CERTIFIED BALANCING AND COMMISSIONING
SO EVERYONE GETS THEIR FAIR SHARE OF AIR

Testing, Adjusting, and Balancing Report

Project	Steamboat Basecamp Partial Renovation
Address	1901 Curve Plaza Steamboat Springs, CO 80487
Architect	Kevin& Asako Sperry Architecture
Mechanical Engineer	Boulder Engineering
Contractor	Bellyache Mechanical
Balancing Supervisors	Greg Barnes
Date	March 19, 2024
Job Number	5007

ASHRAE

NEBB

TABB
TESTING, ADJUSTING AND BALANCING BUREAU
THE PROFESSIONAL'S CHOICE™

ABBREVIATION INDEX

(E): Existing
Actual D.P.: Recorded Differential Pressure
AHU: Air Handling Unit
AK: Area Correction
BV: Balance Valve
CD: Ceiling Diffuser
CFM: Cubic Feet Per Minute
CHW: Chilled Water
CRAC: Computer Room Air Conditioning Unit
CUH: Cabinet Unit Heater
CW: Condenser Water
D.P. (Pump): Discharge Pressure
Design D.P.: Design Differential Pressure
Diff.: Differential
DX: Direct Expansion
EAT: Entering Air Temperature
EF: Exhaust Fan
EG: Exhaust Grille
ERU: Energy Recovery Unit
ERV: Energy Recovery Ventilator
EWT: Entering Water Temperature
FCU: Fan Coil Unit
FPB: Fan Powered Box
FPM: Feet Per Minute
HW: Heating Water
HX: Heat Exchanger
IN.WC.: Inches of Water Column
ESP: External Static Pressure
Ind.Imp.Dia.: Indicated Impeller Diameter
K Factor: Correction/Calibration Factor
KEF: Kitchen Exhaust Fan
CS: Circuit Setter
LAT: Leaving Air Temperature
LD: Linear Diffuser
LWT: Leaving Water Temperature
MA: Mixed Air
MAU: Make Up Air Unit
Motor FLA: Full Load Amperage
MVD: Manual Volume Damper
NAC: No Access
NG: Not Given
NIC: Not in Contract
Nom. Eff.: Nominal Efficiency
OA/OSA: Outside Air
OA: Outside Air
OBD: Opposed Blade Damper
OD: Outside Diameter
P.F.: Power Factor
PSI: Pounds per Square Inch
RA: Return Air
RF: Return Fan
RG: Return Grille
RPM: Revolutions per Minute
RTU: Roof Top Unit
S.F.: Service Factor
S.P. (Pump): Suction Pressure
SA: Supply Air
SD: Supply Diffuser
SEF: Smoke Exhaust Fan
SF: Supply Fan
SP: Static Pressure
SPF: Stairwell Pressurization Fan
SWD: Sidewall Diffuser
T1: Terminal 1
T2: Terminal 2
T3: Terminal 3
TDH: Total Dynamic Head
TF: Transfer Fan
TSP: Total Static Pressure
UH: Unit Heater
VAV: Variable Air Volume
VP: Velocity Pressure

Method of Balancing:

Supply, Return and Exhaust diffusers, grilles and registers were measured with an Alnor Balometer EBT-721, which includes the flow hood, velgrid, pitot tube and airfoil. Heating and Chilled water flow rates were measured with an Alnor Hydronic Manometer HM-680 by obtaining pressure measurements. RPM was measured with a Shimpo tachometer. Amperage and Voltage readings were taken with a Fluke 930 meter.

Instrumentation:

Digital Manometer	Alnor Balometer EBT-721
Flow hood	Alnor Balometer EBT-721
Digital Pressure Gage	Alnor Hydronic Manometer HM-680
Tachometer	Shimpo
Digital Volt-Amp Meter	Fluke 930
Thermometer	Alnor Balometer EBT-721

Warranty Information:

This project was completed per TABB & NEBB Procedural Standards.
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 TABB & NEBB Procedural Standards for Testing, Adjusting, and Balancing Environmental Systems. Any variances from design quantities, which exceed TABB & NEBB tolerances, are noted in the Test-Adjust-Balance Report Project Summary. If a Test-Adjust-Balance Report Project Summary is not issued directly following this cover page, all measurements met the design requirements as specified by the design mechanical engineer.

This project has a one-year guarantee on all Testing, Adjusting & Balancing from the date listed on this cover page.

Greg Barnes
Owner / Supervisor
greg@certtab.com
720-201-6274

Project Summary

1. Individual Notes, Explanations, and Deficiencies, if applicable, are shown underneath the associated equipment.

Table Of Contents

PROJECT:	STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT	**DATE:**	3/19/2024
LOCATION:	STEAMBOAT SPRINGS, CO	**CONTACT:**	Soun Barnes
PROJECT #:	5007	**AUTHOR:**	CBC REPORT DEPT.

Table Of Contents

CERTIFIED BALANCING AND COMMISSIONING
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Roof Top Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: RTU-4(E)

Tested By: Greg Barnes
Date: 1/8/2024

Test Data	
Design Airflow	1600 CFM
Actual Airflow	1610 CFM
Design Outside Airflow	400 CFM
Actual Outside Airflow	415 CFM
O/A Damper Position	25 %/Volts

Log:

RTU-4(E)	1/7/2024	Greg Barnes	EXISTING UNIT SHOWS AS RTU, BUT IS ACTUALLY A FURNACE.

RTU-4(E) Supply Outlet Summary

System/Unit	Outlet Type	Size LxW / D	AK Factor	Design Airflow	Prelim Airflow	% Prelim Diff.	Final Airflow	% Final Diff.
Outlet-01	CD	12X12	1	50	20	40	55	110
Outlet-02	CD	12X12	1	50	45	90	50	100
Outlet-03	CD	10Rd	1	300	105	35	295	98
Outlet-04	CD	10Rd	1	300	100	33	310	103
Outlet-05	CD	10Rd	1	300	145	48	315	105
Outlet-06	CD	10Rd	1	300	170	57	300	100
Outlet-07	CD	10Rd	1	300	160	53	285	95
Totals:	-	-	-	**1600**	**745**	**47**	**1610**	**101**

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Roof Top Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: RTU-5(E)

Tested By: Greg Barnes
Date: 1/8/2024

Test Data	
Design Airflow	1800 CFM
Actual Airflow	1855 CFM
Design Outside Airflow	450 CFM
Actual Outside Airflow	475 CFM
O/A Damper Position	25 %/Volts

Log:

RTU-5(E)	1/8/2024	Greg Barnes	CFM AT HIGH SPEED 1855
RTU-5(E)	1/8/2024	Greg Barnes	UNIT WILL ONLY RUN AT WITH BOTH DAMPERS OSA AND RETUN WIDE OPEN. RETURN ACTUATOR HAS BEEN REMOVED.
RTU-5(E)	1/8/2024	Greg Barnes	EXISTING UNIT SHOWS AS RTU, BUT IS ACTUALLY A FURNACE.

CERTIFIED BALANCING AND COMMISSIONING
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Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: EF-9

Tested By: Greg Barnes
Date: 1/8/2024

Unit Data	
Fan Manufacturer	NO TAG

Motor Data	
Motor Hertz	60 Hz

Test Data	
Design Airflow	50 CFM
Actual Airflow	60 CFM

Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-1A

Tested By: Greg Barnes
Date: 1/8/2024

Log:	FU-5(E)-1A	3/16/2024	Greg Barnes	OSA SET TO 25%

FU-5(E)-1A Supply Outlet Summary

System/Unit	Outlet Type	Size LxW / D	AK Factor	Design Airflow	Prelim Airflow	% Prelim Diff.	Final Airflow	% Final Diff.
Outlet-01	CD	24X24	1	150	75	50	140	93
Outlet-02	CD	12X12	1	50	45	90	55	110
Outlet-03	CD	12X12	1	100	35	35	90	90
Outlet-04	CD	12X12	1	100	30	30	95	95
Outlet-05	SR	18X6	1	200	120	60	190	95
Outlet-06	SR	18X6	1	200	145	73	215	108
Outlet-07	SR	18X6	1	200	100	50	205	103
Outlet-08	SR	18X6	1	200	105	53	195	98
Outlet-09	SR	18X6	1	300	250	83	310	103
Outlet-10	SR	18X6	1	300	145	48	315	105
Outlet-11	SR	18X6	1	300	175	58	295	98
Outlet-12	SR	18X6	1	300	190	63	290	97
Outlet-13	SR	18X6	1	300	120	40	305	102
Totals:	**-**	**-**	**-**	**2700**	**1535**	**57**	**2700**	**100**

Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-1B

Tested By: Greg Barnes
Date: 1/8/2024

Log:				
FU-5(E)-1B	3/16/2024	Greg Barnes	OSA SET TO 25%

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Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-2A

Tested By: Greg Barnes
Date: 1/8/2024

Log:	FU-5(E)-2A	3/16/2024	Greg Barnes	OSA SET TO 25%

FU-5(E)-2A Supply Outlet Summary

System/Unit	Outlet Type	Size LxW / D	AK Factor	Design Airflow	Prelim Airflow	% Prelim Diff.	Final Airflow	% Final Diff.
Outlet-01	SR	18X6	1	250	190	76	245	98
Outlet-02	SR	18X6	1	250	135	54	255	102
Outlet-03	SR	18X6	1	250	110	44	260	104
Outlet-04	SR	18X6	1	250	150	60	240	96
Outlet-05	SR	18X6	1	250	120	48	265	106
Outlet-06	SR	18X6	1	250	190	76	250	100
Outlet-07	SR	18X6	1	250	130	52	240	96
Outlet-08	SR	18X6	1	300	110	37	310	103
Outlet-09	SR	18X6	1	250	160	64	265	106
Outlet-10	SR	18X6	1	250	155	62	255	102
Outlet-11	SR	18X6	1	250	175	70	245	98
Totals:	**-**	**-**	**-**	**2800**	**1625**	**58**	**2830**	**101**

Fan Unit

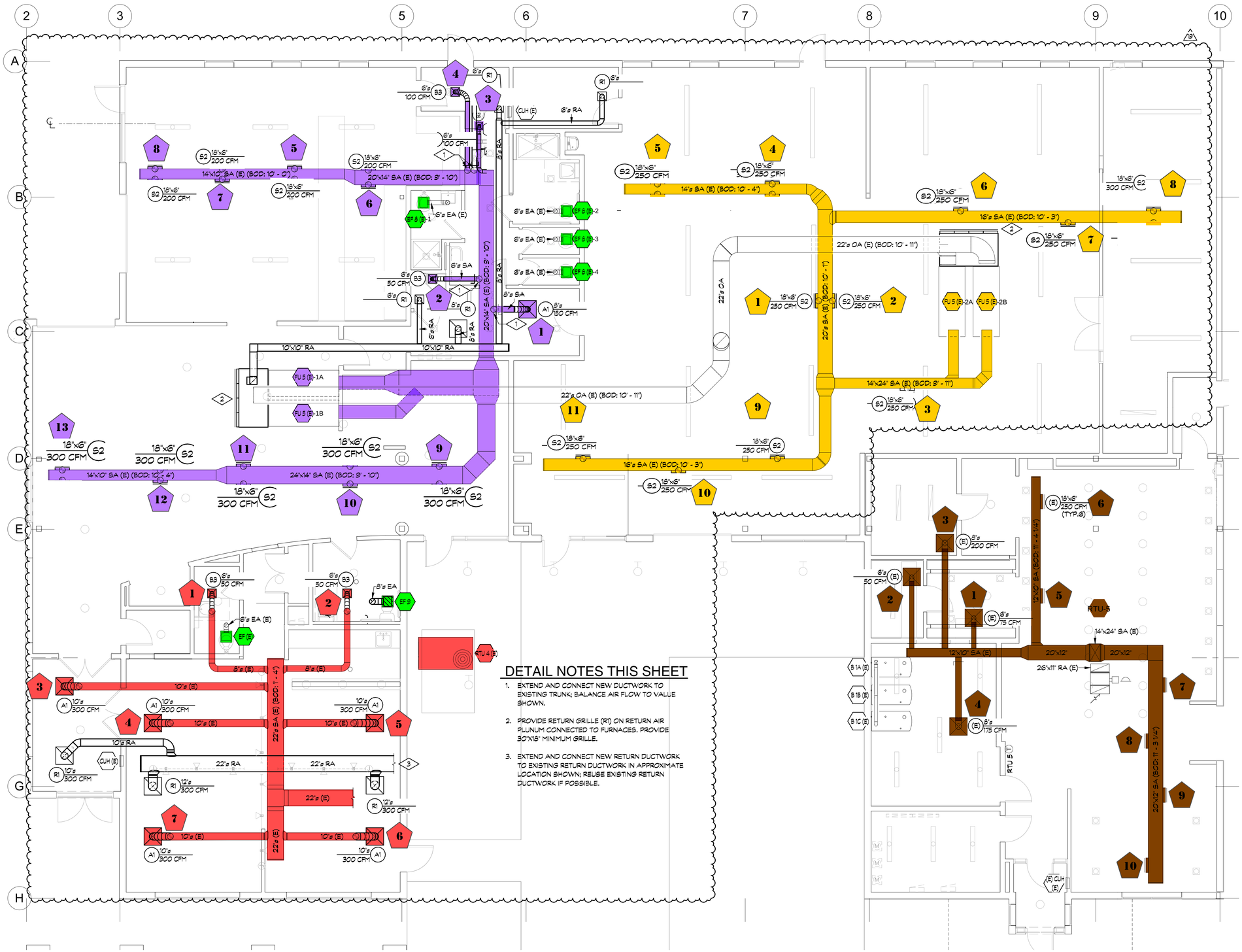
PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 3/19/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-2B

Tested By: Greg Barnes
Date: 1/8/2024

Log:				
FU-5(E)-2B	1/8/2024	Greg Barnes	OSA SET @ 25%



DETAIL NOTES THIS SHEET

1. EXTEND AND CONNECT NEW DUCTWORK TO EXISTING TRUNK; BALANCE AIR FLOW TO VALUE SHOWN.
2. PROVIDE RETURN GRILLE (R1) ON RETURN AIR PLUNUM CONNECTED TO FURNACES. PROVIDE 30"X18" MINIMUM GRILLE.
3. EXTEND AND CONNECT NEW RETURN DUCTWORK TO EXISTING RETURN DUCTWORK IN APPROXIMATE LOCATION SHOWN; REUSE EXISTING RETURN DUCTWORK IF POSSIBLE.

FIRST FLOOR RETAIL BUILDOUT HVAC PLAN

3/16" = 1'-0"

APPROVAL STAMPS:

No.	Date	Description
19	08/17/20 23	ASI-18
4	12/12/22	ISSUED FOR PERMIT

SUBMISSIONS & REVISIONS

OWNER

MAY REIGLER PROPERTIES
2201 WISCONSIN AVE NW
SUITE 200
WASHINGTON DC 20007

ARCHITECT

KEVIN & ASAKO SPERRY ARCHITECTURE
3318 N. Columbus Street
Arlington, VA 22207
T.312.636.3248 / 312.636.4252
www.kasa-arch.com

GENERAL CONTRACTOR

CIVIL ENGINEER

LANDMARK ENGINEERING
141 9TH STREET, PO BOX 774943
STEAMBOAT SPRINGS, CO 80477
T: 970.879.1976

STRUCTURAL FRAMING ENGINEER

KL&A ENGINEERS & BUILDERS
1717 WASHINGTON AVE.
GOLDEN, CO 80401
T: 303.384.9910

M.E.P. ENGINEERS

BOULDER ENGINEERING
1717 15TH STREET
BOULDER, CO 80302
T: 303.444.6038

INTERIOR DESIGNER

JOHNSON NATHAN STROHE
1600 WYNKOOP ST., SUITE 100
DENVER, CO 80202
T: 303.892.7062

PROJECT LOCATION

STEAMBOAT BASECAMP PARTIAL RENOVATION AND TENANT FIT-OUT

1901 CURVE PLAZA
STEAMBOAT SPRINGS, CO 80487

DRAWING TITLE

FIRST FLOOR RETAIL HVAC PLAN

SEAL

COLORADO LICENSED PROFESSIONAL ENGINEER 38983 08/22/2023

DATE: 08/22/23
DRAWN BY:
CHECKED BY:
PROJECT NO: 20129

DRAWING NO:

M1.11