

Date: 10/10/2024

FT#: 23-299

Technician: LF

PROJECT:

Nanuet Union Free School District
Bond Projects Phase 3
Nanuet Senior High School
Barr Middle School

PREPARED FOR:

Joe Lombardo Plumbing & Heating
321 Spook Rock Rd.
Suffern NY 10901

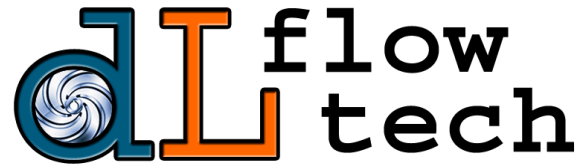
ARCHITECT:

KSQ Architects

ENGINEER:

Sage Engineering





Date: 10/10/2024

FT#: 23-299

Technician: LF

Report Sections

- 1** *Quality Assurance*
- 2** *Summary*
- 3** *Air Balance Report*
- 4** *Hydronic Balance Report
(if applicable)*
- 5** *Definitions*
- 6** *Sketch*
- 7** *Instrumentation*
- 8** *Certifications*



CERTIFICATION FOR:
Nanuet Union Free School District
Bond Projects Phase 3
Nanuet Senior High School
Barr Middle School

The data presented in this report is a record of the system performance and was obtained in accordance with the standards and procedures as outlined by the National Environmental Balancing Bureau and has been balanced to within the physical limits of the systems. Any variances from design quantities which exceed plus or minus ten percent of design, are noted through-out the attached report.

Submitted and Certified By:



10/10/2024



Certified Professional: Luke Fountain





Date: 10/10/2024

FT#: 23-299

Technician: LF

Established in 1982, dL Flow Tech, Inc is a independent Heating and Air Conditioning company specializing in HVAC system diagnostics, holding certifications from NEBB(National Environmental Balancing Bureau) , TABB (Testing Adjusting and Balancing Bureau) and IAQA (Indoor Air Quality Association) . dL Flow Tech is also affiliated wish SMACNA (Sheet Metal & Air Conditioning Contractors National Assn.) and ASHRAE (American Society of Heating, Refrigerating & Air Conditioning Engineers).

Our company offers the following services:

*Air and Hydronic Testing and Balancing
HVAC System Survey
Retro-Commissioning
Sound and Vibration Measurement
Pipe Thickness Testing
Blower Door Testing
Duct Leakage Testing
Fire Damper Testing*

For more information please visit www.dlflowtech.com or call 845-265-2828

*Thank You,
The dL Flow Tech Staff*





REPORT SUMMARY

October 10, 2024

FT #: 23-299.MS

Project: Nanuet Union Free School District
Bond Projects Phase 3
Barr Middle School

Our professional services have been performed and our findings obtained in accordance with customary principles in the engineering field. It should be noted that evaluations are inherently limited in the sense that conclusions are drawn from information obtained during dL Flow Tech's visit to the site. Balancing and testing has been performed as per the Procedural Standards set forth by the National Environmental Balancing Bureau (NEBB) to within the physical limits of the system testing. In NEBB's definition of a TAB report they note it "does not guarantee that systems included are balanced to design flows." This is noted to highlight the fact as a TAB contractor we do not perform testing and balancing services and guarantee it will work as intended, as we did not design it or install it. The dL Flow Tech, Co highly recommends that any commendations or suggestions noted in this report should be reviewed with your design professional.

General Notes:

1. Where available pump or fan capacity is less than the total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to the other parts.
2. The number 1 seen in the AK column indicates a direct CFM reading.
3. Units with ECM motors are balanced proportionate with available airflow due to many manufacturers in their IOM requiring that no adjustments be made on the ECM setting.
4. Due to system effect, static pressure readings are for reference only, static pressure readings may conflict with manufacturers published data, due to field conditions.

Project Notes:

- EF-MS-8: backdraft damper was opened manually for testing then set back closed. The fan is rubbing severely on the housing when brought up to speed. Fan was left in the off position until the issue has been corrected. When fan is powered back on, speed needs to be set to 61% or 1210 RPM on the speed controller.

dL flow tech

	New	New	New	New
Fan Number	EF-MS-8	EF-MS-10	EF-MS-21	EF-MS-23
Location	Roof	Roof	Roof	Roof
Service	Science Labs 222/224	Science Labs 228/230	Boys Locker Room	Cafeteria 108
Manufacturer	Acme	Acme	Acme	Acme
Model/Size	PV165DEC	PV165DEC	PV150DEC	PV300
Fan Type	Down blast	Down blast	Down blast	Down blast
Speed Control	61%	63%	58%	VFD @ 56Hz
Horsepower	0.5	0.5	0.75	3
Safety Factor	Thermal	Thermal	Thermal	1.15
Volts/Phase	115/1	115/1	115/1	230/3
Rated Amperage	6.2	6.2	8.8	8.4
Actual Amperage	2	2.1	1.8	6.7
Sheave Position	Direct Drive	Direct Drive	Direct Drive	100% Closed
Design Fan RPM	1173	1188	1269	866
Actual Fan RPM	1210	1220	1101	848
Design Static Pressure	.800	.800	1.00	1.100
Actual Static Pressure	-.44/.23	-.31/.17	-.66/.14	-.67/.19
Required CFM	1980	2050	1650	9500
Actual CFM	1865	1992	1734	9528
Remarks:				



Zone	Internal Duct Size	Eff Area	Design FPM	Actual FPM	Design CFM	Actual CFM	SP	Remarks
EF-MS-8					<u>1980</u>	<u>1865</u>	Max Exhaust Air Flow 9/5/24	
DT-1	24 X 16	2.67	***	444	***	1184	-0.19	
DT-2	18 X 14	1.75	***	389	***	681	-0.22	
EF-MS-10					<u>2050</u>	<u>1992</u>		
DT-1	20 X 14	1.94	***	414	***	805	-0.21	
DT-2	22 X 14	2.14	***	555	***	1187	-0.20	
EF-MS-21					<u>1650</u>	<u>1734</u>		
	18 X 12	1.50	1100	1156	1650	1734	-0.55	
EF-MS-23					<u>9500</u>	<u>9528</u>		
	48 X 24	8.00	1188	1191	9500	9528	-0.2800	

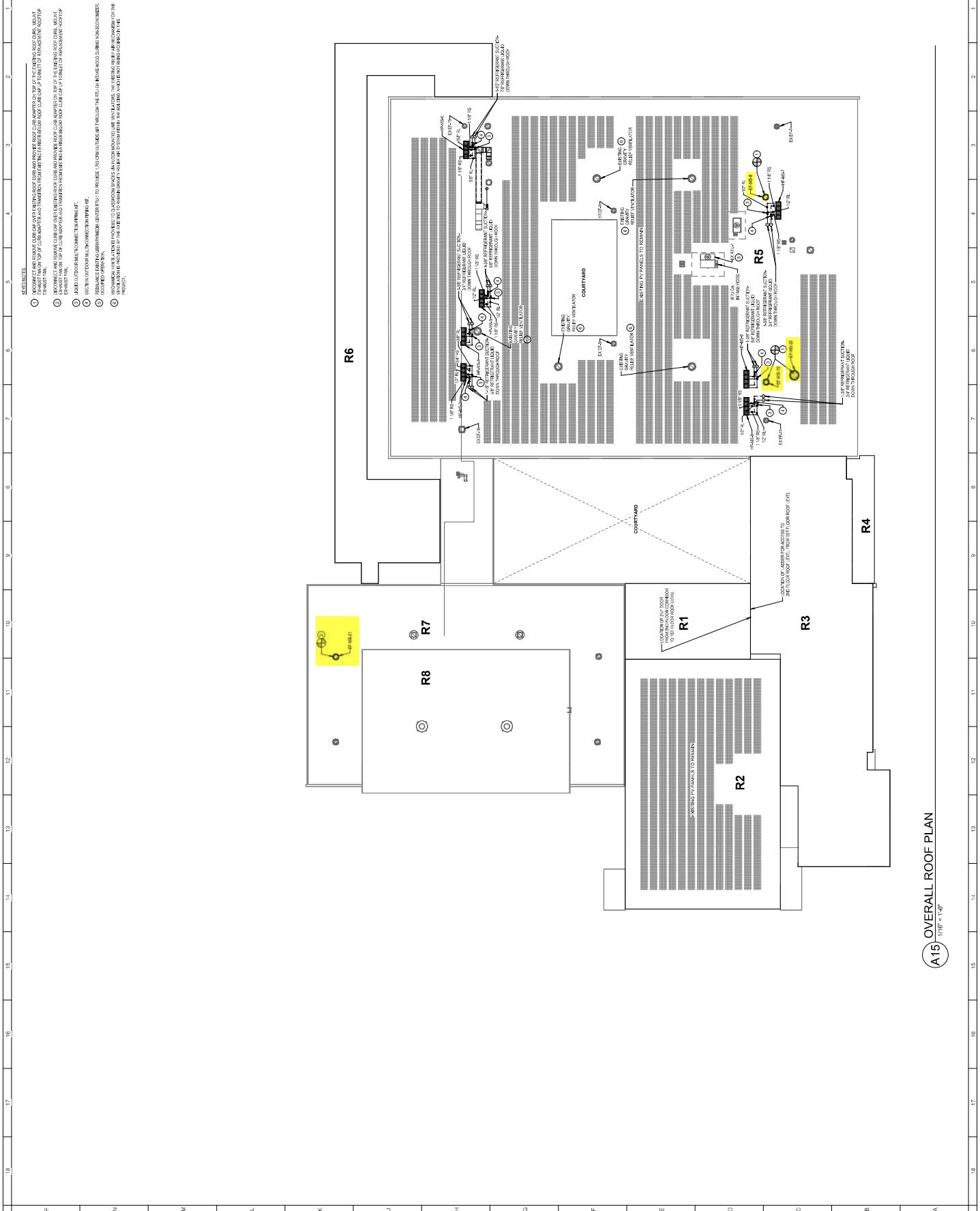
	Hot Water						Design		Delivered		Dial	Remarks
Dwg #	Location / Room #		Terminal	No.	Type	Size	GPM	GPM	dP	Setting		
Inches W.C.												
BM-M111	Sp. Ed. Classroom	100 B	UV-MS-1	1	NuTech	3/4	2	0.69	2.1	Open	Low HW Flow	
BM-M111	Sp. Ed. Classroom	100 B	UV-MS-2	2	NuTech	3/4	2	0.73	2.3	Open		
BM-M111	Sp. Ed. Classroom	102 A	UV-MS-3	3	NuTech	3/4	2	0.71	2.2	Open		
BM-M111	7th/8th Grades Classroom	104	UV-MS-4	4	NuTech	3/4	2	0.61	1.6	Open		
BM-M111	5th/4th Grads Classroom	106	UV-MS-5	5	NuTech	3/4	2	0.62	1.7	Open		
BM-M111	Faculty Lounge	107	UV-MS-38	6	NuTech	3/4	2	0.69	2.1	Open		
BM-M111	Tech Classroom	108	UV-MS-41	7	NuTech	3/4	2	0.57	1.4	Open		
BM-M111	5th Grade Classroom	120	UV-MS-12	8	NuTech	3/4	2	0.59	1.5	Open		
BM-M111	5th Grade Classroom	118	UV-MS-11	9	NuTech	3/4	2	0.62	1.7	Open		
BM-M111	5th Grade Classroom	116	UV-MS-10	10	NuTech	3/4	2	0.64	1.8	Open		
BM-M111	5th Grade Classroom	116.5	UV-MS-9	11	NuTech	3/4	2	0.68	2.0	Open		
BM-M111	5th Grade Classroom	114	UV-MS-7	12	NuTech	3/4	2	0.61	1.6	Open		
BM-M111	5th Grade Classroom	114.5	UV-MS-8	13	NuTech	3/4	2	0.73	2.3	Open		
BM-M111	Sp. Ed. Classroom	112	UV-MS-6	14	NuTech	3/4	2	0.73	2.3	Open		
BM-M111	Fabrication Classroom	110	UV-MS-40	15	NuTech	3/4	2	0.62	1.7	Open		
BM-M111	Fabrication Classroom	110	UV-MS-39	16	NuTech	3/4	2	0.66	1.9	Open		
BM-M111	6th Grade Classroom	200	UV-MS-13	17	NuTech	3/4	2	0.69	2.1	Open		
BM-114	6th Grade Classroom	202	UV-MS-14	18	NuTech	3/4	2	0.62	1.7	Open		
BM-114	Sp. Ed. Classroom	203	UV-MS-15	19	NuTech	3/4	2	0.64	1.8	Open		
BM-114	6th Grade Classroom	204	UV-MS-16	20	NuTech	3/4	2	0.66	1.9	Open		
BM-114	7th Grade Classroom	205	UV-MS-17	21	NuTech	3/4	2	0.61	1.6	Open		
BM-114	6th Grade Classroom	206	UV-MS-19	22	NuTech	3/4	2	0.82	2.9	Open		
BM-114	7th Grade Classroom	207	UV-MS-20	23	NuTech	3/4	2	0.62	1.7	Open		
BM-114	6th Grade Classroom	208	UV-MS-21	24	NuTech	3/4	2	0.73	2.3	Open		
BM-114	6th Grade Classroom	210	UV-MS-22	25	NuTech	3/4	2	0.59	1.5	Open		

[illegible]

Location	Unit Size	#	Supply CFM	Design OSA	% OSA	Fan Speed	Computer Setpoint	Remarks
Unit Vent Minimum Outside Air Test Procedure (for typical units)								
1) Fan speed is set to design CFM according to the MFG's fan performance table.								
2) The outside air damper is indexed fully closed (100% return) and a return air velocity is taken.								
3) The outside air damper is then indexed until the return velocity is reduced to achieve the proper OSA percentage.								
4) The OSA computer setpoint and fan speed is then logged.								
Sp. Ed. Classroom	100B	UV-MS-1	1	1083	360	33%	Medium	40%
Sp. Ed. Classroom	100B	UV-MS-2	2	747	295	39%	Medium	45%
Sp. Ed. Classroom	102B	UV-MS-3	3	1330	630	47%	High	45%
7th/ 8th Grades Classroom	104	UV-MS-4	4	1083	555	51%	Medium	50%
5TH/6TH Grades Classroom	106	UV-MS-5	5	1083	555	51%	Medium	50%
Faculty Lounge	107	UV-MS-38	6	747	100	13%	High	30%
Tech Classroom	108	UV-MS-41	7	1083	550	51%	Medium	50%
5th Grade Classroom	120	UV-MS-12	8	1083	430	40%	Medium	43%
5th Grade Classroom	118	UV-MS-11	9	1083	475	44%	Medium	40%
Fabrication Classroom	110	UV-MS-39	10	1083	440	41%	Medium	40%
Fabrication Classroom	110	UV-MS-40	11	1083	440	41%	Medium	45%
Receiving Custodial	119	UV-MS-6	12	1083	495	46%	Medium	47%
Storage	123	UV-MS-7	13	1083	500	46%	Medium	50%
5th Grade Classroom	114.5	UV-MS-8	14	1083	540	50%	Medium	50%
5th Grade Classroom	116	UV-MS-10	15	1083	460	42%	Medium	40%
5th Grade Classroom	116.5	UV-MS-9	16	1083	460	42%	Medium	45%
6th Grade Classroom	200	UV-MS-13	17	1083	435	40%	Medium	47%
6th Grade Classroom	200	UV-MS-14	18	1083	435	40%	Medium	47%
6th Grade Classroom	204	UV-MS-16	19	1083	440	41%	Medium	47%
6th Grade Classroom	206	UV-MS-19	20	1083	435	40%	Medium	47%
6th Grade Classroom	208	UV-MS-21	21	1083	435	40%	Medium	49%

Page 7 of 8

Code	Remarks
AS Req't'd	Final airflow has been adjusted to suit requests of occupants
ABV CLG	Register (ETC) is located above ceiling line
BKN DPR	Volume Damper (VD), Face Damper (OPD), Splitter Damper (SD) is broken/stuck
CC	Ceiling conflict; kinked flex duct causing low flow
CS	Circuit Setter
DD	Unit is direct drive; no adjustment can be made without a speed controller.
DD on HI	Direct drive fan set to High, medium (MED) or low (LO)
DT	Duct Traverse
DLF	DL Flow Tech Inc.
FACE	Velocity taken at the balance point
HDW MSG	Volume or splitter damper hardware is missing
Inline	Fan is an inline fan; Actual RPM can not be obtained
Long Flex	Flexible duct configuration and length is probable cause for low flow
Locked	No key available at time of balance
Max Flow	Maximum flow achievable
MAN OPN'D	Temporarily opened manually to set
New outlet	Outlet not shown on contract drawing; no CFM given; CFM assigned by DLF
Noisey	Register (ETC) has been set low to reduce objectionable air noise.
NPA	No provision to adjust; requires installation of volume damper / face damper
NI	Outlet not installed
NW	Device not working
TP	Test point location for duct traverse and/or static pressure
PT	Poor take -off / inlet flex to VAV box causing turbulence / probable cause for low flow
RAW	Raw opening -- Ductwork and collar is installed; register (etc.) is missing; tap is balanced high to compensate.
Set High	Set high due to missing register and/or to maintain total room flow (etc).
T'stat REV	The t'stat is reverse or opposite of design
T'stat LOC	T'stat not in area served
VD FO	Volume Dampers are in their maximum open position
VD FC	Volume Dampers are in their full closed position
VAV	Variable air volume box
CAV	Constant Volume Box
FPVAV	Fan powered variable air volume box
Register Types	
CD	Ceiling Diffuser
CR	Ceiling Register
EC	Egg Crate Type register
ER	Exhaust Register
FH	Fume Hood
LD	Linear Diffuser
LT	Light Troffer
WMS	Wire Mesh Screen
TR	Top Register
BR	Bottom Register
RAW	Raw opening
No CC	Flow metering device not installed, temp/pressure differential across elements used to determine flow.
Simulated flow	Where available pump or fan capacity is less than the total flow requirements, flow temporarily restricted to other parts.



ARCHITECT

ksqdesign

NEW YORK OHIO ARIZONA

KSD Design
315 W 4th Street, 10th Floor
New York, NY 10013
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

Owner
New York State School District
100 Park Avenue, 10th Floor
New York, NY 10017

Architect & Engineer
KSQ Design & Engineering
100 Park Avenue, 10th Floor
New York, NY 10017
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

MEP Engineer
KSQ Design & Engineering
100 Park Avenue, 10th Floor
New York, NY 10017
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

Structural Engineer
KSQ Design & Engineering
100 Park Avenue, 10th Floor
New York, NY 10017
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

Electrical Engineer
KSQ Design & Engineering
100 Park Avenue, 10th Floor
New York, NY 10017
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

Environmental Engineer
KSQ Design & Engineering
100 Park Avenue, 10th Floor
New York, NY 10017
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

Construction Manager
KSQ Design & Engineering
100 Park Avenue, 10th Floor
New York, NY 10017
Tel: 212.400.0000
Fax: 212.400.0001
www.ksqdesign.com

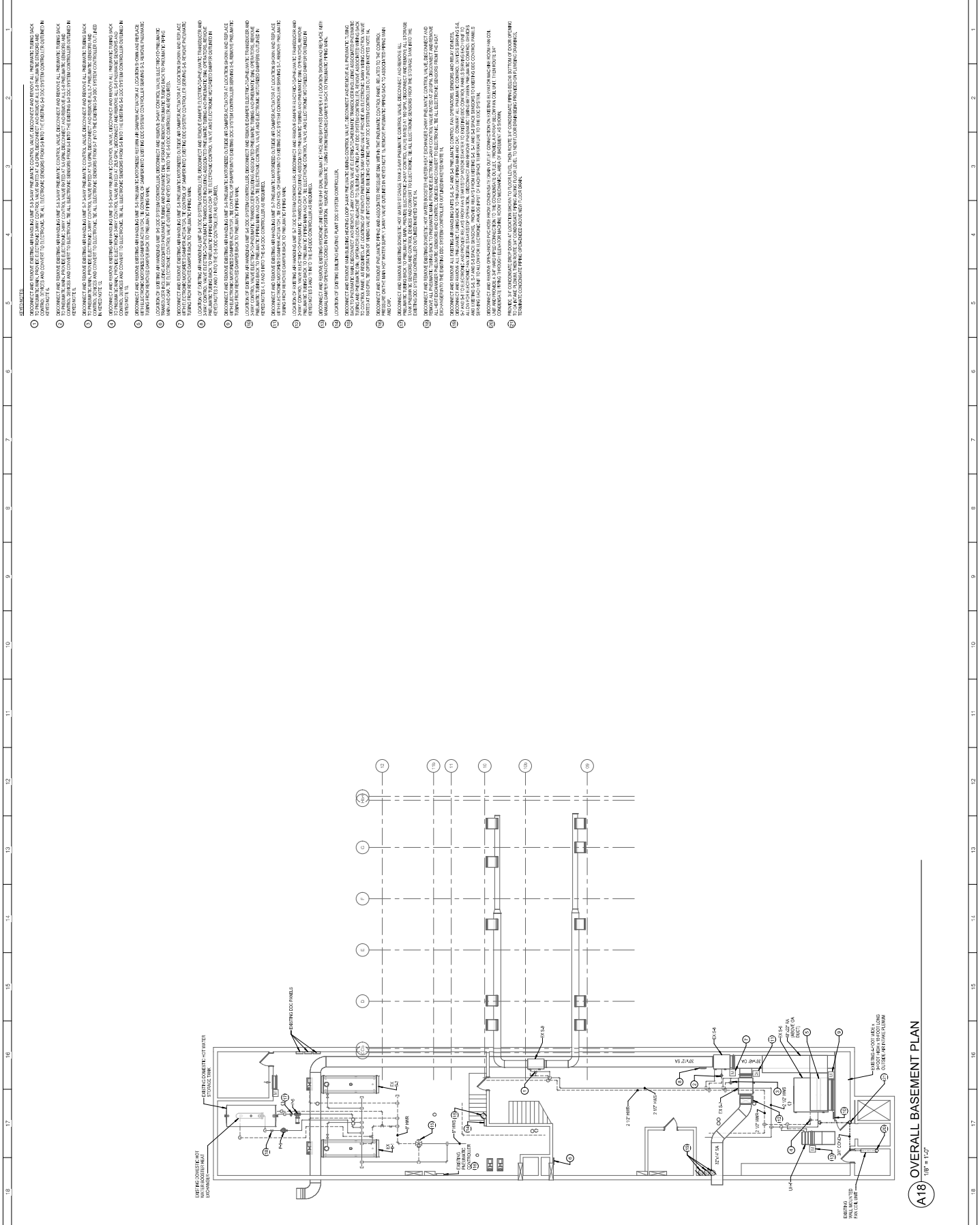
NUFSD
BOND
PROJECTS
PH3

High School
100 Church Street
Newark, NJ 07102

Bar Middle School
50 Blenheim Street
Newark, NJ 07102

ISSUED FOR BID SET
DATE: 06/06/2023
SCALE: 1/8" = 1'-0"
SHEET NAME:
OVERALL ROOF PLAN
SHEET NUMBER:
BM-M103

ISSUED FOR BID SET
DATE: 06/06/2023
SCALE: 1/8" = 1'-0"
SHEET NAME:
OVERALL ROOF PLAN
SHEET NUMBER:
BM-M103



TAB Equipment List dL Flow Tech NEBB CERT# 2582

FUNCTION	RANGE	MINIMUM ACCURACY	INSTRUMENT INFORMATION
Rotating Measurement	0 to 5000 RPM	+/- 2% of reading, +/- 2 RPM	Shimpo DT 207L
Temperature Measurement	Air: 40-140 Immersion: 40-140 Contact: 40-140	0.1 % + 1,4 degrees F (for all)	Make and Model: Shortridge ADM 860
Electrical Measurement	0 to 600 VAC 0 to 100 Amps	+/-2% +/-5 digits +/-2% +/- 5 digits	Make and Model: Fluke 323 Clamp On Meter
Air Pressure Measurement	0 to 10.00 in. w.g.	+/-2% +/- 0.0001 in. w.g.	Make and Model: Shortridge ADM 860
Air Velocity Measuring Rotating Vane	50-2500 FPM	+/-5% of reading	Make and Model: Testo
Humidity Measurement	10 - 90% RH	+/-3% RH	Make and Model: Extech RH390
Direct Reading Hood	100-2000 CFM	+/-5% of reading, +/- 5 cfm	Make and Model: Shortridge ADM 860
Pitot Tubes (2 required)	adequate length and width for intended use	N/A	
Hydronic Pressure Measuring	-30"hg - 60psi 0-100 psi 0-200 ps1	+/-2% of reading, +/- 1 psi +/-2% of reading, +/- 1 psi +/-2% of reading, +/- 1 psi	Shortridge HDM 250
Hydronic DP Measurement	0-100 in. W.G. 0-100 ft. W.G.	+/-2% of reading, +/- 2 in. w.g. +/-2% of reading, +/- 0.2 ft. w.g.	Shortridge HDM 250
Ultrasonic Flow Meter (Optional)	0.5" to 24" dia.	+/-1% of reading	Make and Model: Fuji FSCS

**All instrumentaion meets or exceeds NEBB Standards. Certificates are available upon request.



Firm Certification

DL FLOW TECH, INC.

**HAS MET ALL REQUIREMENTS FOR NEBB CERTIFIED
STATUS IN THE FOLLOWING DISCIPLINE**

Testing, Adjusting and Balancing of Environmental Systems

2582

NEBB Certification Number

December 31, 2024

Expiration Date

A handwritten signature in black ink, appearing to read "James M. Trz" or similar.

NEBB President

A handwritten signature in black ink, appearing to read "Michael J. Kelly" or similar.

NEBB President-Elect