HIGHPOINT HOUSING AUTHORITY
HVAC UPDATES

NOTES:

1. ALL WORK SHALL COMPLY WITH APPLICABLE STATE AND LOCAL CODES.
2. DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
3. COORDINATE WITH ALL TRADES PRIOR TO THE INSTALLATION OF ANY DUCTWORK OR PIPING.
4. INSTALL ALL DUCTWORK, PIPING, & EQUIPMENT TO CURRENT LOCAL MECHANICAL CODE REQUIREMENTS. SEAL ALL DUCTWORK JOINTS AND SEAMS.
5. ALL MATERIALS REMOVED FROM THE SITE MUST FOLLOW RECYCLING AND WASTE DISPOSAL SPECIFICATIONS.
6. PROVIDE ALL MISC. MATERIALS REQUIRED FOR FULLY OPERABLE TURN-KEY SYSTEM.
7. MATERIALS WITHIN PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50. ALL EQUIPMENT LOCATED WITHIN THE PLENUM SHALL BE PLENUM-RATED.
8. SMOKE DETECTORS SHALL BE INSTALLED IN RETURN AIR DUCT OR PLENUM PER IMC, UNLESS DUCT SMOKE DETECTORS OR CONTROLS FIRE PROTECTION SYSTEM IS ALREADY IN OPERATION.
9. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA +- 1 inWC OR HIGHER. NO SNAP-LOCK.
10. ALL SUPPLY PLENUM DUCTWORK SHALL BE INSULATED TO A MINIMUM OF R6.
11. MAXIMUM DUCTWORK HANGER SPACING SHALL COMPLY WITH SMACNA REQUIREMENTS.
12. DUCT TAPS SHOULD BE 2" SMALLER THAN THE MAIN DUCT. ALL RECTANGULAR DUCT TAPS SHOULD BE MADE WITH 45 DEGREE FITTINGS.
13. PROVIDE FLEXIBLE CONNECTIONS AT THE POINT OF CONNECTION TO EQUIPMENT IN ALL DUCTWORK SYSTEMS.
14. ALL 90-DEGREE SQUARE ELBOWS SHALL BE PROVIDED WITH DOUBLE RADIUS TURNING VANES.
15. PROVIDE ACCESS DOORS TO ALL FIRE DAMPERS, SMOKE DAMPERS, SMOKE DETECTORS, VOLUME DAMPERS, MOTOR-OPERATED DAMPERS, HUMIDIFIERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK REQUIRING ACCESS.
16. SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS PER SMACNA SEAL CLASS B.
17. FLEXIBLE DUCT SHALL BE USED AT A MAXIMUM LENGTH OF 5-FEET AND SHALL BE SUPPORTED TO MAXIMIZE AIRFLOW.
18. FLEXIBLE DUCT SHALL BE USED TO CONNECT ALL DROP-IN DIFFUSERS TO ASSOCIATED BRANCH OR TRUNK LINES.
19. RETURN AIR SHALL NOT BE TAKEN FROM A CLOSET, BATHROOM, TOILET ROOM, OR UNCONDITIONED ATTIC.
20. DUCTWORK SHALL BE KEPT CLEAN OF DEBRIS DURING INSTALLATION. TEMPORARY HEPA FILTERS SHALL BE USED ON RETURN GRILLES DURING CONSTRUCTION TO PREVENT THE INTRODUCTION OF DEBRIS INTO DUCTWORK.
21. USE OF DISSIMILAR METALS SHALL BE AVOIDED. USE ONLY STEEL PIPE, FITTINGS, VALVES, FLANGES, AND OTHER DEVICES. WHERE DISSIMILAR METALS CANNOT BE AVOIDED, DIELECTRIC SEPARATION MUST BE USED.
22. PROVIDE EQUIPMENT SERVICE CLEARANCES PER MANUFACTURER(S).
23. INSTALL ALL EQUIPMENT ACCORDING TO LOCAL ELECTRICAL AND SAFETY CODES USING APPROPRIATE WIRE SIZE AND SUITABLE OVERCURRENT PROTECTION.
24. CONTRACTOR IS TO VERIFY THAT ALL EQUIPMENT CLEARANCES ARE MET. ALL EXCEPTIONS ARE TO BE APPROVED BY THE MANUFACTURER.
25. CONTRACTOR IS RESPONSIBLE TO DISPOSE OF ALL WASTE MATERIALS PER WASTE MANAGEMENT SPEC.

LEGEND

	CONTROL WIRING
OA	OUTDOOR AIR TEMPERATURE
DT	DUCT TEMPERATURE SENSOR
	MANUAL BALANCE DAMPER
S	GIGABIT SWITCH
	BAROMETRIC DAMPER
	ZONE DAMPER/ACTUATOR
	SUPPLY DIFFUSER
	RETURN GRILLE
	TURNING VANES
EXP	JACE EXPANSION MODULE
T	WIRED THERMOSTAT
SC	SUPERVISORY CONTROLLER
G	GATEWAY
FC	FIELD CONTROLLER
WTS ADJ	SETPOINT ADJUSTABLE WTS

INDEX OF SHEETS

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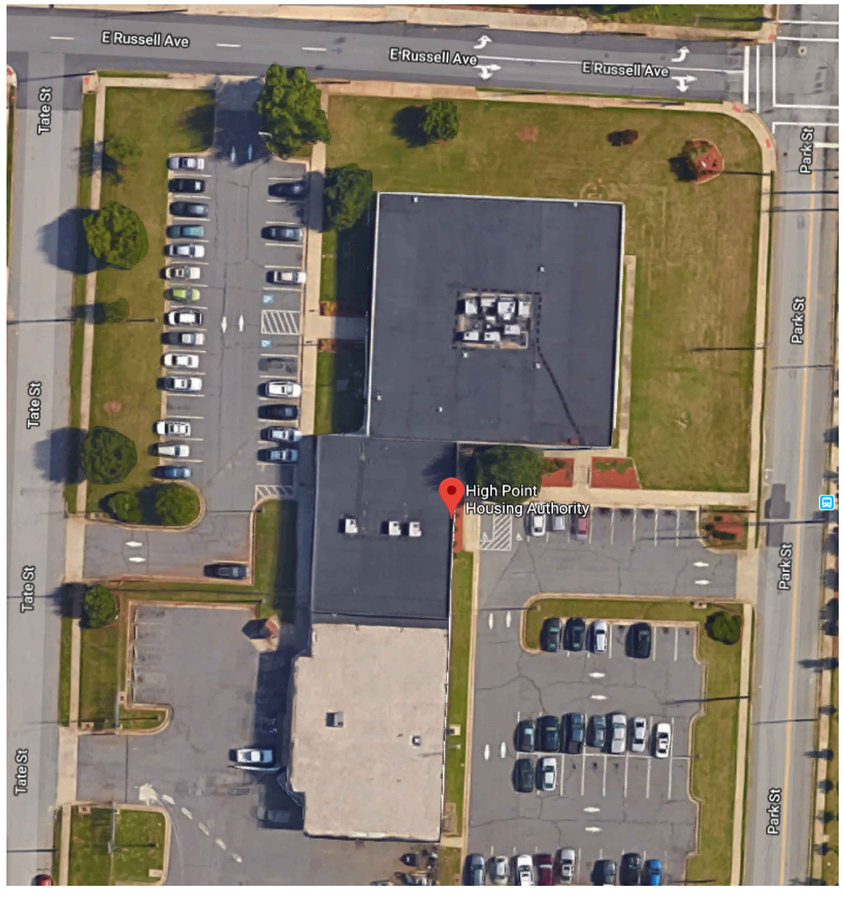
M1.7 CONTROLS POINTS LIST
M1.8 GENERAL DETAILS



NORTH CAROLINA PROFESSIONAL SEAL 029107 ENGINEER MATTHEW M PAGE
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES

FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

500 E. RUSSELL AVE.
HIGH POINT, NC 27260

COVER

DATE:10/02/18

SCALE:
NTS

C
1.00

MECHANICAL, SERVICE SYSTEMS, AND EQUIPMENT METHODS OF COMPLIANCE

Prescriptive X Energy Cost Budget:

Thermal Zone 3A

EXTERIOR DESIGN CONDITIONS:

Winter Dry Bulb: 20F
Summer Dry Bulb: 95F

INTERIOR DESIGN CONDITIONS:

Winter Dry Bulb: 72F
Summer Dry Bulb: 72F

BUILDING HEATING LOAD: Existing
BUILDING COOLING LOAD: Existing

MECHANICAL SPACING CONDITIONING SYSTEMS:

See equipment schedule

BOILER: NA
CHILLER: NA

EQUIPMENT SCHEDULES WITH MOTORS:

See equipment schedule

DESIGNER STATEMENT:

To the best of my knowledge and belief, the design of this building complies with the mechanical systems, service systems, and equipment requirements of the current jurisdictional building codes.

SIGNED :_____

NAME: Matt Pesce, PE

VENTILATION SCHEDULE - RTU-1 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Office Spaces	578	5	0.06	5	3	15	35
Corridors	370	0	0.06	0	0	0	22

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-1	72	0.8	90	90

VENTILATION SCHEDULE - RTU-2 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Office Spaces	447	5	0.06	5	3	15	27
Corridors	370	0	0.06	0	0	0	22

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-2	42	0.8	52	60

VENTILATION SCHEDULE - RTU-3 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Office Spaces	773	5	0.06	5	4	20	46
Corridor	230	0	0.06	0	0	0	14

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-3	66	0.8	83	90

VENTILATION SCHEDULE - RTU-4 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Library	1364	5	0.12	10	14	70	164
Break Room	205	0	0.18	100	21	0	37

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-4	201	0.8	251	260

VENTILATION SCHEDULE - RTU-5 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Office Spaces	355	5	0.06	5	2	10	21
Corridor	807	0	0.06	0	0	0	48

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-5	31	0.8	39	50

VENTILATION SCHEDULE - RTU-6 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Office Spaces	1588	5	0.06	5	8	40	95

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-6	95	0.8	119	125

VENTILATION SCHEDULE - RTU-7 - NORTH WING

OCCUPANCY CLASSIFICATION	AREA S.F.	PEOPLE OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRLFOW RATE IN BREATHING ZONE CFM/S.F.	DEFAULT OCCUPANT DENSITY PEOPLE/1000 S.F.	PEOPLE	OUTSIDE AIRFLOW REQUIRED CFM/PERSON	OUTSIDE AIRFLOW REQUIRED CFM/S.F.
Office Spaces	1557	5	0.06	5	8	40	93
Corridor	444	0	0.06	0	0	0	27

	SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
Adjust OA Damper to Scheduled Values.	RTU-7	133	0.8	167	170

VENTILATION SCHEDULE - RTU-8,9 &10 - SOUTH WING

Adjust OA Damper to Scheduled Values. RTUs 8,9 & 10 are maintenance replacements; Ventilation schedule is per prior design.

SYSTEM	UNCORRECTED OUTSIDE AIR REQUIRED CFM	VENTILATION EFFECTIVENESS Ez	CORRECTED OUTSIDE AIR REQUIRED CFM	OUTSIDE AIR PROVIDED CFM
RTU-8,9,10	N/A	0.8	N/A	N/A

NORTH CAROLINA PROFESSIONAL SEAL 029107 ENGINEER MATTHEW M PESCE
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES
500 E. RUSSELL AVE.
HIGH POINT, NC 27260

FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

CODE COMPLIANCE

DATE:10/02/18

SCALE: NTS

M 1.00

NORTH WING – ZONE DAMPER SCHEDULE (ZD / X–X)

MARK	MAX CFM	MIN CFM	SIZE (IN)
ZD–1–1	370	120	10"
ZD–1–2	715	240	12"
ZD–1–3	615	205	12"
ZD–2–1	295	95	10"
ZD–2–2	1340	440	16"
ZD–3–1	590	190	12"
ZD–3–2	890	290	14"
ZD–4–1	390	130	10"
ZD–4–2	390	130	10"
ZD–4–3	1220	400	16"
ZD–5–1	750	245	14"
ZD–5–2	850	280	14"
ZD–6–1	320	105	9"
ZD–6–2	125	45	6"
ZD–6–3	130	40	8"
ZD–6–4	400	130	12"
ZD–6–5	200	65	8"
ZD–7–1	900	300	14"
ZD–7–2	200	65	8"
ZD–7–3	780	255	14"
ZD–7–4	720	235	12"

1. ALL ZONE DAMPERS TO BE ROUND, HONEYWELL MODEL MARD/U OR SIMILAR.
2. ALL ZONE DAMPERS TO BE EQUIPPED WITH MODULATING ACTUATORS.

NORTH WING – NEW DIFFUSER SCHEDULE (D / X)

MARK	CFM RANGE	NECK SIZE
D1	50–130	6"X6"
D2	130–200	8"X8"
D3	200–300	10"X10"
D4	300–450	12"X12"

1. CONTRACTOR TO PROVIDE TITUS MCD 4–WAY LAY–IN DIFFUSER OR SIMILAR.
2. INCLUDE SQUARE–TO–ROUND.
3. INCLUDE INSULATED BLANKET.

NORTH WING – EXISTING ROOF TOP UNIT SCHEDULE (RTU / X)

MARK	MINIMUM OUTSIDE AIRFLOW (CFM)	TOTAL CFM
RTU–1	90	2000
RTU–2	60	2000
RTU–3	90	2000
RTU–4	260	2000
RTU–5	50	1600
RTU–6	125	2000
RTU–7	170	3000

1. SET ECONOMIZER OUTSIDE AIR DAMPER TO MINIMUM OUTSIDE AIRFLOW CFM.
2. PROVIDE NEW HONEYWELL TH8000 OR EQUIVALENT WITH EACH RTU.

NORTH WING – NEW RETURN GRILLE SCHEDULE (RG / X)

MARK	CFM RANGE	NECK SIZE
RG1	ALL	24"X24"

1. CONTRACTOR TO PROVIDE EGG–CRATE RETURN GRILLES IN LOCATIONS SHOWN.
2. CONTRACTOR IS TO AVOID PLACING EGGCRATE DIRECTLY UNDER EXPOSED DUCT WITHOUT PAINTING EXTERIOR OF DUCT BLACK.

NORTH WING – NEW BYPASS DAMPER SCHEDULE (BD / X)

MARK	MAX CFM	SIZE (IN)
BD–1	700	12
BD–2	1000	14
BD–3	1100–1400	16
BD–4	1750	18

1. PROVIDE WITH ADJUSTABLE COUNTERWEIGHT.
2. PROVIDE RUSKIN ZBBD25 OR EQUIVALENT.

SOUTH WING – EXISTING ZONE DAMPER SCHEDULE (ZD / X)

MARK	MAX CFM	MIN CFM	SIZE (IN)
ZD1 – 1,2,3,4	600	200	10
ZD2–4, ZD3–2,3	300	100	8
ZD2–1,2,3, ZD3–4	300	100	6
ZD3–1	700	210	12

1. INSTALL NEW ACTUATORS ON EXISTING ZONE DAMPERS AND WIRE TO EXISTING CONTROL SYSTEM. BALANCE TO FLOWS IN SCHEDULE.

SOUTH WING – NEW ROOFTOP UNIT SCHEDULE (RTU / X)

MARK	MODEL	NOMINAL CAPACITY (TONS)	SEER	CFM	MINIMUM OUTSIDE AIRFLOW (CFM)	E.S.P (INWC)	HEATING INPUT (MBH)	VOLTAGE/PHASE	MCA/MOCP	WEIGHT (LBS)
RTU–8	CARRIER 48TCE07	6	11	2400	379	0.5	125	208/3	36.5/50	652
RTU–9	CARRIER 48TCE06	5	13	2000	374	0.5	115	208/3	31.3/45	569
RTU–10	CARRIER 48TCE05	4	13	1600	143	0.5	115	208/3	24.8/35	537

1. INCLUDE DUCT SMOKE DETECTORS.
2. INCLUDE BACNET CARD.
3. INCLUDE CONDENSER COIL HAIL GUARD.
4. INCLUDE NON–FUSED DISCONNECT.
5. INCLUDE ECONOMI$ER IV WITH OUTDOOR AIR DRYBULB TEMPERATURE SENSOR AND BAROMETRIC RELIEF.
6. INCLUDE HONEYWELL TH8000 THERMOSTAT.
7. INCLUDE CONDENSATE OVERFLOW SWITCH.

NORTH CAROLINA PROFESSIONAL SEAL 029107 ENGINEER MATTHEW M. PRICE
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES

FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

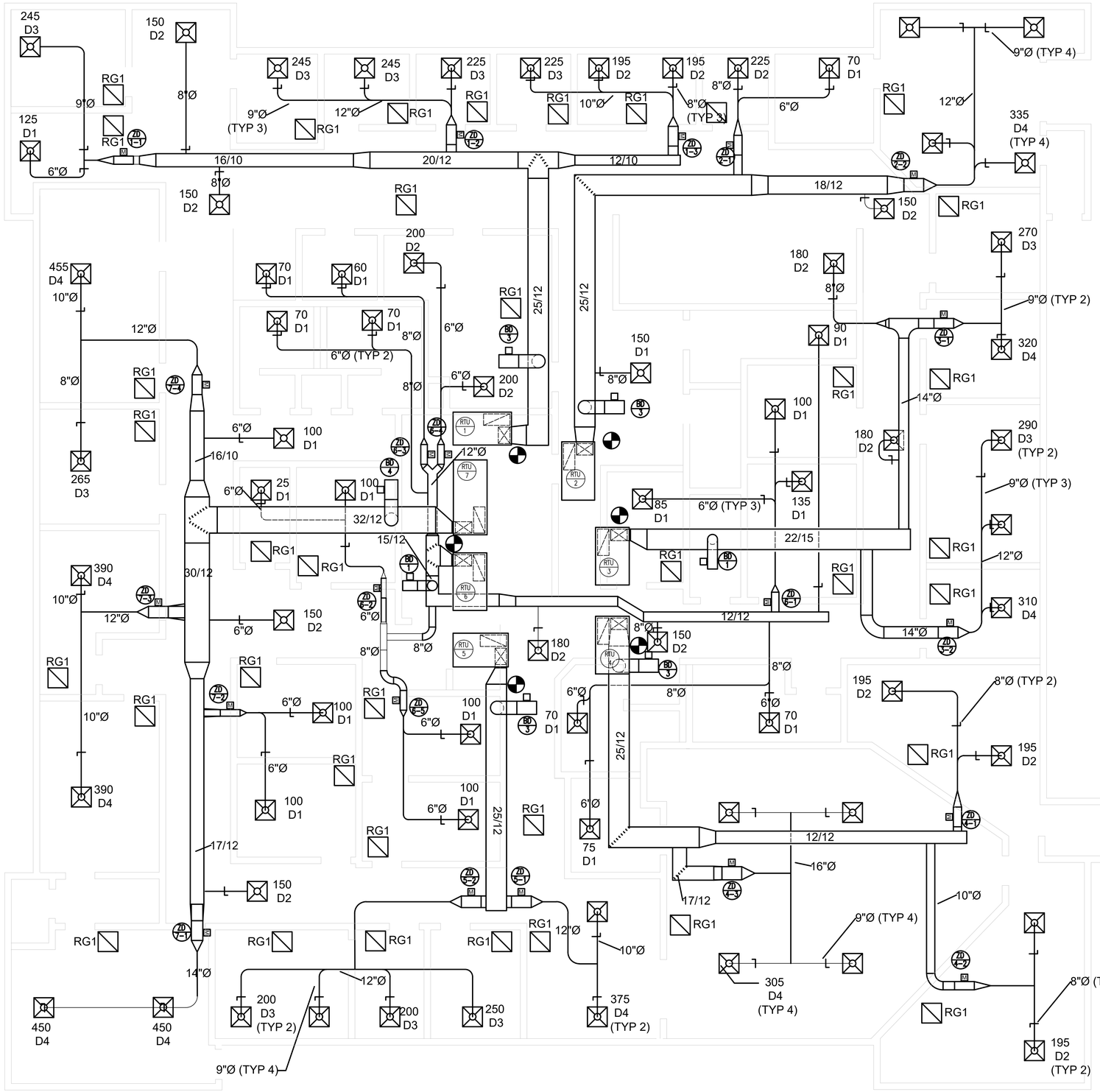
500 E. RUSSELL AVE.
HIGH POINT, NC 27260

MECHANICAL SCHEDULE

DATE:10/02/18

SCALE: NTS

M 1.01



DEMO NOTES:

1. DEMO EXISTING DUCTWORK AND ABANDONED HVAC EQUIPMENT IN PLENUM. LEAVE DUCT DROPS FROM ROOFTOP EQUIPMENT TO PLENUM AND ALL EXHAUST SYSTEMS. EXISTING RETURN DUCTWORK TO REMAIN FOR LATER RE-USE.
2. DEMO EXISTING DIFFUSERS AND RETURN GRILLES.

NEW WORK NOTES:

3. INSTALL NEW DUCTWORK PER PLANS AND SPECS. TIE NEW DUCTWORK INTO DUCT DROPS FROM ROOFTOP EQUIPMENT AT POINTS SHOWN. INSTALL DUCT LINER WITHIN 15 FEET OF ROOFTOP EQUIPMENT. INCREASE DUCT SIZE TO ACCOMMODATE LINER THICKNESS.
4. INSULATE ALL DUCTWORK WITH FOIL-BACKED R6 (MINIMUM). ALL JOINTS AND SEAMS SHALL BE SEALED TO MAINTAIN THE CONTINUITY OF THE VAPOR BARRIER.
5. INSTALL ZONE DAMPERS IN LOCATIONS SHOWN. SEE CONTROLS DRAWINGS FOR ADDITIONAL DETAILS.
6. INSTALL NEW MANUAL BALANCE DAMPERS IN LOCATIONS SHOWN. FULLY OPEN ALL BALANCE DAMPERS UPON INSTALLATION.
7. INSTALL BAROMETRIC DAMPERS IN SUPPLY DUCTWORK OF EACH SYSTEM. SEE MECHANICAL SCHEDULE FOR SIZING.
8. INSTALL NEW DIFFUSERS AND EGG-CRATE RETURN GRILLES.
9. BALANCE SYSTEM TO CFM VALUES SHOWN. SET ZONE DAMPERS TO MIN AND MAX POSITIONS PER MECHANICAL SCHEDULE AND MANUFACTURER'S GUIDELINES. ADJUST BAROMETRIC DAMPER COUNTERWEIGHTS TO OPEN RELATIVE TO ZONE DAMPER(S) CLOSING.

N

NORTH BUILDING - FIRST FLOOR NEW HVAC WORK

SCALE: ARCH TYPE D, 3/16" = 1'0"

NORTH CAROLINA PROFESSIONAL SEAL 029197 ENGINEER MATTHEW M PRESCOTT
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES

FACILITY STRATEGIES GROUP, PLLC

500 E. RUSSELL AVE.
HIGH POINT, NC 27260

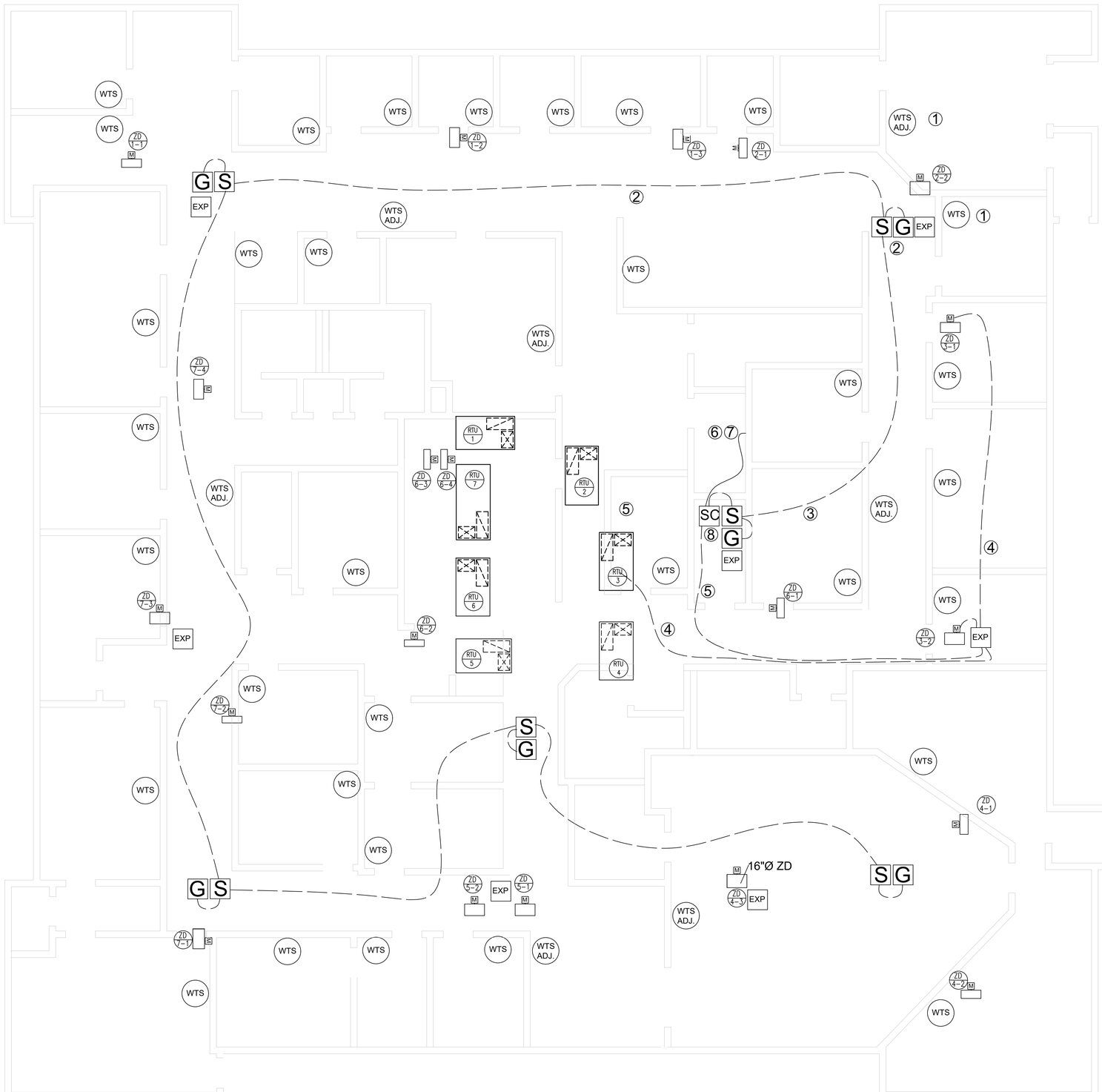
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

NORTH WING
NEW DUCT

DATE:10/02/18

SCALE: 3/16"=1'

M
1.1



GENERAL NOTES:

–DEMO EXISTING THERMOSTATS AND THERMOSTAT WIRE.
–REFERENCE DWG M1.6 AND SPECIFICATIONS FOR ACCEPTED EQUIPMENT MODELS.
–REFERENCE DWG M1.1 AND MECHANICAL SCHEDULE TO MATCH ZONE DAMPERS AND EXPANSION MODULES TO RESPECTIVE ROOFTOP UNIT.

NEW WORK NOTES:

1. INSTALL ENOCEAN WIRELESS TEMPERATURE SENSORS (TYP ALL OFFICE SPACES) AND ENOCEAN SETPOINT ADJUSTABLE WIRELESS TEMPERATURE SENSORS (TYP 7) IN LOCATIONS SHOWN USING INDUSTRIAL VELCRO 4 FT. AFF.
2. INSTALL GATEWAYS AND GIGABIT SWITCHES IN LOCATIONS SHOWN. DAISY-CHAIN GATEWAYS AND SWITCHES USING PLENUM-RATED CAT 6 CABLE. PROVIDE AND INSTALL SECURE ENCLOSURE FOR EACH GATEWAY/SWITCH ASSEMBLY.
3. PULL ALL TEMPERATURES AND TEMPERATURE SETPOINTS INTO JACE SUPERVISORY CONTROLLER USING CAT 6 CABLE.
4. PULL PLENUM RATED CONTROL WIRING FROM EACH ZONE DAMPER AND RESPECTIVE ROOFTOP UNIT TO JACE EXPANSION MODULE (TYP 7). NOTE: ONLY ONE FULL SYSTEM SHOWN; CONTRACTOR IS TO REFERENCE DWG M1.1 TO MATCH ZONE DAMPERS AND EXPANSION MODULES TO RESPECTIVE ROOFTOP UNITS.
5. PULL PLENUM RATED CONTROL WIRING FROM EACH JACE EXPANSION MODULE TO JACE SUPERVISORY CONTROLLER (TYP 7). NOTE: ONLY ONE FULL SYSTEM SHOWN; CONTRACTOR IS TO REFERENCE DWG M1.1 TO MATCH ZONE DAMPERS AND EXPANSION MODULES TO RESPECTIVE ROOFTOP UNITS.
6. PULL 24-V POWER WIRING TO JACE FROM STEPDOWN TRANSFORMER PROVIDED BY ELECTRICIAN (SEE NOTE 7).
7. PROVIDE 24-VOLT STEP-DOWN TRANSFORMER FOR JACE FROM NEARBY ELECTRICAL PANEL, PER LOCAL CODE.
8. PROVIDE GRAPHICS AND REMOTE ACCESS. GRAPHICS TO BE APPROVED BY OWNER BEFORE INSTALLATION.
9. NOTE: DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR IS TO FIELD VERIFY SIGNAL STRENGTH BETWEEN WIRELESS TEMPERATURE SENSORS AND GATEWAYS AND PROVIDE AS MANY GATEWAYS AS NECESSARY TO ACCOMMODATE WIRELESS LAYOUT AS SHOWN.
10. CONTRACTOR TO WORK WITH ENGINEER TO VERIFY ALL CONTROLS SEQUENCES. CONTRACTOR TO PROVIDE REMOTE ACCESS TO GRAPHICS FOR ENGINEER VERIFICATION.

BID ALTERNATE #1:

11. TIE SOUTH WING EXPANSION MODULE INTO NORTH WING JACE USING PLENUM RATED CONTROL WIRING.
12. PROVIDE GRAPHICS AND TRENDING OF BACNET POINTS.

N

NORTH BUILDING – CONTROLS LAYOUT
SCALE: ARCH TYPE D, 3/16" = 1'0"

NORTH CAROLINA PROFESSIONAL SEAL 029197 ENGINEER MATTHEW M MACKEY
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES

FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

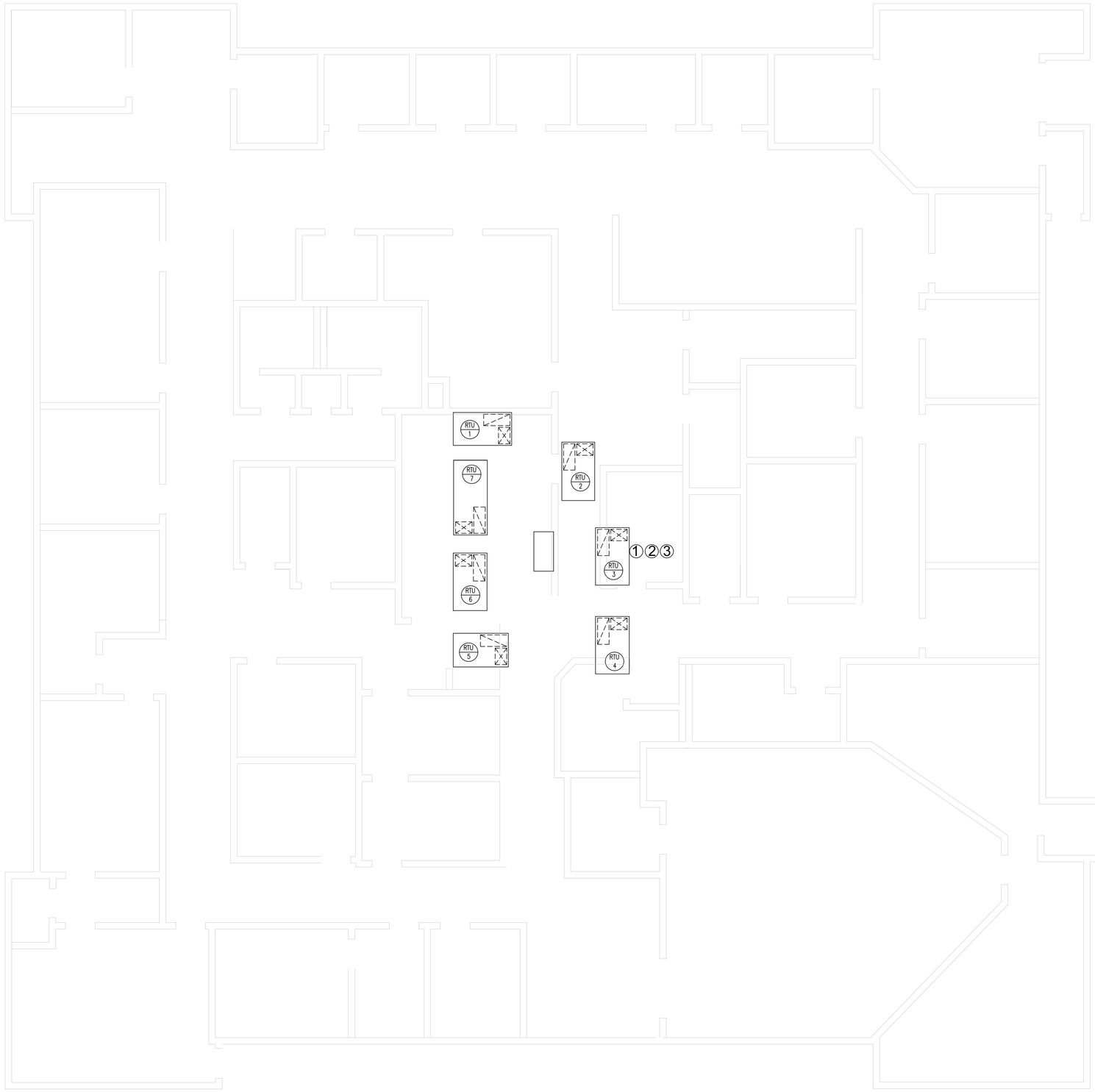
500 E. RUSSELL AVE.
HIGH POINT, NC 27260

NORTH WING CONTROLS

DATE:10/02/18

SCALE: 3/16"=1'

M 1.2



NEW WORK NOTES:

1. BRUSH AND PAINT EXISTING GAS LINE (YELLOW) BETWEEN ROOF PENETRATIONS AND ISOLATION VALVES TO PROTECT FROM CORROSION (TYP 7).
2. SET ECONOMIZER MINIMUM OUTSIDE AIR DAMPER POSITION PER MECHANICAL SCHEDULE (TYP 7).
3. VERIFY THAT ALL EQUIPMENT IS PROVIDED WITH A DUCT SMOKE DETECTOR. SUPPLY AND INSTALL DUCT SMOKE DETECTOR(S) ON EQUIPMENT, AS NECESSARY (TYP 7).

NORTH BUILDING –
ROOFTOP WORK/ EQUIPMENT LAYOUT
SCALE: ARCH TYPE D, 3/16" = 1'0"

NORTH CAROLINA PROFESSIONAL SEAL 029107 ENGINEER MATTHEW W. PECK
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES

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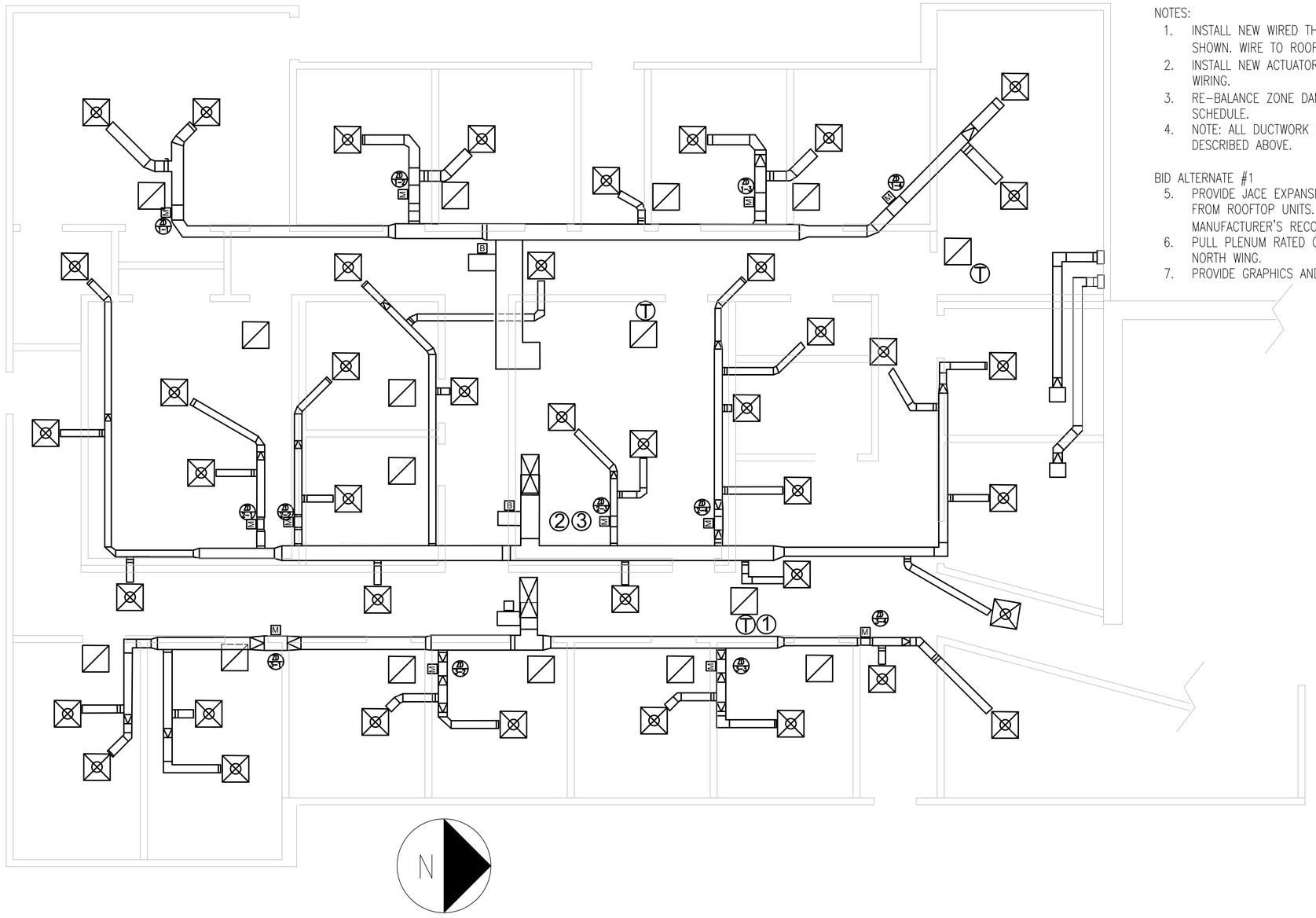
500 E. RUSSELL AVE.
HIGH POINT, NC 27260

NORTH WING ROOFTOP EQUIPMENT

DATE:10/02/18

SCALE: 3/16"=1'

M 1.3



NOTES:

1. INSTALL NEW WIRED THERMOSTATS (HONEYWELL TH800 OR EQUIVALENT) IN LOCATIONS SHOWN. WIRE TO ROOFTOP UNITS (TYP 3).
2. INSTALL NEW ACTUATORS ON EXISTING ZONE DAMPERS (TYP 12). USE EXISTING WIRING.
3. RE-BALANCE ZONE DAMPERS TO MIN/MAX POSITIONS SHOWN IN MECHANICAL SCHEDULE.
4. NOTE: ALL DUCTWORK IS EXISTING AND IS TO REMAIN UNALTERED OTHER THAN AS DESCRIBED ABOVE.

BID ALTERNATE #1

5. PROVIDE JACE EXPANSION MODULE IN SOUTH WING TO PICK UP BACNET POINTS FROM ROOFTOP UNITS. WIRE BACNET CARDS TO JACE EXPANSION MODULE PER MANUFACTURER'S RECOMMENDATIONS.
6. PULL PLENUM RATED CONTROL WIRING FROM JACE EXPANSION MODULE TO JACE IN NORTH WING.
7. PROVIDE GRAPHICS AND TRENDING OF BACNET POINTS.

SOUTH WING - NEW CONTROLS

SCALE: ARCH TYPE D, 1/4" = 1'0"

NORTH CAROLINA PROFESSIONAL SEAL 029197 ENGINEER MATTHEW W. PACK
10/2/18

HIGHPOINT HOUSING AUTHORITY - HVAC UPGRADES

500 E. RUSSELL AVE.
HIGH POINT, NC 27260

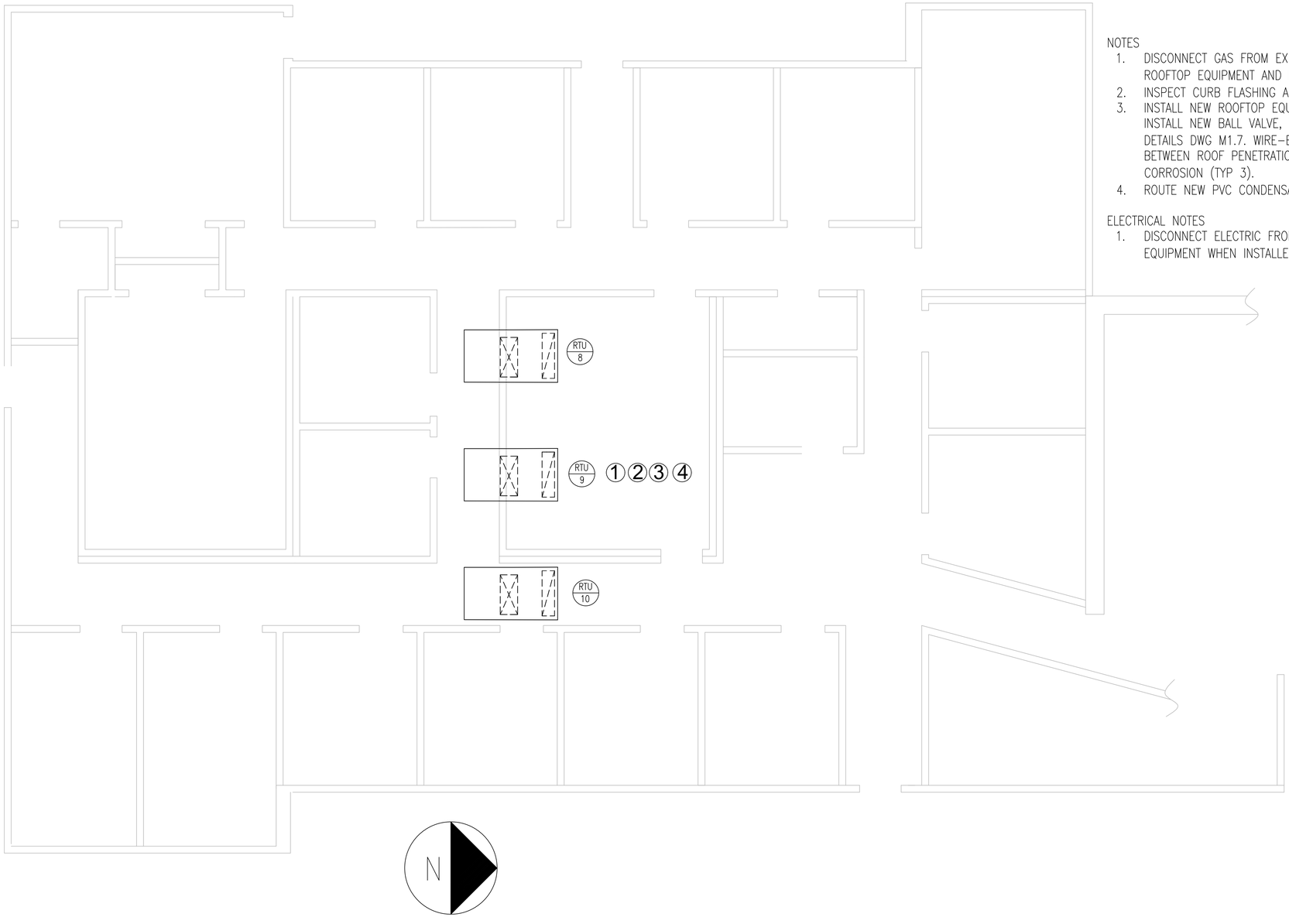
FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

SOUTH WING NEW CONTROLS

DATE:10/02/18

SCALE: 1/4"=1'

M
1.4



NOTES
1. DISCONNECT GAS FROM EXISTING ROOFTOP EQUIPMENT. REMOVE EXISTING ROOFTOP EQUIPMENT AND DISPOSE (TYP 3).
2. INSPECT CURB FLASHING AND REPAIR, IF NECESSARY (TYP 3).
3. INSTALL NEW ROOFTOP EQUIPMENT PER MECHANICAL SCHEDULE DWG M1.0. INSTALL NEW BALL VALVE, FLEX CONNECTION, AND DIRT LEG PER MECHANICAL DETAILS DWG M1.7. WIRE-BRUSH AND PAINT EXISTING GAS LINE (YELLOW) BETWEEN ROOF PENETRATION AND ISOLATION VALVE TO PROTECT FROM CORROSION (TYP 3).
4. ROUTE NEW PVC CONDENSATE DRAIN LINE TO ROOFTOP DRAIN (TYP 3).

ELECTRICAL NOTES
1. DISCONNECT ELECTRIC FROM EXISTING ROOFTOP EQUIPMENT. RECONNECT NEW EQUIPMENT WHEN INSTALLED BY MECHANICAL CONTRACTOR (TYP 3).

SOUTH BUILDING – ROOFTOP WORK/ EQUIPMENT LAYOUT
SCALE: ARCH TYPE D, 1/4" = 1'0"

NORTH CAROLINA PROFESSIONAL SEAL 029197 ENGINEER MATTHEW M PRESCHER
10/2/18

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FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

500 E. RUSSELL AVE.
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SOUTH WING ROOFTOP EQUIPMENT

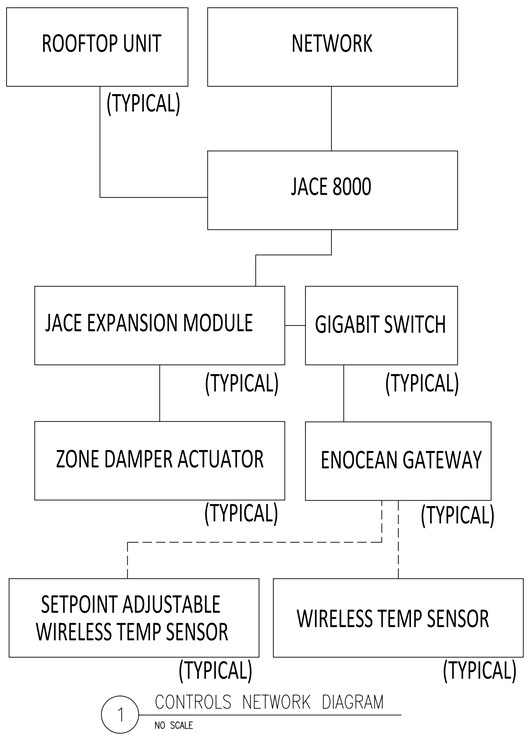
DATE:10/02/18

SCALE: 1/4"=1'

M 1.5

CONTROLS GENERAL NOTES

1. INSTALL NEW BUILDING CONTROLLER – TRIDIUM JACE 8000 OR EQUIVALENT. NEW BAS CONTROLLER SHALL RUN NIAGARA N4 SUPERVISORY SOFTWARE.
2. INSTALL NEW JACE EXPANSION MODULES – IO–R–34 OR EQUIVALENT. CONTRACTOR IS TO VERIFY THE NUMBER OR EXPANSION MODULES NECESSARY TO ACCOMMODATE ALL SYSTEM INPUTS/OUTPUTS.
3. INSTALL NEW ENOCEAN WIRELESS TEMPERATURE SENSORS AS SHOWN IN DWG M1.2. MAGNUM MX–RTS1 OR EQUIVALENT.
4. INSTALL NEW ENOCEAN SETPOINT ADJUSTABLE WIRELESS TEMPERATURE SENSORS AS SHOWN IN DWG M1.2. MAGNUM MX–RTS1–SP OR EQUIVALENT.
5. INSTALL NEW HVAC CONTROLLER ON EACH ROOFTOP UNIT. MAGNUM MX–MTB OR EQUIVALENT.
6. INSTALL NEW ENOCEAN WIRELESS GATEWAYS AS SHOWN IN DWG M1.2. MAGNUM MX–EBOX OR EQUIVALENT. DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR IS RESPONSIBLE TO TEST SIGNAL STRENGTH AND PROVIDE AS MANY GATEWAYS AS NECESSARY TO ACCOMMODATE TEMPERATURE SENSOR AND WIRELESS THERMOSTAT LAYOUTS AS SHOWN.
7. INSTALL NEW UNMANAGED GIGABIT SWITCHES AS SHOWN IN DWG M1.2. C
8. INCLUDE ALL HARDWARE, SOFTWARE, ASSOCIATED COMPONENTS, WIRING, CONDUIT, ETC. REQUIRED FOR COMPLETE AND OPERABLE SYSTEM. ALL NEW COMM WIRE SHALL BE CAT–6.
9. CONTRACTOR SHALL PROVIDE REMOTE ACCESS TO JACE WITH GRAPHICAL USER INTERFACE SHOWING SITE LAYOUT, SPACE TEMPERATURES, SETPOINTS, AND COLOR–CODING SHOWING DEVIATION FROM SETPOINTS. CONTRACTOR TO SUBMIT GRAPHICS TO OWNER FOR APPROVAL.
10. CONTRACTOR SHALL COMPLY WITH ALL HHA IT SECURITY STANDARDS AND POINTS NAMING CONVENTIONS.
11. CONTRACTOR SHALL PROVIDE ALL LICENSES FOR SOFTWARE AND ENGINEERING TOOLS NEEDED TO MODIFY THE SYSTEM, AS WELL AS ANY ADDITIONAL HARDWARE OR CONNECTORS REQUIRED. OWNER SHALL BE PROVIDED ALL ADMINISTRATIVE ACCESS IDs AND PASSWORDS. CONTRACTOR TO WORK WITH ENGINEER TO VERIFY ALL CONTROLS SEQUENCES AND GRAPHICS.



1 CONTROLS NETWORK DIAGRAM
NO SCALE

SEQUENCE OF OPERATIONS

1. SYSTEM CONTROL SEQUENCES SHALL BE EXECUTED BY THE JACE SUPERVISORY CONTROLLER. ALL TEMPERATURE SETPOINTS AND SPACE TEMPERATURE POINTS SHALL BE PULLED INTO THE JACE FOR REMOTE MONITORING. ALL POINTS PULLED INTO THE JACE SHALL BE ACCOMPANIED BY GRAPHICS PER THE SPECIFICATIONS.

ZONE DAMPERS

1. AVERAGE TEMPERATURE(S) OF ZONE(S) SERVED BY ZONE DAMPER SHALL BE USED TO MODULATE ZONE DAMPER ACTUATOR FROM MAXIMUM TO MINIMUM AIRFLOWS PER MECHANICAL SCHEDULE. SETPOINT SHALL BE DICTATED BY SETPOINT ADJUSTABLE WIRELESS THERMOSTAT. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS TO CALIBRATE ZONE DAMPERS.

COOLING MODE – OCCUPIED HOURS

1. SETPOINT ADJUSTABLE THERMOSTAT SHALL CONTROL COOLING. WHILE IN COOLING MODE:
- IF SPACE TEMPERATURE > 70°F (ADJ.)+DEADBAND, ROOFTOP UNIT SHALL ACTIVATE COOLING TO MAINTAIN DISCHARGE AIR TEMPERATURE OF 55°F.
- IF SPACE TEMPERATURE < 70°F (ADJ.) – DEADBAND, ROOFTOP UNIT SHALL DEACTIVATE COOLING.
- ALL ROOFTOP EQUIPMENT SHALL COMPLY WITH ECONOMIZER AND FAN REQUIREMENTS (SEE SECTIONS BELOW).

HEATING MODE – OCCUPIED HOURS

1. SETPOINT ADJUSTABLE THERMOSTAT SHALL CONTROL GAS HEATING. WHILE IN HEATING MODE:
- IF SPACE TEMPERATURE < 70°F (ADJ.)–DEADBAND, ROOFTOP UNIT SHALL ACTIVATE HEATING.
- IF SPACE TEMPERATURE > 70°F (ADJ.) + DEADBAND, ROOFTOP UNIT SHALL DEACTIVATE HEATING.
- ALL ROOFTOP EQUIPMENT SHALL COMPLY WITH ECONOMIZER AND FAN REQUIREMENTS (SEE SECTIONS BELOW).

HEATING MODE – UNOCCUPIED HOURS

1. SCHEDULE INDICATES UNOCCUPIED HOURS.
2. TEMPERATURE SETPOINT SHALL RESET TO LOWER TEMPERATURE (65°F ADJ.).
3. UPON CALL FOR HEATING, SUPPLY FAN CYCLES ON AND OUTSIDE AIR DAMPER REMAINS CLOSED.

COOLING MODE MODE – UNOCCUPIED HOURS

1. SCHEDULE INDICATES UNOCCUPIED HOURS.
2. TEMPERATURE SETPOINT SHALL RESET TO HIGHER TEMPERATURE (80°F ADJ.).
3. UPON CALL FOR COOLING, SUPPLY FAN CYCLES ON AND OUTSIDE AIR DAMPER REMAINS CLOSED.

RTU/Controls Setpoints		
	Occupied	Unoccupied
Cooling	72[F]	80[F]
Heating	72[F]	60[F]
OA Damper	Open	Closed
Period	7AM - 6PM(Adj.)	6PM - 7AM(Adj.)

ROOFTOP UNIT FAN – OCCUPIED HOURS

1. SCHEDULE (WITHIN JACE) INDICATES OCCUPIED HOURS.
- ALL ROOFTOP UNIT FANS SHALL RUN CONTINUOUSLY.

ROOFTOP UNIT FAN – UNOCCUPIED HOURS

1. SCHEDULE (WITHIN JACE) INDICATES UNOCCUPIED HOURS.
- ROOFTOP UNIT FANS SHALL TURN OFF UNLESS HEATING OR COOLING IS REQUESTED.

ECONOMIZER

EXISTING ROOFTOP EQUIPMENT WITH MANUAL OUTSIDE AIR DAMPERS (NORTH WING) SHALL BE SET TO MINIMUM OA DAMPER POSITION PER MECHANICAL SCHEDULE. ALL NEW ROOFTOP EQUIPMENT (SOUTH WING) SHALL FOLLOW THE FOLLOWING ECONOMIZER SEQUENCES OF OPERATION:

COOLING MODE – ECONOMIZER – OCCUPIED HOURS

1. SCHEDULE INDICATES OCCUPIED HOURS. ROOFTOP UNIT FAN TURNS ON (IF NOT ALREADY ON TO MAINTAIN SETBACK SETPOINT).
2. OUTSIDE AIR DAMPER OPENS TO MINIMUM POSITION (20 PERCENT ADJ.)
- IF OSA DB TEMP > 65°F, OUTSIDE AIR DAMPER HOLDS MIN POSITION.
- IF OSA DB TEMP <= 65°F, FREE COOLING IS ENABLED AND OUTSIDE AND RETURN AIR DAMPERS MODULATE TO MAINTAIN DISCHARGE AIR TEMPERATURE OF 55°F

HEATING MODE – ECONOMIZER – OCCUPIED HOURS

1. SCHEDULE INDICATES OCCUPIED HOURS. ROOFTOP UNIT FAN TURNS ON (IF NOT ALREADY ON TO MAINTAIN SETBACK SETPOINT).
2. OUTSIDE AIR DAMPER OPENS TO MINIMUM POSITION (20 PERCENT ADJ.)

MORNING WARM–UP/COOL–DOWN

1. CONTROLS SHALL WARM–UP OR COOL–DOWN THE BUILDING IN ANTICIPATION OF OCCUPIED HOURS.
- ECONOMIZER OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING MORNING WARM–UP OR COOL–DOWN.
- THE START TIME OF MORNING WARM–UP OR COOL–DOWN SHALL BE DETERMINED AUTOMATICALLY SO AS TO BRING THE SPACE TEMPERATURE(S) TO THE DESIRED SETPOINT UPON OCCUPANT ARRIVAL.

SETBACK

1. WORK SCHEDULE SHALL BE PROGRAMMED REMOTELY BY OWNER.
- IF UNOCCUPIED "VACATION DAY" IS SCHEDULED, SYSTEM SETPOINTS SHALL SETBACK PER UNOCCUPIED HOURS.

NORTH CAROLINA PROFESSIONAL SEAL 029197 ENGINEER MATTHEW M WARSICKI
10/2/18

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FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

500 E. RUSSELL AVE.
HIGH POINT, NC 27260

CONTROLS SEQUENCE OF OPERATIONS

DATE:10/02/18

SCALE: NA

M 1.6

Base Scope - Points List		JACE OUTPUTS				JACE INPUTS	Software
		Digital	Analog			Analog	Application
Ref. #	Point Name	Control Relay	0-10V	Heating	Cooling	Temperature	Programs
1	ST1 Space Temperature 1...STn Space Temperature n					40	
2	SS1 Space Setpoint 1...SSn Space Setpoint n					7	
3	RTU 1 On/Off...RTU n On/Off	7					
4	RTU 1 Mode...RTU n Mode			7	7		
5	RTU Day/Night Setback						7
6	ZoneDamperPosition 1...ZoneDamperPostion n		21				

1. PROVIDE GRAPHICS SHOWING FLOOR LAYOUT WITH SPACE TEMPERATURE AND TEMPERATURE SETPOINTS. GRAPHICS TO BE APPROVED BY OWNER.
2. PROVIDE COLOR-CODED GRAPHICS FOR TEMPERATURE DEVIATION FROM SET POINT OF 5[F] OR GREATER.
3. PROVIDE TRENDING OF ALL POINTS AT 15 MINUTE INTERVALS.
4. SETBACK SCHEDULE TO BE ACCESSIBLE VIA REMOTE ACCESS.

Add Alternate #1 - Points List		JACE INPUTS					Software
		Analog				Digital	Application
Ref. #	Point Name	Heating	Cooling	Temperature	Position	Alarm	Programs
7	RTU8 OA Damper Position				1		
8	RTU8 Supply Temperature			1			
9	RTU8 Return Temperature			1			
10	RTU8 Fan Status					1	
11	RTU8 Alarm Status					1	
12	RTU8 Temperature Setpoint			1			
13	RTU8 Space Temperature			1			
14	RTU8 Mode	1	1				
15	RTU8 Day/Night Setback						1
16	RTU9 OA Damper Position				1		
17	RTU9 Supply Temperature			1			
18	RTU9 Return Temperature			1			
19	RTU9 Fan Status					1	
20	RTU9 Alarm Status					1	
21	RTU9 Temperature Setpoint			1			
22	RTU9 Space Temperature			1			
23	RTU9 Mode	1	1				
24	RTU9 Day/Night Setback						1
25	RTU10 OA Damper Position				1		
26	RTU10 Supply Temperature			1			
27	RTU10 Return Temperature			1			
28	RTU10 Fan Status					1	
29	RTU10 Alarm Status					1	
30	RTU10 Temperature Setpoint			1			
31	RTU10 Space Temperature			1			
32	RTU10 Mode	1	1				
33	RTU10 Day/Night Setback						1
34	Outside Temp			1			

1. PROVIDE GRAPHICS SHOWING ROOFTOP UNITS AND POINTS ABOVE. GRAPHICS TO BE APPROVED BY OWNER.
2. PROVIDE TRENDING FOR ALL POINTS ABOVE AT 15 MINUTE INTERVALS.
3. ALL OTHER AVAILABLE BACNET POINTS TO BE PULLED INTO TABLE.

NORTH CAROLINA PROFESSIONAL SEAL 029107 ENGINEER MATTHEW M PRINCE
10/2/18

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500 E. RUSSELL AVE.
HIGH POINT, NC 27260

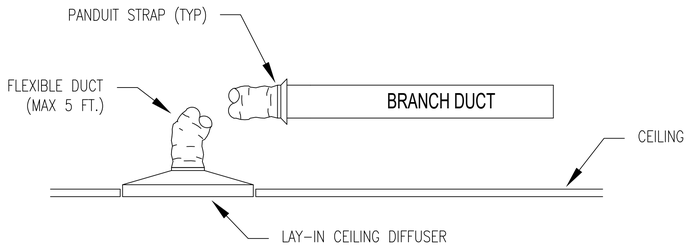
FACILITY STRATEGIES GROUP, PLLC
1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

CONTROLS POINTS LIST

DATE:10/02/18

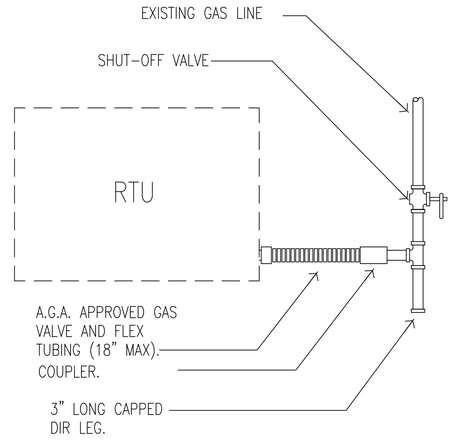
SCALE: NA

M 1.7



1 LAY-IN DIFFUSER/FLEX DUCT CONNECTION DETAIL

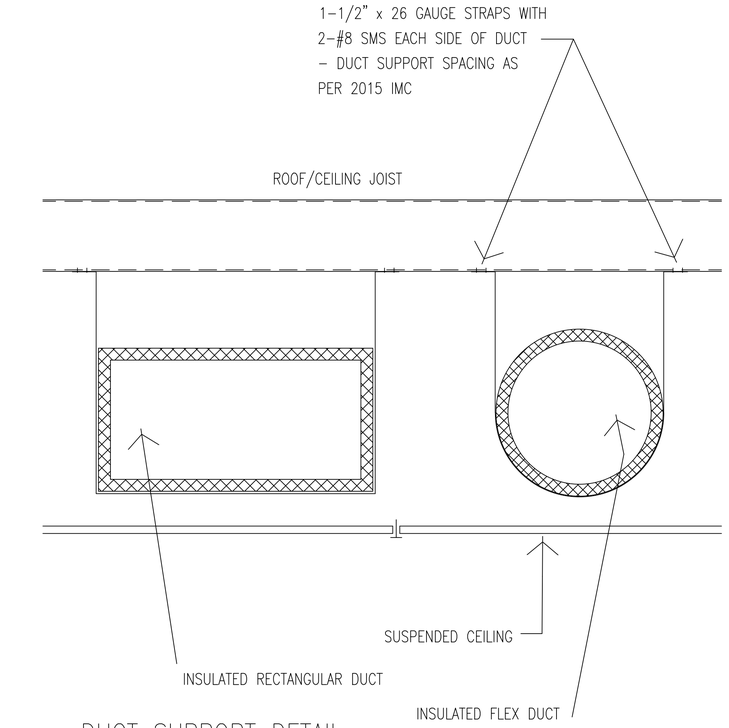
NO SCALE



TYPICAL BOILER

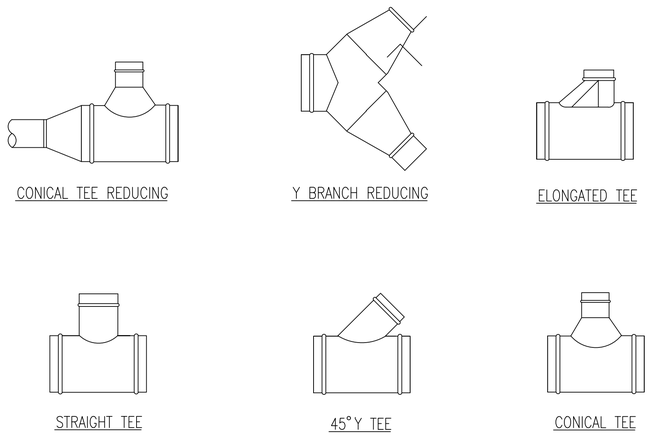
2 GAS CONNECTION SCHEMATIC

NO SCALE



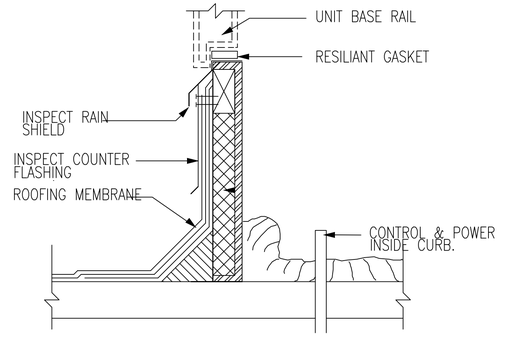
3 DUCT SUPPORT DETAIL

NO SCALE



4 ROUND DUCT BRANCH TAKE-OFF DETAILS

NO SCALE



5 ROOF CURB INSPECTION DETAIL

NO SCALE

NORTH CAROLINA PROFESSIONAL SEAL 029197 ENGINEER MATTHEW M. GRACE
10/2/18

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1012 MARKET ST. SUITE 307
FORT MILL, SC 29708

500 E. RUSSELL AVE.
HIGH POINT, NC 27260

GENERAL
HVAC
DETAILS

DATE:10/02/18

SCALE: NA

M
1.8