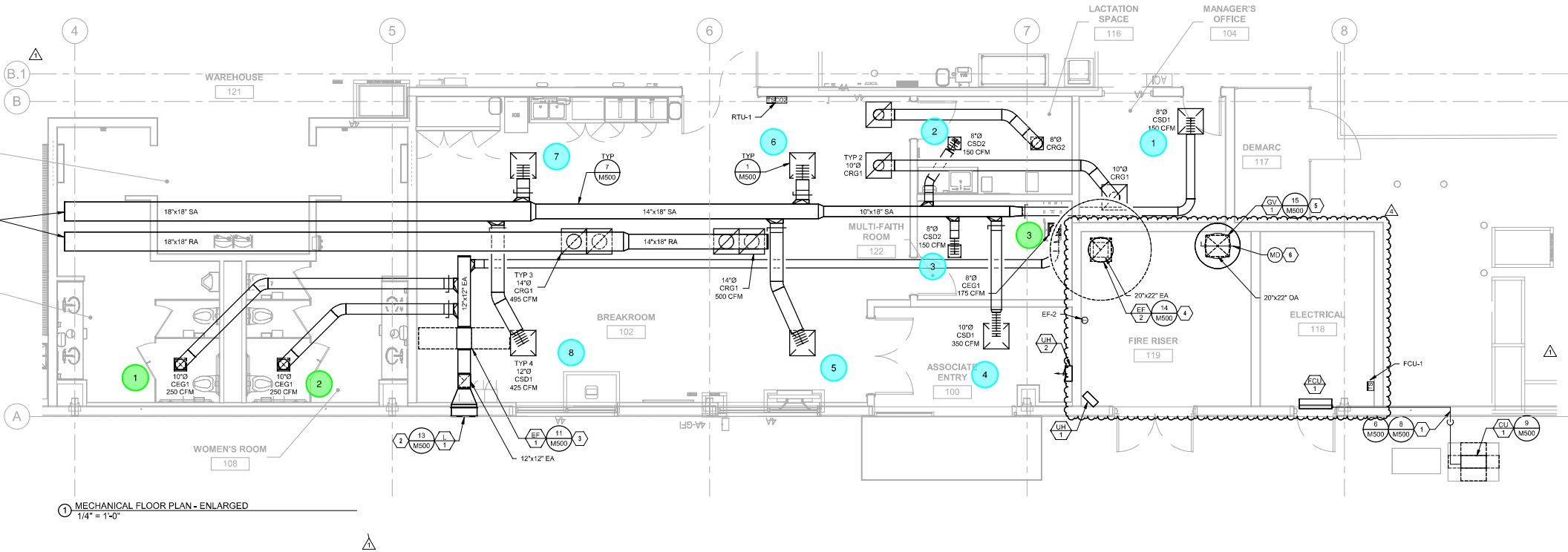
A = Area (ft^2)	S.F. = Service Factor
AHU = Air Handling Unit	SF = Supply Fan
A_k = Effective Area	SP = Static Pressure
BHP = Brake Horsepower (IP) HP	SR = Supply Register
Btu = British Thermal Unit	T = Temperature
Btu/h = Btuh = BTUH = BTU/Hour	T_{ma} = Mixed Air Temperature
CL = Center Distance (used in belt formula)	T_{oa} = Outside Air Temperature
CD = Ceiling Diffuser	T_{ra} = Return Air Temperature
CF = Correction Factor	H = Head (in wc, ft wc, psi)
CFM = Volumetric Flow: Cubic Feet Per Minute	h = Enthalpy
CO2 = Carbon Dioxide	HP = Horsepower
CO = Carbon Monoxide	hr = Hour
C_v = Flow Constant	K_v = Flow constant (SI)
d = Diameter (in.) IP	kW = Kilowatt = 1000 Watts
Δ = Difference or Change (Final - Initial)	LAT = Leaving Air Temperature
DB = Dry Bulb	lb = Pounds
EA = Exhaust Air	LWT = Leaving Water Temperature
EAT = Entering Air Temperature	ma = Mixed Air
EF = Exhaust Fan	MIN = Minimum
Eff = Efficiency	MAX = Maximum
EG = Exhaust Grille	N/A = Not Applicable
ESP = External Static Pressure	NA = No Access
EWT = Entering Water Temperature	NL = Not Listed
°F = Degrees Fahrenheit, °F	NPSHA = Net Positive Suction Head Available
FPB = Fan Powered Box	NS = Not Specified
FLA = Full Load Amps	OA = Outside Air
fpm = Feet per Minute (fpm)	OAT = Outside Air Temperature
ft = Foot	PD = Sheave Pitch Diameter
gal = Gallons	P.D. = Pressure Drop
GPM = Gallons Per Minute (GPM)	PF = Power Factor
h = Enthalpy (BTU/lb dry air)	SG = Supply Grille
P = Pressure	SR = Supply Register
ppm = parts per million	TP = Total Pressure
psi = Pounds Per Square Inch	T_{ra} = Return Air Temperature
psid = PSI Differential	TS = Tip Speed (fpm) IP, (m/s) SI
r = Radius (in)	TSP = Total Static Pressure
$\%_{ra}$ = % of Return Air	V = Velocity
RA = Return Air	VAV = Variable Air Volume
RAT = Return Air Temperature	VD = Volume Damper
RF = Return Fan	VFD = Variable Frequency Drive
RG = Return Grille	W = Watt
RH = Relative Humidity	WB = Wet Bulb
RPM = Revolutions Per Minute	wg = wc = water gauge = water column
RTU = Roof Top Unit	WHP = Water Horsepower (IP)
SA = Supply Air	ω = Humidity Ratio

National TAB

Testing, Adjusting, and Balancing Equipment

Function		Range	Minimum Accuracy	Instrument Information	Calibration Date	Date Due
AIR	AIR PRESSURE	0 in wg to 10 in wg	2% +/- 0.001 in wg	Evergreen S-PVF-1 24D-00509	6/17/2024	6/17/2025
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	Evergreen S-PVF-1 24D-00509	6/17/2024	6/17/2025
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	Evergreen S-PVF-1 24D-00509	6/17/2024	6/17/2025
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper SRH77A S/N 100516003	9/18/2024	9/18/2025
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Klein Tools CL800 S/N 1220C-C1	9/18/2024	9/18/2025
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Klein Tools CL800 S/N 1220C-C1	9/18/2024	9/18/2025
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	Shimpo DT 207Lp S/N D1690029R	9/18/2024	9/18/2025





1 MECHANICAL FLOOR PLAN - ENLARGED
1/4" = 1'-0"