SYMBOL LIST

ELECTRICAL AND IT DEVICES

⏀	EXISTING DUPLEX RECEPTACLE TO BE REMOVED
Ⓙ	CEILING MOUNTED JUNCTION BOX (J-BOX) WITH HOMERUN CIRCUIT AND FLEXIBLE CONNECTION TO EQUIPMENT. USE SEALTITE FOR OUTDOOR CONNECTIONS.

ELECTRICAL DISTRIBUTION

▬	PANEL BOARD
▭	UNFUSED DISCONNECT SWITCH; SWITCH SIZE TO BE GREATER THAN OR EQUAL TO OVER CURRENT PROTECTION. U.O.N. 'WP' INDICATES WEATHERPROOF
——	CONCEALED CONDUIT
– – – –	EXPOSED CONDUIT
○——	CONDUIT UP
●——	CONDUIT DOWN
▩	PULL BOX
PP-KIT/21,23,25 PANEL DESIGNATION CIRCUIT NUMBER	HOMERUN NOTATION

ABBREVIATIONS

@	"AT" OR "EACH AT"
A	AMPERE
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AT	AMPERE TRIP
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
C	CONDUIT
°C	DEGREE CELSIUS
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CLOS	CLOSET
COMM	COMMUNICATION
CONT	CONTINUATION
CU	COPPER
DN	DOWN
DP	DISTRIBUTION PANELBOARD
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRICAL
EXT	EXTERIOR
°F	DEGREE FAHRENHEIT
FDS	FUSED DISCONNECT SWITCH
FL	FLOOR
FT	FEET OR FOOT
G	GROUND
GFI	GROUND FAULT INTERUPTER
HP	HORSEPOWER
HZ	HERTZ
JB	JUNCTION BOX
KVA	KILOVOLT AMPERE
KW	KILOWATT
LV	LOW VOLTAGE
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MECH	MECHANICAL
MIN	MINIMUM
MLO	MAIN LUGS ONLY
N	NEUTRAL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PB	PULLBOX
PH	PHASE
RECEPT	RECEPTACLE
REQ	REQUIRED
RM	ROOM
SP	SINGLE POLE
SPEC	SPECIFICATION
SW	SWITCH
TBD	TO BE DETERMINED
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLT OR VOLTAGE
VA	VOLT AMPERE
W	WATT
WP	WEATHERPROOF

ELECTRICAL GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWING IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM AND SPACE CONDITIONS.
2. RACEWAYS SHALL BE ALLOWED TO PASS OVER WATER OR OTHER PIPING WHEN PULL BOXES ARE NOT REQUIRED. NO RACEWAY SHALL BE ROUTED WITHIN 3 INCHES OF HOT WATER PIPES EXCEPT PERPENDICULAR CROSSINGS WHERE RACEWAY SHALL BE A MINIMUM OF 1 INCH FROM PIPE COVER.
3. FOR EMPTY RACEWAY RUNS, PROVIDE PULL BOXES EVERY 100 FT AND AS INDICATED. COORDINATE LOCATIONS WITH OTHER TRADES.
4. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
5. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL.
6. CUT CONDUIT ENDS SQUARE, REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.
7. PROVIDE PULLBOXES AS REQUIRED BY CODE AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRE. COORDINATE PULLBOX LOCATIONS WITH OTHER TRADES.
8. JUNCTION AND PULL BOXES SHOULD NOT BE LOCATED EXPOSED IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT.
9. COVERS OF JUNCTION AND PULLBOXES SHALL BE READILY ACCESSIBLE.
10. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT; MINIMUM 18 IN. IN LENGTH AND 50% SLACK. DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
11. FOR EACH MODIFIED ELECTRICAL PANEL, THE CONTRACTOR SHALL PROVIDE A TYPE-WRITTEN DIRECTORY CARD TO REFLECT NEW CIRCUITING.
12. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. PROVIDE PULL CORD FOR ALL EMPTY CONDUITS.
13. DO NOT PULL THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32°F (0°C) PROVIDE CABLE SUPPORTS FOR WIRE IN RISER CONDUITS AS REQUIRED BY CODE.
14. WIRE COLOR CODING: AS PER CODE.
15. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART.
16. SUPPORT JUNCTION AND PULL BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
17. SET BOXES SQUARE AND TRUE WITH BUILDING FINISH. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRONS.
18. INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES.
19. ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE RATED NEMA-3R.
20. UPON COMPLETION OF THE WORK, A SET OF "AS-BUILT" DRAWINGS SHALL BE SUBMITTED TO THE FACILITIES MANAGER.

ELECTRICAL DRAWING LIST

E-001	ELECTRICAL SYMBOL LIST, ABBREVIATIONS, GENERAL NOTES AND DRAWING LIST
E-100	ELECTRICAL EXISTING FLOOR PLANS
E-101	ELECTRICAL NEW WORK FLOOR PLANS
E-200	ELECTRICAL SPECIFICATIONS

Rev.	Description	Date
	ISSUED FOR BID	08/26/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

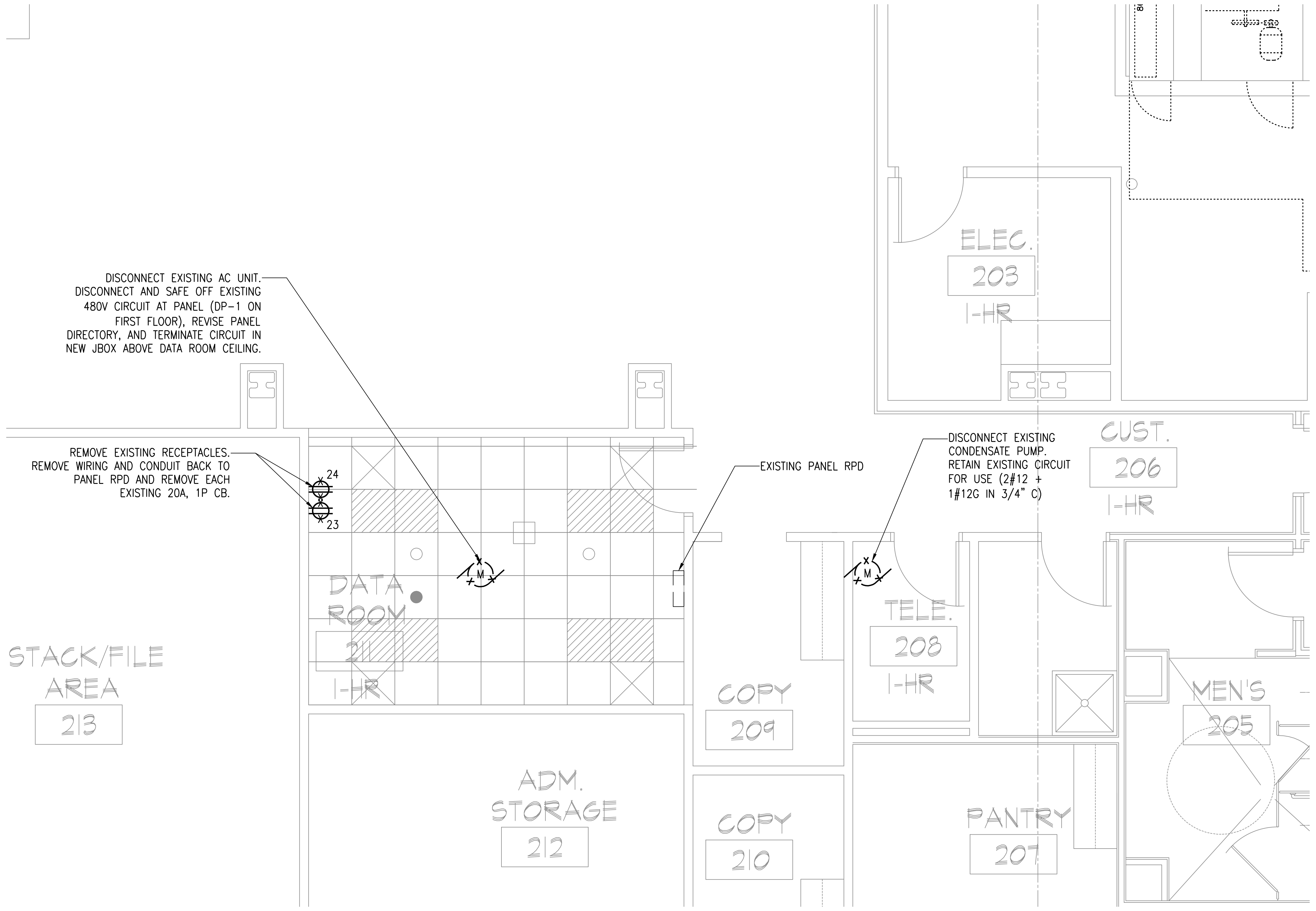
PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
ELECTRICAL SYMBOL LIST, ABBREVIATIONS, GENERAL NOTES AND DRAWING LIST

Scale AS NOTED
Date 08/26/2021
Drawing No. E-001
Drawn MG
C.E. Job No. 23059
Checked JH

Copyright©2021 by Collado Engineering, D.P.C.



DISCONNECT EXISTING AC UNIT. DISCONNECT AND SAFE OFF EXISTING 480V CIRCUIT AT PANEL (DP-1 ON FIRST FLOOR), REVISE PANEL DIRECTORY, AND TERMINATE CIRCUIT IN NEW JBOX ABOVE DATA ROOM CEILING.

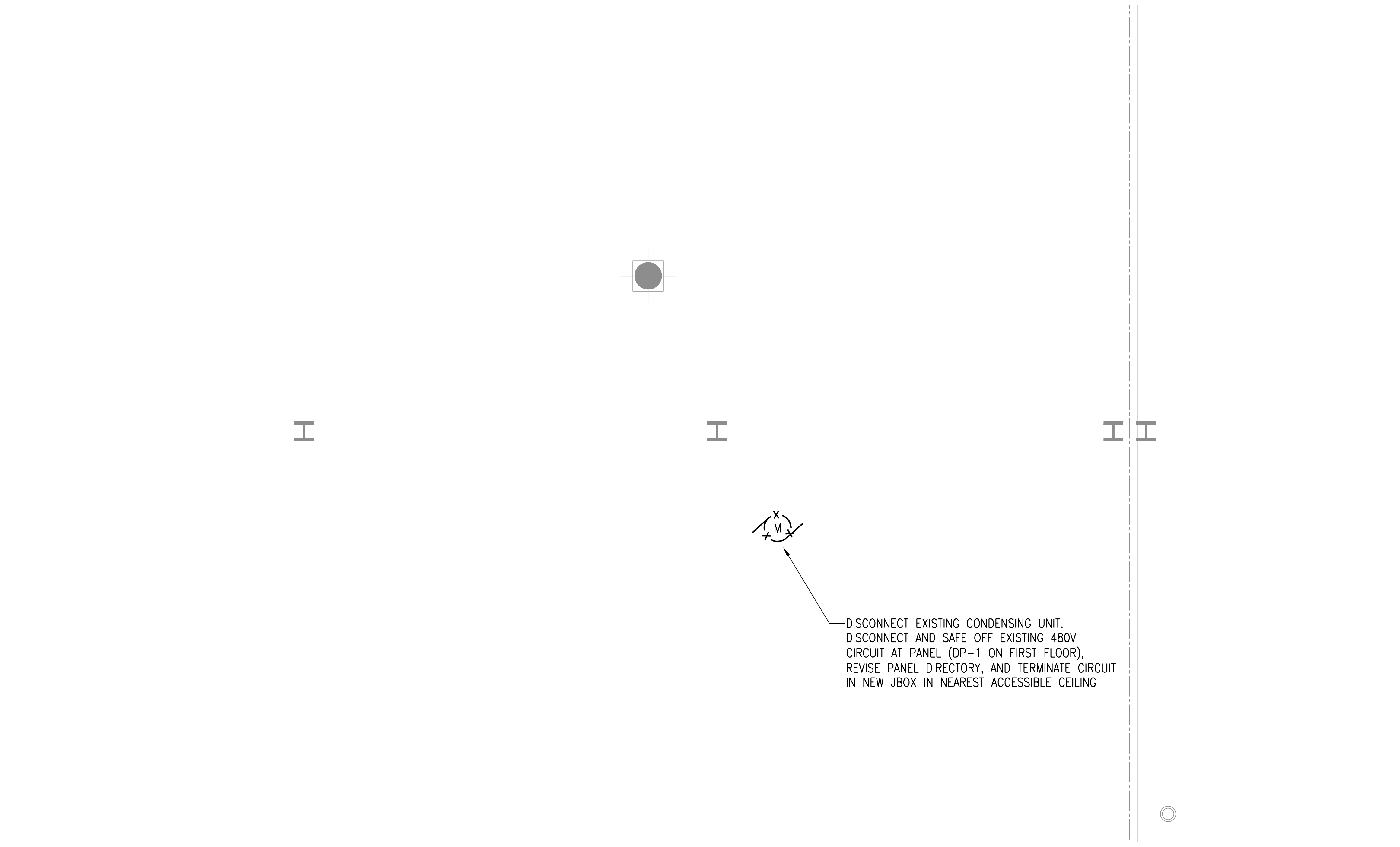
REMOVE EXISTING RECEPTACLES. REMOVE WIRING AND CONDUIT BACK TO PANEL RPD AND REMOVE EACH EXISTING 20A, 1P CB.

EXISTING PANEL RPD

DISCONNECT EXISTING CONDENSATE PUMP. RETAIN EXISTING CIRCUIT FOR USE (2#12 + 1#12G IN 3/4" C)

1 ELECTRICAL EXISTING 2ND FLOOR PLAN

SCALE: 1/4"=1'-0"



DISCONNECT EXISTING CONDENSING UNIT. DISCONNECT AND SAFE OFF EXISTING 480V CIRCUIT AT PANEL (DP-1 ON FIRST FLOOR), REVISE PANEL DIRECTORY, AND TERMINATE CIRCUIT IN NEW JBOX IN NEAREST ACCESSIBLE CEILING

2 ELECTRICAL EXISTING ROOF PLAN

SCALE: 1/4"=1'-0"

Rev.	Description	Date
	ISSUED FOR BID	08/26/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

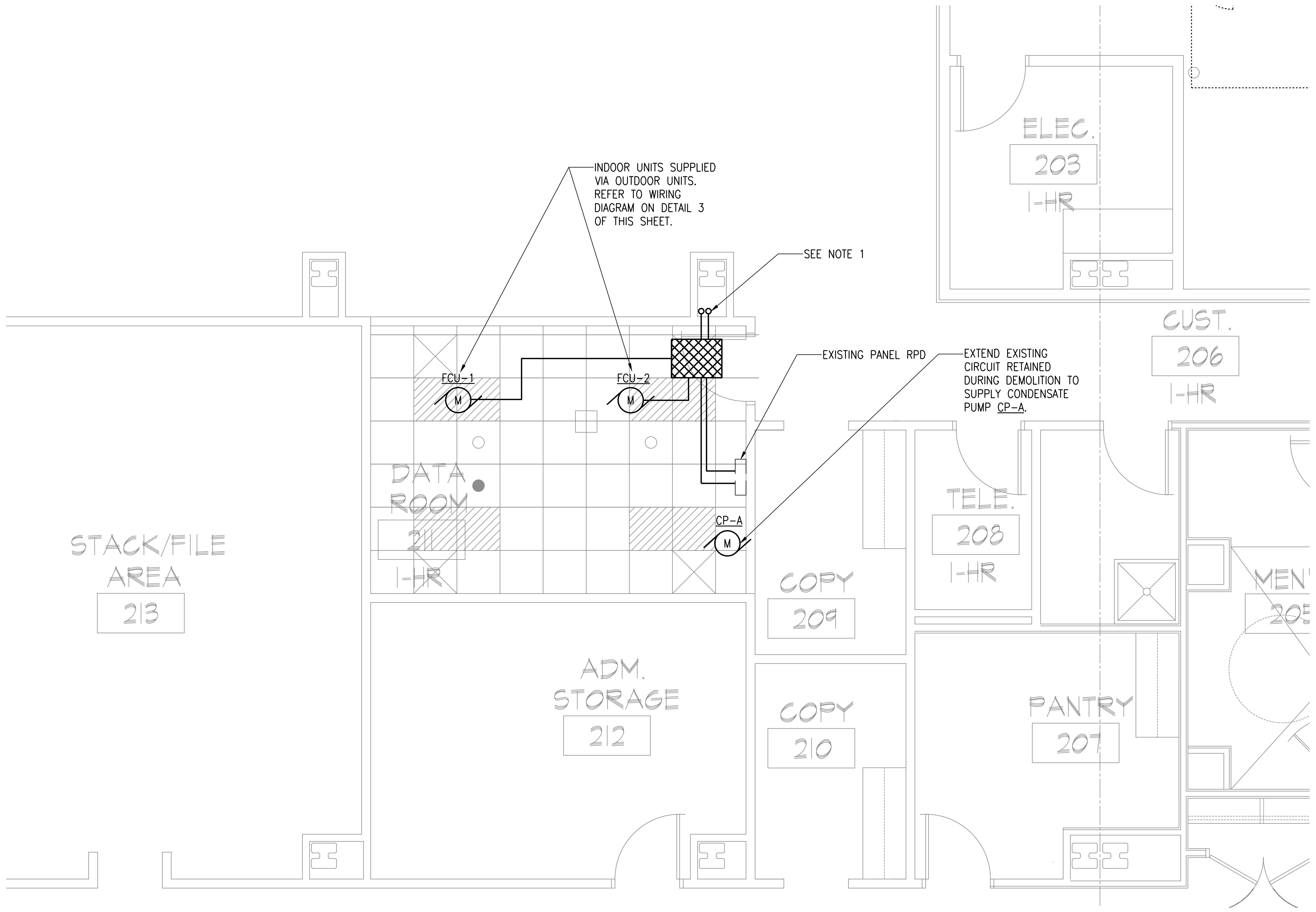
PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
ELECTRICAL EXISTING FLOOR PLANS

Scale AS NOTED
Date 08/26/2021
Drawing No. E-100
Drawn MG
C.E. Job No. 23059
Checked JH

Copyright©2021 by Collado Engineering, D.P.C.

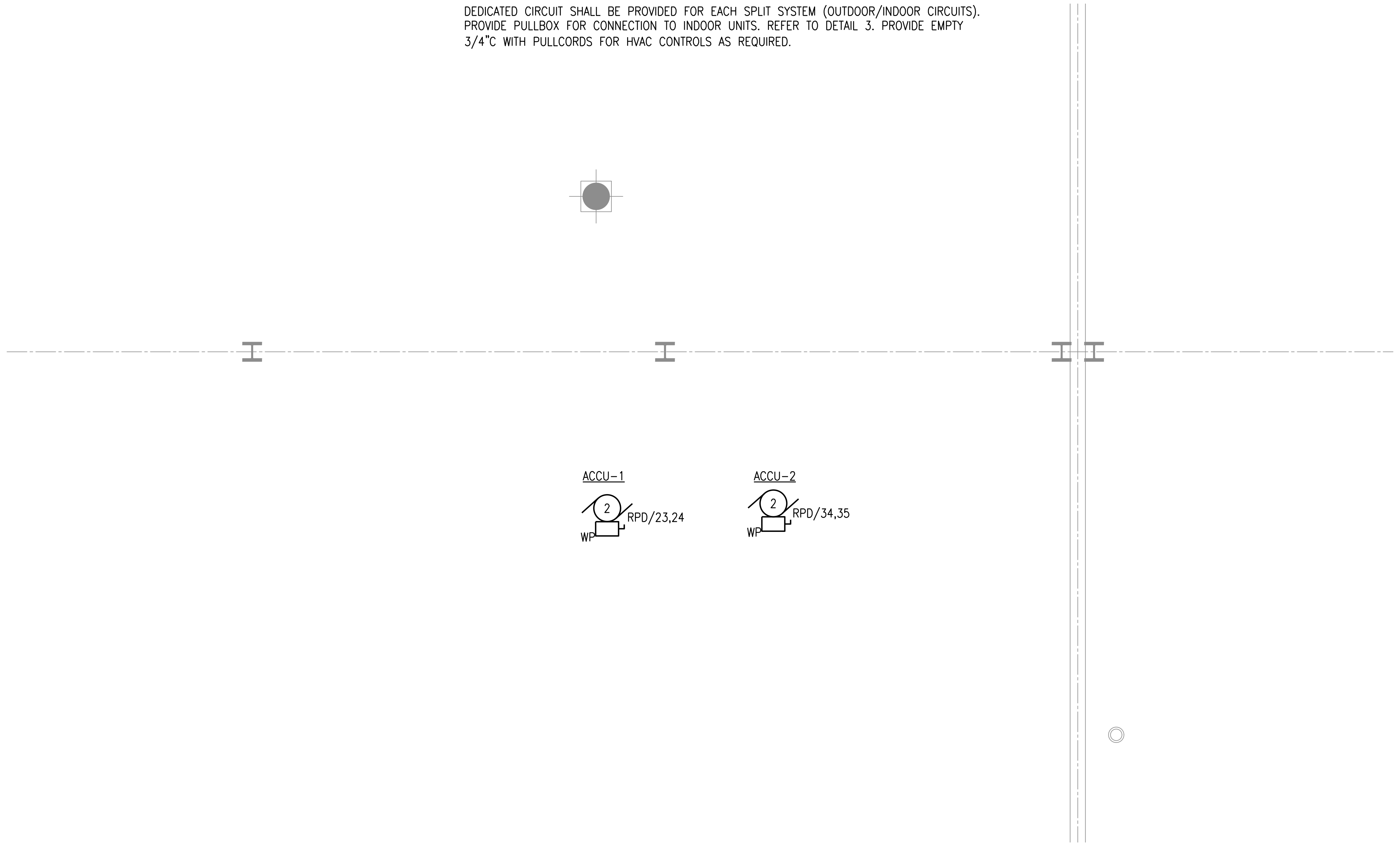


1 ELECTRICAL 2ND FLOOR PLAN

SCALE: 1/4"=1'-0"

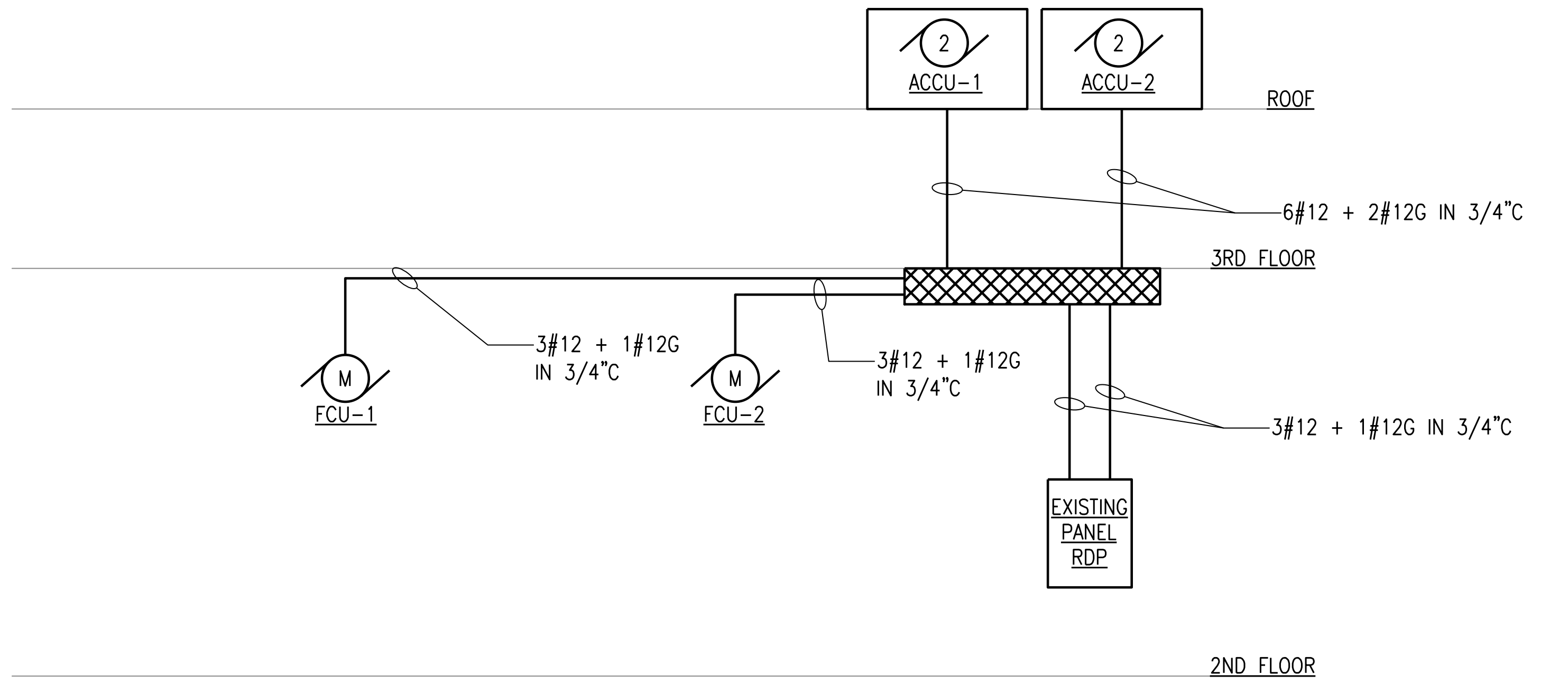
NOTES:

1. PROVIDE HVAC POWER CIRCUITS RISER IN REFRIGERANT PIPING SHAFT UP TO THE ROOF. A DEDICATED CIRCUIT SHALL BE PROVIDED FOR EACH SPLIT SYSTEM (OUTDOOR/INDOOR CIRCUITS). PROVIDE PULLBOX FOR CONNECTION TO INDOOR UNITS. REFER TO DETAIL 3. PROVIDE EMPTY 3/4"C WITH PULLCORDS FOR HVAC CONTROLS AS REQUIRED.



2 ELECTRICAL ROOF PLAN

SCALE: 1/4"=1'-0"



3 ACCU/FCU WIRING DIAGRAM

SCALE: NTS

PANEL NO. RDP SECTION -
VOLTS 120/208 PH 3 W 4 G 1
MAIN CB - BUS 225A MIN. INTERRUPTING RATING - SYMM.

EXISTING PANEL

☐ RECESSED
☒ SURFACE MOUNTED
☒ MAIN LUG ONLY
☐ MAIN CB
☐ FEED THRU LUG

CKT NO.	TRIP (AMPS)	DESCRIPTION OF LOAD	LOAD (KVA)	PER PHASE KVA			LOAD (KVA)	DESCRIPTION OF LOAD	TRIP (AMPS)	
				A	B	C				
1	30	EXISTING DATA RECEPTACLE	0	0			0	EXISTING DATA RECEPTACLE	20	22
2	20	EXISTING DATA RECEPTACLE	0		0		0	**ACCU-1/FCU-1 3#12 + 1#12G IN 3/4"C**	**30**	23
3	30	EXISTING DATA RECEPTACLE	0			0	0			24
4	20	EXISTING DATA RECEPTACLE	0	0			0	EXISTING DATA RECEPTACLE	20	25
5	30	EXISTING DATA RECEPTACLE	0		0		0	EXISTING DATA RECEPTACLE	20	26
6	20	EXISTING DATA RECEPTACLE	0			0	0	EXISTING DATA RECEPTACLE	20	27
7	20	EXISTING DATA RECEPTACLE	0	0			0	EXISTING DATA RECEPTACLE	20	28
8	20	EXISTING DATA RECEPTACLE	0		0		0	EXISTING DATA RECEPTACLE	20	29
9	20	EXISTING DATA RECEPTACLE	0			0	0	EXISTING DATA RECEPTACLE	20	30
10	20	EXISTING DATA RECEPTACLE	0	0			0	EXISTING DATA RECEPTACLE	20	31
11	20	EXISTING DATA RECEPTACLE	0		0		0	EXISTING DATA RECEPTACLE	20	32
12	20	EXISTING DATA RECEPTACLE	0			0	0	EXISTING PUMP	20	33
13	20	EXISTING DATA RECEPTACLE	0	0			0	**ACCU-2/FCU-2 3#12 + 1#12G IN 3/4"C**	**30**	34
14	20	EXISTING DATA RECEPTACLE	0		0		0			35
15	20	EXISTING DATA RECEPTACLE	0			0	0	**SPARE**	**20**	36
16	20	EXISTING DATA RECEPTACLE	0	0			0	EXISTING DATA RECEPTACLE	30	37
17	20	EXISTING DATA RECEPTACLE	0		0		0	EXISTING DATA RECEPTACLE	30	38
18	20	EXISTING DATA RECEPTACLE	0			0	0	EXISTING DATA RECEPTACLE	30	39
19	20	EXISTING DATA RECEPTACLE	0	0			0	EXISTING SURGE SUPPRESSOR	30	40
20	20	EXISTING DATA RECEPTACLE	0		0		0			41
21	20	EXISTING DATA RECEPTACLE	0			0	0			42
				0	0	0				

SEE NOTE 1

SEE NOTE 2

NOTES:

1. REPLACE (2) EXISTING 20A, 1P CBS WITH (1) 30A, 2P CB.
2. REPLACE (1) EXISTING 60A, 3P CB WITH (1) 30A, 2P CB AND (1) 20A, 1P CB.

Rev.	Description	Date
	ISSUED FOR BID	08/26/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
ELECTRICAL NEW WORK FLOOR PLANS

Scale AS NOTED
Date 08/26/2021
Drawing No. E-101
Drawn MG
C.E. Job No. 23059
Checked JH
Copyright©2021 by Collado Engineering, D.P.C.

ELECTRICAL WORK

1.GENERAL:

A. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR.

B. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. ASCERTAIN FROM CAMPUS AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

C. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.

F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.

J. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.

K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

L. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

M. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

O. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC) AND CONDITIONS.

P. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

Q. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

2. SCOPE OF WORK:

A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.

B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ENGINEER.

B. INDICATE ON EACH SHOP DRAWING SUBMITTED:

1) PROJECT NAME AND LOCATION
2) NAME OF ENGINEER
3) ITEM IDENTIFICATION
4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS:

1) CONTRACTOR SHALL SUBMIT A PDF FILE TO ENGINEER THROUGH PREVIOUSLY DISCUSSED AND APPROVED METHOD (EMAIL, SUBMITTAL EXCHANGE PROGRAM, ETC). SUBMITTAL WILL THEN BE FORWARDED TO RELEVANT PARTIES FOR REVIEW.
2) UNLESS OTHERWISE DISCUSSED & AGREED, PROVIDE ALL EQUIPMENT SUBMITTALS AND SHOP DRAWINGS AT ONE TIME, THE SAME TIME; AT LEAST, THREE WEEKS BEFORE A RESPONSE IS REQUIRED.
3) PROVIDE A SEPARATE TRANSMITTAL FOR EACH SUBMITTAL ITEM. TRANSMITTALS SHALL INDICATE PRODUCT BY SPECIFICATION SECTION NAME AND NUMBER. SEPARATE ALL SUBMITTALS INTO APPROPRIATE SPECIFICATION SECTION NUMBER. DO NOT COMBINE SPECIFICATION SECTIONS.
4) DO NOT SUBMIT ENTIRE MANUFACTURER'S CATALOG; IT WILL NOT BE REVIEWED. SUBMIT ONLY PAGES WHICH ARE PERTINENT TO THE PROJECT. ALL OPTIONS WHICH ARE INDICATED ON THE PRODUCT DATA SHALL BECOME PART OF THE CONTRACT AND SHALL BE REQUIRED WHETHER SPECIFIED ARE NOT.
5) MARK EACH COPY OF STANDARD PRINTED DATA TO IDENTIFY PERTINENT PRODUCTS, REFERENCED TO SPECIFICATION SECTION AND ARTICLE NUMBER.
6) SHOW REFERENCE STANDARDS, PERFORMANCE CHARACTERISTICS AND CAPACITIES; WIRING AND PIPING DIAGRAMS AND CONTROLS; COMPONENT PARTS; FINISHES; DIMENSIONS AND REQUIRED CLEARANCES.
7) MODIFY MANUFACTURER'S STANDARD SCHEMATIC DRAWINGS AND DIAGRAMS TO SUPPLEMENT STANDARD INFORMATION AND TO PROVIDE INFORMATION SPECIFICALLY APPLICABLE TO THE WORK. DELETE INFORMATION NOT APPLICABLE.
8) THE ENGINEER WILL REVIEW THE ORIGINAL SUBMITTAL AND ONE RESUBMITTAL FOR THE SAME PRODUCT. ADDITIONAL RESUBMITTALS WILL BE REVIEWED ON A HOURLY RATE, PAYABLE BY THE CONTRACTOR.
9) PARTIAL SUBMITTALS OR SUBMITTALS NOT PROPERLY FORMATTED AS INDICATED ABOVE, ARE SUBJECT TO RETURN WITHOUT REVIEW FOR THE CONTRACTOR TO CORRECT.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

1) CIRCUIT BREAKERS
2) RACEWAYS
3) WIRE AND CABLE
4) TESTED AND LISTED FIRESTOPPING SYSTEMS

4. AS-BUILT DRAWINGS

A. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS-INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ENGINEER AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

B. DEFINITIONS:

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
3) "FURNISH" OR "SUPPLY: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.
6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

C. QUALITY ASSURANCE

1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
3) CURRENT CHARACTERISTICS:
   a. DISTRIBUTION: 265/460 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

D. PRODUCT DELIVERY, STORAGE AND HANDLING

1) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

E. MATERIALS

1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, ENCLOSURE, AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
3) INSERTS AND SUPPORTS:

   b. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
   - SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
   - MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
   - CLIP FORM NAILS FLUSH WITH INSERTS.
   - MAXIMUM LOADING 75 PERCENT OF RATING.

   b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
   c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
   d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ENGINEER.

I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ENGINEER PRIOR TO INSTALLATION.

6. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

A. PROVIDE COMPLETE EQUIPMENT INCLUDING: CIRCUIT BREAKERS.

B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.

C. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:

1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE.
2) 240 VOLTS, 100-AMP FRAME: 18,000 AMPS, 2 AND 3 POLES.

D. BALANCE THE LOAD OVER PHASES WHEN NEW CIRCUITS ARE ADDED TO EXISTING PANELS. PROVIDE MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING SHALL NOT BE PERMITTED. MOUNTING HEIGHT SHALL BE A MAXIMUM OF 6 FT-6 IN. FROM FLOOR TO TOP SWITCH UNIT. UPDATE DIRECTORIES ON EXISTING PANELBOARDS WHERE CIRCUITING IS CHANGED.

E. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.

7. RACEWAYS:

A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.

B. MATERIALS

1) RACEWAYS:
   a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
   b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
   c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
2) FITTINGS AND ACCESSORIES:
   a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
   b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
   c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
   d. BUSHINGS: METALLIC INSULATED TYPE.
3) BOXES:
   a. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING.

C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED.

EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES.

FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

D. JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

8. WIRE AND CABLE:

A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM.

OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

C. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED.

D. METAL CLAD CABLE (MC) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF MC.

E. COLOR CODING SHALL BE AS FOLLOWS:

1) 120/208 VOLT SYSTEM:
   BLACK FOR A PHASE
   RED FOR B PHASE
   BLUE FOR C PHASE
2) 265/460 VOLT SYSTEM:
   BROWN FOR A PHASE
   ORANGE FOR B PHASE
   YELLOW FOR C PHASE
3) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

F. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING, INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

G. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

H. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 °F.

I. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

J. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

12. GROUNDING

A. PROVIDE ALL COMPONENTS REQUIRED FOR A COMPLETE GROUNDING SYSTEM IN ACCORDANCE WITH THE 2017 NEC.

B. GROUND CONNECTORS SHALL BE TIN-PLATED ALUMINUM ALLOY, UL APPROVED AND STAMPED FOR USE WITH EITHER ALUMINUM OR COPPER CONDUCTORS.

C. GROUND CABLES SHALL BE BARE OR GREEN COLOR CODED, INSULATED, ANNEALED STRANDED TINNED COPPER WIRE AS INDICATED ON DRAWINGS.

D. PROVIDE CONTINUOUS GROUND PATH FOR ALL ELECTRICAL CIRCUITS, FROM POINT OF UTILIZATION BACK TO SOURCE THROUGH GROUND WIRES, CONDUIT RUNS, AND RELATED ITEMS.

E. ALL GROUND WIRES AND BONDING JUMPERS SHALL BE STRANDED COPPER INSTALLED IN CONDUIT. ALL GROUND WIRES SHALL BE WITHOUT JOINTS AND SPLICES OVER ITS ENTIRE LENGTH.

F. MECHANICAL EQUIPMENT SHALL BE BONDED TO THE BUILDING EQUIPMENT GROUNDING SYSTEM, INCLUDING FANS, PUMPS, ETC.

G. PVC CONDUITS AND PORTIONS OF THE METALLIC PIPING AND DUCT SYSTEMS WHICH ARE ISOLATED BY FLEXIBLE CONNECTIONS, INSULATED COUPLINGS, METERS, ETC. SHALL BE BONDED TO EQUIPMENT GROUND WITH A FLEXIBLE BONDING JUMPER, OR SEPARATE GROUNDING CONDUCTOR.

14. FIRESTOPPING

A. QUALITY ASSURANCE:

11) USE FIRESTOPPING SYSTEMS THAT HAVE BEEN TESTED IN ACCORDANCE WITH ASTM E814 OR UL 1479. LISTING BY UL (DIR), UL (FDR), FM (AG), OR ITS (DIR) IN THEIR CERTIFICATION DIRECTORIES WILL BE CONSIDERED EVIDENCE OF SUCCESSFUL TESTING.
12) MANUFACTURER QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS FOR USE IN FIRE RATED ASSEMBLIES WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE.

A. FIRESTOPPING ASSEMBLY REQUIREMENTS

1) FOR MEMBRANE AND THROUGH PENETRATIONS, PROVIDE FIRESTOPPING MATERIALS TO CREATE A LISTED SYSTEM, FOR THE ASSEMBLY BEING PENETRATED AND FIELD CONDITIONS, THAT HAVE THE FOLLOWING PROPERTIES, EXCEPT AS OTHERWISE PERMITTED BY THE BUILDING CODE:
   a. FIRE RESISTANCE: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO SHOW F-RATING EQUAL TO REQUIRED FIRE RATING OF PENETRATED ASSEMBLY.
   b. TEMPERATURE RISE: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO SHOW T-RATING EQUAL TO OR GREATER THAN THE F-RATING.
   c. AIR LEAKAGE: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO SHOW L-RATING IS EQUAL TO OR GREATER THAN THE L-RATING OF JOINTS IN ASSEMBLY BEING PENETRATED.
   d. WATERTIGHTNESS: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO MEET A CLASS 1 W-RATING FOR FLOOR PENETRATIONS.

C. FIELD CONDITIONS

1) COMPLY WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS FOR TEMPERATURE AND CONDITIONS DURING AND AFTER INSTALLATION; MAINTAIN MINIMUM TEMPERATURE BEFORE, DURING, AND FOR THREE DAYS AFTER INSTALLATION OF MATERIALS.
2) PROVIDE VENTILATION IN AREAS WHERE SOLVENT-CURED MATERIALS ARE BEING INSTALLED.

D. INSPECTION OF FIRESTOPPING SYSTEMS

1) METHOD OF INSPECTION SHALL BE AT THE DISCRETION OF THE SPECIAL INSPECTOR. CONTRACTOR SHALL PROVIDE ALL REQUIRED INFORMATION, COORDINATE WITH SPECIAL INSPECTOR AT LEAST 10 DAYS IN ADVANCE OF FIRE STOP INSTALLATION, AND ARRANGE SITE ACCESS. CONTRACTOR SHALL COMPLETELY REMOVE AND RESTORE ALL FIRESTOPPING THAT HAS UNDERGONE DESTRUCTIVE TESTING. NO CLAIMS FOR ADDITIONAL COST OR TIME WILL BE ALLOWED.
2) VISUAL INSPECTION: SPECIAL INSPECTOR SHALL BE ONSITE DURING INSTALLATION AND RANDOMLY WITNESS A MINIMUM OF 10% OF EACH TYPE OF FIRE STOP BEING INSTALLED.
3) DESTRUCTIVE TESTING: VERIFICATION OF FIRESTOPPING AFTER INSTALLATION HAS TAKEN PLACE. A MINIMUM OF 2%, BUT NOT LESS THEN ONE, OF EACH TYPE OF FIRE STOP SHALL BE INSPECTED PER FLOOR OR EACH AREA OF A FLOOR WHEN A FLOOR AREA IS LARGER THAN 10,000 SQ. FT.

Rev.	Description	Date
	ISSUED FOR BID	08/26/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM–AC

Drawing Title
ELECTRICAL SPECIFICATIONS

Scale AS NOTED
Date 08/26/2021
Drawing No. E-200
Drawn MG
C.E. Job No. 23059
Checked JH

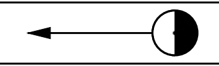
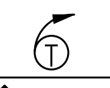
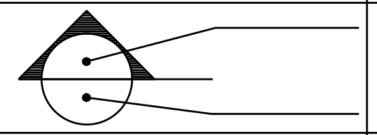
Copyright©2021 by Collado Engineering, D.P.C.

ABBREVIATIONS

A	AMPERES
AC	AIR CONDITIONING
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
BHP	BRAKE HORSEPOWER
BMS	BUILDING MANAGEMENT SYSTEM
BTU	BRITISH THERMAL UNIT
BTUH	BTUH PER HOUR
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
COND	CONDENSATE
CP	CONDENSATE PUMP
CU FT	CU FT
CU IN	CU IN
DWG	DRAWING
CV	CONSTANT VOLUME
D	DROP
DB	DRY BULB
DX	DIRECT EXPANSION
DIAM	DIAMETER
DN	DOWN
(E)	EXISTING TO REMAIN
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB TEMPERATURE
EL	ELEVATION
ELEC	ELECTRIC
EQ	EQUAL
(ER)	EXISTING TO BE REMOVED
(ERR)	EXISTING TO REMOVED AND RELOCATED
EXH	EXHAUST
EXP	EXPANSION
EXIST	EXISTING
°F	DEGREES FAHRENHEIT
FA	FREE AREA (SQ.FT.)
FC	FLEXIBLE CONNECTION
FLA	FULL LOAD AMPERES
FPM	FEET PER MINUTE
FPS	FEET PER SECOND

FT	FEET
HC	HEATING COIL
HD	HEAD
HR	HOUR
HT	HEIGHT
HV	HEATING AND VENTILATING
HZ	FREQUENCY
IN	INCH OR INCHES
KW	KILOWATT
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LIN FT	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LWT	LEAVING WATER TEMPERATURE
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	THOUSAND BTUH PER HOUR
MER	MECHANICAL EQUIPMENT ROOM
MHP	MOTOR HORSEPOWER
MIN	MINIMUM
NO.	NUMBER
NTS	NOT TO SCALE
OED	OPEN ENDED DUCT
PD	PRESSURE DROP
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PSIG	PSI GAUGE
R	RISE
RA	RETURN AIR
RG	RETURN GRILLE
RLA	RUNNING LOAD AMPS
RM	ROOM
ROT	ROTATION
RPM	REVOLUTIONS PER MINUTE
(RRO)	EXISTING TO BE REMOVED AND RETURNED TO OWNER
SA	SUPPLY AIR
SP	STATIC PRESSURE
SPEC	SPECIFICATION
TEMP	TEMPERATURE
TYP	TYPICAL
V	VOLTS

SYMBOL LIST

———————	SINGLE LINE DUCTWORK OR EQUIPMENT – NEW
—·—·—·—·—·—	SINGLE LINE DUCTWORK OR EQUIPMENT – EXISTING
—x-——--x--——-x—	DUCTWORK OR EQUIPMENT TO BE REMOVED
℄	CENTER LINE
∯	CUBIC FEET PER MINUTE
Φ	DIAMETER
→→	AIRFLOW DIRECTION
⌑	SQUARE FEET
	POINT OF CONNECTION
	POINT OF DISCONNECTION
	TYPE A CEILING DIFFUSER (400 CFM SUPPLY AIR)
	THERMOSTAT
	SECTION DESIGNATION SHEET NO. WHERE SECTION IS SHOWN
———▶———	NEW PIPE WITH DIRECTION OF FLOW
—·—·—·—·—·—	EXISTING PIPING
—x——x——x—	PIPING TO BE REMOVED
———)——▶—	PIPE DROP
———)——◀—	PIPE RISE

MECHANICAL DRAWING LIST

M–001	MECHANICAL SYMBOL LIST, GENERAL NOTES, ABBREVIATIONS, AND DRAWING LIST
M–100	MECHANICAL EXISTING FLOOR PLANS
M–101	MECHANICAL FLOOR PLANS
M–200	MECHANICAL DETAILS AND SCHEDULES
M–300	MECHANICAL SPECIFICATIONS

GENERAL NOTES

1. GENERAL NOTES, SYMBOL LIST AND DETAILS ARE APPLICABLE TO ALL HVAC/MECHANICAL DRAWINGS.
2. DRAWINGS ARE DIAGRAMMATIC. DETERMINE EXACT LOCATIONS OF SYSTEMS AND COMPONENTS IN FIELD. RELOCATE EXISTING WORK THAT INTERFERES WITH WORK OF THIS CONTRACT.
3. COORDINATE THIS WORK WITH THAT OF OTHER TRADES.
4. DIMENSIONS SHOWN ON PLAN ARE HORIZONTAL. DIMENSIONS SHOWN IN ELEVATION ARE VERTICAL EXCEPT IN WAY OF STRUCTURAL STEEL, DIMENSIONS ARE MEASURED PERPENDICULAR TO FLANGE.
5. NEITHER ACCURACY NOR COMPLETENESS OF SERVICES AND UTILITY LOCATIONS SHOWN ON DRAWINGS IS GUARANTEED. DETERMINE EXACT LOCATIONS OF EXISTING SERVICES AND UTILITIES IN FIELD, WHETHER OR NOT SHOWN ON DRAWINGS. EXERCISE CAUTION AND IDENTIFY LOCATIONS OF UNMARKED UTILITY LINES AS NECESSARY TO PERFORM WORK OF THIS SECTION.
6. PRODUCT INSTALLATION SHALL ADHERE TO MANUFACTURER'S REQUIREMENTS.
7. PROVIDE ACCESS PANELS FOR EQUIPMENT THAT REQUIRES SERVICE OR MAINTENANCE.
8. PROVIDE HANGERS, ANCHORS, INSERTS, SUPPLEMENTAL STEEL, AND SUPPORTS AS REQUIRED TO SUPPORT DUCTWORK, PIPING, AND EQUIPMENT FROM STRUCTURE.
9. RUN DUCTS AND PIPING CONCEALED WITHIN WALLS, CEILINGS, OR SOFFITS, UNLESS OTHERWISE SPECIFIED AND CLEAR OF CEILING INSERTS. COORDINATE ROUTING WITH ARCHITECT AND CONSTRUCTION METHODS.
10. INSTALL THERMOSTATS 4'–6" ABOVE FINISHED FLOOR UNLESS OTHERWISE DIRECTED BY ARCHITECT.
11. SPECIFICATIONS ARE PART OF THESE DOCUMENTS AND SCOPE OF WORK.
12. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF AIR DEVICES.
13. PROVIDE 36" CLEARANCE IN FRONT OF ALL ELECTRIC CONTROL PANELS PER N.E.C. AND MFG. REQUIREMENTS.

DEMOLITION NOTES

1. THE CONTRACTOR SHALL INCLUDE IN HIS PRICE ALL COSTS ASSOCIATED WITH REMOVALS AND RELOCATIONS OF HVAC WORK AS DESCRIBED ON THE DRAWINGS AND IN THE SPECIFICATIONS WITH ALLOWANCES FOR EXPECTED OR UNFORESEEN DIFFICULTIES WHEN CONCEALED WORK HAS BEEN OPENED. NO CLAIMS FOR ADDITIONAL WORK ASSOCIATED WITH DEMOLITION WILL BE ACCEPTED, EXCEPT IN CERTAIN CASES CONSIDERED JUSTIFIABLE BY THE OWNER/ENGINEER.
2. THE CONTRACTOR SHALL PERFORM DEMOLITION AND REMOVAL WORK WITH MINIMUM INTERFERENCE TO FUNCTIONING HVAC SYSTEMS. ALL AFFECTED SYSTEMS SHALL BE RECONNECTED AND RESTORED.
3. DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER. THE CONTRACTOR SHALL PATCH, REPAIR OR OTHERWISE RESTORE ANY DAMAGED INTERIOR OR EXTERIOR BUILDING SURFACE TO ITS ORIGINAL CONDITION.
4. THE CONTRACTOR SHALL REMOVE ALL DUCT AND PIPING SUPPORTS, ETC. FROM PARTITIONS THAT ARE TO BE REMOVED. WHERE THE REMOVAL OF THESE ITEMS DISRUPTS EXISTING PIPING THAT IS TO REMAIN, THE CONTRACTOR SHALL INSTALL AND PROVIDE BYPASS CONNECTIONS AS NECESSARY.
5. ALL PIPING WHICH BECOMES EXPOSED DURING THE ALTERATION WORK SHALL BE REMOVED AND REROUTED CONCEALED BEHIND FINISHED SURFACES.
6. PORTIONS OF PIPING AND DUCTWORK TO BE REMOVED OR ABANDONED AS A RESULT OF DEMOLITION WORK, BUT WHICH ARE REQUIRED TO REMAIN ACTIVE, SHALL BE CUT AT CONVENIENT LOCATIONS, REROUTED AND RECONNECTED.
7. THE CONTRACTOR SHALL NOTIFY THE OWNER, AT THE APPROPRIATE TIME, OF THE PROJECTED DEMOLITION AND PHASING SCHEDULE SO THAT REMOVAL OR RELOCATION OF AFFECTED UTILITIES MAY BE CARRIED OUT IN COORDINATION WITH THE PROJECT REQUIREMENTS.
8. ALL EXISTING MATERIAL AND EQUIPMENT IN USABLE CONDITION, WHICH IS TO BE REMOVED UNDER THIS CONTRACTOR, SHALL REMAIN THE PROPERTY OF THE OWNER OR SHALL BE DISPOSED OF BY THE HVAC CONTRACTOR, AS DIRECTED BY THE OWNER.
9. ARRANGE TO WORK CONTINUOUSLY, INCLUDING OVERTIME IF REQUIRED, TO ASSURE THAT SYSTEMS WILL BE SHUT DOWN ONLY DURING THE TIME ACTUALLY REQUIRED TO MAKE THE NECESSARY CONNECTIONS TO THE EXISTING SYSTEMS.
10. THE SHUTDOWN OF EXISTING BUILDING HVAC SERVICES SHALL BE COORDINATED WITH THE OWNER. MAKE ARRANGEMENTS AT LEAST 5 BUSINESS DAYS PRIOR TO A SHUTDOWN.
11. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL REQUIREMENTS REGARDING DISPOSAL OR REFRIGERANTS.

Rev.	Description	Date
	ISSUED FOR BID	08/26/21
	REISSUED FOR BID	09/13/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

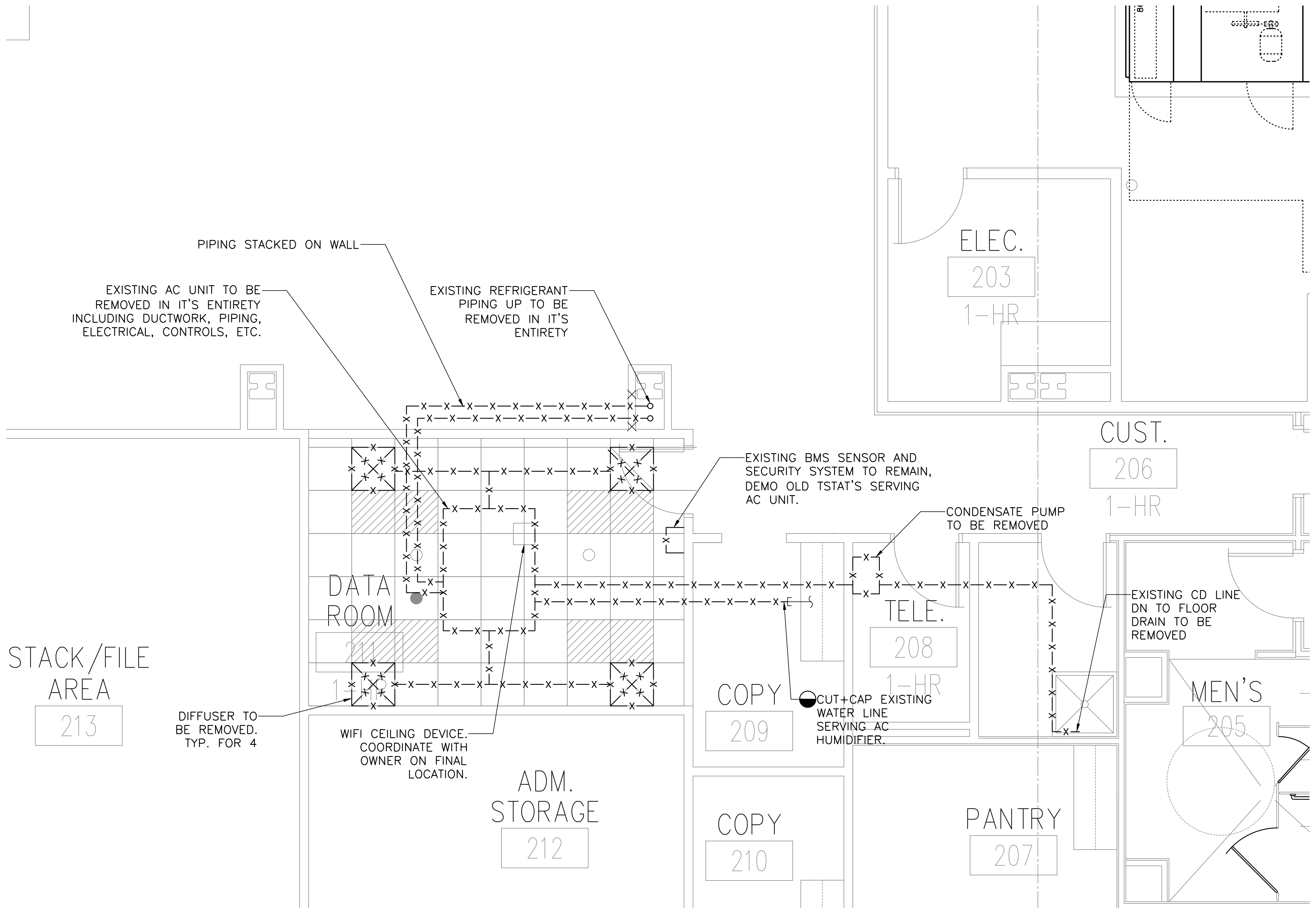
PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM–AC

Drawing Title
MECHANICAL SYMBOL LIST, GENERAL NOTES, ABBREVIATIONS, AND DRAWING LIST

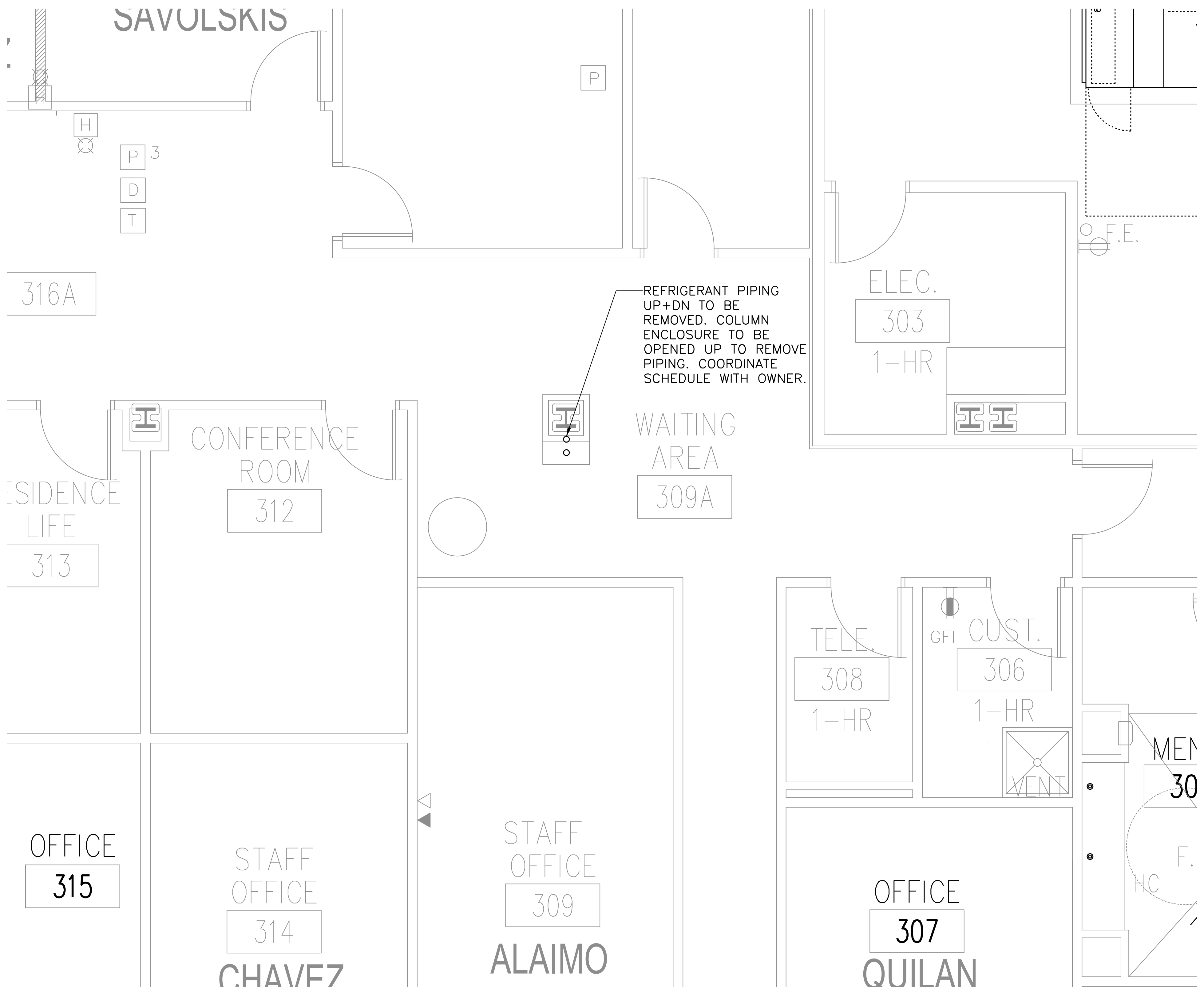
Scale NTS
Drawing No. M-001
Date 08/26/2021
Drawn MG
C.E. Job No. 23059
Checked JH

Copyright©2021 by Collado Engineering, D.P.C.



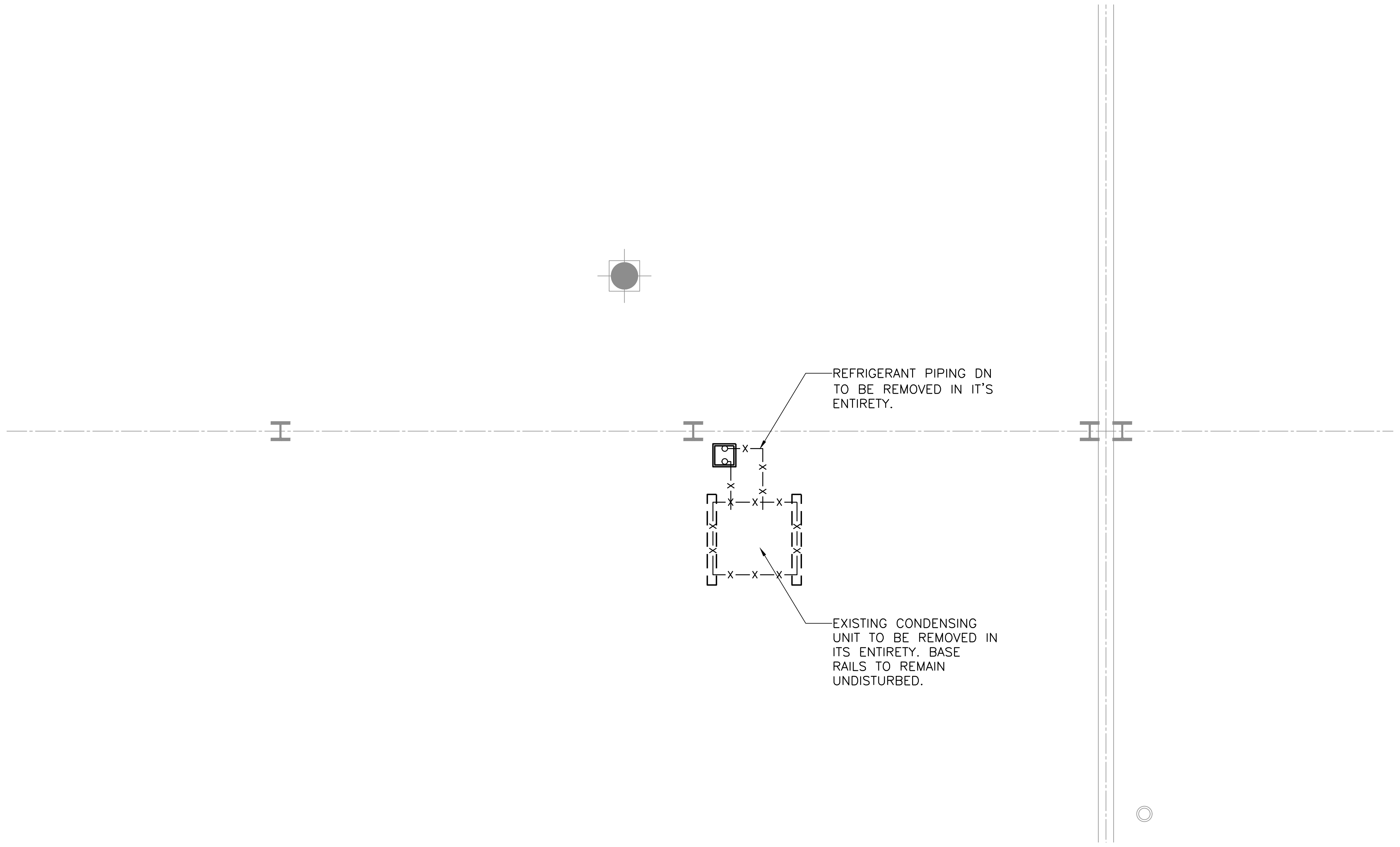
1 MECHANICAL EXISTING 2ND FLOOR PLAN

SCALE: 1/4"=1'-0"



2 MECHANICAL EXISTING 3RD FLOOR PLAN

SCALE: 1/4"=1'-0"



3 MECHANICAL EXISTING ROOF PLAN

SCALE: 1/4"=1'-0"

Rev.	Description	Date
	ISSUED FOR BID	08/26/21
	REISSUED FOR BID	09/13/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

PURCHASE, NY

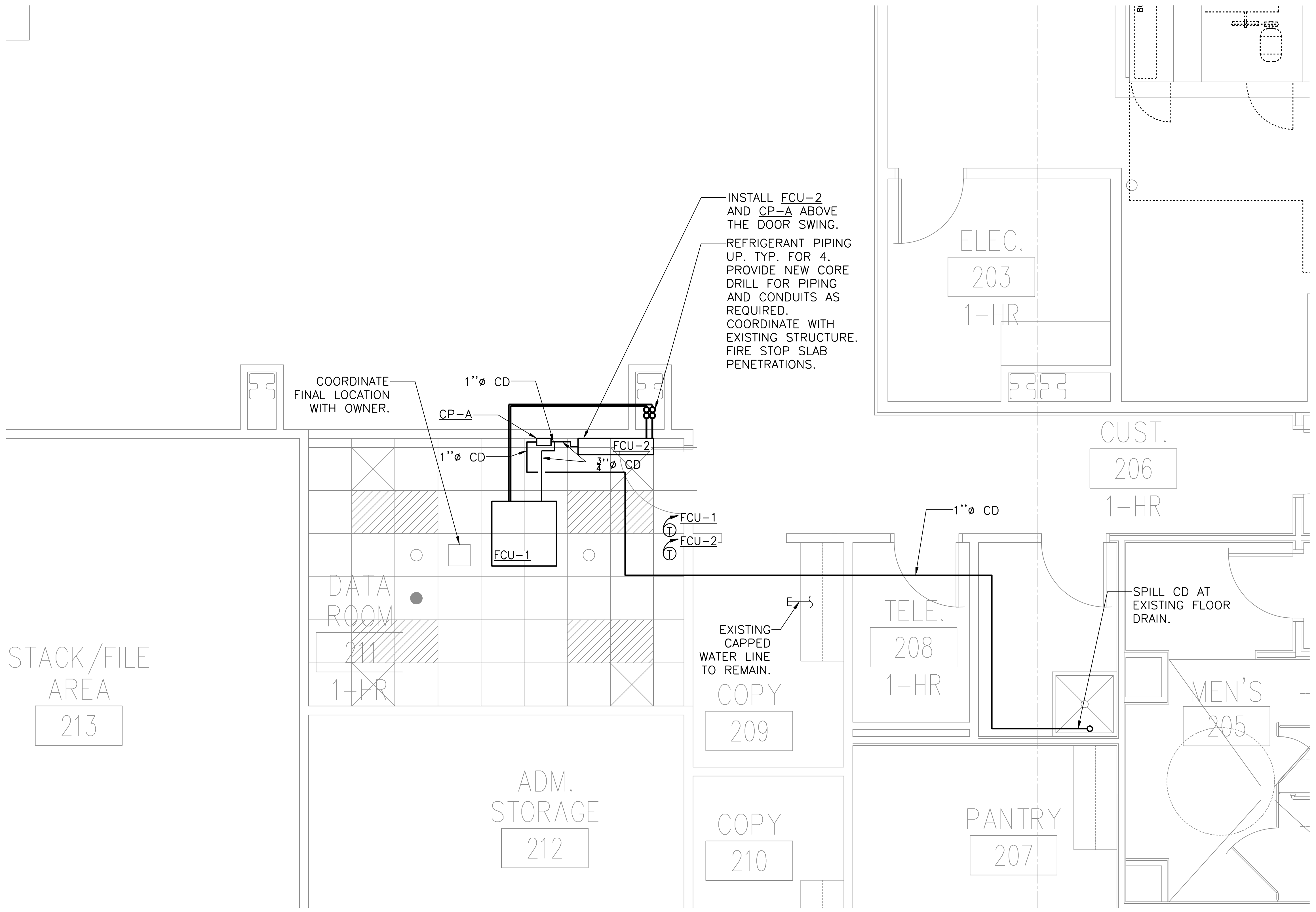
Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
MECHANICAL EXISTING FLOOR PLANS

Scale AS NOTED
Drawing No. M-100
Date 08/26/2021
Drawn MG
C.E. Job No. 23059
Checked JH

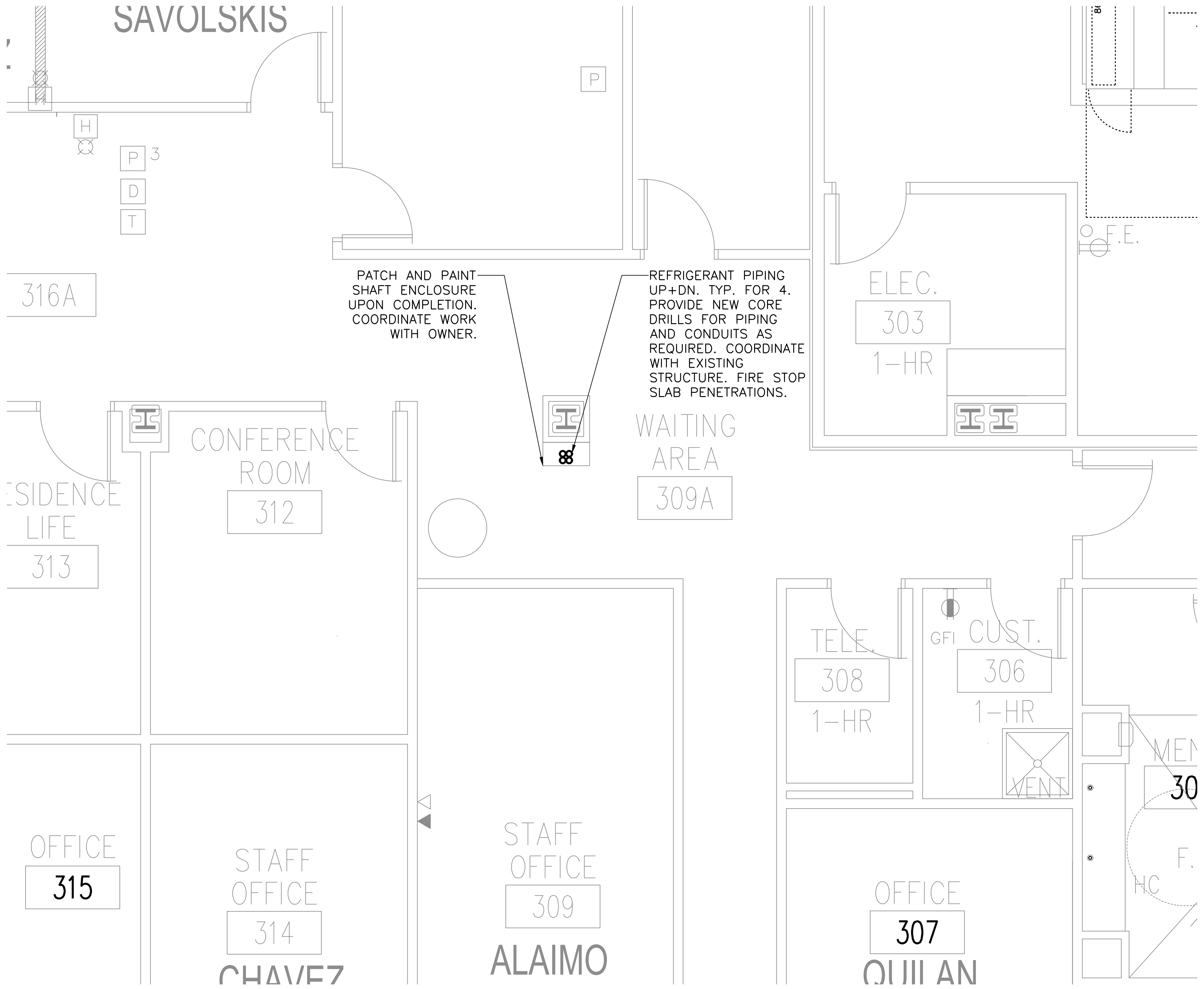
Copyright©2021 by Collado Engineering, D.P.C.

Rev.	Description	Date
	ISSUED FOR BID	08/26/21
	REISSUED FOR BID	09/13/21



1 MECHANICAL 2ND FLOOR PLAN

SCALE: 1/4"=1'-0"

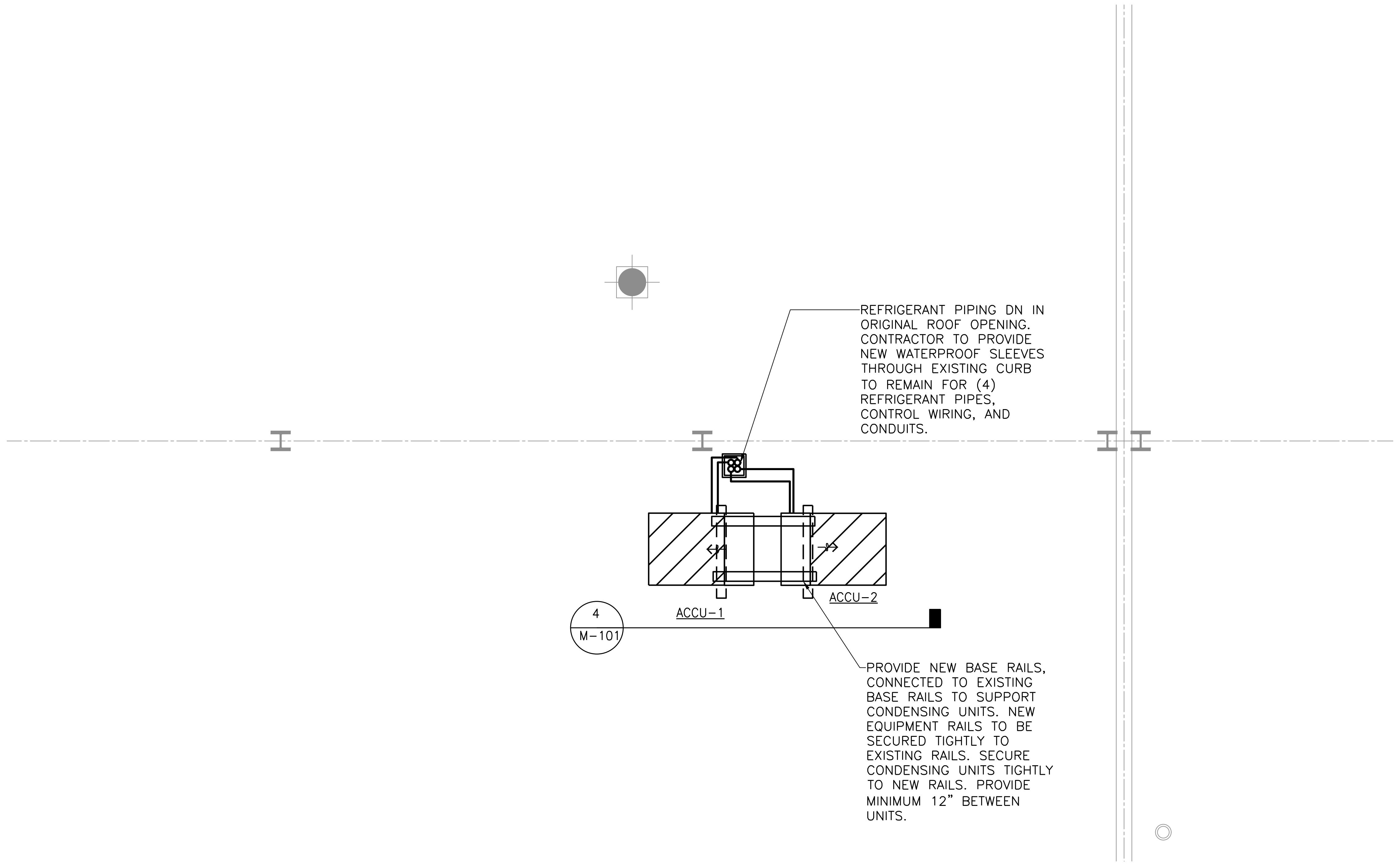


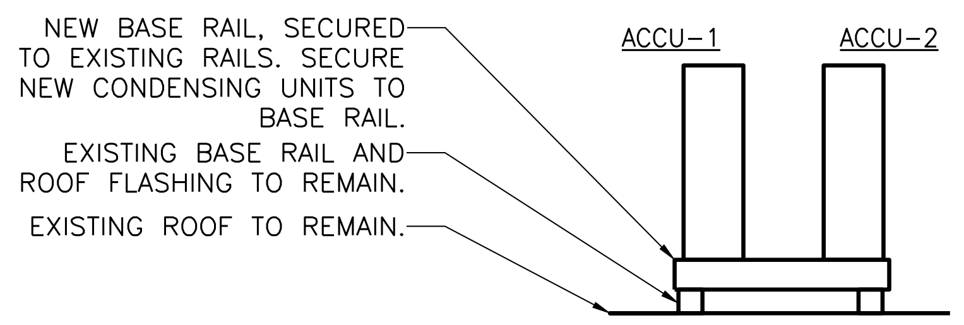
2 MECHANICAL 3RD FLOOR PLAN

SCALE: 1/4"=1'-0"

GENERAL NOTES:

1. SIZE REFRIGERANT PIPING PER MANUFACTURERS RECOMMENDATIONS.
2. CUT EXISTING CEILING TILES AS NECESSARY TO FIT NEW CASSETTE UNITS.
3. PROVIDE DRAIN PAN WITH LEAK DETECTOR UNDER CP-A.





4 MECHANICAL EQUIPMENT SECTION

SCALE: 1/4"=1'-0"

3 MECHANICAL ROOF PLAN

SCALE: 1/4"=1'-0"

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
MECHANICAL FLOOR PLANS

Scale AS NOTED
Drawing No. M-101
Date 08/26/2021
Drawn MG
C.E. Job No. 23059
Checked JH

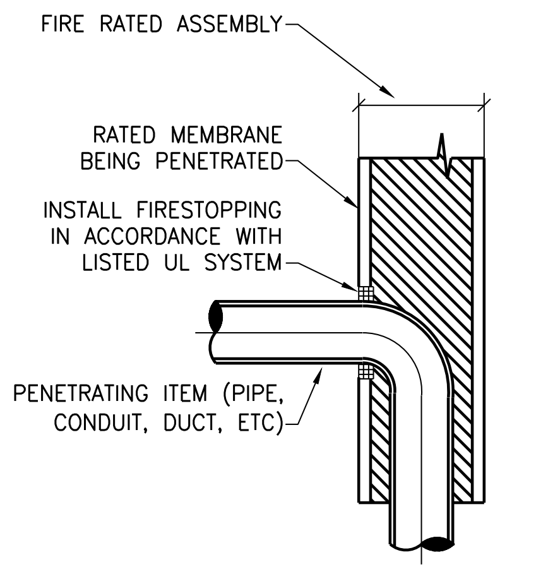
Copyright©2021 by Collado Engineering, D.P.C.

GENERAL GUIDELINE FOR SELECTING APPROPRIATE FIRESTOPPING SYSTEMS:

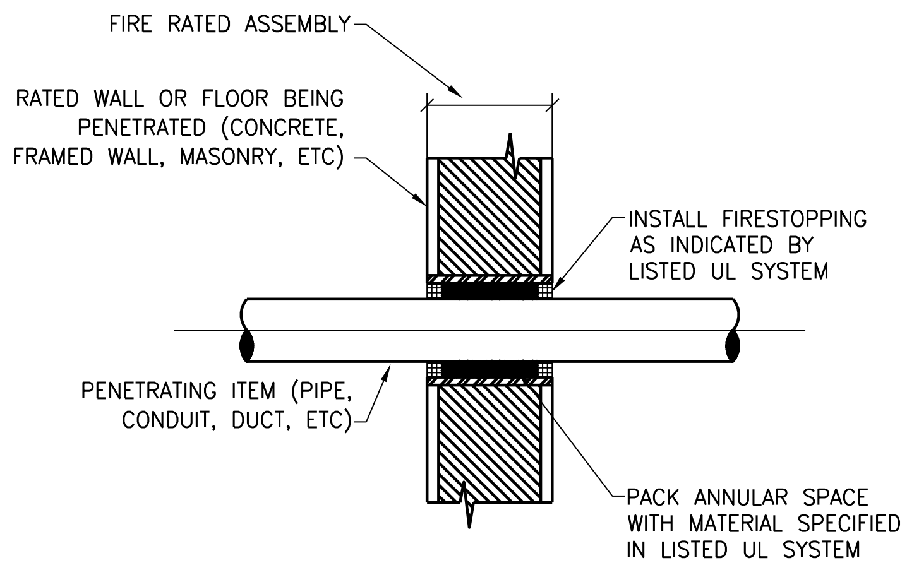
DETERMINE SYSTEM COMPONENTS:
-TYPE OF PENETRATION (MEMBRANE OR THROUGH)
-PENETRATING ITEM
-ASSEMBLY BEING PENETRATED
-MINIMUM AND MAXIMUM ANNULAR SPACES, POINTS OF CONTACT

DETERMINE RATING REQUIREMENTS:
-F-RATING, T-RATING, L-RATING, AND W-RATING

FOR EACH PENETRATION, SELECT A SYSTEM LISTED BY AN APPROVED TESTING AGENCY (UL, FM, ETC) THAT MEETS ALL OF THE ABOVE PARAMETERS



MEMBRANE PENETRATION



THROUGH PENETRATION

F-RATING: THE AMOUNT OF TIME (IN HOURS) BEFORE FLAMES CAN PASS THROUGH A PENETRATION FROM THE SIDE OF A WALL OR FLOOR EXPOSED TO FLAMES TO THE UNEXPOSED SIDE

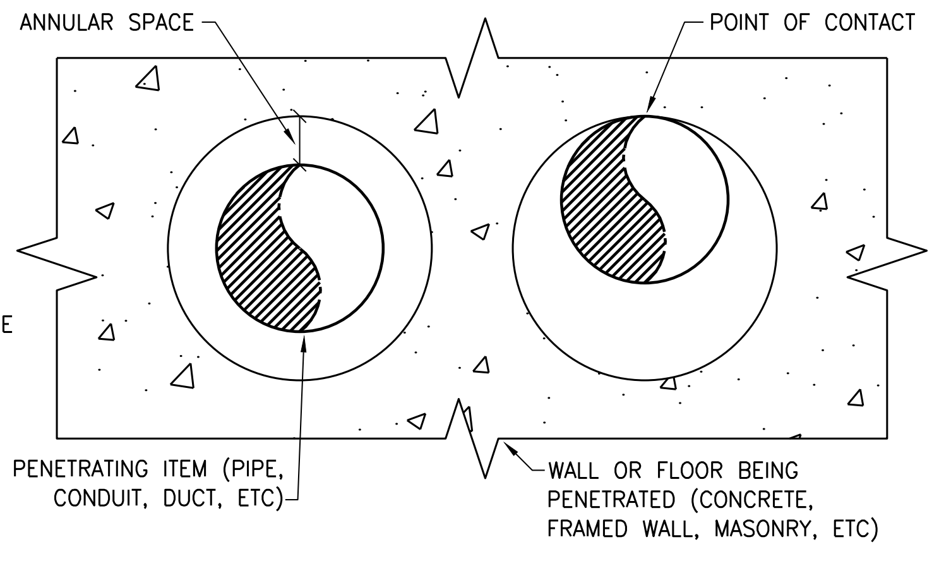
T-RATING: THE AMOUNT OF TIME (IN HOURS) BEFORE THE SURFACE OF AN ASSEMBLY AND/OR PENETRATING ITEM ON THE SIDE OF A WALL OR FLOOR NOT EXPOSED TO FLAMES RISES TO A TEMPERATURE OF 325°F

L-RATING: THE AMOUNT OF AIR/SMOKE (IN CUBIC FEET PER MINUTE PER SQUARE FOOT) THAT CAN LEAK THROUGH THE PENETRATION

W-RATING: A FIRESTOPPING PRODUCT'S ABILITY TO RESIST THE PASSAGE OF WATER THROUGH FLOOR ASSEMBLIES

REFER TO PROJECT SPECIFICATIONS FOR RATINGS AND ADDITIONAL FIRESTOPPING REQUIREMENTS

DEFINITIONS AND NOTES



ANNULAR SPACE

FIRESTOPPING PENETRATIONS GUIDELINE

INDOOR VRF FAN COIL UNIT SCHEDULE

TAG	SERVICE	NOMINAL COOLING CAPACITY (BTU/H)	CFM (PEAK)	FRESH AIR CFM	ESP (IN. WC)	COOLING DATA			ELECTRICAL DATA		MANUFACTURER AND MODEL	NOTES
						EAT		LAT	VOLTAGE	PHASE		
						DB (°F)	WB (°F)	DB (°F)				
FCU-1	DATA ROOM 211	24,000	810	0	–	80	67	55	208	1	MITSUBISHI TPLA0A0241EA70A	1,2,3,4,5,6
FCU-2	DATA ROOM 211	24,000	775	0	–	80	67	55	208	1	MITSUBISHI TPKA0A0241KA70A	1,2,3,4,5,6

NOTES:

1. BASIS OF DESIGN IS BASED ON MITSUBISHI. OTHER MANUFACTURERS MUST PROVIDE ALL COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM AT NO ADDITIONAL CHARGE TO THE PROJECT.
2. PROVIDE DISCONNECT SWITCH FOR INDOOR UNIT.
3. PROVIDE ALL SUPPORTS AND 7 DAY WALL MOUNTED PROGRAMMABLE CONTROLLER.
4. UNITS SHALL UTILIZE R-410A REFRIGERANT.
5. ALL INDOOR UNITS SHALL BE PROVIDED WITH CONDENSATE LIFT PUMP.
6. COORDINATE BACnet TIE-IN WITH BASE BUILDING BMS. ALL THERMOSTATS SHALL BE READABLE THROUGH THE BMS.

OUTDOOR VRF HEAT PUMP SCHEDULE

TAG	LOCATION	SERVICE	NOMINAL COOLING CAPACITY (BTU/H)	SEER	EER	ESP (IN. WC)	ELECTRICAL DATA				MANUFACTURER AND MODEL	NOTES
							VOLTAGE	PHASE	MCA (AMPS)	MOP (AMPS)		
ACCU-1	ROOF	DATA ROOM 211	24,000	24.2	–	–	208	1	19	26	MITSUBISHI TRUYA0241HA70	1,2,3,4
ACCU-2	ROOF	DATA ROOM 211	24,000	21.4	–	–	208	1	19	26	MITSUBISHI TRUYA0241HA70	1,2,3,4

NOTES:

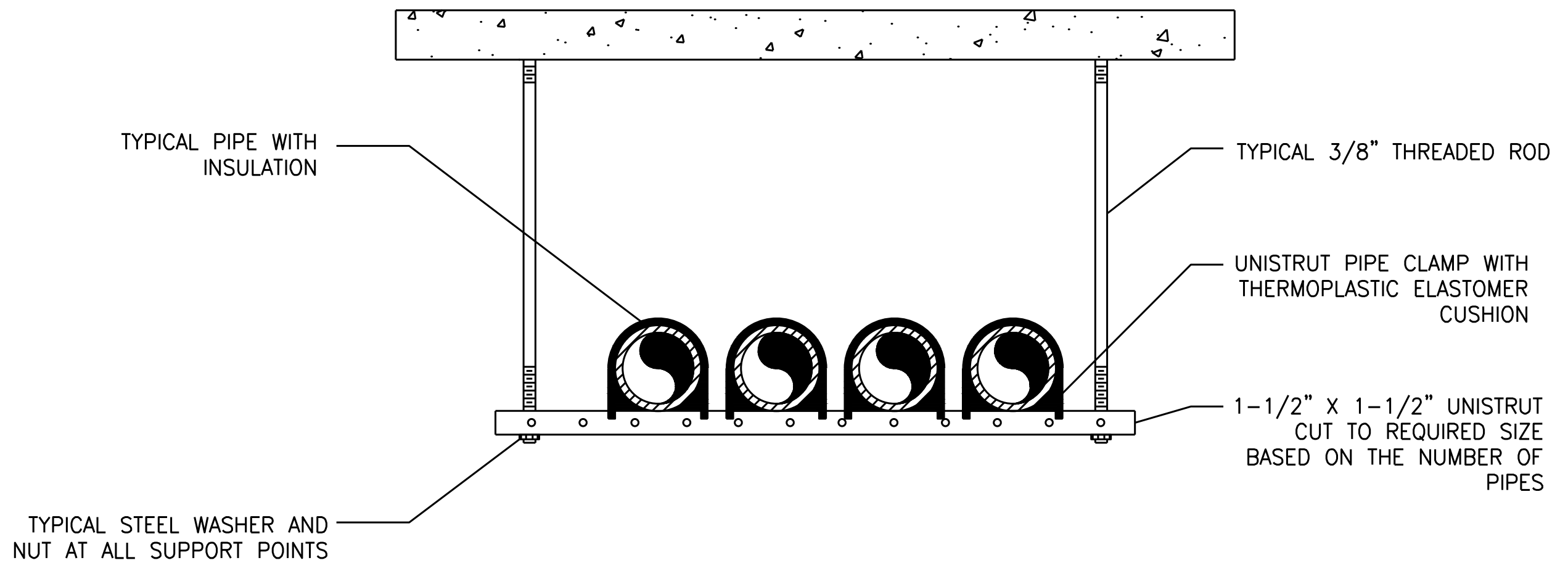
1. BASIS OF DESIGN IS BASED ON MITSUBISHI. OTHER MANUFACTURERS MUST PROVIDE ALL COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM AT NO ADDITIONAL CHARGE TO THE PROJECT.
2. PROVIDE DISCONNECT SWITCH FOR CONDENSING UNIT.
3. UNITS SHALL UTILIZE R-410A REFRIGERANT.

CONDENSATE PUMP

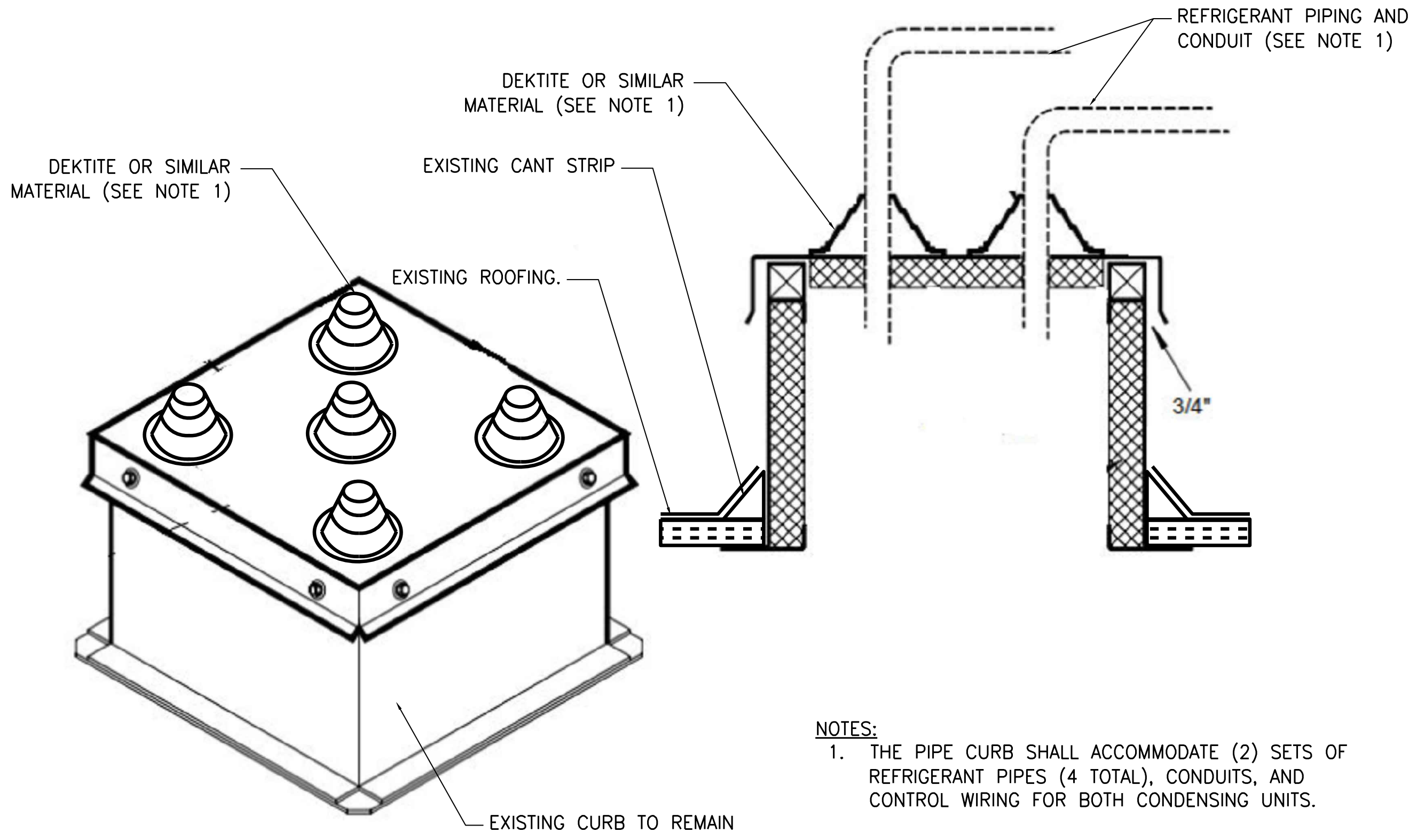
TAG	LOCATION	GPH (10 FT.)	HEAD (FT.)	SUCTION TEMP (°F)	POWER (HP)	VOLTS/PHASE	MANUFACTURER AND MODEL	NOTES
CP-A	SEE PLANS	45	15	45	1/30	115V/1	LITTLE GIANT VCC-20-P	1,2,3

NOTES:

1. FURNISHED WITH THERMAL OVERLOAD PROTECTOR, POLYETHYLENE SCREEN.
2. INTEGRAL FLOAT SWITCH, COPPER CHECK VALVE FOR ½" OP COPPER TUBING.
3. CONDENSATE PUMP TO BE PLENUM RATED AND HARD WIRED.



MULTIPLE REFRIGERANT PIPES SUPPORT



NOTES:
1. THE PIPE CURB SHALL ACCOMMODATE (2) SETS OF REFRIGERANT PIPES (4 TOTAL), CONDUITS, AND CONTROL WIRING FOR BOTH CONDENSING UNITS.

PIPE CURB FOR INSULATED ROOF ASSEMBLY

Rev.	Description	Date
	ISSUED FOR BID	08/26/21
	REISSUED FOR BID	09/13/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
MECHANICAL DETAILS AND SCHEDULES

Scale NTS
Date 08/26/2021
Drawing No. M-200
Drawn MG
C.E. Job No. 23059
Checked JH

Copyright©2021 by Collado Engineering, D.P.C.

HVAC SPECIFICATIONS

1. GENERAL

A. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

B. INVESTIGATE EACH SPACE THROUGH WITH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

C. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED.

D. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.

E. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

F. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.

G. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POINT OF CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.

H. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.

I. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.

J. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

K. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH APPROVED FIRESTOPPING METHODS.

L. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.

M. ALL PRESENT MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

N. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

O. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

P. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

Q. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

R. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.

S. ALL MATERIAL AND EQUIPMENT SHALL HAVE A UL, CSA, OR OTHER TESTING APPROVED AGENCY NUMBER. THIS INFORMATION MUST BE INCLUDED IN THE SUBMITTAL PACKAGE.

T. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

U. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.

V. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

W. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

X. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

Y. DEFINITIONS:

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

5) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

6) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

7) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

2. SCOPE OF WORK

A. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

B. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME EXCEPT REQUIRED PROGRESS AND SPECIAL INSPECTIONS. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. PROGRESS AND SPECIAL INSPECTIONS SHALL BE PERFORMED BY A LICENSED SPECIAL INSPECTION AGENCY OR A PROFESSIONAL ENGINEER TO BE HIRED BY THE OWNER.

E. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT PROVIDE COMPLETE SET OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, DUCTWORK, PIPING AND CONTROL SYSTEMS INDICATING CAPACITY DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

3. SHOP DRAWINGS

A. INDICATE ON EACH SUBMISSION: PROJECT NAME AND LOCATION, ARCHITECT AND ENGINEER, ITEM IDENTIFICATION AND APPROVAL STAMP OF PRIME CONTRACTOR.

B. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND SUBMITTALS INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1) AIR BALANCE REPORT.

2) AC UNITS.

3) PIPING LAYOUT.

4) OPERATING SEQUENCES.

5) VIBRATION ISOLATION.

6) AUTOMATIC CONTROL SYSTEMS AND DEVICES.

7) CONDENSATE PUMPS.

4. AS-BUILTS AND EQUIPMENT OPERATION INSTRUCTIONS

A. CONTRACTOR SHALL SUBMIT A PDF OR TIFF FILE TO ARCHITECT THROUGH PREVIOUSLY DISCUSSED AND APPROVED METHOD (EMAIL, SUBMITTAL EXCHANGE PROGRAM, ETC). SUBMITTAL WILL THEN BE FORWARDED TO RELEVANT PARTIES FOR REVIEW.

B. UNLESS OTHERWISE APPROVED, PROVIDE ALL MECHANICAL EQUIPMENT SUBMITTALS AND SHOP DRAWINGS AT ONE TIME.

C. PROVIDE A SEPARATE TRANSMITTAL FOR EACH SUBMITTAL ITEM. TRANSMITTALS SHALL INDICATE PRODUCT BY SPECIFICATION SECTION NAME AND NUMBER. SEPARATE ALL SUBMITTALS INTO APPROPRIATE SPECIFICATION SECTION NUMBER. DO NOT COMBINE SPECIFICATION SECTIONS.

D. SUBMIT ONLY PAGES WHICH ARE PERTINENT TO THE PROJECT. ALL OPTIONS WHICH ARE INDICATED ON THE PRODUCT DATA SHALL BECOME PART OF THE CONTRACTOR AND SHALL BE REQUIRED WHETHER SPECIFIED OR NOT.

E. MARK EACH COPY OF STANDARD PRINTED DATA TO IDENTIFY PERTINENT PRODUCTS, REFERENCED TO SPECIFICATION SECTION AND ARTICLE NUMBER.

F. SHOW REFERENCE STANDARDS, PERFORMANCE CHARACTERISTICS AND CAPACITIES; WIRING AND PIPING DIAGRAMS AND CONTROLS; COMPONENT PARTS; FINISHES; DIMENSIONS AND REQUIRED CLEARANCES.

G. MODIFY MANUFACTURER'S STANDARD SCHEMATIC DRAWINGS AND DIAGRAMS TO SUPPLEMENT STANDARD INFORMATION AND TO PROVIDE INFORMATION SPECIFICALLY APPLICABLE TO THE WORK. DELETE INFORMATION NOT APPLICABLE.

H. THE ENGINEER WILL REVIEW THE ORIGINAL SUBMITTAL AND ONE RESUBMITTAL FOR THE SAME PRODUCT. ADDITIONAL RESUBMITTALS WILL BE REVIEW ON AN HOURLY RATE, PAYABLE BY THE CONTRACTOR.

I. PARTIAL SUBMITTALS OR SUBMITTALS NOT PROPERLY FORMATTED AS INDICATED ABOVE, ARE SUBJECT TO RETURN WITHOUT REVIEW FOR THE CONTRACTOR TO CORRECT.

5. NOISE CONTROL

A. ALL ROOM NC LEVELS SHALL BE 35 OR LESS.

B. ALL SOUNDLINING, ADHESIVES, FACES AND ACCESSORIES TO BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED.

6. INSULATION - GENERAL REQUIREMENTS

F. ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E-84), (ASA A2.5-1963). FLAMESPREAD: MAXIMUM 25. FUEL CONTRIBUTED AND SMOKE DEVELOPED: MAXIMUM 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.

G. DEFINITIONS:

1) EXPOSED: INDOOR PIPING OR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND IN AREAS WHICH WILL BE VISIBLE WITHOUT REMOVING CEILINGS OR OPENING ACCESS PANELS.

2) CONCEALED: INDOOR PIPING OR EQUIPMENT WHICH IS NOT EXPOSED.

3) OUTDOOR: PIPING OR EQUIPMENT WHICH IS EXPOSED TO THE WEATHER.

7. PIPING INSULATION

A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

INSULATION SCHEDULE - PIPING

SERVICE	SIZE	THICKNESS	MATERIAL	FINISH
REFRIGERANT LIQUID & SUCTION LINES	ALL	1/2"	P-6	VAPORSEAL

B. MATERIAL:

1) TYPE P-6: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 DEG F MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE. SIMILAR TO ARMSTRONG ARMAFLEX II.

C. OUTDOOR PIPING:

1) FOR ALL PIPING, FITTINGS AND VALVES LOCATED OUTDOORS, INCREASE SCHEDULED INSULATION THICKNESS BY A MINIMUM OF 1/2 IN. PROVIDE VAPORSEAL ON ALL OUTDOOR PIPES, VALVES AND FITTINGS SUBJECT TO CONDENSATION.

D. INSTALLATION:

1) BEFORE APPLYING INSULATION ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.

2) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.

3) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS FOR PROTECTION.

4) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.

8. VIBRATION ISOLATION

A. GENERAL:

1) PROVIDE ISOLATION FOR EQUIPMENT AND PIPING.

2) INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3) PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4 IN.

4) ACCEPTABLE MANUFACTURERS:

a. MASON INDUSTRIES, INC.

b. VIBRATION ELIMINATOR CO.

c. KORFUND DYNAMICS CORP.

B. CEILING-HUNG EQUIPMENT:

1) PROVIDE SPRING HANGER ROD ISOLATORS. STEEL COMPRESSION SPRING AND NEOPRENE SOUND PAD WITHIN A STEEL RETAINER BOX. SIMILAR TO MASON TYPE PCHS.

2) 1 IN. MINIMUM STATIC DEFLECTION. 1/2 IN. MINIMUM RESERVE DEFLECTION. FACTORY-PRELOADED TO 75% OF RATED LOAD.

3) PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE EQUIPMENT OR STRUCTURE CANNOT SUPPORT POINT LOADS.

9. PIPING - GENERAL REQUIREMENTS

A. COMPLETE WITH: PIPE, FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDE, SLEEVES, AND ACCESSORIES.

B. ALL ITEMS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS:

1) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).

2) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).

3) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).

4) MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTING INDUSTRY (MSS).

C. ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE. REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.

D. PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.

E. PIPE SUPPORTS:

1) PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.

2) HORIZONTAL PIPING TO BE SUPPORTED BY FORGED STEEL ADJUSTABLE CLEVIS TYPE HANGER. MAXIMUM SPACING AS FOLLOWS:

a. STEEL 1 IN. AND SMALLER: 7 FT.

b. STEEL 1-1/4 IN. AND LARGER: 10 FT.

c. COPPER 3 IN. AND SMALLER: 7 FT.

d. ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, RUNOUTS, AND CONCENTRATED LOADS DUE TO VALVES, ETC.

3) VERTICAL PIPING:

a. BASE ELBOW SUPPORT WITH BEARING PLATE ON STRUCTURAL SUPPORT.

b. GUIDES AT EVERY SECOND FLOOR (SPACING NOT TO EXCEED 25 FT).

c. TOP SUPPORT HANGER OR SADDLE IN HORIZONTAL CONNECTION WITH PROVISIONS FOR EXPANSION.

d. INTERMEDIATE STEEL RISER CLAMP SUPPORT BOLTED AND WELDED TO PIPE BEARING ON STRUCTURAL STEEL OR BEARING PLATE AT FLOOR.

10. REFRIGERANT PIPING & SPECIALTIES

A. COPPER TUBE: ASTM B 280, H58 HARD DRAWN OR O60 SOFT ANNEALED, ASME B16.22 WROUGHT COPPER FITTINGS, BRAZED, AWS A5.8 BCUP SILVER/PHOSPHORUS/COPPER ALLOY. PIPE SUPPORTS AND ANCHORS: CONFORM TO ASME B31.5.

B. PROVIDE DIAPHRAGM PACKLESS VALVES AND SERVICE VALVES AS REQUIRED FOR ISOLATION AND SERVICE. PROVIDE INLINE MOISTURE INDICATOR. PROVIDE FILTER DRYER. TYPE.

C. EXPANSION VALVES SHALL BE ANGLE OR STRAIGHT THROUGH TYPE. SELECT VALVE FOR MAXIMUM LOAD AT DESIGN OPERATING PRESSURE AND MINIMUM 10 DEGREES F SUPERHEAT.

D. RECEIVERS TO BE ARI 495, UL LISTED, STEEL, BRAZED; 400 PSI MAXIMUM PRESSURE RATING, WITH TAPPINGS FOR INLET, OUTLET, AND PRESSURE RELIEF VALVE.

E. INSTALL REFRIGERATION SPECIALTIES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ROUTE PIPING IN ORDERLY MANNER, WITH PLUMBING PARALLEL TO BUILDING STRUCTURE, AND MAINTAIN GRADIENT. FLOOD PIPING SYSTEM WITH NITROGEN WHEN BRAZING. FOLLOW ASHRAE STD 15 PROCEDURES FOR CHARGING AND PURGING OF SYSTEMS AND FOR DISPOSAL OF REFRIGERANT. FULLY CHARGE COMPLETED SYSTEM WITH REFRIGERANT AFTER TESTING.TEST REFRIGERATION SYSTEM IN ACCORDANCE WITH ASME B31.5.

11. CONDENSATE DRAIN PIPING

A. PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L".

B. FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER.

C. PITCH, EXCEPT AS NOTED:

1) 1 IN. IN 4 FT PREFERRED.

2) 1 IN. IN 8 FT MINIMUM.

D. SWING CHECK VALVES: AT CONDENSATE PUMP DISCHARGE. 300 LB WOG, BRONZE BODY SOLDER ENDS, REGRIND BRONZE DISC TO BE USED WITH COPPER TUBING. JENKINS FIG. 1222.

12. MOTORS:

A. MOTORS (UNDER HVAC WORK): IN ACCORDANCE WITH NEMA, IEEE AND ANSI C50 STANDARDS:

1) STANDARD EFFICIENCY UNLESS OTHERWISE NOTED.

2) 1.15 SERVICE FACTOR.

3) SQUIRREL CAGE INDUCTION, OPEN DRIPPROOF TYPE, 1750 RPM, NEMA TYPE B INSULATION CLASS, CONTINUOUS DUTY, EXCEPT AS NOTED.

13. MOTOR CONTROLLERS

A. PROVIDED BY HVAC CONTRACTOR AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.

B. NEMA ENCLOSURE, WEATHERPROOF WHERE MOUNTED OUTDOORS.

C. WITH OVERLOAD PROTECTION. COORDINATE ALL MOTOR CONTROLLER TYPES AND SIZES WITH MOTOR TYPES AND SIZES.

D. 1/3 HP AND SMALLER: PROVIDE MANUAL STARTER EXCEPT USE MAGNETIC TYPE WHERE AUTOMATICALLY CONTROLLED.

1) MANUAL TYPE: 2-POLE TOGGLE SWITCH WITH OVERLOAD PROTECTION AND PILOT LIGHT.

E. 1/2 HP AND LARGER: PROVIDE MAGNETIC STARTER:

1) COMBINATION UNFUSED DISCONNECT SWITCH AND MAGNETIC STARTER EXCEPT AS NOTED.

2) OVERLOAD PROTECTION IN EACH PHASE LEG WITH RESET IN ENCLOSURE.

3) HOA SELECTOR SWITCH FOR AUTOMATICALLY OPERATED MOTORS. SAFETY CONTROLS COMMON TO BOTH CONTROLS.

4) RED, GREEN AND AMBER PILOT LIGHTS.

5) SWITCHES: HORSE-POWER-RATED, EXTERNAL PADLOCKING TYPE.

6) HOLDING COILS: 10 WATT, 120 VOLT.

7) CONTACTS: MAIN LINE AND MINIMUM (2) - NORMALLY OPEN, (2) - NORMALLY CLOSED 10 AMP AUXILIARIES, IN ADDITION TO CONTACTS REQUIRED FOR CONTROLS SPECIFIED.

8) CONTROL TRANSFORMER: FOR MOTORS OVER 120 VOLTS, TO STEP DOWN CONTROL VOLTAGE TO 120 VOLTS; OF THE REQUIRED CAPACITY WITH FUSE AND GROUND CONNECTION ON VOLTAGE SIDE.

9) FUSES: SIMILAR TO BUSSMAN.

10) RELAYS: TO SUPPLEMENT AUXILIARY CONTACTS IN CONTROLLER. MINIMUM 10 WATT COIL AND TWO 10 AMP CONTACTS.

11) TERMINALS: SUITABLE FOR CONDUCTORS NOTED AND AS APPROVED.

F. ACCEPTABLE MANUFACTURERS:

1) CUTLER-HAMMER.

2) SQUARE D.

3) ALLEN BRADLEY.

14. FIRESTOPPING

A. QUALITY ASSURANCE:

1) USE FIRESTOPPING SYSTEMS THAT HAVE BEEN TESTED IN ACCORDANCE WITH ASTM E814 OR UL 1479. LISTING BY UL (DIR), UL (FDR), FM (AG), OR ITS (DIR) IN THEIR CERTIFICATION DIRECTORIES WILL BE CONSIDERED EVIDENCE OF SUCCESSFUL TESTING.

2) MANUFACTURER QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS FOR USE IN FIRE RATED ASSEMBLIES WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE.

B. FIRESTOPPING ASSEMBLY REQUIREMENTS

1) FOR MEMBRANE AND THROUGH PENETRATIONS, PROVIDE FIRESTOPPING MATERIALS TO CREATE A LISTED SYSTEM, FOR THE ASSEMBLY BEING PENETRATED AND FIELD CONDITIONS, THAT HAVE THE FOLLOWING PROPERTIES, EXCEPT AS OTHERWISE PERMITTED BY THE BUILDING CODE:

a. FIRE RESISTANCE: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO SHOW F-RATING EQUAL TO REQUIRED FIRE RATING OF PENETRATED ASSEMBLY.

b. TEMPERATURE RISE: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO SHOW T-RATING EQUAL TO OR GREATER THAN THE F-RATING.

c. AIR LEAKAGE: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO SHOW L-RATING IS EQUAL TO OR GREATER THAN THE L-RATING OF JOINTS IN ASSEMBLY BEING PENETRATED.

d. WATERTIGHTNESS: PROVIDE SYSTEMS THAT HAVE BEEN TESTED TO MEET A CLASS 1 W-RATING FOR FLOOR PENETRATIONS.

C. FIELD CONDITIONS

1) COMPLY WITH FIRESTOPPING MANUFACTURER'S RECOMMENDATIONS FOR TEMPERATURE AND CONDITIONS DURING AND AFTER INSTALLATION; MAINTAIN MINIMUM TEMPERATURE BEFORE, DURING, AND FOR THREE DAYS AFTER INSTALLATION OF MATERIALS.

2) PROVIDE VENTILATION IN AREAS WHERE SOLVENT-CURED MATERIALS ARE BEING INSTALLED.

D. INSPECTION OF FIRESTOPPING SYSTEMS

1) METHOD OF INSPECTION SHALL BE AT THE DISCRETION OF THE SPECIAL INSPECTOR. CONTRACTOR SHALL PROVIDE ALL REQUIRED INFORMATION, COORDINATE WITH SPECIAL INSPECTOR AT LEAST 10 DAYS IN ADVANCE OF FIRE STOP INSTALLATION, AND ARRANGE SITE ACCESS. CONTRACTOR SHALL COMPLETELY REMOVE AND RESTORE ALL FIRESTOPPING THAT HAS UNDERGONE DESTRUCTIVE TESTING. NO CLAIMS FOR ADDITIONAL COST OR TIME WILL BE ALLOWED.

2) VISUAL INSPECTION: SPECIAL INSPECTOR SHALL BE ONSITE DURING INSTALLATION AND RANDOMLY WITNESS A MINIMUM OF 10% OF EACH TYPE OF FIRE STOP BEING INSTALLED.

3) DESTRUCTIVE TESTING: VERIFICATION OF FIRESTOPPING AFTER INSTALLATION HAS TAKEN PLACE. A MINIMUM OF 2%, BUT NOT LESS THAN ONE, OF EACH TYPE OF FIRE STOP SHALL BE INSPECTED PER FLOOR OR EACH AREA OF A FLOOR WHEN A FLOOR AREA IS LARGER THAN 10,000 SQ. FT.

END OF SECTION

SEQUENCE OF OPERATIONS

PROVIDE AN OPERATIONAL CONTROL SYSTEM FOR THE INDICATED HVAC SYSTEMS. PROVIDE ALL REQUIRED HARDWARE, SUCH AS CONTROLLERS, TRANSMITTERS, SENSORS, SWITCHES, AND CONTROL WIRING TO ENABLE THE INDICATED SEQUENCES OF OPERATION. PROVIDE ALL REQUIRED FIELD CONTROL WIRING TO FACILITATE INSTALLATION OF CONTROL DEVICES FURNISHED BY THE EQUIPMENT MANUFACTURERS. CONTRACTOR SHALL INTERFACE AND INTEGRATE THE NEW CONTROL SYSTEM WITH ALL VENDOR PROVIDED CONTROLS.

A. FAN COIL UNIT (FCU-1,2)

- INDOOR UNIT SHALL OPERATE TO MAINTAIN SET POINT TEMPERATURE. A LOCAL WALL MOUNTED CONTROLLER SHALL ALLOW FOR SPACE TEMPERATURE ADJUSTMENT AND SCHEDULING OF SPACE.
- COOLING MODE
  SPACE SETPOINT TEMPERATURE SHALL BE SET AT 72°F (ADJUSTABLE).
- UPON ACTIVATION OF DRIP PAN LEAK DETECTOR, UNIT SHALL SHUT DOWN AND LEAK DETECTOR SHALL SOUND AUDIBLE ALARM.
- A 7 DAY PROGRAMMABLE TSTAT SHALL BE PROVIDED FOR EACH UNIT. SCHEDULE SHALL BE SET PER THE BELOW SCHEDULE:

UNIT	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
FCU-1	72°F	72°F	72°F	72°F	80°F	80°F	80°F
FCU-2	80°F	80°F	80°F	80°F	72°F	72°F	72°F

Rev.	Description	Date
	ISSUED FOR BID	08/26/21
	REISSUED FOR BID	09/13/21

collado
445 HAMILTON AVE, SUITE 608
White Plains, NY 10601
(914) 332-7658

Engineers stamp:

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Client or Agent
SUNY PURCHASE

PURCHASE, NY

Project Title
STUDENT SERVICES IT ROOM-AC

Drawing Title
MECHANICAL SPECIFICATIONS

Scale NTS
Date 08/26/2021
Drawing No. M-300
Drawn MG
C.E. Job No. 23059
Checked JH

Copyright©2021 by Collado Engineering, D.P.C.