GRILLES - REGISTERS - DIFFUSERS

DESIG.	DUTY	TYPE	MOUNTING LOCATION	MATERIAL	VOLUME CONTROL	FINISH	AIR PATTERN CONTROL	METHOD OF SUPPORT	EQUAL TO MANUFACTURER AND MODEL NO.	REMARKS
A	SUPPLY	PLAQUE	LAY-IN CLG	STEEL	YES	OFF WHITE	YES	T-BAR	TITUS OMNI 24X24 FACE	SEE NOTE 1,2
B	RETURN	PERFORATED	LAY-IN CLG	STEEL	NO	OFF WHITE	NO	T-BAR	TITUS PAR 24X24 FACE	SEE NOTE 2
C	SUPPLY	SLOT	LAY-IN CLG	STEEL	NO	BLACK	YES	T-BAR	TITUS TBD80 (1)1-1/2" SLOT	SEE NOTE 1,2,3,4
C1	SUPPLY	LINEAR SLOT	GYP BD CLG	ALUMINUM	NO	OFF WHITE	YES	SURFACE	TITUS FL-15-HT	SEE NOTE 7
C2	SUPPLY	SLOT	DUCT	STEEL	NO	BLACK	YES	DUCT	TITUS FL-10 4'LONG JET THROW	SEE NOTE 1,2
E	SUPPLY	DOUBLE DEFLECTION	SIDEWALL	STEEL	NO	PRIMER	YES	SURFACE	TITUS 300RS	SEE NOTE 6
G	RETURN	FIXED	SIDEWALL	ALUMINUM	NO	PRIMER	NO	SURFACE	TITUS 350RL	SEE NOTE 5

NOTES:
1) NECK SIZES AS FOLLOWS:

DESIGNATION "A" CFM RANGE	NECK SIZE	DESIGNATION "C" CFM RANGE	NECK SIZE	LENGTH
000-250	8"RD	000-130	8"RD	2'-0"
255-400	10"RD	135-260	10"RD	4'-0"
405-550	12"RD			
555-700	14"RD			

2) NOTIFY ENGINEER OF ANY DISCREPENCIES BETWEEN NEW MODEL NUMBER AND EXISTING NUMBER PRIOR TO PURCHASE.
3) COORDINATE NEW INACTIVE SECTIONS NEXT TO SLOT DIFFUSER WITH ARCHITECT PRIOR TO BIDDING.
4) INACTIVE SECTIONS OF SLOT DIFFUSERS SHALL HAVE SHEET METAL LIGHTPROOF SIGHT GUARDS AND SHALL BE USED FOR RETURN AIR.
5) EXPOSED, NON-ADJUSTABLE, PRIME AND PAINT AS REQUIRED. COORDINATE PAINT COLOR WITH ARCHITECT.
6) REFER TO DRAWINGS FOR GRILLE/NECK SIZES.

APPROVED MANUFACTURERS: PRICE, TITUS, NAILOR, GREENHECK, & KRUEGER.

VRF DX - FAN COIL UNIT

DESIG.	SERVES	DESIGN COOLING CFM	OUTSIDE AIR CFM	NOMINAL COOLING CAPCITY BTUH	NOMINAL HEATING CAPCITY	VOLTAGE	HERTZ	MCA	MOCP	EQUAL TO MANUFACTURER	MODEL NO.
FCU1-18	PERIMETER	1160	90	36000	40000	208/1	60	4.25	15	MITSUBISHI	TPEFYP036MA144A
FCU1-19	CONFERENCE	520	95	18000	20000	208/1	60	2.94	15	MITSUBISHI	TPEFYP018MA144A
FCU1-20	HUDDLE	150	45	8000	9000	208/1	60	1.75	15	MITSUBISHI	TPEFYP008MA144A
FCU1-21	HUDDLE	150	45	8000	9000	208/1	60	1.75	15	MITSUBISHI	TPEFYP008MA144A
FCU1-22	OPEN OFFICE	1140	185	36000	40000	208/1	60	4.25	15	MITSUBISHI	TPEFYP036MA144A
FCU1-23	OPEN OFFICE	800	185	30000	34000	208/1	60	2.88	15	MITSUBISHI	TPEFYP030MA144A
FCU1-24	BREAK/ENTRY/HUDDLE	360	95	15000	17000	208/1	60	2.88	15	MITSUBISHI	TPEFYP015MA144A

NOTES: (APPLICABLE TO ALL BOXES)
1) Refer to specifications for additional requirements.
2) Nominal cooling capacities are based on indoor coil EAT of 80/67°F (DB/WB), outdoor of 95°F (DB)
3) Nominal heating capacities are based on indoor coil EAT of 70°F (DB), outdoor of 43°F (WB)
4) See schematic piping/control diagram for indication of required indoor unit remote controllers, system

NOTES:
1) NOMINAL COOLING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 80/67 F (DB/WB), OUTDOOR OF 95 DEGREES F (DB).
2) NOMINAL HEATING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 70 DEGREES F (DB), OUTDOOR OF 43 DEGREES F (WB)
3) SEE OUTDOOR UNIT SCHEDULE FOR OUTDOOR AMBIENT CONDITIONS, CONNECTED CAPACITY, AND OTHER FACTORS ASSOCIATED WITH CORRECTED CAPACITIES.
4) FULL DEMAND CORRECTED CAPACITY INCLUDES DE-RATE ASSOCIATED WITH INDOOR VS OUTDOOR CONNECTED CAPACITY INDICATED ON OUTDOOR UNIT SCHEDULE FOR ASSOCIATED SYSTEM. PARTIAL CORRECTED CAPACITY ASSUMES SUFFICIENT DIVERSITY EXISTS SUCH THAT THE CONNECTED CAPACITY DE-RATE
5) CONTROLS TO BE CLIMATEC DDC CONTROLS. REFER TO SEQUENCE OF OPERATION FOR VRF CONTROLS AND CONNECTION TO BMS.
6) APPROVED MANUFACTURER'S ARE: MITSUBISHI, SAMSUNG, CARRIER, DAIKIN, TRANE AND LG.
7) PROVIDE ADD ALTERNATE FOR BI-POLAR IONIZATION AT EACH UNIT WITH SENSORS FOR OPERATIONAL FEEDBACK.

SPLIT SYSTEM AIR CONDITIONING

OUTDOOR CONDENSING UNIT					
		ELECTRICAL			
DESIG.	AMB. TEMP DEG. F	MCA	MOCP	VOLT/PH	EQUAL TO BASIS OF DESIGN MFR & MODEL #
CU-1A	105	28	40	460/3	MITSUBISHI TURYP1684AN40AN

NOTES: (APPLICABLE TO ALL BOXES)
1) Refer to specifications for additional requirements.
2) Nominal cooling capacities are based on indoor coil EAT of 80/67°F (DB/WB), outdoor of 95°F (DB)
3) Nominal heating capacities are based on indoor coil EAT of 70°F (DB), outdoor of 43°F (WB)
4) See schematic piping/control diagram for indication of required indoor unit remote controllers, system controllers, and integration devices.

NOTES:
1) NOMINAL COOLING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 80/67 F (DB/WB), OUTDOOR OF 95 DEGREES F (DB).
2) NOMINAL HEATING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 70 DEGREES F (DB), OUTDOOR OF 43 DEGREES F (WB)
3) SEE OUTDOOR UNIT SCHEDULE FOR OUTDOOR AMBIENT CONDITIONS, CONNECTED CAPACITY, AND OTHER FACTORS ASSOCIATED WITH CORRECTED CAPACITIES.
4) FULL DEMAND CORRECTED CAPACITY INCLUDES DE-RATE ASSOCIATED WITH INDOOR VS OUTDOOR CONNECTED CAPACITY INDICATED ON OUTDOOR UNIT SCHEDULE FOR ASSOCIATED SYSTEM. PARTIAL CORRECTED CAPACITY ASSUMES SUFFICIENT DIVERSITY EXISTS SUCH THAT THE CONNECTED CAPACITY DE-RATE
5) CONTROLS TO BE CLIMATEC DDC CONTROLS. REFER TO SEQUENCE OF OPERATION FOR VRF CONTROLS AND CONNECTION TO BMS.
6) APPROVED MANUFACTURER'S ARE: MITSUBISHI, SAMSUNG, CARRIER, DAIKIN, TRANE AND LG.

GENERAL NOTES:

A. ALL WORK SHALL COMPLY WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES, RULES, REGULATIONS AND REQUIREMENTS.

B. ALL WORK SHALL COMPLY WITH THE BUILDING TENANT CONSTRUCTION GUIDE. COORDINATE WITH BUILDING MANAGEMENT/OWNER FOR ACCESS TO ANY TENANT LEASE SPACES THAT MIGHT BE REQUIRED FOR THE INSTALLATION. . UNLESS DIRECTED BY LANDLORD ALL EQUIPMENT AND WORKMANSHIP SHALL BE GUARANTEED FOR 1 YEAR.

C. EXISTING CONDITIONS ARE BASED ON INFORMATION PROVIDED BY SITE SURVEY AND PREVIOUS RECORD DRAWINGS. HOWEVER, IT IS NOT INTENDED TO BE A TRUE REPRESENTATION OF ACTUAL CONDITIONS. CONTRACTOR SHALL VISIT JOB SITE PRIOR TO BIDDING TO ASCERTAIN EXISTING CONDITIONS AND SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO BID.

D. CONTRACTOR SHALL ENGAGE AN INDEPENDENT AIR BALANCING COMPANY TO OBTAIN AIR QUANTITIES SHOWN ON DRAWING. AT COMPLETION OF AIR BALANCE, BALANCING DAMPER SHALL BE TIGHTENED AND PROPERLY SEALED WITH FOIL TAPE.

E. ALL MEDIUM AND LOW PRESSURE DUCTWORK SHALL BE GALVANIZED SHEET METAL, FABRICATED. INSTALL AND SEAL MEDIUM PRESSURE DUCTWORK FOR 3"W.G. AND LOW PRESSURE DUCTWORK FOR 1"W.G. IN ACCORDANCE WITH SMACNA STANDARD. DUCTWORK SHALL BE INSULATED WITH FIBERGLASS BLANKET WITH FOIL FACED VAPOR BARRIER TO MEET IECC REQUIREMENT (MIN R5 VALUE).

F. ALL SUPPLY AND RETURN DUCT SIZES ARE FREE AREAS.

G. INDIVIDUAL DUCT RUN-OUTS TO EACH DIFFUSER SHALL BE SIZED IN ACCORDANCE TO THE DIFFUSER NECK SIZE FOUND IN THE GRILLES-REGISTERS-DIFFUSERS SCHEDULE UNLESS NOTED OTHERWISE

H. OFFSET DUCTS INTO JOIST SPACE FOR CLEARANCE WHERE SPACE ABOVE CEILING IS NOT SUFFICIENT FOR DUCTS TO CROSS OTHER DUCTS OR WORK OF OTHER TRADES.

I. INSULATED FLEX DUCT IN THE LOW PRESSURE SYSTEM SHALL BE LIMITED TO AN OVERALL LENGTH OF SIX (6) FEET WITH A MAXIMUM OF A 90 DEGREE CHANGE IN DIRECTION. SUPPORTS SHALL BE SADDLE BANDED TO STRUCTURE. SUPPORTING FROM FIRE PROTECTION PIPING, ELECTRICAL CONDUIT OR CEILING SUPPORT WIRES IS NOT ACCEPTABLE.

J. ENSURE NEC CLEARANCES ARE MAINTAINED INCLUDING 36" IN FRONT OF 0-208V POWER AND 42" IN FRONT OF 277/480V POWER.

K. ALL ENCLOSED ROOMS (INTERIOR AND PERIMETER) SHALL HAVE RETURN AIR PATH. ROOMS WITH ALL WALLS TO DECK SHALL HAVE LINED SHEET METAL RETURN AIR BOOTS PLACED IN WALL ABOVE CEILING SIZED FOR 500 FPM MAXIMUM. FIRE RATED WALLS SHALL HAVE FIRE DAMPERS WITHIN THE DUCT PER LOCAL CODE REQUIREMENTS. FIRE DAMPERS AND FIRE-SMOKE DAMPERS SHALL BE FREE AREA/OUT OF AIRSTREAM TYPE. ALL MOTORIZED DAMPERS SHALL BE FREE AREA/OUT OF AIRSTREAM TYPE.

L. PIPES AND DUCTS TO BE COORDINATED ON JOB WITH BUILDING STRUCTURE AND WORK OF OTHER CONTRACTORS. ROUTE AS HIGH AS PHYSICALLY POSSIBLE.

M. COORDINATE CEILING DIFFUSERS AND GRILLES WITH LIGHTING FIXTURES. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN.

N. THERMOSTATS TO BE MOUNTED 48" ABOVE FINISHED FLOOR LEVEL UNLESS NOTED OTHERWISE ON THE PLANS. CONTRACTOR SHALL COORDINATE LOCATION OF THERMOSTATS WITH ARCHITECT IN FIELD

O. REPAIR AND PATCH CONSTRUCTION DAMAGED DUE TO THE DEMOLITION OF THIS PROJECT, USING SAME METHODS AND MATERIALS TO MATCH EXISTING.

P. EVAPORATORS SHALL HAVE A PRIMARY INSULATED CONDENSATE DRAIN LINE SLOPED 1/8"/FT, EXTENDED TO NEAREST FLOOR DRAIN IN MECHANICAL ROOM OR MOP SINK. GALVANIZED SHEET METAL SECONDARY DRAIN PANS SHALL HAVE LEAK DETECTION TAPE IN PAN AND ROUTE THE PAN'S INSULATED CONDENSATE DRAIN LINE SLOPED 1/8"/FT NEXT TO BUT INDEPENDENT OF PRIMARY DRAIN LINES.

Q. PROVIDE TEMPORARY HIGH EFFICIENCY FILTER MEDIA ON MAIN RETURN AIR AND EXHAUST FROM FLOOR AT BEGINNING OF PROJECT AND REPLACED AT TWO (2) WEEK INTERVALS UNTIL PROJECT COMPLETION AT WHICH TIME THE FILTER MEDIA SHALL BE REMOVED.

R. FLEXIBLE DUCTS SHALL BE SIMILAR AND EQUAL TO THERMOFLEX: TYPE M-KE. FLEXIBLE DUCTS SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF UL-181, NFPA 90-A AND OTHER GOVERNING AUTHORITIES.

S. FLEXIBLE DUCT BETWEEN DUCT AND AC UNITS AND EXHAUST FANS SHALL BE EQUAL TO VENTFABRICS "VENTGLAS",

T. AIR CONDITIONING COOLING CONDENSATE PIPING TO BE ONE-HALF INCH THICK ARMAFLEX. FITTINGS SHALL BE PRE-MOLDED OF THE SAME MATERIAL. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

U. DUCTLINER SHALL BE 1-INCH ACOUSTICAL DUCT LINING IN ACCORDANCE WITH SMACNA STANDARDS. DUCT LINING SHALL BE OWENS-CORNING FIBERGLAS "AEROFLEX" NO. 200 OR EQUAL.

V. ALL EXISTING DUCTWORK SHALL BE FIELD VERIFIED TO BE INSULATED AND IN GOOD CONDITION, ANY TORN, DAMAGED OR MISSING INSULATION WILL BE REPLACED. EXISTING CONTROLS SHALL BE CONFIRMED TO BE IN WORKING CONDITION.

HVAC SYMBOLS

SYMBOL	DESCRIPTION
	ARROW INDICATES EXISTING TO BE RELOCATED AS INDICATED ON PLAN
150	REDISTRIBUTE AIR TO EXISTING DIFFUSER AS INDICATED ON PLAN
10X10 100 A	INDICATES SIZE, CFM, AND DIFFUSER TYPE
	NEW CEILING SUPPLY DIFFUSER
	NEW RETURN AIR/EXHAUST GRILLE
	EXISTING RETURN AIR/EXHAUST GRILLE
	NEW SLOT DIFFUSER
	EXISTING SLOT DIFFUSER
	POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
E	EXISTING TO REMAIN
----	REMOVE EXISTING AS INDICATED
	CAP EXISTING DUCT
	MANUAL VOLUME CONTROL DAMPER
	DUCT TRANSITION
FD	FIRE (SMOKE) DAMPER (24V ACTUATOR)
	NEW OR RELOCATED THERMOSTAT
T	EXISTING THERMOSTAT
	FLEXIBLE DUCT CONNECTION
	INDICATES A WALL TO DECK (FOR COORDINATION PURPOSE ONLY-REFER TO ARCHITECTS PLANS FOR REQUIREMENTS)

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STATE OF TEXAS
TODD M. JOHNSON
86955
LICENSED
PROFESSIONAL ENGINEER
7/13/22

PROJECT NO.: 581-028
DRAWN BY: R.H.
CHECKED BY: M.W.
R.S.F.: 4,994

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NO.	ISSUED FOR:	DATE:

LANDLORD/CLIENT REVIEW ISSUE DATE: 07/13/22
BID ISSUE DATE: 07/13/22
PERMIT ISSUE DATE: 07/13/22

DRAWING TITLE:
MECHANICAL
NOTES & SYMBOLS

DRAWING NUMBER:
M0.01

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PROJECT MGR. TODD JOHNSON

Summary

The existing HVAC systems for the building at 3501 Olympus consist of four discrete components:

1. Comfort cooling systems for core/shell and future tenant spaces
2. Exhaust for core/shell restrooms and janitor closets
3. Dedicated outside air systems for minimum occupant ventilation requirements, coupled with building static pressure relief fans
4. Crawlspace ventilation exhaust/intake

Additionally, the building is equipped with a direct digital controls (DDC) building management system (BMS).

The four HVAC system components, along with any other miscellaneous equipment/controls, will be described in detail below, along with the intended operating sequences and building automation system integration requirements, as applicable.

Systems

Comfort Cooling Systems – Variable Refrigerant Flow (VRF) with Heat Recovery

All portions of the building intended for occupancy are to be heated and cooled by virtue of individual heat pump fan-coil units, both ducted and non-ducted type as required, that are to be integrated with a heat-recovery VRF system capable of allowing for simultaneous heating and cooling among the zones. Each fan-coil unit (designated by FCU-# on the drawings) constitutes a zone, and will be equipped with its own zone temperature sensor, provided by the VRF system manufacturer, that allows for adjustable heating and cooling setpoints. Each fan-coil unit (including future fan-coil units for unfinished tenant areas) is to be connected to existing branch and sub-branch controllers that control the flow of refrigerant as required by the individual zone needs for heating and/or cooling.

Each existing branch controller (and sub-branch controller as applicable) is connected directly to a VRF condensing unit array at the roof, sized for a portion of the core/shell and/or tenant area, and furnished with a number of additional connection points for areas not intended to be occupied immediately after completion of this tenant finshout. The branch controller for each system designated for future tenant use are equipped with multiple ports for future tenant hookup of refrigerant piping for fan-coil units. Fan-coil unit sizes for future tenant spaces are to be determined by each tenant's mechanical consultant during the tenant space design phases. Contractor shall coordinate the quantity of available ports, location of branch controllers (and sub-branch controllers) and available capacity of each system with building management prior to bidding.

In relation to the BMS, the VRF systems are to be stand-alone, and are to be provided with their own manufacturer's control system to provide full functionality. The VRF manufacturer's control system is to be integrated to the BMS via an integral Bacnet interface.

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

SECTION 230500 - COMMON WORK RESULTS
PART 1 - GENERAL
1.1 GENERAL NOTES AND SCOPE OF WORK
A. REFER TO SECTION 220500 FOR INFORMATION RELATED TO HVAC GENERAL CONDITIONS, MISCELLANEOUS EQUIPMENT AND MATERIALS, AND CONSTRUCTION REQUIREMENTS.
1.2 RELATED SECTIONS
A. SECTIONS 230523, 230529, 230553 AND 230700 ARE APPLICABLE BUT THEY DO NOT APPEAR IN THESE DIVISION 23 SPECIFICATIONS. REFER TO GENERAL NOTES.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 230548 - VIBRATION CONTROLS
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 EQUIPMENT PADS
A. PADS SHALL BE 3/4 INCH WATER RESISTANT NEOPRENE WITH WAFFLE PATTERN, MASON TYPE WSW, OR EQUAL.
2.2 ELASTOMERIC HANGERS
A. HANGER SHALL CONSIST OF RODS WITH STEEL BOX HOUSING NEOPRENE ISOLATION ELEMENT AND SPRING, MASON SERIES 30N, OR EQUAL.
2.3 RESTRAINED SPRING ISOLATORS
A. ISOLATORS SHALL UTILIZE A STEEL BASE WITH WAFFLED NEOPRENE PAD, WELDED STEEL ENCLOSURE WITH SPRING AND RESTRAINING BOLTS, MASON TYPE SLR, OR EQUAL.
2.4 ROOF CURB ISOLATORS
A. AS PART OF THE ROOF CURB, PROVIDE SPRING ISOLATORS WITH WATER-TIGHT DESIGN, RETRAINED SPRINGS AND NEOPRENE PADS, MASON TYPE RSC, OR EQUAL.
2.5 INERTIA BASES
A. PROVIDE STEEL POURING FORM FOR REINFORCED CONCRETE BLOCKS WITH FLOOR MOUNTED SPRINGS, MASON KSL, OR EQUAL.

PART 3 - EXECUTION
3.1 SCHEDULE
A. EQUIPMENT PADS - SMALL FLOOR MOUNTED EQUIPMENT OR PACKAGED EQUIPMENT WITH INTERNAL ISOLATION.
B. ELASTOMERIC HANGERS - SUSPENDED AIR HANDLING UNITS, EXHAUST FANS, TERMINAL UNITS, HEAT PUMPS, PUMPS, ETC.
C. RESTRAINED SPRING ISOLATORS - FLOOR MOUNTED FANS GREATER THAN ¾ HP.
D. ROOF CURB ISOLATORS - FACTORY FABRICATED ROOFTOP UNITS.
E. INERTIA BASES - FLOOR MOUNTED PUMPS GREATER THAN ¾ HP.
3.2 INSTALLATION
A. INSTALL VIBRATION CONTROLS PER THE MANUFACTURER'S INSTRUCTIONS.

END OF SECTION

SECTION 230553 - IDENTIFICATION
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.
B. LABEL ALL NEW EQUIPMENT AND PIPING SYSTEMS.

PART 2 - PRODUCTS
2.1 PIPE LABELS
A. PRETENSION PIPE LABELS OF SEMI-RIGID PLASTIC FORMED TO COVER THE FULL CIRCUMFERENCE OF PIPE.
B. IDENTIFY THE SERVICE AND DIRECTION OF FLOW. LABELS SHALL CONTAIN AT LEAST ½ INCH HIGH LETTERING AND BE PLACED SO THEY ARE EASY TO READ.
2.2 EQUIPMENT LABELS
A. MULTILAYER, MULTICOLOR PLASTIC LABELS WITH MECHANICAL ENGRAVING AND HOLES FOR ATTACHMENT TO EQUIPMENT.

PART 3 - EXECUTION
3.1 PIPE LABELS
A. INSTALL PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE AN ACCESSIBLE CEILING AT MAXIMUM 20 FT. CENTERS.
3.2 VALVE TAGS
A. ATTACH TAGS TO VALVES USING CHAIN. PROVIDE A VALVE SCHEDULE FOR MOUNTING IN THE MECHANICAL ROOM.
3.3 EQUIPMENT LABELS
A. PERMANENTLY ATTACH LABELS TO EQUIPMENT. LOCATE WHERE LABEL CAN BE EASILY SEEN AND READ.

END OF SECTION.

SECTION 230593 - TESTING ADJUSTING AND BALANCING
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. THE WORK INCLUDED IN THIS SECTION CONSISTS OF FURNISHING ALL LABOR, MATERIALS, INSTRUMENTS, TOOLS, AND SERVICES REQUIRED IN CONNECTION WITH THE TESTING, ADJUSTING AND BALANCING (TAB) OF THE HEATING, VENTILATING AND AIR CONDITIONING (HVAC) SYSTEMS AS DESCRIBED IN THE MECHANICAL SPECIFICATIONS AND/OR SHOWN ON THE MECHANICAL PLANS, OR REASONABLY IMPLIED THERE FROM.
B. THE TAB FIRM SHALL HAVE A LICENSED PROFESSIONAL ENGINEER SUPERVISING ALL WORK AND THE FIRM SHALL HOLD A CURRENT AABC OR NEHB CERTIFICATION.
C. REFER TO SECTION 230500.
1.2 START-UP, TEST AND ADJUST
A. PROVIDE ALL TESTS OF EQUIPMENT AND SYSTEMS REQUIRED TO PROVE COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS. OWNER SHALL BE MADE COMPLETELY FAMILIAR WITH THE COMPLETE WORKING OF ALL THE MECHANICAL SYSTEMS.
B. THE TESTS SHALL DEMONSTRATE THE SPECIFIED CAPACITIES AND OPERATION OF ALL EQUIPMENT AND MATERIALS COMPRISING THE SYSTEMS. ALL DATA REQUIRED BY THESE SPECIFICATIONS SHALL BE PREPARED ON TYPED FORMS AND SUBMITTED TO THE ENGINEER FOR APPROVAL. COMPLETE APPROVAL WILL BE NECESSARY BEFORE FINAL PAYMENT CAN BE MADE. THE CONTRACTOR SHALL THEN MAKE AVAILABLE SUCH INSTRUMENTS NECESSARY FOR SPOT CHECKS ON THE SYSTEM.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION
3.1 HVAC SYSTEM
A. THE HVAC CONTRACTOR SHALL WORK IN CONJUNCTION WITH THE TAB CONTRACTOR TO START-UP AND OPERATE ALL EQUIPMENT NECESSARY TO PROVIDE A COMPLETE AIR AND WATER TEST AND BALANCE REPORT.
B. TAB CONTRACTOR SHALL MEASURE CFM AT ALL DIFFUSERS, REGISTERS AND GRILLES, AND HVAC UNITS, AS WELL AS WATER FLOWS AT COILS AND PUMPS, TO ASSURE THAT THEY MATCH THE QUANTITIES SHOWN ON THE PLANS (PLUS OR MINUS 5 PERCENT). CONFIRM ALL SEQUENCES OF OPERATION ARE PERFORMING CORRECTLY.
C. TAB CONTRACTOR SHALL CALIBRATE ALL EQUIPMENT AND SENSORS TO WORK PROPERLY AND GIVE CORRECT INFORMATION TO THE BMS SYSTEM.

END OF SECTION

SECTION 230900 - CONTROLS
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 CONTROLS SYSTEM
A. PROVIDE NEW, MODIFY OR EXTEND AUTOMATIC TEMPERATURE CONTROLS TO ALL NEW EQUIPMENT SHOWN ON THE DRAWINGS.
B. REFER TO THE DRAWINGS FOR ANY SPECIAL SEQUENCES OF CONTROL AND LOCATION OF EQUIPMENT.
C. REMODEL PROJECTS SHALL UTILIZE EQUIPMENT BY THE SAME MANUFACTURER AS CURRENTLY EXISTS.

PART - EXECUTION
3.1 DESIGN AND LAYOUT
A. THE CONTROL SYSTEM DESIGN AND LAYOUT SHALL BE PERFORMED BY A FACTORY AUTHORIZED AGENT OF THE MANUFACTURER USED.
3.2 SYSTEM OPERATION
A. AT THE CONCLUSION OF WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE PROVEN TO THE ENGINEER TO OPERATE IN ACCORDANCE WITH THE NEW OR EXISTING MAIN CONTROL PANEL AND NEW/EXISTING SEQUENCES OF OPERATION ON THE DRAWINGS.
B. PROVIDE ALL WIRING REQUIRED TO CONNECT INPUT/OUTPUT DEVICES TO CONTROL PANELS.
C. TEST AND ADJUST ALL DEVICES AND DOCUMENT CALIBRATION.
D. PROVIDE NECESSARY INSTRUCTION TO THE OWNER'S PERSONNEL.

END OF SECTION

SECTION 232300 - REFRIGERANT PIPING
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 COPPER PIPE
A. PIPING SHALL BE COPPER TYPE ACR WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS.

PART 3 - EXECUTION
3.1 INSTALLATION
A. REFER TO SECTION 230529 FOR METHODS OF SUPPORTING ALL PIPING.

END OF SECTION

SECTION 233113 - DUCTWORK
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 GENERAL
A. CONCEALED DUCTWORK SHALL BE CONSTRUCTED OF NEW, PRIME GRADE, CONTINUOUS HOT-DIP MILL GALVANIZED, LOCK-FORMING, QUALITY STEEL. REFER TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
B. WHERE DUCTS EXPOSED TO VIEW PASS THROUGH WALLS, FLOORS OR CEILINGS, PROVIDE SHEET METAL COLLARS TO COVER VOIDS AROUND THE DUCTS.
C. SQUARE AND ROUND ELBOWS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SMACNA STANDARDS. ELBOWS NOT CONSTRUCTED WITH A CENTERLINE RADIUS OF AT LEAST 50 PERCENT OF THE DUCT WIDTH OR DIAMETER SHALL BE PROVIDED WITH TURNING VANES IN ACCORDANCE WITH SMACNA STANDARDS.
D. "FIBERBOARD" DUCTWORK WILL NOT BE ACCEPTED ON THIS PROJECT.
2.2 MEDIUM PRESSURE DUCT CONSTRUCTION
A. UNLESS NOTED OTHERWISE, MEDIUM PRESSURE DUCTS SHALL BE CONSTRUCTED TO A PRESSURIZATION CLASSIFICATION OF THREE (3) INCHES WG POSITIVE.
B. ALL ROUND MEDIUM PRESSURE DUCTS SHALL BE SPIRAL TYPE.
2.3 LOW PRESSURE DUCT CONSTRUCTION
A. LOW PRESSURE DUCTS CONNECTING SMALL AIR HANDLING EQUIPMENT, SHALL BE CONSTRUCTED TO A PRESSURIZATION CLASSIFICATION OF TWO (2) INCHES WG, POSITIVE OR NEGATIVE AS APPROPRIATE. THESE LOW PRESSURE ROUND DUCTS SHALL BE SPIRAL TYPE.
B. DUCTWORK DOWN STREAM OF AIR TERMINAL UNITS SHALL BE CONSTRUCTED TO A PRESSURE CLASSIFICATION OF ONE (1) INCHES WG POSITIVE. THESE LOW PRESSURE ROUND DUCTS MAY BE SPIRAL OR SNAP-LOCK TYPE.
C. SHOP FABRICATED DUCTS SHALL BE CONSTRUCTED, BRACED AND REINFORCED IN ACCORDANCE WITH SMACNA STANDARDS.
2.4 DUCT SEALING
A. SEAL ALL DUCTWORK ON THE PROJECT TO SMACNA CLASSIFICATION A.
2.5 FLEXIBLE DUCTS
A. FLEXIBLE DUCTS SHALL BE SIMILAR AND EQUAL TO THERMOFLEX TYPE M-KE AND SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF UL-181, NFPA 90-A AND OTHER GOVERNING AUTHORITIES.
B. FLEXIBLE DUCTS SHALL BE FACTORY INSULATED WITH A NOMINAL 1 INCH THICKNESS OF FIBERGLASS INSULATION, PRODUCING A THERMAL CONDUCTANCE ("C") OF 0.23. DUCTS SHALL HAVE A POSITIVE INTERIOR AIR SEAL PERMANENTLY BONDED TO A COATED HIGH CARBON SPRING STEEL HELIX, ALL SHEATHED IN AN OUTER VAPOR BARRIER OF FIBERGLASS REINFORCED FILM LAMINATE.
C. FLEXIBLE DUCTS SHALL BE RATED FOR OPERATING PRESSURE OF PLUS 6 INCHES WG THROUGH 10 INCH DIAMETER, PLUS 4 INCHES WG THROUGH 16 INCH DIAMETER AND - 2 INCHES WG FOR ALL SIZES.
A. FLEXIBLE DUCTS TO DIFFUSERS AND GRILLES SHALL BE LIMITED TO 6 FOOT LENGTHS AND A MAXIMUM OF ONE (1) 90 DEGREE CHANGE IN DIRECTION. MEDIUM PRESSURE DUCTS SERVING TERMINAL UNITS SHALL BE LIMITED TO 2 FOOT LENGTHS WITH NO ELBOWS.
2.6 FLEXIBLE DUCT FABRIC
A. PROVIDE VENTFABRICS "VENTGLAS", OR EQUAL, 30 OZ PER SQ YD, BETWEEN SHEET METAL DUCTS AND AIR HANDLING EQUIPMENT, INCLUDING ALL FANS, AND POWER TYPE VENTILATORS.
2.7 DAMPERS
A. DAMPER AND SPLITTER HARDWARE FOR LOW PRESSURE DUCTS SHALL BE:
END BEARINGS - VENTLOK #607
REGULATOR FINISHED AREAS - VENTLOK #666, PLAIN COVER
REGULATOR UNFINISHED AREAS - VENTLOK #640, 3/8 INCH.
B. VOLUME DAMPERS SHALL BE LOCATED AT BRANCH TAKE-OFFS AT MAIN TRUNK DUCT. NO DAMPERS (SPLITTER DAMPERS) SHALL BE LOCATED IN THE CENTER OF DUCTS.

PART 3 - EXECUTION
3.1 FABRICATION
A. DUCTWORK SHOWN ON THE DRAWINGS, SPECIFIED, OR REQUIRED FOR HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS SHALL BE CONSTRUCTED AND ERECTED IN A FIRST CLASS MANNER.
B. DUCTS SHALL BE REINFORCED IN ACCORDANCE WITH THE APPROPRIATE SMACNA STANDARDS TO PREVENT BUCKLING, BREATHING, VIBRATION AND UNNECESSARY NOISE.
C. PROVIDE MANUALLY OPERATED VOLUME CONTROL DAMPERS IN DUCT BRANCHES, FOR PROPER BALANCING OF AIR DISTRIBUTION. DAMPERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROPRIATE SMACNA STANDARDS.
D. PROVIDE HINGED ACCESS DOORS IN DUCTWORK FOR ACCESS TO ALL SMOKE DETECTORS, SENSORS, AND OTHER CONTROL DEVICES, MANUAL DAMPERS, AND FOR CLEANING OPERATIONS. FACTORY FABRICATED DOORS SIMILAR AND EQUAL TO MILCOR AND MEETING THESE SPECIFICATIONS SHALL BE ACCEPTABLE.
E. WHERE DUCTS CONNECT TO FANS, INCLUDING ROOF EXHAUSTERS PROVIDE FLEXIBLE DUCT FABRIC CONNECTIONS. PROVIDE A MINIMUM OF ½ INCH SLACK IN THE CONNECTIONS, AND A MINIMUM OF 2-1/2 INCH DISTANCE BETWEEN THE EDGES OF THE DUCTS, PLUS AN ADDITIONAL MINIMUM IF 1 INCH OF SLACK FOR EACH INCH OF STATIC PRESSURE ON THE FAN SYSTEM.
F. PROVIDE SCREENS ON DUCTS, FANS AND OPENINGS WHICH LEAD TO, OR ARE OUTDOORS. SCREENS SHALL BE 16 GAUGE, ½ INCH MESH, IN REMOVABLE GALVANIZED STEEL FRAMES.
G. FURNISH TEST OPENINGS WITH COVERS IN EACH DUCT FOR TAKING READINGS OF AIR VELOCITIES AND PRESSURES IN DUCTS. REFER TO THE APPROPRIATE SMACNA STANDARD FOR COVER CONSTRUCTION.
3.2 DUCT SUPPORTS
A. HORIZONTAL AND VERTICAL SHEET METAL DUCTWORK SHALL BE SUPPORTED IN ACCORDANCE WITH THE APPROPRIATE SMACNA STANDARDS.
B. HANGER DESIGN AND METHODS OF HANGING AND SUPPORTING SHALL BE COMPATIBLE WITH THE STRUCTURE.

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES
PART 1 - GENERAL
1.1 GENERAL NOTES
A. REFER TO SECTION 230500

PART 2- PRODUCTS
2.1 AIR INLETS AND OUTLETS
A. GRILLES, REGISTERS, CEILING OUTLETS, AND CEILING INLETS SHALL BE AS INDICATED ON THE DRAWING, AND SHALL BE PROVIDED WITH HEAVY DUTY SPONGE, OR SOFT FELT GASKETS. THE THROW SHALL BE SUCH THAT THE VELOCITY AT THE END OF THE THROW IN THE FIVE (5) FOOT OCCUPANCY ZONE WILL NOT BE MORE THAN 50 FPM NOT LESS THAN 25 FPM. NOISE LEVELS (NC CURVE) SHALL NOT EXCEED 40.
B. IF PRODUCTS OF A MANUFACTURER OTHER THAN THE ONES INDICATED ON THE DRAWINGS ARE USED, THE SIZES SHOWN ON THE DRAWING SHALL BE CHECKED FOR PERFORMANCE, NOISE LEVEL, FACE VELOCITY, THROW AND PRESSURE DROP BEFORE THE SUBMITTAL IS MADE. SELECTIONS SHALL MEET THE MANUFACTURER'S OWN PUBLISHED DATA FOR THE ABOVE PERFORMANCE CRITERIA. SHOULD DEVICES OTHER THAN THOSE SCHEDULED BY NAME BE FURNISHED, THE MANUFACTURER SHALL DEMONSTRATE COMPLIANCE WITH NOISE CRITERIA, ON REQUEST, TO THE ARCHITECT'S SATISFACTION.
C. WHERE CALLED FOR IN SCHEDULES, THE GRILLES, REGISTERS, CEILING OUTLETS, AND CEILING INLETS SHALL BE PROVIDED WITH DEFLECTING DEVICES AND MANUAL DAMPERS. THESE SHALL BE STANDARD PRODUCTS OF THE MANUFACTURER, SUBJECT TO REVIEW BY THE ARCHITECT, AND SHALL BE SIMILAR AND EQUAL TO THOSE SCHEDULED.

PART 3 - EXECUTION
3.1 INSTALLATION
A. LOCATIONS OF OUTLETS SHOWN ON THE DRAWINGS ARE APPROXIMATE. COORDINATE THE EXACT LOCATION WITH REFLECTED CEILING PLAN AND OTHER TRADES.
B. VERIFY THE TYPE OF CEILING SYSTEM AND MATERIAL INTO EACH OF THE AIR INLETS AND OUTLETS IS TO BE INSTALLED, AND PROVIDE EQUIPMENT, WHICH PROPERLY "FITS" WHETHER SPECIFICALLY, SO INDICATED OR NOT ON THE DRAWINGS.

END OF SECTION

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NO.	ISSUED FOR:	DATE:
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LANDLORD/CLIENT REVIEW ISSUE DATE: 07/13/22
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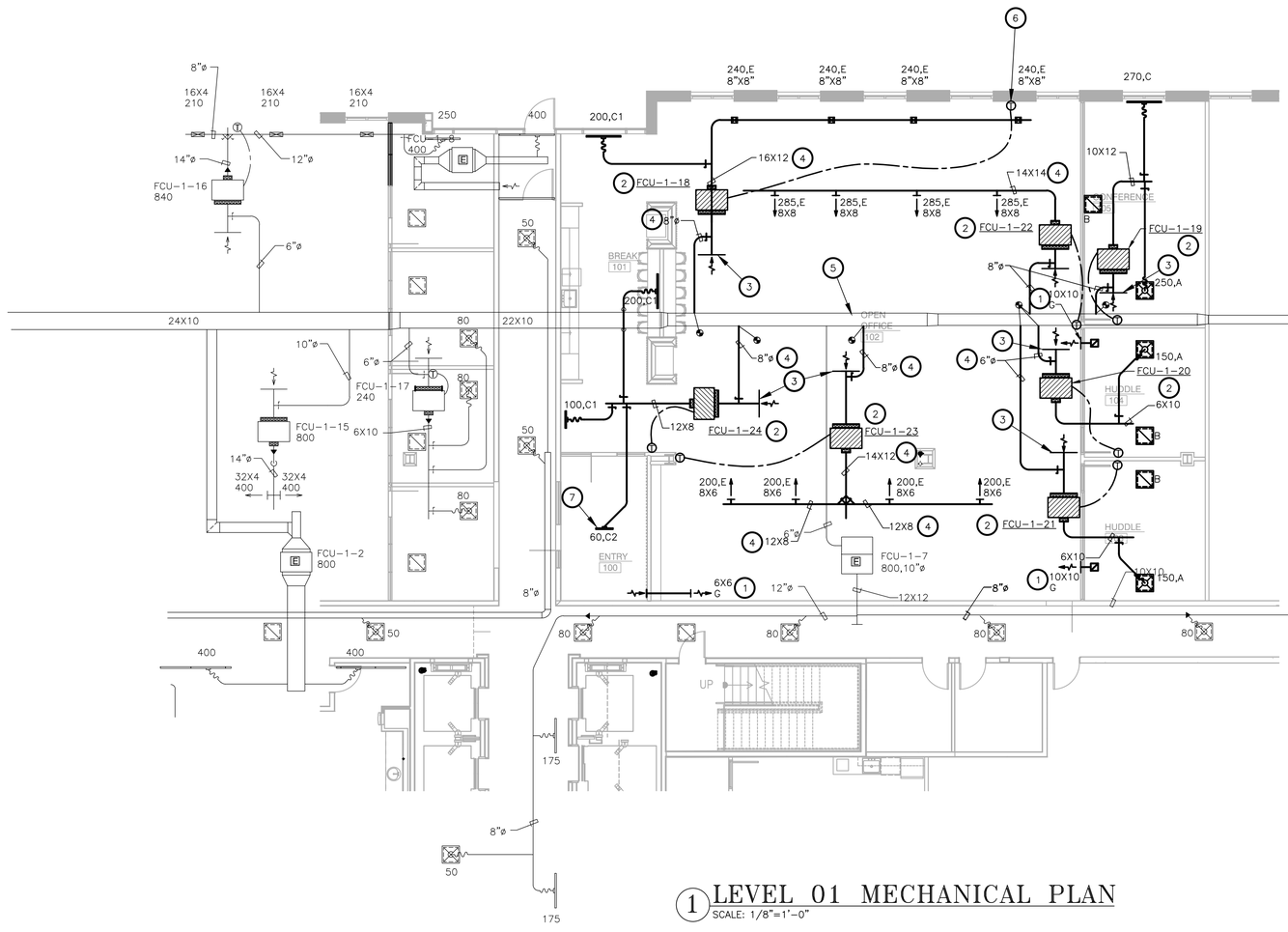
PERMIT ISSUE DATE: 07/13/22

DRAWING TITLE:
MECHANICAL SPECIFICATIONS

DRAWING NUMBER:
M1.01



1 LEVEL 01 MECHANICAL PLAN

SCALE: 1/8"=1'-0"

NOTES BY SYMBOL (X):

1. PROVIDE ACOUSTICALLY LINED RETURN AIR BOOT TRANSFER GRILLE IN WALL TO DECK AS HIGH AS POSSIBLE ABOVE CEILING WITH OUTLET 90° ELBOWS FACING UPWARD IN CEILING PLENUM. SIZE PER PLANS. REFER TO DETAIL SHEET M3.01 FOR MORE INFORMATION.
2. FC UNIT TO BE SUSPENDED FROM STRUCTURE. EXTEND FULL SIZED RETURN AIR PLENUM AS INDICATED ON DRAWINGS. PROVIDE MANUAL DAMPER AT OUTSIDE AIR DUCT CONNECTION TO PLENUM.
3. EXTEND FULL SIZED RETURN PLENUM FROM FAN COIL UNIT AS SHOWN. PROVIDE RETURN AIR GRILLE TYPE 'G' AT OPENING. CONNECT OUTSIDE AIR DUCT WITH BALANCING DAMPER AS SHOWN ON DETAIL LOCATED ON SHEET M3.01.
4. EXPOSED DUCT SHALL BE 1" INTERNALLY LINED DUCT. DUCT SHALL BE LINED WITH MICROBIOLOGICAL TREATMENT AND PRIMED FOR PAINTING. COORDINATE HEIGHT WITH ARCHITECT PRIOR TO INSTALLATION.
5. WRAP EXPOSED EXISTING OUTSIDE AIR DUCT WITH 1" INSULATION WITH PRIMER COATING READY FOR PAINTING BY GENERAL CONTRACTOR.
6. PROVIDE INSULATION PAD TO BE INSTALLED BETWEEN THERMOSTAT AND PERIMETER WALL FOR THERMOSTATS MOUNTED ON EXTERIOR COLUMN/WALLS.
7. NO FLEX DUCT, MOUNTED ON DUCT.

OUTSIDE AIR TAPS:

PROVIDE SQUARE TO ROUND TRANSITIONS AT EXISTING OUTSIDE AIR SUPPLY DUCT AS FOLLOWS:

6"X24" SQUARE TO 12"ø.
6"X16" SQUARE TO 10"ø.
6"X10" SQUARE TO 8"ø.

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DRAWING TITLE:
LEVEL 01 MECHANICAL PLAN

DRAWING NUMBER:
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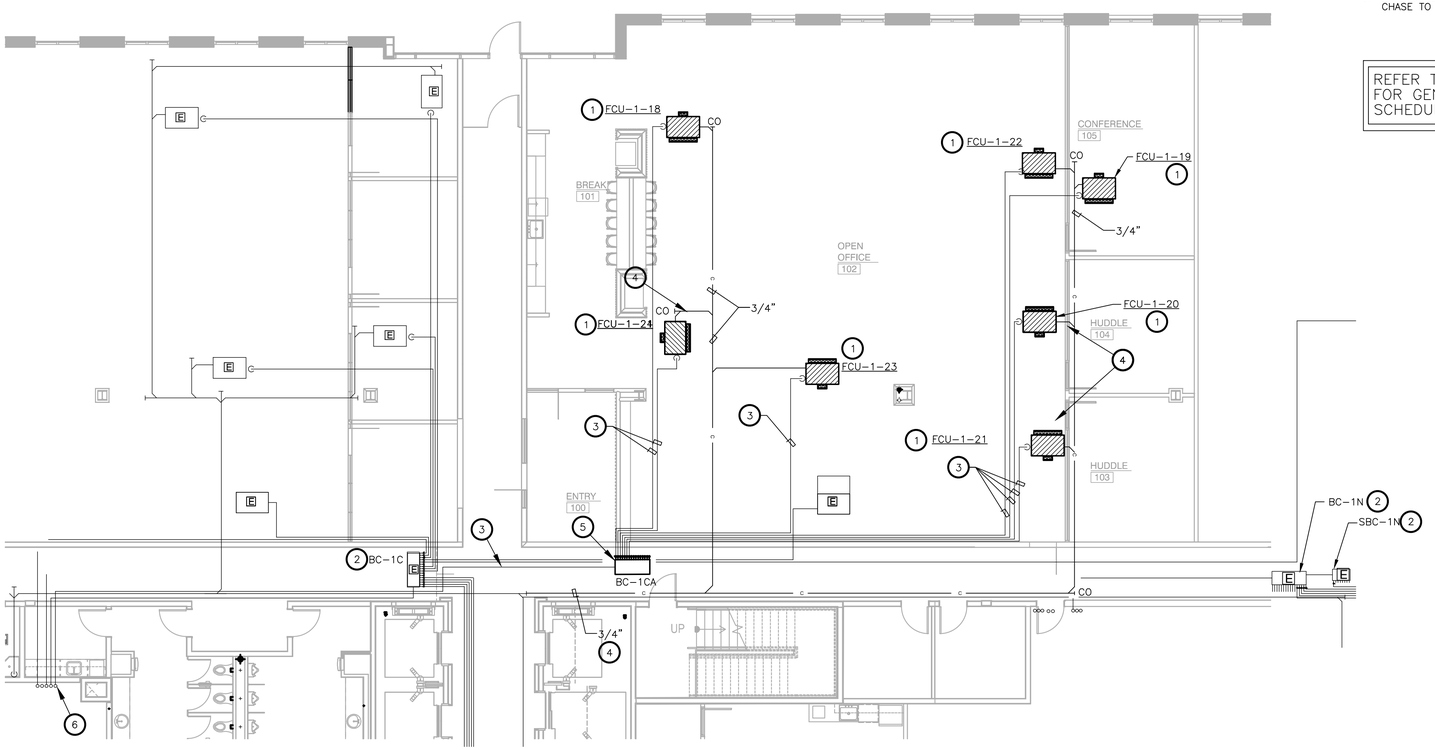

1 LEVEL 01 REFRIGERANT PIPING PLAN
SCALE: 1/8"=1'-0"

NOTES BY SYMBOL (X):

1. FC UNIT TO BE SUSPENDED FROM STRUCTURE USING ALTHREAD HANGER RODS.
2. EXISTING BRANCH CONTROLLER SUSPENDED FROM STRUCTURE WITH ISOLATION SPRINGS.
3. COORDINATE WITH MANUFACTURER'S SPECIFICATIONS FOR REFRIGERANT REQUIREMENTS. COORDINATE ROUTING FROM FC UNIT TO BRANCH CONTROLLER. LOCATION OF FCU SHALL NOT EXCEED 150' OF PIPING BETWEEN UNITS.
4. EXTEND AN INSULATED CONDENSATE DRAIN AND DISCHARGE TO NEAREST EXISTING CONDENSATE DRAIN AS SHOWN ON DRAWINGS. ALL PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE, AND SLOPED AT 1/8" PER FOOT TOWARDS FLOOR DRAIN. PROVIDE CONDENSATE PUMP CAPABLE OF A MINIMUM OF 10' OF HEAD PRESSURE WITH UNIT IF REQUIRED SLOPE IS UNATTAINABLE.
5. NEW BRANCH CONTROLLER SUSPENDED FROM STRUCTURE WITH ALTHREAD HANGER RODS AND ISOLATION SPRINGS.
6. EXTEND REFRIGERANT PIPING FROM NEW BRANCH CONTROLLER UP THRU EXISTING CHASE TO NEW CONDENSING UNIT ON ROOF.

REFER TO SHEET M0.01
FOR GENERAL NOTES,
SCHEDULES AND SYMBOLS.

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DRAWING TITLE:
LEVEL 01 REFRIGERANT PLAN

DRAWING NUMBER:
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NORTH