Johnston County Public Schools HVAC CONTROLS REPLACEMENTS – PACKAGE 5

ADDENDUM NO. 2

DATE: December 14, 2023

PROJECT: Johnston County Public Schools

Controls Replacements – Package 5

OWNER: Johnston County Public Schools

2320 US 70 Business, Smithfield, NC 27577

ENGINEER: Dewberry Engineers Inc.

2610 Wycliff Road, Suite 410, Raleigh, NC 27607

This Addendum, applicable to the work designated herein, shall be understood to be and is an Addendum to the contract documents and, as such, shall be become a part of and included in the contract.

Drawings:

- 1. Sheet 0G-001 Sheet added.
- 2. Sheet 0M-502 New sheet for added details.
- 3. Sheet 0M-720 Added Gymnasium timer switch to SOO
- 4. Sheet 1ME-201 Keynote removed.
- 5. Sheet 1M-601 Flowmeter and Air Systems schedules adjusted.
- 6. Sheet 2ME-204 Keynote removed.
- 7. Sheet 2M-601 Air System schedule adjusted.
- 8. Sheet 2M-603 Flowmeter schedule adjusted.
- 9. Sheet 3ME-204 Keynote removed.
- 10. Sheet 3M-601 Air System schedule adjusted
- 11. Sheet 3M-603 Flowmeter
- 12. Sheet 4ME-201 Keynote removed.
- 13. Sheet 4ME-204 Keynote removed.
- 14. Sheet 4M-601 Air System schedule adjusted
- 15. Sheet 4M-603 Flowmeter schedule adjusted

Specifications:

1. None.

Contractor Questions:

- 1. What are the glycol and non-glycol loop volumes for water treatment at each of the schools?
 - a. Estimated Volumes (Not Verified)
 - i. West Smithfield 6 Tanks
 - Glycol See Calmac O&M Manual. Approximately 25% glycol;
 System volume 1,450 gallons (6 tanks @ 157 + 350 gal in ~135' of 8" pipe + 10% sf for mech rm hxr, etc). Include biocide similar to Aquacar PS20. 192 oz / 16 per tank. Contractor to verify prior to install.
 - 2. Building -3,900 gallons
 - ii. River Dell 6 tanks
 - 1. Building -3,900 gallons
 - iii. Riverwood 6 Tanks
 - 1. Building -3,900 gallons
 - b. Flushing shall be completed per Calmac operating and maintenance instructions.

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- 2. Have there been any hazardous materials confirmed to be present at any of the schools? If so, what is the plan for remediation?
 - Asbestos records are kept for each school. All schools in this package are recorded as having no Asbestos. Hazard material reports beyond that are typically done by contractors before work begins.
- Do any of the schools have a roof warranty that needs to be maintained? If so, please provide a contact for the required roofing company.

 No
- 4. Can work be performed during the school year as long as classes are not disrupted and required zone comfort is maintained?
 Yes
- 5. Per the spec for this project all controls panels are to be UL listed panels. They are also to have hinged doors and removable back plates. Please verify that the existing control panels will not meet this spec and will need to be replaced.
 Control Panel Assemblies must be UL listed. Enclosure must be listed either as an assembly "508A closed" or as a backplate with components "508A open". If the installation includes only the controller that is UL listed in the existing control panel then the control panel is not considered an assembly and will not have to have a 3rd party listing or new control panel assembly listing. Reuse of existing control panels may be done at the contractor's discretion to meet this requirement and take responsibility of the existing panel. The controls contractor will take responsibility and warranty for all control system components that are reused or new to complete a fully functioning control system compliant with the contract drawings and specifications.
- 6. Spec 23-08-00 page 2 item C says to monitor the below but does not show on the control diagrams, monitor or not? This is under the commissioning section:
 - a. Elevator sump Not applicable
 - b. Freezer and cooler temps Removed from scope
 - c. Metering Domestic Water and Hydronic Flow Only
 - d. Fire alarm Applicable for control schematics/sequences only for shutdown.
 - e. Security system Not applicable
- 7. Air handling schematics show mixing box damper actuators plus a relief damper, but there's a damper schedule with a different quantities of dampers on the drawings... go only with the schedule? I'm thinking go with what's on the schedule.

 Incorrect, damper schedule does not include all dampers. The damper schedule is for "independent", "remote" or "shared" dampers separate from the equipment such as an AHU or FCU. Additional dampers may be included as part of the AHU or FCU that would be shown on the control schematic.
- 8. Drawings show on the boilers and chillers to be integrated to the BAS and says to provide a "device controller and integrate". Do the chillers and boilers have comm cards? If not, do we provide?

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A plant controller is to be provided. Hardwired points for each chiller / boiler are shown in schematic and comm cards may be available in some instances for additional point integration. If there is not an existing comm card, then the hardwired points will be required and a comm card will be noted if it is to be added to existing chiller / boiler.

- 9. Specs call for the existing control system to stay working while the changeout is taking place. Is the existing system LON or BACnet? Do we need to install a new communications trunk? If the existing system needs to stay operational a new communications trunk will be required, unless where network is existing to chillers/boilers.
- 10. Drawing show that the fan coils have a control panel, can we reuse?

 Control Panel Assemblies must be UL listed. Enclosure must be listed either as an assembly "508A closed" or as a backplate with components "508A open". If the installation includes only the controller that is UL listed in the existing control panel then the control panel is not considered an assembly and will not have to have a 3rd party listing or new control panel assembly listing requirement. Reuse of existing control panels may be done at the contractor's discretion to meet this requirement and take responsibility of the existing panel. The controls contractor will take responsibility and warranty for all control system components that are reused or new to complete a fully functioning control system compliant with the contract drawings and specifications.
- 11. New control panels for the boiler/chiller plants?

 Yes, there are certain boiler / chiller plants with recent controller replacements as part of boiler / chiller changeout. These controllers may be modified to meet current contract drawings and specification requirements or replaced for same purpose.
- 12. Do we know who's controls are in each of the 8 schools? That would determine if they existing controls are LON or BACnet and if we could reuse any comm wiring.

 A new communications trunk will be required along with IP CAT5/6 wire.

Attached Documents:

1. None.

End of Addendum No. 2



JOHNSTON COUNTY PUBLIC SCHOOLS

HVAC CONTROLS UPGRADE DEWBERRY PACKAGE 5

JOHNSTON COUNTY, NC

Dewberry

Raleigh, NC 27607-3073 919.881.9939 NC License No. F-0929

KEY PLAN

ADDENDUM #1

DESCRIPTION DRAWN BY APPROVED BY___ CHECKED BY ______JPH

COVER SHEET

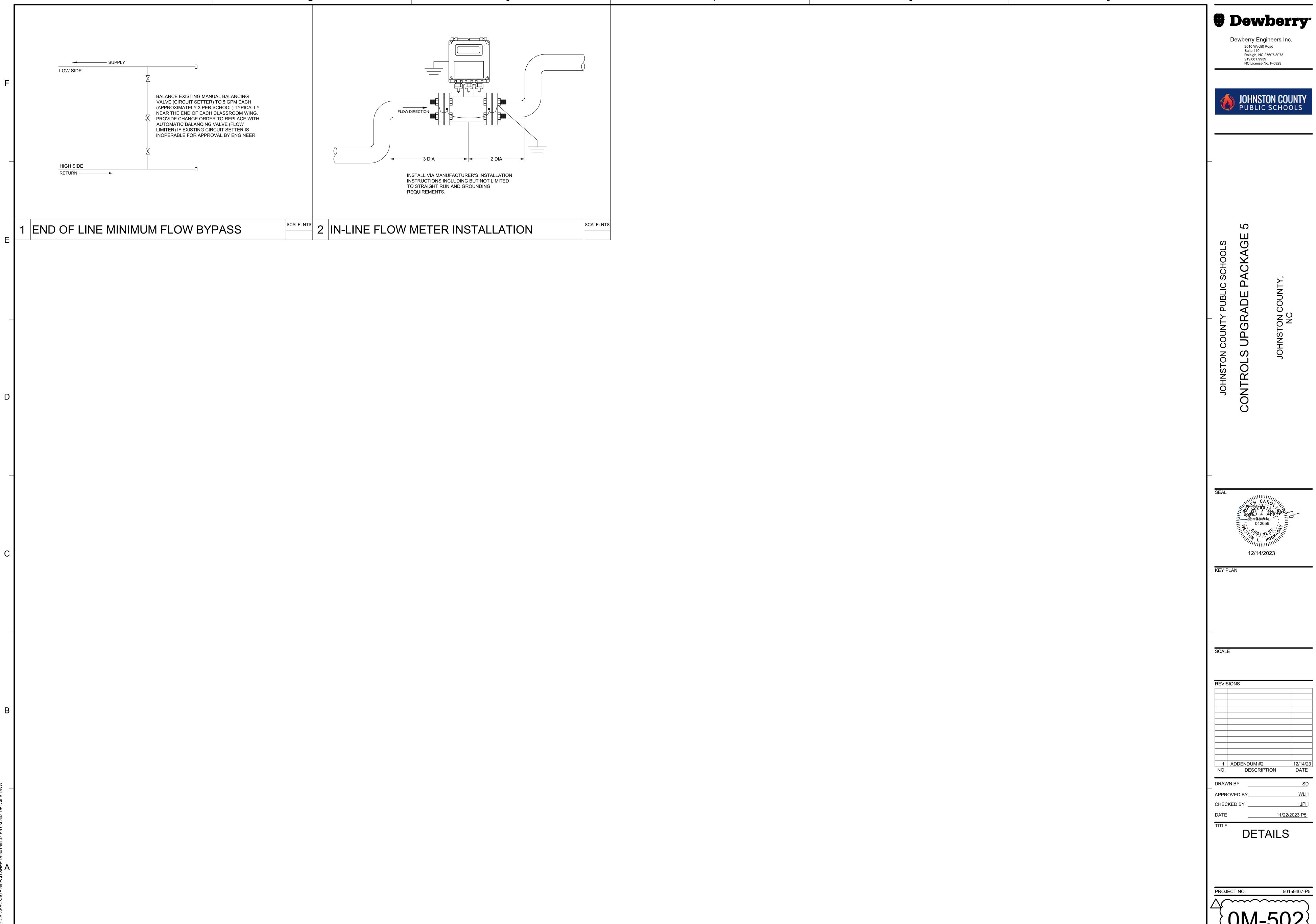
DRAWING INDEX

COMPLETE CODE COMPLIANT CONSTRUCTION OF THE FOLLOWING: A. UPGRADE AND MODERNIZE EXISTING SCHOOLS WITH NEW A BUILDING AUTOMATION SYSTEM CONTROL. SYSTEM. A. I. REPLACE BUILDING CONTROLLERS, DEVICE CONTROLLERS, ACTUATORS, WIRING, AND SENSORS THAT INTEGRATE INTO AN EXISTING COUNTYWIDE TRIDIUM NIACARA A SYSTEM TO IMPROVE INDOOR AIR QUALITY MONITORING AND CONTROL SEQUENCES. A. 2. PROVIDE NEW BUILDING CONTROLLERS FOR INTEGRATION OF NEW DEVICE CONTROLLERS. CONTROLLERS. A. 3. PROVIDE DATA CABLING FOR OWNER IT WHERE NEW DATA DROPS ARE REQUIRED. A. 4. PROVIDE NEW CONTROL VALVES WHERE INDICATED. A. 5. PROVIDE NEW GONEROLY ON MEASUREMENT FLOW STATIONS ON ZONE DAMPERS AND TERMINAL UNITS FOR CONTROLLERS. A. 6. PROVIDE NEW GRAPHICS, SCHEDULING, AND TRENDING DATA FOR CONTROLLERS. A. 7. PROVIDE NEW GRAPHICS, SCHEDULING, AND TRENDING DATA FOR CONTROLLERS. A. 8. PROVIDE NEW GRAPHICS, SCHEDULING, AND TRENDING DATA FOR CONTROLLERS. A. 9. PROVIDE NEW HEATING HOT WATER PLANT CONTROLLERS. A. 10. PROVIDE NEW HEATING HOT WATER PLANT CONTROLLERS. A. 11. PROVIDE NEW EXHAUST FAN CONTROLLERS. A. 12. PROVIDE NEW EXHAUST FAN CONTROLLERS. A. 13. INTEGRATE EXISTING AND NEW EQUIPMENT CONTROLLERS. A. 14. INTEGRATE EXISTING AND NEW EQUIPMENT CONTROLLERS. A. 15. INTEGRATE EXISTING AND NEW EQUIPMENT CONTROLLERS. A. 16. PROVIDE NEW BATE AND CONTROLLERS. A. 17. PROVIDE NEW HEATING HOT WATER PLANT CONTROLLERS. A. 18. INTEGRATE EXISTING AND NEW EQUIPMENT CONTROLLERS. A. 19. PROVIDE NEW EXHAUST FAN CONTROLLERS. A. 10. PROVIDE NEW EXHAUST FAN CONTROLLERS. A. 11. PROVIDE NEW EXHAUST FAN CONTROLLERS. A. 12. PROVIDE NEW OUTSIDE AIR MONITORING STATION. A. 13. INTEGRATE EXISTING AND NEW EQUIPMENT CONTROLLERS. A. 14. PROVIDE NEW OUTSIDE AIR MONITORING STATION. A. 13. INTEGRATE EXISTING AND NEW EQUIPMENT CONTROLLERS.	
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A.16. PROVIDE CARBON DIOXIDE MONITORING FOR DEMAND CONTROL VENTILATION AND 1ME-204 GLENDALE KENLY ES AREA D	
INDOOR AIR QUALITY MONITORING. MONITORED THROUGH WALL MODULE FOR SINGLE 1ME-205 GLENDALE KENLY ES AREA E	
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A.17. PROVIDE TIMER SWITCH IN PRINCIPAL'S OFFICE AND ATHLETIC DIRECTOR / COACHES 1M-601 SCHEDULES	
OFFICE FOR ADMIN AND GYMNASIUM OCCUPANCY OVERRIDE. COORDINATE WITH OWNER ON LOCATION. 1M-602 SCHEDULES	
A.18. PROVIDE NEW ELECTROMAGNETIC FLOW SENSORS AND PIPING INSTALLATION KITS FOR 2M-110 WEST SMITHFIELD ES FIRST FLOOR PLAN	
HYDRONIC SYSTEMS. 2ME-201 WEST SMITHFIELD ES AREA A	
B. PROVIDE NEW PUMPS WITH VARIABLE FREQUENCY DRIVES (VFD). PROVIDE NEW INVERTER DUTY RATED MOTORS WITH SHAFT GROUNDING RING FOR VFD INSTALLATION. 2ME-202 WEST SMITHFIELD ES AREA B	
C. PROVIDE NEW PUMP MOTORS WITH VARIABLE FREQUENCY DRIVES (VFD). PROVIDE NEW 2ME-203 WEST SMITHFIELD ES AREA C	
INVERTER DUTY RATED MOTOR WITH SHAFT GROUNDING RING FOR VFD INSTALLATION. 2ME-204 WEST SMITHFIELD ES AREA D	
D. PROVIDE TEST AND BALANCE FOR HVAC SYSTEMS TO: D.1. VERIFY AND RESTORE TO ORIGINAL VENTILATION REQUIREMENTS. 2ME-205 WEST SMITHFIELD ES AREA E	
D.2. VERIFY AND BALANCE NEW HYDRONIC CONTROL VALVES. 2ME-401 WEST SMITHFIELD ES ENLARGED PLANS	
D.3. VERIFY AND BALANCE NEW PUMPS. 2M-402 WEST SMITHFIELD ES ENLARGED PLANS	
D.4. VERIFY AND CALIBRATE NEW CONTROL SYSTEM COMPONENTS. 2M-601 SCHEDULES	
E. PROVIDE FUNCTIONAL TESTING AND CONTROLS CHECKOUT TO ENSURE PROPER SYSTEM OPERATION. 2M-602 SCHEDULES	
F. CONTRACTOR SHALL PROVIDE EQUIPMENT AND LABOR THAT ALLOWS COMPLETION WITHIN 2M-603 SCHEDULES	
THE SCHEDULED TIMEFRAME. 2E-601 SCHEDULES	
G. PROVIDE NEW DUCTLESS MINI SPLIT SYSTEMS AND ASSOCIATED CONDENSING UNIT AT RIVER DELL AND WEST SMITHFIELD ELEMENTARY SCHOOLS. RUN NEW REFRIGERANT PIPING RIVER DELL AND WEST SMITHFIELD ELEMENTARY SCHOOLS. RUN NEW REFRIGERANT PIPING	
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SYSTEM WITH WATER. FILL TO APPROPRIATE LEVEL. PROVIDE RE-COMMISSIONING OF ICE 3ME-204 RIVER DELL ES AREA D	
STORAGE SYSTEM IN CONFORMANCE WITH THE MANUFACTURER	11
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	# X	# # # 		
BUILDING NUMBER 0 = ALL PACKAGE 5 BUILDINGS PACKAGE 5 1 = GLENDALE KENLY ELEMENTARY SCHOOL 2 = WEST SMITHFIELD ELEMENTARY SCHOOL 3 = RIVER DELL ELEMENTARY SCHOOL 4 = RIVERWOOD ELEMENTARY SCHOOL	DISCIPLINE CODE G = GENERAL INFORMATION ALL TRADES A = ARCHITECTURAL M = MECHANICAL E = ELECTRICAL C = CONTROLS S = STRUCTURAL F = FIRE PROTECTION P = PLUMBING T = TELECOM	DRAWING GROUP 0 = MISC. INFO. 1 = FLOOR PLANS 2 = AREA PLANS 3 = RISERS 4 = ENLARGED PLANS 5 = DETAILS 6 = SCHEDULES 7 = SCHEMATICS, POINTS, & SEQUENCES 700 - GENERAL CONTROLS 701-709 - HOT WATER CONTROLS 710-719 - CHILLED WATER CONTROLS 720 - MISC. AIR CONTROLS 721-729 - AHU CONTROLS	FLOOR NUMBER OR SEQUENCE NUMBER NUMBER	SEQUENC NUMBER

DRAWING NUMBER CODE

PROJECT SCOPE



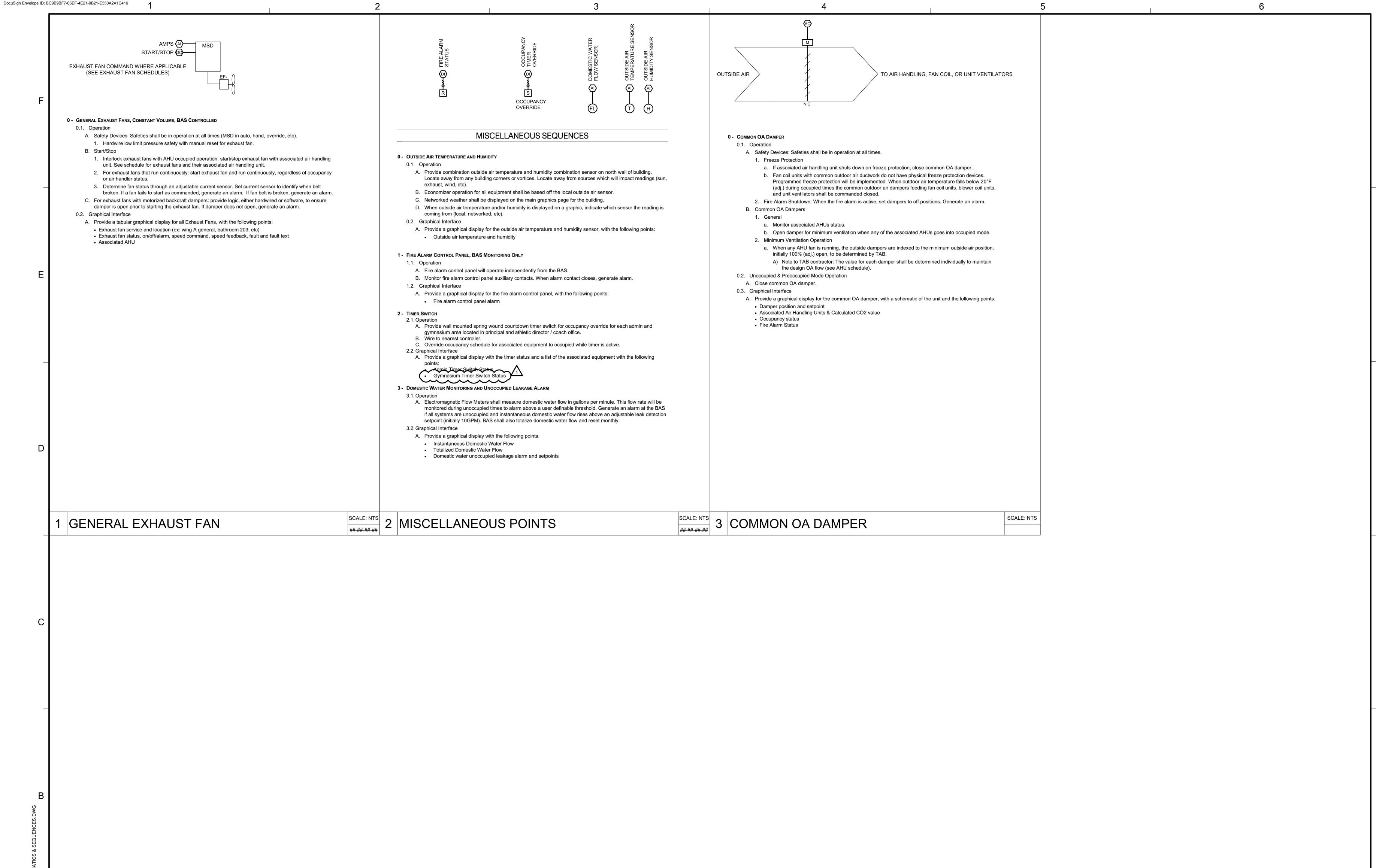
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Dewberry

Dewberry Engineers Inc. 2610 Wycliff Road Suite 410 Raleigh, NC 27607-3073 919.881.9939 NC License No. F-0929



1 ADDENDUM #2
NO. DESCRIPTION



Dewberry Dewberry Engineers Inc.

2610 Wycliff Road Raleigh, NC 27607-3073 919.881.9939

NC License No. F-0929



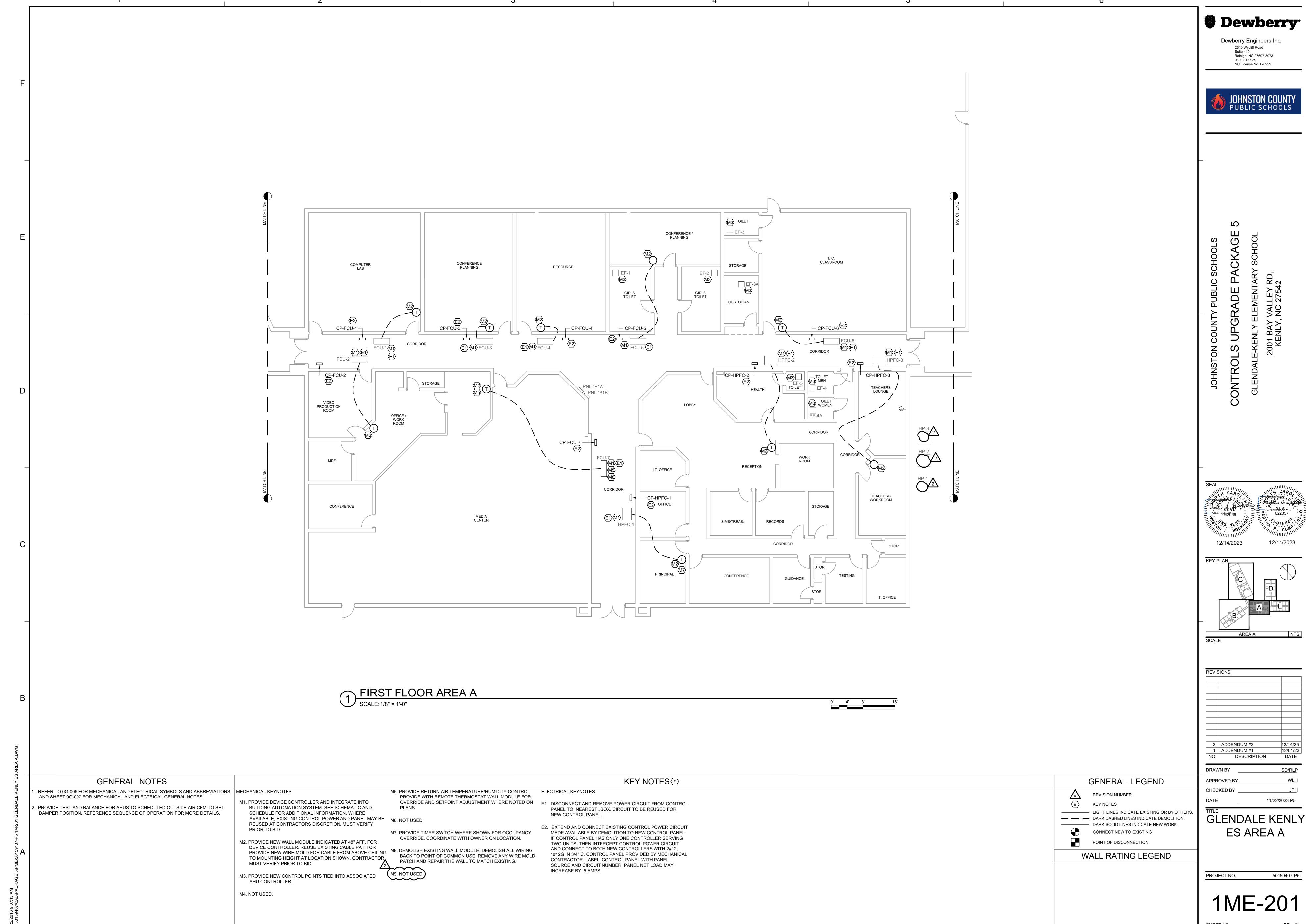
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ADDENDUM #2 DESCRIPTION

APPROVED BY_

CONTROL SCHEMATICS & SEQUENCES

0M-720



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Dewberry

MARK

AHU-1

AHU-2

AHU-3

FCU-1

FCU-2

FCU-3

FCU-4

FCU-5

FCU-6

FCU-7

FCU-8

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FCU-11

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FCU-37

FCU-38

FCU-39

FCU-40

FCU-41

FCU-42

FCU-43

FCU-44

FCU-45

AIR SYSTEMS CONTROL SCHEDULE - GLENDALE ELEMENTARY SCHOOL

LOCATION

SERVICE

AFF LOCKERS 412,413, DRY STORAGE

411, KITCHEN 408, OFFICE 410, CUST 409, DISH 407 DINING 404, STOR 404B, GEN STOR 405,

CHAIR STOR 406

MULTIPURPOSE 401, OFFICE 401A, STOR

401B

COMP LAB 129

VID PROD RM 130, TAPE STOR 134, CONF 133, OFFICE / WORK RM 132, A/V

STOR 135, CORRIDOR 100B

RESOURCE 128

RESOURCE 127

BOYS TLT 124, CONF/PLANNING 125,

GIRLS TLT 126, CORRIDOR 100A

E.C CLASSROOM 122, STOR 122B, TLT

122A, CORRIDOR 100A

MEDIA CENTER 131, CORRIDOR 100

CLASSROOM 212

CLASSROOM 213

CLASSROOM 211

CLASSROOM 210

TEACHER PLANNING 208, RESOURCE

206, CORRIDOR 200

GIRLS TLT 205, BOYS TLT 209, STAFF TLT

CLASSROOM 204

CLASSROOM 203

CLASSROOM 201

CLASSROOM 202

CLASSROOM 302

CLASSROOM 301

CLASSROOM 304

CLASSROOM 303

GIRLS TLT 305, BOYS TLT 309, STAFF TLT

TEACHER PLANNING 308, RESOURCE

306, CORRIDOR 300

CLASSROOM 311

CLASSROOM 310

CLASSROOM 312

CLASSROOM 313

CLASSROOM 502, TLT 502A

CLASSROOM 501, TLT 501A

CLASSROOM 504, TLT 504A

CLASSROOM 503, TLT 503A

CLASSROOM 505, TLT 505A

CLASSROOM 506, TLT 506A

CORRIDOR 500, TLT 500A, TLT 500B,

RESOURCE 509, TEACHER PLANNING

CLASSROOM 508, TLT 508A

CLASSROOM 511, TLT 511A

CLASSROOM 510, TLT 510A

CLASSROOM 513, TLT 513A

CLASSROOM 512, TLT 512A

CORRIDOR 400, BOYS TLT 418, GIRLS TLT

MUSIC STOR 403A, MUSIC ROOM 403

ART ROOM 402, ART STOR 402A, KILN

STAGE 404A

CONNECTOR 601

CONNECTOR 601

D

507, STOR 507A

TYPE

AHU

FCU

FCU

FCU

FCU

FCU

FCU

FCU

FCU

FCU

CONTROL SCHEMATIC NUMBER

1/0M-721

1/0M-721

1/0M-721

1/0M-722

OUTSIDE AIRFLOW (DCV/VENT) (CFM)

750/2390 1,2,3,4,6

780/4500 ,2,3,4,5,6

810/4530 1,2,3,4,5,6

1,2,3,4,6

1,2,3,4,6

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NOTES

Dewberry

PACKAGE UPGRADE ROL

EAL	ASE37F3SEE9A7L O42056 12/14/2023

KEY PLAN

SCALE

ONS	
ADDENDUM #2	12/14/2
ADDENDUM #1	12/01/2
DECODIDATION	DATE

		JOINI # I	12/01/2
	NO. D	ESCRIPTION	DATE
_	DRAWN BY		SD/RLF
	APPROVED BY		WLF
	CHECKED BY		JPF

SCHEDULES

					AHU	
					OUTSIDE AIRFLOW (DCV/VENT)	
MARK	TYPE	2 LOCATION	SERVICE	CONTROL SCHEMATIC NUMBER	(CFM)	NOTES
HPFC-1	HP	A	PRINCIPAL 105, CONF 106, GUIDANCE 107, STOR 107A, STOR 108A, TESTING 108	1/0M-723	345	1,2,3,6
HPFC-2	HP	A	HEALTH 120, TLT 120A, TLT 118, TLT 119, CORRIDOR 121, WORK RM 117, RECEPTION 101A, SIMS/TREAS 114, RECORDS 115, STOR 116, LOBBY 101, CORRIDOR 113, CORRIDOR 103,OFFICE 104, IT OFFICE 102	1/0M-723	255	1,2,3,6
HPFC-3	HP	A A	TEACHERS LOUNGE 112, TEACHERS WORKROOMS 111, STOR 110, IT OFFICE 109	1/0M-723	180	1,2,3,6

- 1. PROVIDE TEST AND BALANCE TO DETERMINE VENTILATION SETTING FOR OUTSIDE AIR DAMPER POSITION. OUTSIDE AIR FLOW RATES WERE
- OBTAINED FROM ORIGINAL DESIGN ASBUILTS.
- 2. PROVIDE NEW EQUIPMENT LABELS FOR EQUIPMENT, MOTOR STARTER/DISCONNECTS, VARIABLE FREQUENCY DRIVES, AND ELECTRICAL PANELS
- 3. PROVIDE EQUIPMENT CONTROLLER AND SENSORS. SEE ASSOCIATED CONTROL SCHEMATIC FOR POINTS TO INCLUDE.
- 4. DEMOLISH CHILLED WATER AND HEATING HOT WATER CONTROL VALVES FOR AHU AND PROVIDE NEW 2 WAY PRESSURE INDEPENDENT CONTROL VALVES. PROVIDE NEW 2-WAY CONTROL VALVE TO MATCH EXISTING SIZE. MODIFY PIPING AS NECESSARY TO ACCOMODATE NEW
- 5. PROVIDE RETURN AIR TEMPERATURE/HUMIDITY CONTROL WITH REMOTE THERMOSTAT WALL MODULE FOR OVERRIDE AND SETPOINT ADJUSTMENT WHERE NOTED ON PLANS.
- 6. DEMOLISH AND PROVIDE NEW ACTUATOR(S) FOR MOTOR-OPERATED DAMPERS. MULTIPLE UNITS SERVED BY ONE OAD, NOT ONE PER UNIT. MATCH EXISTING COMMAND.

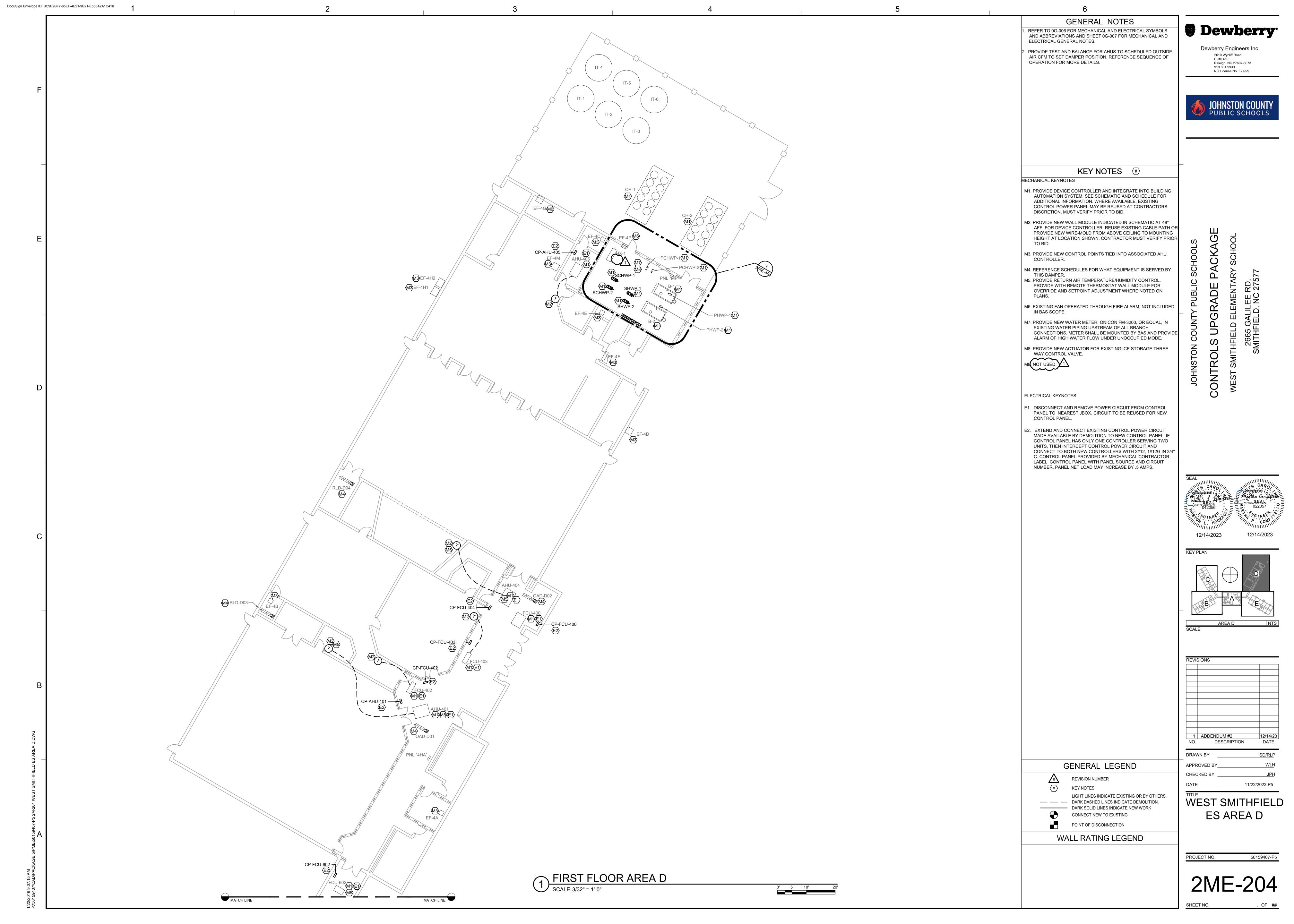
YDRONIC SYS	TEMS CONTRO	L SCHEDULE	- GELNDALE	KENLY ELEMENTAI	RY SCHO	OL
					HYDRONICS	
					FLOW	
MARK	TYPE	LOCATION	SERVICE	CONTROL SCHEMATIC NUMBER	(GPM)	NOTES
B-1	BOILER - COND	С	BUILDING	OM-702	144	1,2,5
B-2	BOILER - COND	С	BUILDING	0M-702	144	1,2,5
SHWP-1	PUMP	С	BUILDING	0M-702	342	1,2,3,5
CH-1	ACC	С	BUILDING	OM-711	382.3	1,2,5
CH-2	ACC	С	BUILDING	OM-711	382.3	1,2,5
PCHWP-1	PUMP	С	CH-1	OM-711	383	1,4,5
PCHWP-2	PUMP	С	CH-2	OM-711	383	1,4,5
SCHWP-1	PUMP	С	BUILDING	OM-711	582	1,2,3,4,5
SCHWP-2	PUMP	С	BUILDING	OM-711	582	1,2,3,4,5

- 1. PROVIDE NEW EQUIPMENT CONTROLLER AND/OR MODIFY AND INTEGRATE TO EXISTING SYSTEM (WITH COORDINATION OF PREVIOUS INSTALLING CONTRACTOR). SEE PLANS FOR DETAILS.
- 2. REFER TO CONTROL VALVE SCHEDULE FOR NEW SECONDARY PLANT CONTROL VALVE.
- 3. REFER TO VFD SCHEDULE FOR NEW VFDS FOR PUMPS.
- 4. REFER TO PUMP SCHEDULE FOR NEW PUMP. 5. PROVIDE NEW EQUIPMENT LABELS FOR EQUIPMENT, MOTOR STARTER/DISCONNECTS, VARIABLE FREQUENCY DRIVES, AND ELECTRICAL PANELS.

WATER FLO	WMETER	SCHEDULE -	GLENDALE	KENLY ELEME	NTARY SCHOOL
MARK	PIPE SIZE	SERVICE	MANUFACTURER	MODEL NO.	NOTES
HW-FLOW	4	HOT WATER	ONICON	F-3500	1
CHW-FLOW	6	CHILLED WATER	ONICON	F-3200	1
DOM-FLOW	4	DOMESTIC WATER	ONICON	F-3500	1

1. REFER TO PLANS FOR ADDITIONAL REQUIREMENTS.

PROJECT NO.



NOTES

OUTSIDE AIRFLOW (DCV/VENT)▲

210/210

250 1,2,3,4,6

225 1,2,3,4,6

225 1,2,3,4,6

1/0M-722

1/0M-722

1/0M-722

CONTROL SCHEMATIC NUMBER

1/0M-721

AIR SYSTEMS CONTROL SCHEDULE - WEST SMITHFIELD ELEMENTARY SCHOOL

SERVICE

ADMIN

LOCATION

MARK

AHU-101

FCU-502

FCU-503

FCU-504

TYPE

AHU

					AHU OUTSIDE AIRFLOW (DCV/VENT)	
MARK	TYPE	LOCATION	SERVICE	CONTROL SCHEMATIC NUMBER	(CFM)	NOTES
FCU-504	FCU	E	CLASSROOM 504	1/0M-722	225	1,2,3,4,6
FCU-505	FCU	E	CLASSROOM 505	1/0M-722	225	1,2,3,4,6
FCU-506	FCU	Е	CLASSROOM 506	1/0M-722	225	1,2,3,4,6
FCU-508	FCU	E	CLASSROOM 508	1/0M-722	225	1,2,3,4,6
FCU-509	FCU	E	PLANNING / RESOURCE / CORR.	1/0M-722	200	1,2,3,4,6
FCU-510	FCU	E	CLASSROOM 510	1/0M-722	225	1,2,3,4,6
FCU-511	FCU	E	CLASSROOM 511	1/0M-722	225	1,2,3,4,6
FCU-512	FCU	E	CLASSROOM 512 / CORR.	1/0M-722	250	1,2,3,4,6
FCU-513	FCU	E	CLASSROOM 513	1/0M-722	225	1,2,3,4,6
FCU-601	FCU	E	CONNECTOR 601	1/0M-722	75	1,2,3,4,5,6
FCU-602	FCU	D	CONNECTOR 601	1/0M-722	75	1,2,3,4,5,6
FCU-603	FCU	В	CONNECTOR 602	1/0M-722	75	1,2,3,4,5,6
FCU-604	FCU	С	CONNECTOR 602	1/0M-722	75	1,2,3,4,5,6

1. PROVIDE TEST AND BALANCE TO DETERMINE VENTILATION SETTING FOR OUTSIDE AIR DAMPER POSITION. OUTSIDE AIR FLOW RATES WERE

OBTAINED FROM ORIGINAL DESIGN ASBUILTS.

2. PROVIDE NEW EQUIPMENT LABELS FOR EQUIPMENT, MOTOR STARTER/DISCONNECTS, VARIABLE FREQUENCY DRIVES, AND ELECTRICAL PANELS

3. PROVIDE EQUIPMENT CONTROLLER AND SENSORS. SEE ASSOCIATED CONTROL SCHEMATIC FOR POINTS TO INCLUDE.

4. DEMOLISH CHILLED WATER AND HEATING HOT WATER CONTROL VALVES FOR AHU AND PROVIDE NEW 2 WAY PRESSURE INDEPENDENT CONTROL VALVES. PROVIDE NEW 2-WAY CONTROL VALVE TO MATCH EXISTING SIZE. MODIFY PIPING AS NECESSARY TO ACCOMODATE NEW

5. PROVIDE RETURN AIR TEMPERATURE/HUMIDITY CONTROL WITH REMOTE THERMOSTAT WALL MODULE FOR OVERRIDE AND SETPOINT ADJUSTMENT WHERE NOTED ON PLANS. 6. DEMOLISH AND PROVIDE NEW ACTUATOR(S) FOR MOTOR-OPERATED DAMPERS. MULTIPLE UNITS SERVED BY ONE OAD, NOT ONE PER UNIT. MATCH EXISTING COMMAND.

							AHU	
MARK	TYPE	LOCATION	LOCATION (ORIGINAL)	SERVICE	ASSOCIATED LOUVER	CONTROL SCHEMATIC NUMBER	MAXIMUM AIRFLOW CFM	NOTE
OAD-A01	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-101, AHU-102, AHU-103, FCU-108, FCU-109	LV-1A	3/0M-720	1500	1
OAD-A02	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-129, FCU-104, FCU-106, FCU-107	LV-1B	3/0M-720	2800	1
OAD-A03	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-129	LV-1C	3/0M-720	2400	1
OAD-B01	OUTSIDE AIR DAMPER	AREA B	AREA 200	FCU-201, FCU-202, FCU-205, FCU-206, FCU-207, FCU-208, FCU-210	LV-2A	3/0M-720	2250	1
OAD-B02	OUTSIDE AIR DAMPER	AREA B	AREA 200	FCU-213, FCU-214, FCU-215, FCU-216, FCU- 217, FCU-218	LV-2B	3/0M-720	2250	1
OAD-C01	OUTSIDE AIR DAMPER	AREA C	AREA 300	FCU-301, FCU-302, FCU-305, FCU-306, FCU-307, FCU-308, FCU-310	LV-3A	3/0M-720	2250	1
OAD-C02	OUTSIDE AIR DAMPER	AREA C	AREA 300	FCU-313, FCU-314, FCU-315, FCU-316, FCU-317, FCU-318	LV-3B	3/0M-720	2250	1
OAD-D01	OUTSIDE AIR DAMPER	AREA D	AREA 400	AHU-401	LV-4A	3/0M-720	3750	1
OAD-D02	OUTSIDE AIR DAMPER	AREA D	AREA 400	FCU-400, FCU-402, FCU-403	LV-4B	3/0M-720	3750	1
RLD-D03	AHU RELIEF AIR DAMPER	AREA D	AREA 400	AHU-401	LV-4C	1/0M-721	3750	1
RLD-D04	AHU RELIEF AIR DAMPER	AREA D	AREA 400	AHU-404	LV-4D	1/0M-721	2400	1
OAD-E01	OUTSIDE AIR DAMPER	AREA E	AREA 500	FCU-501, FCU-502, FCU-503, FCU-504, FCU-505, FCU-506	LV-5A	3/0M-720	2250	1
OAD-E02	OUTSIDE AIR DAMPER	AREA E	AREA 500	FCU-508, FCU-509, FCU-510, FCU-511, FCU- 512, FCU-513	LV-5B	3/0M-720	2250	1

1. PROVIDE NEW ACTUATOR AND CONTROL WIRING TO EQUIPMENT CONTROLLER. TEST AND BALANCE TO VALUES IN COMMON OUTSIDE AIR DAMPER SCHEMATIC.

Dewberry

Dewberry Engineers Inc. 2610 Wycliff Road Raleigh, NC 27607-3073 919.881.9939 NC License No. F-0929



PACKAGE S UPGRADE JOHNSTON CONTROLS

SCHOOLS

KEY PLAN

SCALE

EVIS	SIONS	
		+
2	ADDENDUM #2	12/14/23
1	ADDENDUM #1	12/01/23
NO.	DESCRIPTION	DATE
RAV	VN BY	SD/RLP
PPR	OVED BY	WLH
	WED DV	IDL

SCHEDULES

PROJECT NO.

CLASSROOM 502 / CORR.

CLASSROOM 503

CLASSROOM 504

COEFF.

10.4

10.4

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

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(PSIG)

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3.0

3.0

3.0

3.0

3.0

3.0

26.0

31.8

23.1

7.5 3.0 4.3 100.0 24 Vac 4-20 mA 1,2,3 3.0 3.0 1.7 100.0 24 Vac 4-20 mA 1,2,3

15.0

5.0

5.0

10.0

7.0

15.0

2.0

6.0

2.0

6.0

2.0

7.5

3.0

7.5

2.0

15.0

3.0

7.5

3.0

7.5

3.0

7.5

3.0

7.5

6.0

3.0

7.5

3.0

3.0

7.5

2.0

7.5

3.0

7.5

3.0

3.0

7.5

3.0

6.0

3.0

2 45.0

3.0

15.0

0.75 7.5 3.0

2 40.0

1.25 10.0

0.75

0.75

0.75

0.75

24.0

1.5 15.0

CONTROL CONTROL

SIGNAL

4-20 mA

4-20 mA 1,2,3

4-20 mA

24 Vac | 4-20 mA | 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac | 4-20 mA | 1,2.3

24 Vac 4-20 mA 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac | 4-20 mA | 1,2,3 24 Vac 4-20 mA 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac 4-20 mA 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac | 4-20 mA | 1,2,3

24 Vac

24 Vac

24 Vac

100.0 24 Vac 4-20 mA 1,2,3

4-20 mA

4-20 mA 1,2,3

TYPE

24 Vac

WEST SMITHFIELD ELEMENTARY SCHOOL HYDRONIC CONTROL VALVE SCHEDULE

VALVE

STYLE

CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

2-WAY PI CHARACTERIZED BALL CHILLED WATER

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

CHARACTERIZED BALL

CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

CHARACTERIZED BALL

CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER |

2-WAY PI | CHARACTERIZED BALL | CHILLED WATER

CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL

2-WAY PI CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL |

2-WAY PI CHARACTERIZED BALL

2-WAY PI | CHARACTERIZED BALL

2-WAY PI CHARACTERIZED BALL

2-WAY PI CHARACTERIZED BALL

CHARACTERIZED BALL CHILLED WATER

CHARACTERIZED BALL | CHILLED WATER

CHARACTERIZED BALL | CHILLED WATER

2-WAY PI CHARACTERIZED BALL

2-WAY PI CHARACTERIZED BALL

2-WAY PI CHARACTERIZED BALL

2-WAY PI CHARACTERIZED BALL

FLUID

TYPE

HOT WATER

CHILLED WATER

HOT WATER

HOT WATER

CHILLED WATER

HOT WATER

CHILLED WATER

HOT WATER

CHILLED WATER

HOT WATER

HOT WATER

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HOT WATER

CHILLED WATER

CHILLED WATER

CHILLED WATER

CHILLED WATER

CHILLED WATER

CHILLED WATER

HOT WATER

VALVE

2-WAY PI

SERVICE

AHU-101

AHU-101

AHU-102

AHU-102

AHU-103

AHU-103

FC-104

FC-104

AHU-129

AHU-129

FC-106

FC-106

FC-107

FC-107

FC-108

FC-108

FC-109

FC-109

FC-201

FC-201

FC-202

FC-202

FC-205

FC-205

FC-206

FC-206

FC-207

FC-207

FC-208

FC-208

FC-210

FC-210

FC-213

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FC-217

FC-218

FC-218

FC-301

FC-301

FC-302

FC-302

FC-305

FC-305

FC-306

FC-306

FC-307

FC-308

FC-308

FC-310

FC-310

FC-314

FC-314

FC-315

FC-315

FC-316

FC-316

FC-318

FC-318

FC-400

AHU-401

FC-402

FC-403

AHU-404

AHU-404

AHU-405

AHU-405

FC-501

FC-503

FC-504

HWV-##

CWV-##

CWV-##

HWV-##

CWV-##

HWV-##

CWV-##

SIZE

0.75

0.75

0.75

1.25

1.25

0.75

0.75

0.75

0.75

0.75

0.75

1.25

0.75

0.75

0.75

0.75

0.75

0.75

0.75

WEST SMITHFIELD ELEMENTARY SCHOOL HYDRONIC CONTROL VALVE SCHEDULE

STYLE

CHARACTERIZED BALL

WATER FLOWMETER SCHEDULE - WEST SMITHFIELD ELEMENTARY SCHOOL

MANUFACTURER

ONICON

ONICON

FLUID

HOT WATER

HOT WATER

CHILLED WATER

CHILLED WATER

CHILLED WATE

HOT WATER

CHILLED WATE

HOT WATER

CHILLED WATE

HOT WATER

CHILLED WATER

HOT WATER

HILLED WATE

HOT WATER

CHILLED WATER

HOT WATER

CHILLED WATER

HOT WATER

HILLED WATER

CHILLED WATER

HOT WATER

CHILLED WATER

2. VALVES SHALL BE SIZED BASED ON DESIGN FLOW OF HEAT EXCHANGER OR COIL. EXISITING CIRCUIT SETTER TO REMAIN AT 100% FOR FLOW MEASUREMENT.

1. PROVIDE NEW CONTROL VALVES AS SCHEDULED. DEMOLISH EXISTING CONTROL VALVE. REFER TO SECTION 239010 FOR ADDITIONAL REQUIREMENTS. REFER TO DETAILS AND

F-3500

F-3500

VALVE

2-WAY PI

2-WAY PD

HOT WATER

CHILLED WATER

DOMESTIC WATER

MARK

HWV-##

CWV-##

CWV-##

HWV-##

CWV-##

HW-FLOW

CHW-FLOW

DOM-FLOW

SERVICE

FC-505

FC-505

FC-506

FC-506

FC-508

FC-508

FC-509

FC-510

FC-512

FC-513

FC-513

FC-601

FC-601

FC-603

FC-604

AHU-MDF

MAIN BOILER SHWF

BYPASS CONTROL

MAIN CHILLER SCHWE

BYPASS CONTROL

3. ALL CONTROL VALVE ACTUATORS SHALL BE MODULATING.

6

4

1. REFER TO PLANS FOR ADDITIONAL REQUIREMENTS.

SIZE

0.75

0.75

0.75

0.75

0.75

0.75

0.75

COEFF. | PRESSURE

4.3

4.3

4.3

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

100.0

(PSIG)

3.0

3.0

3.0

3.0

3.0

3.0

9.0

9.0

33.3

3.0

10.0

10.0

10.0

10.0

10.0

10.0

4.0

100

SIGNAL

4-20 mA

4-20 mA

4-20 mA | 1,2,3

4-20 mA 3,4

4-20 mA

4-20 mA 1,2,3

24 Vac

NC License No. F-0929

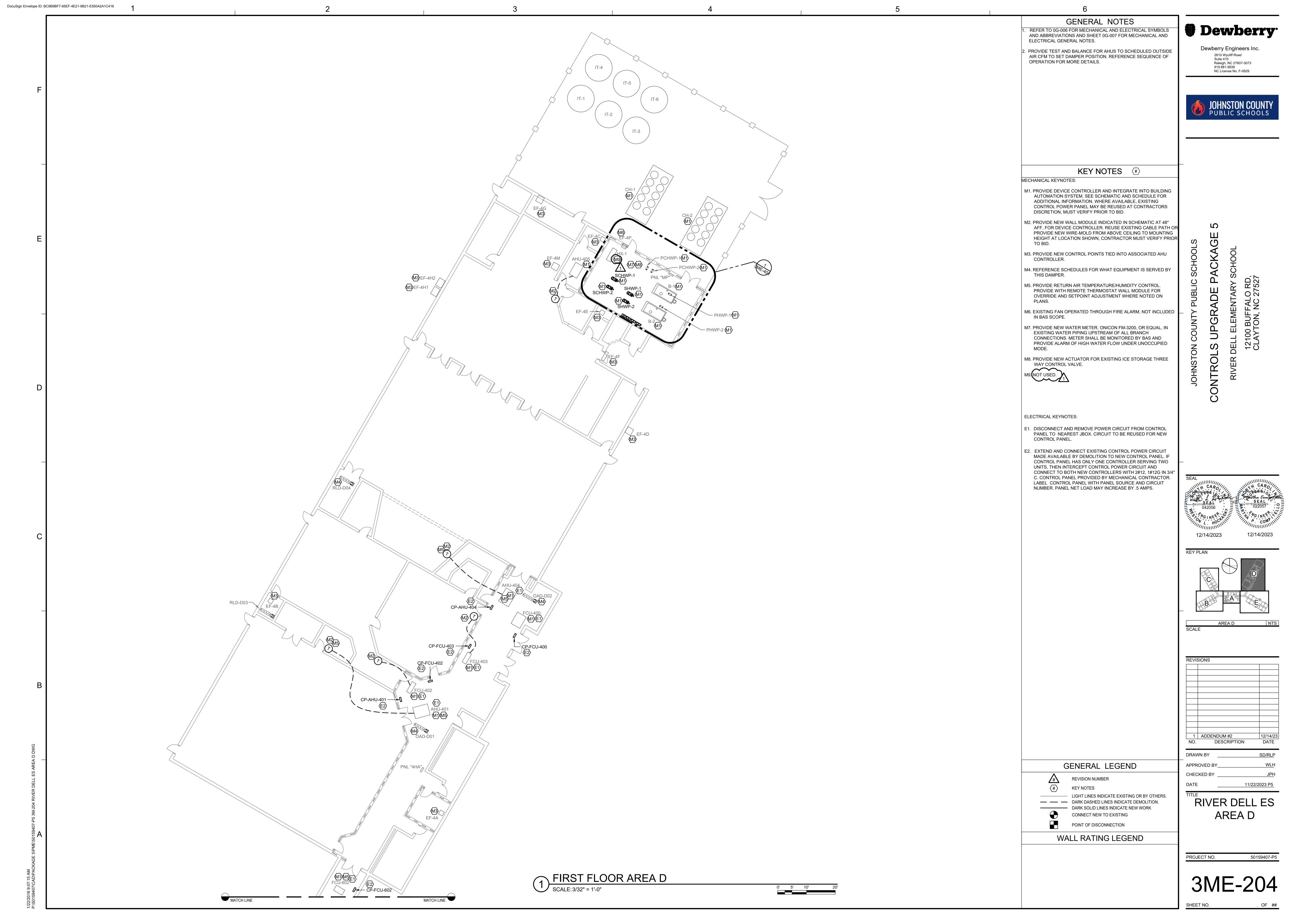
VIS	SIONS	
1).	ADDENDUM #2	12/14/2
Э.	DESCRIPTION	DATE
A۷	VN BY	SD/RLF
D D	OVED BY	WLH
11	OVLD D1	V V L1

CHECKED BY ______JPH

TITLE SCHEDULES

PROJECT NO.

2M-603



FCU-322

FCU-400

FCU-402

FCU-403

FCU-502

FCU-504

FCU

FCU

1/0M-722

1/0M-722

1/0M-722

1/0M-722

1/0M-721

1/0M-721

1/0M-722

1/0M-722

1/0M-722

1/0M-722

CLASSROOM 322

CORRIDOR 400 / TOILETS

MULTIPURPOSE ROOM 401

ART 402 / KILN / STORAGE

MUSIC 403 / STORAGE

DINING 404

KITCHEN

CLASSROOM 501

CLASSROOM 502 / CORR.

CLASSROOM 503

CLASSROOM 504

425

560

265/2200 (1.2,3,4,5,6

250 1,2,3,4,6

225 1,2,3,4,6

1200/1500 (,2,3,4,5,6

750/750 ,2,3,4,6

225 1,2,3,4,6

250 1,2,3,4,6

225 1,2,3,4,6

225 1,2,3,4,6

1,2,3,4,6

					AHU OUTSIDE AIRFLOW (DCV/VENT)	
MARK	TYPE	LOCATION	SERVICE	CONTROL SCHEMATIC NUMBER	(CFM)	NOTES
FCU-505	FCU	E	CLASSROOM 505	1/0M-722	225	1,2,3,4,6
FCU-506	FCU	E	CLASSROOM 506	1/0M-722	225	1,2,3,4,6
FCU-508	FCU	E	CLASSROOM 508	1/0M-722	225	1,2,3,4,6
FCU-509	FCU	E	PLANNING / RESOURCE / CORR.	1/0M-722	200	1,2,3,4,6
FCU-510	FCU	E	CLASSROOM 510	1/0M-722	225	1,2,3,4,6
FCU-511	FCU	E	CLASSROOM 511	1/0M-722	225	1,2,3,4,6
FCU-512	FCU	E	CLASSROOM 512 / CORR.	1/0M-722	250	1,2,3,4,6
FCU-513	FCU	E	CLASSROOM 513	1/0M-722	225	1,2,3,4,6
FCU-514	FCU	С	CLASSROOM 514	1/0M-722	425	1,2,3,4,6
FCU-515	FCU	С	CLASSROOM 515	1/0M-722	425	1,2,3,4,6
FCU-516	FCU	С	CLASSROOM 516	1/0M-722	425	1,2,3,4,6
FCU-517	FCU	С	CLASSROOM 517	1/0M-722	425	1,2,3,4,6
FCU-601	FCU	E	CONNECTOR 601	1/0M-722	75	1,2,3,4,5,6
FCU-602	FCU	D	CONNECTOR 601	1/0M-722	75	1,2,3,4,5,6
FCU-603	FCU	В	CONNECTOR 602	1/0M-722	75	1,2,3,4,5,6

- 1. PROVIDE TEST AND BALANCE TO DETERMINE VENTILATION SETTING FOR OUTSIDE AIR DAMPER POSITION. OUTSIDE AIR FLOW RATES WERE
- OBTAINED FROM ORIGINAL DESIGN ASBUILTS.

AHU-MDF

- 2. PROVIDE NEW EQUIPMENT LABELS FOR EQUIPMENT, MOTOR STARTER/DISCONNECTS, VARIABLE FREQUENCY DRIVES, AND ELECTRICAL PANELS
- 3. PROVIDE EQUIPMENT CONTROLLER AND SENSORS. SEE ASSOCIATED CONTROL SCHEMATIC FOR POINTS TO INCLUDE.

FCU

- 4. DEMOLISH CHILLED WATER AND HEATING HOT WATER CONTROL VALVES FOR AHU AND PROVIDE NEW 2 WAY PRESSURE INDEPENDENT CONTROL VALVES. PROVIDE NEW 2-WAY CONTROL VALVE TO MATCH EXISTING SIZE. MODIFY PIPING AS NECESSARY TO ACCOMODATE NEW
- 5. PROVIDE RETURN AIR TEMPERATURE/HUMIDITY CONTROL WITH REMOTE THERMOSTAT WALL MODULE FOR OVERRIDE AND SETPOINT ADJUSTMENT WHERE NOTED ON PLANS. 6. DEMOLISH AND PROVIDE NEW ACTUATOR(S) FOR MOTOR-OPERATED DAMPERS. MULTIPLE UNITS SERVED BY ONE OAD, NOT ONE PER UNIT. MATCH EXISTING COMMAND.

MDF 134

2/0M-723

							AHU	
MARK	TYPE	LOCATION	LOCATION (ORIGINAL)	SERVICE	ASSOCIATED LOUVER	CONTROL SCHEMATIC NUMBER	MAXIMUM AIRFLOW CFM	NOTES
OAD-A01	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-101, AHU-102, AHU-103, FCU-108, FCU-109	LV-1A	3/0M-720	1500	1
OAD-A02	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-129, FCU-104, FCU-106, FCU-107	LV-1B	3/0M-720	2800	1
RLD-A03	AHU RELIEF AIR DAMPER	AREA A	AREA 100	AHU-129	LV-1C	3/0M-720	2400	1
OAD-B01	OUTSIDE AIR DAMPER	AREA B	AREA 200	FCU-201, FCU-202, FCU-205, FCU-206, FCU-207, FCU-208, FCU-210	LV-2A	3/0M-720	2250	1
OAD-B02	OUTSIDE AIR DAMPER	AREA B	AREA 200	FCU-207, FCU-208, FCU-209, FCU-210, FCU-211, FCU-219, FCU-220, FCU-221, FCU-222	LV-2B	3/0M-720	2250	1
OAD-C01	OUTSIDE AIR DAMPER	AREA C	AREA 300	FCU-301, FCU-302, FCU-305, FCU-306, FCU-307, FCU-308, FCU-310	LV-3A	3/0M-720	2250	1
OAD-C02	OUTSIDE AIR DAMPER	AREA C	AREA 300	FCU-313, FCU-314, FCU-315, FCU-316, FCU-317, FCU-318, FCU-319, FCU-320, FCU-321, FCU-322	LV-3B	3/0M-720	2250	1
OAD-D01	OUTSIDE AIR DAMPER	AREA D	AREA 400	AHU-401	LV-4A	3/0M-720	3750	1
OAD-D02	OUTSIDE AIR DAMPER	AREA D	AREA 400	AHU-404, FCU-400, FCU-402, FCU-403	LV-4B	3/0M-720	3750	1
RLD-D04	AHU RELIEF AIR DAMPER	AREA D	AREA 400	AHU-401	LV-4C	1/0M-721	3750	1
RLD-D05	AHU RELIEF AIR DAMPER	AREA D	AREA 400	AHU-404	LV-4D	1/0M-721	2400	1
OAD-E01	OUTSIDE AIR DAMPER	AREA E	AREA 500	FCU-501, FCU-502, FCU-503, FCU-504, FCU-505, FCU-506	LV-5A	3/0M-720	2250	1
OAD-E02	OUTSIDE AIR DAMPER	AREA E	AREA 500	FCU-508, FCU-509, FCU-510, FCU-511, FCU- 512, FCU-513, FCU-514, FCU-515, FCU-516, FCU-517	LV-5B	3/0M-720	2250	1

1. PROVIDE NEW ACTUATOR AND CONTROL WIRING TO EQUIPMENT CONTROLLER. TEST AND BALANCE TO VALUES IN COMMON OUTSIDE AIR DAMPER SCHEMATIC.

Dewberry Dewberry Engineers Inc.

> 2610 Wycliff Road Raleigh, NC 27607-3073 919.881.9939 NC License No. F-0929



PACKAGE SCHOOLS UPGRADE ROL

'[S	SIONS	
)	ADDENDUM #2	12/14/23
	ADDENDUM #1	12/01/23
١.	DESCRIPTION	DATE
۷	VN BY	SD/RLP
R	OVED BY	WLH

CHECKED BY JPH
DATE 11/22/2023 P5

TITLE

SCHEDULES

PROJECT NO.

RIVER	R DELL ELEMEN	ITARY SC	CHOOL HYDRO	NIC CONT	ROL V	ALVE	SCHEDU	JLE				
					VALVE	=, 0,1,1	PRESSURE	FLOW	CLOSE-OFF			
MARK	SERVICE	VALVE TYPE	VALVE STYLE	FLUID TYPE	SIZE (IN)	FLOW (GPM)	DROP (PSIG)	COEFF.	PRESSURE (PSIG)	CONTROL	CONTROL	NOTES
HWV-##	AHU-101	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	(GFIVI) 5.0	3.0	2.9	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	AHU-101	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.5	15.0	3.0	8.7	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	AHU-102	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	5.0	3.0	2.9	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	AHU-102	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.5	15.0	3.0	10.4	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	AHU-103	2-WAY PI	CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75	5.0	3.0	2.9	100.0	24 Vac	4-20 mA	1,2,3
CWV-## HWV-##	AHU-103 FC-104	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	1.5 0.75	24.0	3.0	10.4	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-104	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	AHU-129	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	7.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	AHU-129	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	15.0	3.0	8.7	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-106 FC-106	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1	2.0 6.0	3.0	1.2 3.5	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-107	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-107	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	3.5	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-108	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-108	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-109 FC-109	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1	3.0 7.5	3.0	1.7 4.3	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-201	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-201	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-202	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	
CWV-##	FC-202	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-205 FC-205	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1	3.0 7.5	3.0	1.7 4.3	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-206	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-206	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-207	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-207	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-208 FC-208	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1	3.0 7.5	3.0	1.7 4.3	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-210	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-210	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-213	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-213	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-214 FC-214	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1	2.0 6.0	3.0	1.2 3.5	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-214 FC-215	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-215	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-216	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-216	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-217 FC-217	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-218	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-218	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-219	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-219	2-WAY PI	CHARACTERIZED BALL		1	6.3	3.0	3.6	100.0	24 Vac	4-20 mA	l ' '
HWV-## CWV-##	FC-220 FC-220	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 7.3	3.0	1.7 4.2	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-221	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-221	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.3	3.0	3.6	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-222	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-## HWV-##	FC-222 FC-301	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	1.25 0.75	7.3	3.0	4.2 1.2	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-301	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-302	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-302	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-305	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-## HWV-##	FC-305 FC-306	2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	7.5	3.0	4.3 1.7	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
CWV-##	FC-306	2-WAY PI 2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-307	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-307	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	23.1	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-308	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-## HWV-##	FC-308	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER HOT WATER	1 0.75	7.5	3.0	4.3 1.7	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-310 FC-310	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER	0.75 1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3 1,2,3
HWV-##	FC-313	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-313	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-314	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-## HWV-##	FC-314 FC-315	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	6.0 3.0	3.0	3.5 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-315	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-316	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-316	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-317 FC-317	2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
CWV-## HWV-##	FC-31 <i>7</i> FC-318	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	1.25 0.75	3.0	3.0	5.8 1.7	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-318	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-319	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-319	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.3	3.0	3.6	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-320 FC-320	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 7.3	3.0	1.7 4.2	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
HWV-##	FC-320 FC-321	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	1.25 0.75	3.0	3.0	1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	FC-321	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.3	3.0	3.6	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-322	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-322	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-## CWV-##	FC-400 FC-400	2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	1 1.25	6.0	3.0	3.5 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
CVVV-## HWV-##	FC-400 AHU-401	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	1.25	20.0	3.0	5.8 11.5	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
CWV-##	AHU-401	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	2	45.0	3.0	26.0	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-402	2-WAY PI	CHARACTERIZED BALL	HOT WATER	1	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-402	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-403	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-## HWV-##	FC-403 AHU-404	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	2	7.5 25.0	3.0	4.3 14.4	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
CWV-##	AHU-404	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER		55.0	3.0	31.8	100.0	24 Vac	4-20 mA	
HWV-##	AHU-405	2-WAY PI	CHARACTERIZED BALL	HOT WATER	1.5	15.0	3.0	8.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	AHU-405	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER		40.0	3.0	23.1	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-501	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75 0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
C/V//	FC-501 FC-502	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75 0.75	7.5 3.0	3.0	4.3 1.7	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
CWV-## HWV-##	L C-DO	I - *** \				10.0	3.0	5.8	100.0	24 Vac		1,2,3
CWV-## HWV-## CWV-##	FC-502 FC-502	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	1 5.5	J 3.0	1 100.0	27 Vac	4-20 mA	-,-,-
HWV-##		2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	1.25 0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3
HWV-## CWV-##	FC-502				0.75							

					VALVE		PRESSURE	FLOW	CLOSE-OFF	ACTUATOR		
		VALVE	VALVE	FLUID	SIZE	FLOW	DROP	COEFF.	PRESSURE	CONTROL	CONTROL	
MARK	SERVICE	TYPE	STYLE	TYPE	(IN)	(GPM)	(PSIG)	(CV)	(PSIG)	TYPE	SIGNAL	NOTES
HWV-##	FC-505	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-505	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-506	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-506	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-508	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-508	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-509	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-509	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-510	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-510	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-511	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-511	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-512	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-512	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-513	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-513	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-514	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-514	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.3	3.0	3.6	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-515	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-515	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	7.3	3.0	4.2	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-516	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-516	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	7.3	3.0	4.2	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-517	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-517	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.3	3.0	3.6	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-601	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-601	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	10.0	3.0	23.1	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-602	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-602	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-603	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-603	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-604	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-604	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	AHU-MDF	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	0.75	4.0	3.0	2.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	MAIN BOILER SHWP BYPASS CONTROL VALVE	2-WAY PD	CHARACTERIZED BALL	HOT WATER	2	35	9.0	11.7	100.0	24 Vac	4-20 mA	3
CWV-##	MAIN CHILLER SCHWP BYPASS CONTROL	2-WAY PD	CHARACTERIZED BALL	CHILLED WATER	3	100	9.0	33.3	100.0	24 Vac	4-20 mA	3

1. PROVIDE NEW CONTROL VALVES AS SCHEDULED. DEMOLISH EXISTING CONTROL VALVE. REFER TO SECTION 239010 FOR ADDITIONAL REQUIREMENTS. REFER TO DETAILS AND

2. VALVES SHALL BE SIZED BASED ON DESIGN FLOW OF HEAT EXCHANGER OR COIL. EXISITING CIRCUIT SETTER TO REMAIN AT 100% FOR FLOW MEASUREMENT.

3. ALL CONTROL VALVE ACTUATORS SHALL BE MODULATING.

MARK	PIPE SIZE	SERVICE	MANUFACTURER	MODEL NO.	NOTES
HW-FLOW	4	HOT WATER	ONICON	F-3500)1
CHW-FLOW	6	CHILLED WATER	ONICON	F-3200	1
DOM-FLOW	4	DOMESTIC WATER	ONICON	F-3500)1

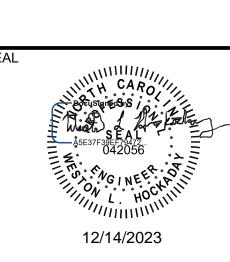
NOTES: 1. REFER TO PLANS FOR ADDITIONAL REQUIREMENTS.

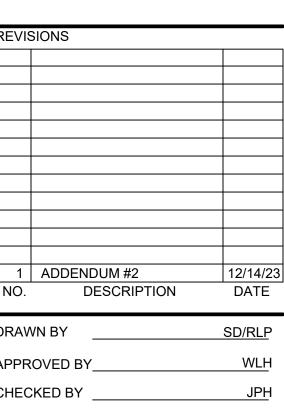


Dewberry

Dewberry Engineers Inc.

2610 Wycliff Road
Suite 410
Raleigh, NC 27607-3073
919.881.9939
NC License No. F-0929



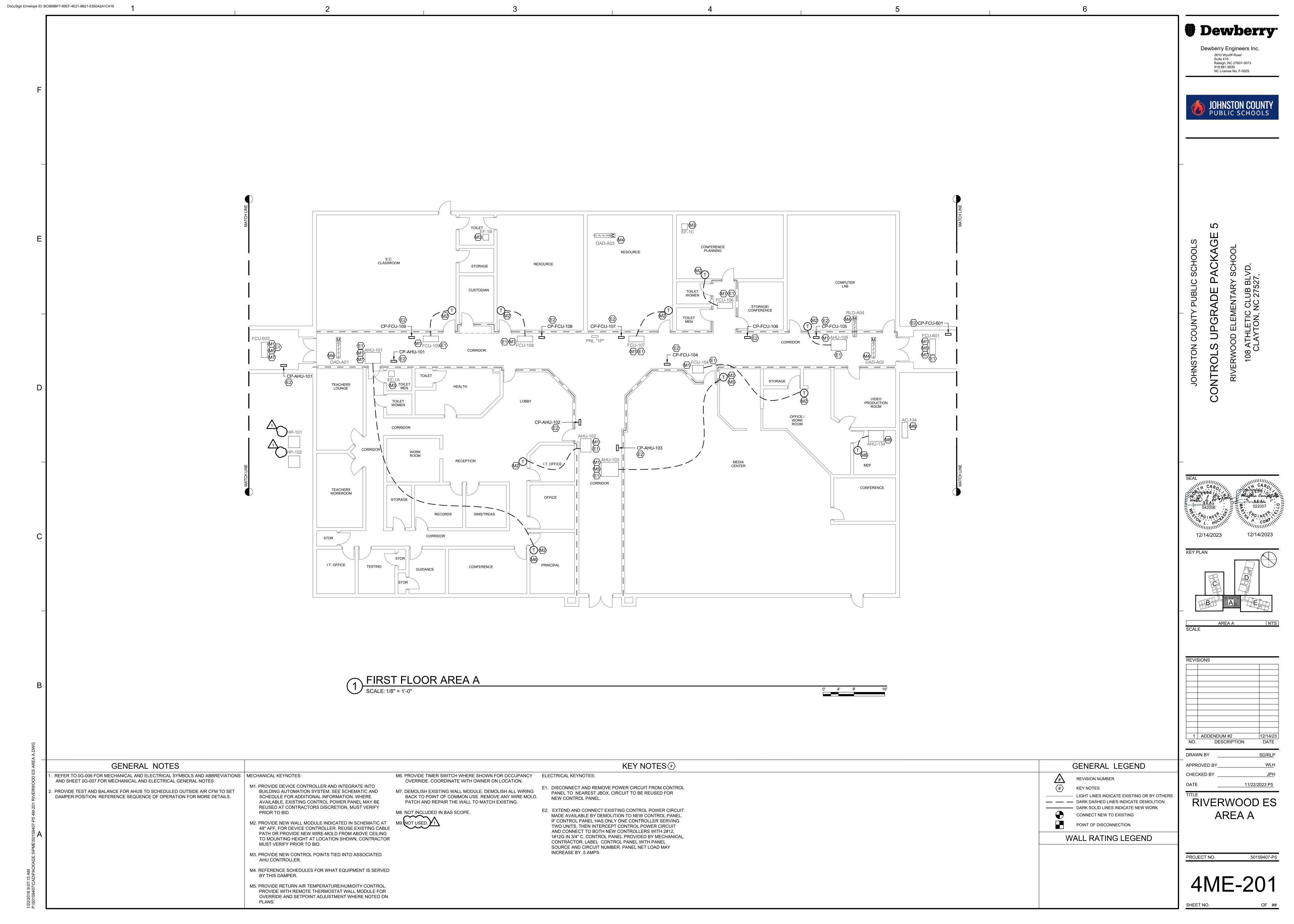


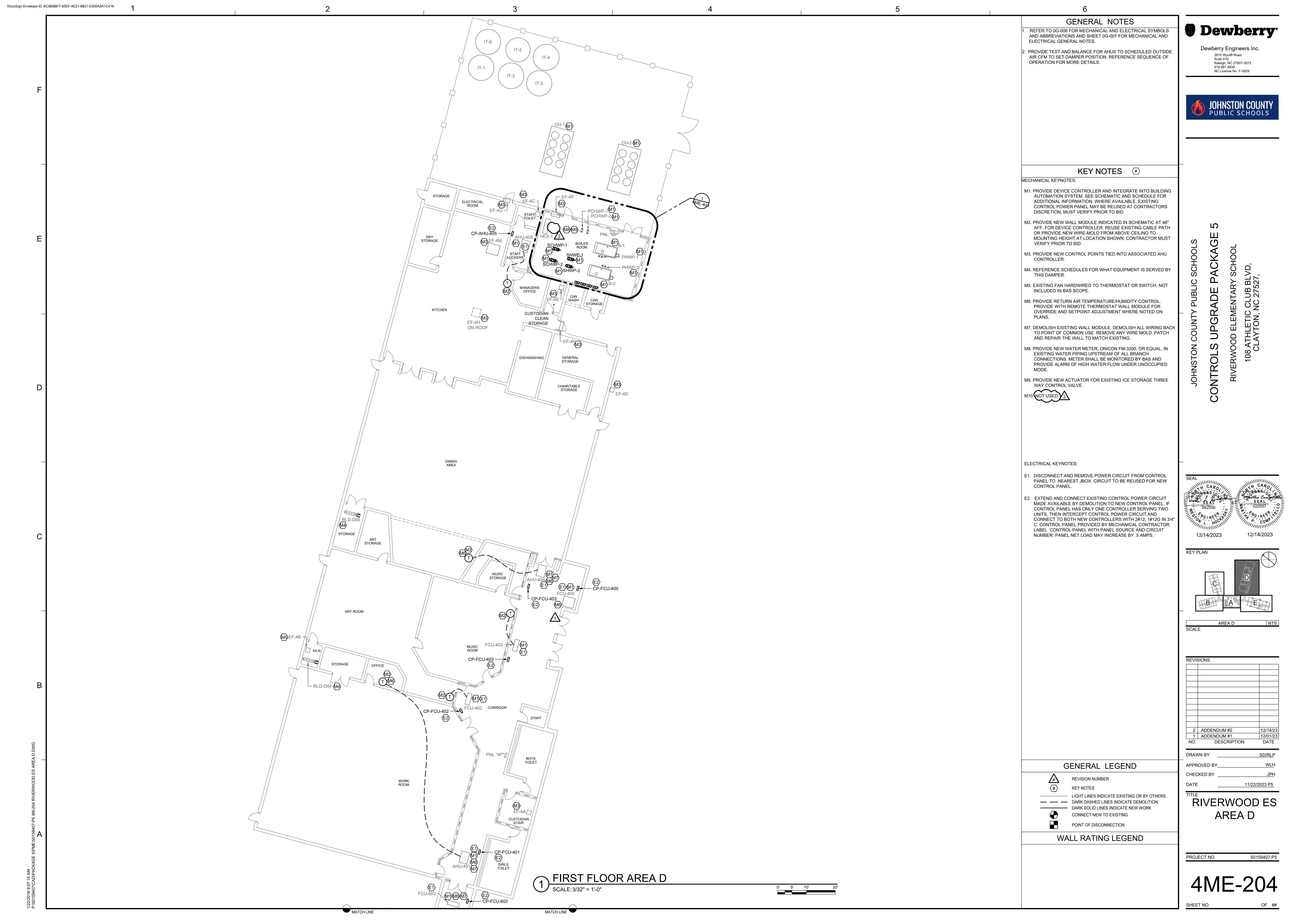
APPROVED BY_____ CHECKED BY JPH
DATE 11/22/2023 P5

TITLE

SCHEDULES

3M-603





2610 Wycliff Road Suite 410 Raleigh, NC 27607-3073 919.881.9939 NC License No. F-0929



EVIS	SIONS	
2	ADDENDUM #2	12/14/23
1	ADDENDUM #1	12/01/23
10.	DESCRIPTION	DATE
RAV	VN BY	SD/RLP

NO.	DESCRIPTION	I DA
DRAWN B	Υ	SD/F
— APPROVE	D BY	V
CHECKED	BY	
DATE		11/22/2022

SCHEDULES

SHEET NO.

					OUTSIDE AIRFLOW (DCV/VENT)	
MARK	TYPE	LOCATION	SERVICE	CONTROL SCHEMATIC NUMBER	(CFM) 2	
AHU-101	AHU	AREA A MEZZANINE	ADMINISTRATION ADMINISTRATION	1/0M-721	160/550	,2,3,4
AHU-102	AHU	AREA A MEZZANINE	CENTRAL	1/0M-721	150/400	,2,3,4
AHU-103	AHU	AREA A MEZZANINE	MEDIA CENTER	1/0M-721	175/700	1,2,3,4,5
FC-104	FCU	AREA A MEZZANINE	MEDIA CENTER SUPPORT	1/0M-722	300 2	1,2,3,4
AHU-105	AHU	AREA A MEZZANINE	COMPUTER LAB 129	1/0M-721	120/450	1,2,3,4
FC-106	FCU	AREA A MEZZANINE	CONFERENCE / PLAN / TOILETS	1/0M-722	225	1,2,3,4
FC-107	FCU	AREA A MEZZANINE	RESOURCE 127	1/0M-722	250	1,2,3,4
FC-108	FCU	AREA A MEZZANINE	RESOURCE 128	1/0M-722	250	1,2,3,4
FC-109	FCU	AREA A MEZZANINE	E.C. CLASSROOM 122	1/0M-722	300	1,2,3,4
FC-201	FCU	AREA B MEZZANINE	CLASSROOM 201 & CORRIDOR	1/0M-722	425	1,2,3,4
FC-202	FCU	AREA B MEZZANINE	CLASSROOM 202	1/0M-722	375	1,2,3,4
FC-203	FCU	AREA B MEZZANINE	CLASSROOM 203	1/0M-722	375	1,2,3,4
FC-204	FCU	AREA B MEZZANINE	CLASSROOM 204	1/0M-722	375	1,2,3,4
FC-205	FCU	AREA B MEZZANINE	CLASSROOM 212 & TOILETS	1/0M-722	695	1,2,3,4
FC-206	FCU	AREA B MEZZANINE	CLASSROOM 206	1/0M-722	375	1,2,3,4
FC-207	FCU	AREA B MEZZANINE	CLASSROOM 213	1/0M-722	375	1,2,3,4
FC-208	FCU	AREA B MEZZANINE	PLANNING / RESOURCE /	1/0M-722	320	1,2,3,4
FC-209	FCU	AREA B MEZZANINE	CORRIDOR CLASSROOM 215 &	1/0M-722	425	1,2,3,4
FC-210	FCU	AREA B MEZZANINE	CORRIDOR CLASSROOM 214	1/0M-722	375	1,2,3,4
FC-211	FCU	AREA B MEZZANINE	CLASSROOM 216	1/0M-722	375	1,2,3,4
			CLASSROOM 219 &			
FC-219	FCU	AREA B MEZZANINE	CORRIDOR CLASSROOM 220 &	1/0M-722	425	1,2,3,4
FC-220	FCU	AREA B MEZZANINE	CORRIDOR	1/0M-722		1,2,3,4
FC-221	FCU	AREA B MEZZANINE	CLASSROOM 221 CLASSROOM 222 &	1/0M-722		1,2,3,4
FC-222	FCU	AREA B MEZZANINE	CORRIDOR CLASSROOM 301 &	1/0M-722	425	1,2,3,4
FC-301	FCU	AREA C MEZZANINE	CORRIDOR	1/0M-722	425	1,2,3,4
FC-302	FCU	AREA C MEZZANINE	CLASSROOM 302	1/0M-722	375	1,2,3,4
FC-303	FCU	AREA C MEZZANINE	CLASSROOM 303	1/0M-722	375	1,2,3,4
FC-304	FCU	AREA C MEZZANINE	CLASSROOM 304	1/0M-722	375	1,2,3,4
FC-305	FCU	AREA C MEZZANINE	CLASSROOM 312 & TOILETS	1/0M-722	695	1,2,3,4
FC-306	FCU	AREA C MEZZANINE	CLASSROOM 306	1/0M-722	375	1,2,3,4
FC-307	FCU	AREA C MEZZANINE	CLASSROOM 313	1/0M-722	375	1,2,3,4
FC-308	FCU	AREA C MEZZANINE	PLANNING / RESOURCE / CORRIDOR	1/0M-722	320	1,2,3,4
FC-309	FCU	AREA C MEZZANINE	CLASSROOM 315 & CORRIDOR	1/0M-722	425	1,2,3,4
FC-310	FCU	AREA C MEZZANINE	CLASSROOM 314	1/0M-722	375	1,2,3,4
FC-311	FCU	AREA C MEZZANINE	CLASSROOM 316	1/0M-722	375	1,2,3,4
FC-319	FCU	AREA C MEZZANINE	CLASSROOM 319 & CORRIDOR	1/0M-722	425	1,2,3,4
FC-320	FCU	AREA C MEZZANINE	CLASSROOM 320 & CORRIDOR	1/0M-722	425	1,2,3,4
FC-321	FCU	AREA C MEZZANINE	CLASSROOM 321	1/0M-722	375	1,2,3,4
FC-322	FCU	AREA C MEZZANINE	CLASSROOM 322	1/0M-722	425	1,2,3,4
FC-400	FCU	AREA D MEZZANINE	CORRIDOR 400 / TOILETS	1/0M-722	500	1,2,3,4
AHU-401	AHU	AREA D MEZZANINE	MULTIPURPOSE ROOM	1/0M-721	265/1500	2 1,2,3,4,5
FC-402	FCU	AREA D MEZZANINE	401 ART 402 / KILN / OFFICE	1/0M-722		1,2,3,4
FC-403	FCU	AREA D MEZZANINE	MUSIC 403 / STORAGE	1/0M-722		1,2,3,4
AHU-404	AHU	AREA D MEZZANINE	DINING 404	1/0M-721	$\sim\sim$	1,2,3,4,5
AHU-404	AHU	AREA D MEZZANINE	KITCHEN	1/0M-721		,2,3,4
					——————————————————————————————————————	
FC-501	FCU	AREA E MEZZANINE	CLASSROOM 501 CLASSROOM 502 /	1/0M-722	375	1,2,3,4
FC-502	FCU	AREA E MEZZANINE	CORRIDOR	1/0M-722	425	1,2,3,4
FC-503	FCU	AREA E MEZZANINE	CLASSROOM 503	1/0M-722	375	1,2,3,4

AREA E MEZZANINE

CLASSROOM 504

AIR SYSTEMS CONTROL SCHEDULE - RIVERWOOD ELEMENTARY SCHOOL

					AHU OUTSIDE AIRFLOW (DCV/VENT)	
MARK	TYPE	LOCATION	SERVICE	CONTROL SCHEMATIC NUMBER	(CFM)	NOTES
FC-505	FCU	AREA E MEZZANINE	CLASSROOM 505	1/0M-722	375	1,2,3,4
FC-506	FCU	AREA E MEZZANINE	CLASSROOM 506	1/0M-722	375	1,2,3,4
FC-507	FCU	AREA E MEZZANINE	PLANNING / RESOURCE / CORRIDOR	1/0M-722	320	1,2,3,4
FC-508	FCU	AREA E MEZZANINE	CLASSROOM 508	1/0M-722	375	1,2,3,4
FC-509	FCU	AREA E MEZZANINE	CLASSROOM 511	1/0M-722	375	1,2,3,4
FC-510	FCU	AREA E MEZZANINE	CLASSROOM 510	1/0M-722	375	1,2,3,4
FC-511	FCU	AREA E MEZZANINE	CLASSROOM 513	1/0M-722	375	1,2,3,4
FC-512	FCU	AREA E MEZZANINE	CLASSROOM 512 / CORRIDOR	1/0M-722	425	1,2,3,4
FC-514	FCU	AREA E MEZZANINE	CLASSROOM 514	1/0M-722	375	1,2,3,4
FC-515	FCU	AREA E MEZZANINE	CLASSROOM 515	1/0M-722	425	1,2,3,4
FC-516	FCU	AREA E MEZZANINE	CLASSROOM 512 / CORRIDOR	1/0M-722	425	1,2,3,4
FC-517	FCU	AREA E MEZZANINE	CLASSROOM 517	1/0M-722	375	1,2,3,4
FC-601	FCU	NORTH CONNECTOR MEZZANINE	CONNECTOR 601	1/0M-722	75	1,2,3,4,5
FC-602	FCU	NORTH CONNECTOR MEZZANINE	CONNECTOR 601	1/0M-722	75	1,2,3,4,5
FC-603	FCU	SOUTH CONNECTOR MEZZANINE	CONNECTOR 602	1/0M-722	75	1,2,3,4,5
FC-604	FCU	SOUTH CONNECTOR MEZZANINE	CONNECTOR 602	1/0M-722	75	1,2,3,4,5
HP-101	HP	ON GRADE	AHU-101	1/0M-723	N/A	1,2,3,4
HP-102	HP	ON GRADE	AHU-102	1/0M-723	N/A	1,2,3,4

1. PROVIDE TEST AND BALANCE TO DETERMINE VENTILATION SETTING FOR OUTSIDE AIR DAMPER POSITION. OUTSIDE AIR FLOW RATES WERE OBTAINED FROM ORIGINAL DESIGN ASBUILTS.

2. PROVIDE NEW EQUIPMENT LABELS FOR EQUIPMENT, MOTOR STARTER/DISCONNECTS, VARIABLE FREQUENCY DRIVES, AND ELECTRICAL PANELS.

3. PROVIDE EQUIPMENT CONTROLLER AND SENSORS. SEE ASSOCIATED CONTROL SCHEMATIC FOR POINTS TO INCLUDE.

4. DEMOLISH CHILLED WATER AND HEATING HOT WATER CONTROL VALVES FOR AHU AND PROVIDE NEW 2 WAY PRESSURE INDEPENDENT CONTROL VALVES. PROVIDE NEW 2-WAY CONTROL VALVE TO MATCH EXISTING SIZE. MODIFY PIPING AS NECESSARY TO ACCOMODATE NEW VALVE AND

5. PROVIDE RETURN AIR TEMPERATURE/HUMIDITY CONTROL WITH REMOTE THERMOSTAT WALL MODULE FOR OVERRIDE AND SETPOINT ADJUSTMENT AS NOTED ON PLANS. 6. DEMOLISH AND PROVIDE NEW ACTUATOR(S) FOR MOTOR-OPERATED DAMPERS. MULTIPLE UNITS SERVED BY ONE OAD, NOT ONE PER UNIT. MATCH EXISTING COMMAND.

							AHU	
MARK	TYPE	LOCATION	LOCATION (ORIGINAL)	SERVICE	ASSOCIATED LOUVER	CONTROL SCHEMATIC NUMBER	MAXIMUM AIRFLOW CFM	NOTE
OAD-A01	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-101, FCU-109	LV-1A	3/0M-720	675	1
OAD-A02	OUTSIDE AIR DAMPER	AREA A	AREA 100	AHU-105, FCU-104, FCU-106, FCU-107	LV-1B	3/0M-720	3200	1
OAD-A03	OUTSIDE AIR DAMPER	AREA A	AREA 100	FCU-108, AHU-102, AHU-103	LV-1C	3/0M-720	2400	1
RLD-A04	AHU RELIEF AIR DAMPER	AREA A	AREA 100	AHU-105	LV-1D	1/0M-721	3200	1
OAD-B01	OUTSIDE AIR DAMPER	AREA B	AREA 200	FCU-201, FCU-202, FCU-203, FCU-204, FCU- 205, FCU-206	LV-2A	3/0M-720	2250	1
OAD-B02	OUTSIDE AIR DAMPER	AREA B	AREA 200	FCU-207, FCU-208, FCU-209, FCU-210, FCU- 211, FCU-219, FCU-220, FCU-221, FCU-222	LV-2B	3/0M-720	2250	1
OAD-C01	OUTSIDE AIR DAMPER	AREA C	AREA 300	FCU-301, FCU-302, FCU-303, FCU-304, FCU-305, FCU-306	LV-3A	3/0M-720	2250	1
OAD-C02	OUTSIDE AIR DAMPER	AREA C	AREA 300	FCU-307, FCU-308 ,FCU-309 ,FCU-310 ,FCU-311, FCU-319, FCU-320, FCU-321, FCU-322	LV-3B	3/0M-720	2250	1
OAD-D01	OUTSIDE AIR DAMPER	AREA D	AREA 400	AHU-401	LV-4A	3/0M-720	3750	1
OAD-D02	OUTSIDE AIR DAMPER	AREA D	AREA 400	AHU-404, FCU-400, FCU-402, FCU-403	LV-4B	3/0M-720	3750	1
RLD-D04	AHU RELIEF AIR DAMPER	AREA D	AREA 400	AHU-401	LV-4C	1/0M-721	3750	1
RLD-D05	AHU RELIEF AIR DAMPER	AREA D	AREA 400	AHU-404	LV-4D	1/0M-721	2400	1
OAD-E01	OUTSIDE AIR DAMPER	AREA E	AREA 500	FCU-501, FCU-502, FCU-503, FCU-504, FCU-505, FCU-506	LV-5A	3/0M-720	2250	1
OAD-E02	OUTSIDE AIR DAMPER	AREA E	AREA 500	FCU-507, FCU-508, FCU-509, FCU-510, FCU-511, FCU-512, FCU-514, FCU-515, FCU-516,	LV-5B	3/0M-720	2250	1

^{1.} PROVIDE NEW ACTUATOR AND CONTROL WIRING TO EQUIPMENT CONTROLLER. TEST AND BALANCE TO VALUES IN COMMON OUTSIDE AIR DAMPER SCHEMATIC.

RIVERWOOD ELEMENTARY SCHOOL HYDRONIC CONTROL VALVE SCHEDULE

Dewberry

/[5	SIONS	
1	ADDENDUM #2	12/14/
).	DESCRIPTION	DATE
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¬(V	VIN DI	3D/KLI
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CHECKED BY JPH
DATE 11/22/2023 P5

TITLE

SCHEDULES

PROJECT NO. 50159407-P5

4M-603

					VALVE		PRESSURE	FLOW	CLOSE-OFF	ACTUATOR		
		VALVE	VALVE	FLUID	SIZE	FLOW	DROP	COEFF.	PRESSURE	CONTROL	CONTROL]
WV-##	SERVICE AHU-103	TYPE 2-WAY PI	STYLE CHARACTERIZED BALL	TYPE HOT WATER	(IN) 1	(GPM) 7.5	(PSIG) 3.0	(CV) 4.3	(PSIG) 100.0	TYPE 24 Vac	SIGNAL 4-20 mA	1,2,3
WV-##	AHU-103	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.5	24.0	3.0	13.9	100.0	24 Vac	4-20 mA	1,2,3
WV-##	FC-104	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
WV-## WV-##	FC-104 AHU-105	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	1.25 0.75	10.0 7.0	3.0	5.8 4.0	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
WV-##	AHU-105	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	15.0	3.0	8.7	100.0	24 Vac	4-20 MA	1,2,3
WV-##	FC-106	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
WV-##	FC-106	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	3.5	100.0	24 Vac	4-20 mA	1,2,3
WV-##	FC-107	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
WV-## WV-##	FC-107 FC-108	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	6.0 2.0	3.0	3.5 1.2	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
//V-##	FC-108	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	3.5	100.0	24 Vac	4-20 mA	1,2,3
WV-##	FC-109	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
WV-##	FC-109	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
//V-## //V-##	FC-201 FC-201	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 10.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
// ## // // ##	FC-202	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
/ √√-##	FC-202	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-203	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-203 FC-204	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	7.5 3.0	3.0	4.3 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
//	FC-204	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
//V-##	FC-205	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
/ √√-##	FC-205	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-206	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
//V-## //V-##	FC-206 FC-207	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	7.5 3.0	3.0	4.3 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
// / //// /////////////////////////////	FC-207	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-208	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-208	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-209 FC-209	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 10.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/V V-## //V-##	FC-209 FC-210	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3
NV-##	FC-210	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-211	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-211 FC-217	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	7.5 3.0	3.0	4.3 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/VV-## //V-##	FC-217	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 MA	1,2,3
NV-##	FC-218	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-218	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
VV-##	FC-219	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
VV-## VV-##	FC-220	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	1.25 0.75	10.0 3.0	3.0	5.8 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/\V-##	FC-220	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-221	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-221	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac		1,2,3
NV-## NV-##	FC-222 FC-222	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 10.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/VV-##	FC-301	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
//V-##	FC-301	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
//V-##	FC-302	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
//V-## //V-##	FC-302 FC-303	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	0.75	7.5 3.0	3.0	4.3 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/VV-## //VV-##	FC-303	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 MA	1,2,3
//∨-##	FC-304	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
// √-##	FC-304	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
//V-## //V-##	FC-305 FC-305	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 10.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA	1,2,3
/VV-## //V-##	FC-306	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
NV-##	FC-306	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
/ √√-##	FC-307	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-307	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	23.1	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-308 FC-308	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 10.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/V V-## //V-##	FC-308 FC-309	2-WAY PI 2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3
NV-##	FC-309	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-310	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-310 FC-311	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	1 0.75	7.5 3.0	3.0	4.3 1.7	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/V V-## //V-##	FC-311 FC-311	2-WAY PI 2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3
VV-##	FC-319	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-319	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-320 FC-320	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1.25	3.0 10.0	3.0	1.7 5.8	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/VV- ## /VV-##	FC-320 FC-321	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	5.8 1.7	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
VV-##	FC-321	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-322	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-## NV-##	FC-322 FC-400	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	CHILLED WATER HOT WATER	1.25 1.25	10.0 6.0	3.0	5.8 3.5	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/V V-## //V-##	FC-400 FC-400	2-WAY PI 2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA 4-20 mA	1,2,3
VV-##	AHU-401	2-WAY PI	CHARACTERIZED BALL	HOT WATER	2	20.0	3.0	11.5	100.0	24 Vac	4-20 mA	1,2,3
VV-##	AHU-401	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	2	45.0	3.0	26.0	100.0	24 Vac	4-20 mA	1,2,3
VV-## VV-##	FC-402 FC-402	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	1	3.0 7.5	3.0	1.7 4.3	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/VV- ## /VV-##	FC-402 FC-403	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER	0.75	7.5 2.0	3.0	4.3 1.2	100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3
VV-##	FC-403	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
NV-##	AHU-404	2-WAY PI	CHARACTERIZED BALL	HOT WATER	2	25.0	3.0	14.4	100.0	24 Vac	4-20 mA	1,2,3
NV-##	AHU-404	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	2.5	55.0	3.0	31.8	100.0	24 Vac	4-20 mA	1,2,3
//V-## //V-##	AHU-405 AHU-405	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	1.5 2	15.0 40.0	3.0	8.7 23.1	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
/VV-##	FC-501	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
//V-##	FC-501	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-502	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
//V-##	FC-503	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25 0.75	10.0	3.0	5.8 1.7	100.0	24 Vac	4-20 mA	1,2,3
NV-##	FC-503 FC-503	2-WAY PI 2-WAY PI	CHARACTERIZED BALL CHARACTERIZED BALL	HOT WATER CHILLED WATER	0.75 1	3.0 7.5	3.0	1.7 4.3	100.0 100.0	24 Vac 24 Vac	4-20 mA 4-20 mA	1,2,3 1,2,3
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					VALVE		PRESSURE	FLOW	CLOSE-OFF	ACTUATOR		
		VALVE	VALVE	FLUID	SIZE	FLOW	DROP	COEFF.	PRESSURE	CONTROL	CONTROL	1
MARK	SERVICE	TYPE	STYLE	TYPE	(IN)	(GPM)	(PSIG)	(CV)	(PSIG)	TYPE	SIGNAL	NOTES
HWV-##	FC-505	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-505	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-506	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-506	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-507	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-507	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-508	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-508	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-509	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-509	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-510	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-510	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-511	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-511	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-512	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-512	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-514	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-514	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-515	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-515	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-516	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-516	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1.25	10.0	3.0	5.8	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-517	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	3.0	3.0	1.7	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-517	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	7.5	3.0	4.3	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-601	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-601	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	23.1	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-602	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-602	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	3.5	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-603	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-603	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	3.5	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	FC-604	2-WAY PI	CHARACTERIZED BALL	HOT WATER	0.75	2.0	3.0	1.2	100.0	24 Vac	4-20 mA	1,2,3
CWV-##	FC-604	2-WAY PI	CHARACTERIZED BALL	CHILLED WATER	1	6.0	3.0	3.5	100.0	24 Vac	4-20 mA	1,2,3
HWV-##	MAIN BOILER SHWP BYPASS CONTROL VALVE	2-WAY PD	CHARACTERIZED BALL	HOT WATER	2	35	9.0	11.7	100.0	24 Vac	4-20 mA	3,4
CWV-##	MAIN CHILLER SCHWP BYPASS CONTROL	2-WAY PD	CHARACTERIZED BALL	CHILLED WATER	3	100	9.0	33.3	100.0	24 Vac	4-20 mA	3,4

1. PROVIDE NEW CONTROL VALVES AS SCHEDULED. DEMOLISH EXISTING CONTROL VALVE. REFER TO SECTION 239010 FOR ADDITIONAL REQUIREMENTS. REFER TO DETAILS AND

DIAGRAMS FOR CONFIGURATION. 2. VALVES SHALL BE SIZED BASED ON DESIGN FLOW OF HEAT EXCHANGER OR COIL. EXISITING CIRCUIT SETTER TO REMAIN AT 100% FOR FLOW MEASUREMENT.

3. ALL CONTROL VALVE ACTUATORS SHALL BE MODULATING.

ATER FLC	WMETER	SCHEDULE -	RIVERWOO	D ELEMENTARY	SCHOOL
MARK	PIPE SIZE	SERVICE	MANUFACTURER	MODEL NO.	NOTES
HW-FLOW	4	HOT WATER	ONICON	F-3500	1
CHW-FLOW	6	CHILLED WATER	ONICON	F-3200	1
DOM-FLOW	4	DOMESTIC WATER	ONICON	F-3500	<u> </u>

1. REFER TO PLANS FOR ADDITIONAL REQUIREMENTS.