

MECHANICAL SYMBOLS LIST	
AC-1	TXF-1
EQUIPMENT SYMBOL	
AIR DEVICES	
	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN
	SCHEDULE DESIGNATION
AL1074 NECK SIZE 200	AIR DEVICE TAG
DUCT ACCESSORIES	
	VOLUME DAMPER W/ ACCESS DOOR
CONTROLS AND SENSORS	
	THERMOSTAT
	HOOD TEMPERATURE SENSOR
	TEMPERATURE SENSOR
	DUCT SMOKE DETECTOR
DUCTWORK	
	AIR DUCT W/ 1.5" ACOUSTICAL LINING
	FLEXIBLE DUCT
	FLEXIBLE CONNECTION
	RECTANGULAR DUCT (WIDTH X DEPTH)
	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	RETURN AIR RECTANGULAR DUCT CROSS SECTION
	ROUND DUCT (DIAMETER)
	ROUND DUCT CROSS SECTION
SCOPE OF WORK	
SCOPE OF WORK	
ABBREVIATIONS	
AL	ACOUSTIC LINING
BD	BACKDRAFT DAMPER
CDS	CEILING DIFFUSER SUPPLY
CDR	CEILING DIFFUSER RETURN
CFM	CUBIC FEET OF AIR PER MINUTE
SG	SUPPLY GRILLE
FC	FLEXIBLE CONNECTION
IEER	INTEGRATED ENERGY EFFICIENCY RATIO
EER	ENERGY EFFICIENCY RATIO
RTU	ROOF TOP UNIT
ACURT	AIR CURTAIN
TEF	TOILET EXHAUST FAN
VD	VOLUME DAMPER
KEF	KITCHEN EXHAUST FAN
RG	RETURN GRILLE
MECHANICAL DRAWING LIST	
M-001	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
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APPLICABLE CODES	
IBC	2018 INTERNATIONAL BUILDING CODE
IFC	2018 INTERNATIONAL FIRE CODE
IMC	2018 INTERNATIONAL MECHANICAL CODE
IPC	2018 INTERNATIONAL PLUMBING CODE
IECC	2018 INTERNATIONAL ENERGY CONSERVATION CODE
NFPA 70	2020 NATIONAL ELECTRICAL CODE
NFPA 58	2018 INTERNATIONAL FUEL GAS CODE

FARMERS BRANCH BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2018 INTERNATIONAL BUILDING CODE AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
2. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2018 INTERNATIONAL BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].

3. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.

4. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:

- A. STANDARDS OF HEATING – 2018 INTERNATIONAL MECHANICAL CODE, SECTION 303
- B. DUCT CONSTRUCTION AND INSTALLATION – 2018 INTERNATIONAL MECHANICAL CODE, SECTION 603
- C. AIR INTAKES, EXHAUSTS AND RELIEF – 2018 INTERNATIONAL MECHANICAL CODE, SECTION 403
- D. AIR FILTERS – 2018 INTERNATIONAL MECHANICAL CODE, SECTION 605
- E. GAS FIRED EQUIPMENT – 2018 INTERNATIONAL MECHANICAL CODE, SECTION 915

5. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.

6. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2018 INTERNATIONAL MECHANICAL CODE, SECTION 401.

7. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2018 INTERNATIONAL MECHANICAL CODE SECTION 403.

8. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.

9. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

10. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.

SCOPE OF WORK

SCOPE OF WORK

1. 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 AS DESCRIBED IN THE SPECIFICATIONS. YOUR PLAN(S), DESIGN, DETAIL DRAWINGS, NOTES, RFT'S, ETC. FOR THIS PROJECT, WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

2. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT 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 AUTHORITY AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR REMOVING THE OWNER'S EQUIPMENT OR BUILDING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. 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 OF ACTUAL USE OF EQUIPMENT OR CONSTRUCTION. THE CONTRACTOR SHALL NOT BE HELD LIABLE FOR THE DEFECTS OF THE WORK, WHICH EVER DATE IS EARLIED. 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.

4. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE ANY DEFECTS WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES HAS BEEN MADE POSSIBLE BY THE CONTRACTOR, TOGETHER WITH EXAMINATIONS 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.

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

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

7. 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.

8. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

9. PAINT ALL EXPOSED GAS PIPING USING RUST INHIBITOR PAINT. PAINT AND COLOR SHALL BE COORDINATED WITH THE ARCHITECT AND/ OR OWNER.

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.

GENERAL NOTES

GENERAL:

1. CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID. OWNER SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OR ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
2. 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.
3. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.

4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND ASSOCIATED CONTRACTS WHICH DISPARATES ARBITRARY PRACTICE WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
5. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
6. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
7. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.

8. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS, COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
9. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

11. LOCATE ALL TEMPERATURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
12. WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.

13. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
14. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONTROLLED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUIVALENT RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
15. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
16. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
17. ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL, BEAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDED BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.

18. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
19. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.

20. ALL CONDENSATE DRAIN LINES FROM EACH ROOF TOP UNIT SHALL BE PIPED FULL LENGTH OF THE DUCT PENNANT WITH 7" TRAP AND PIPES TO THE NEAREST DRAIN OR GUTTER OR DOWN SPOUT PROVIDED THAT DOWNSPOUT DOES NOT DISCHARGE ONTO PAVEMENT. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
21. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
22. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

23. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

SPECIFICATIONS

SECTION 0001 – NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

- A. THE BIDDER IS MAKING A BID REPRESENTS THAT:
- THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.
- B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
- C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
- D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
- E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

- A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.
- C. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
- D. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWNS OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

GENERAL HVAC NOTES

GENERAL:

1. PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
2. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
3. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.

4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND ASSOCIATED CONTRACTS WHICH DISPARATES ARBITRARY PRACTICE WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ME

SECTION 230529 – HANGERS AND SUPPORTS FOR HVAC
PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.

2. DESIGN EQUIPMENTS SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS.

3. DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.

1.2 SUBMITTALS

A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER

1.3 QUALITY ASSURANCE

A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE – STEEL."

1.4 COMPONENTS

A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL

B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL

C. FIBERGLASS PIPE HANGERS: –CLEVIS, CENTURY COMPOSITES, COOPER B-LINE

D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER

E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE

F. THERMAL-HANGER SHIELD INSERTS:

G. FASTENER SYSTEMS: POWDER-ACTUATED FASTENERS OR MECHANICAL-EXPANSION ANCHORS

H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB-MOUNTED TYPE

I. EQUIPMENT SUPPORTS.

END OF SECTION 230529

SECTION 230548 – VIBRATION CONTROLS FOR HVAC PIPING
AND EQUIPMENT

PART 1 – GENERAL

1.1 COMPONENTS

A. VIBRATION ISOLATORS:

1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS

2. MOUNTS: DOUBLE-DEFLECTION TYPE.

3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING.

4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN-SPRING TYPE.

5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING TYPE WITH SEISMIC RESTRAINT.

6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.

7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE.

8. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.

9. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL-LIMIT STOP.

10. PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.

11. RESILIENT PIPE GUIDES.

B. AIR-MOUNTING SYSTEMS:

1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED-AIR BELLows.

2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLows.

C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR- AND WATERPROOF CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.

D. VIBRATION ISOLATION EQUIPMENT BASES:

1. STEEL BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.

2. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE

1.2 FIELD QUALITY CONTROL

A. TESTING: BY EITHER: OWNER-ENGAGED AGENCY, CONTRACTOR-ENGAGED AGENCY, OR CONTRACTOR.

PART-2 PRODUCTS

1.1 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. ACE MOUNTINGS CO., INC.

2. AMBER/BOOTH COMPANY, INC.

3. CALIFORNIA DYNAMICS CORPORATION.

4. HILT, INC.

5. ISOLATION TECHNOLOGY, INC.

6. KINETICS NOISE CONTROL.

7. LOOS & CO: CABLEWARE DIVISION.

8. MASON INDUSTRIES.

9. TOLCO INCORPORATED: A BRAND OF NIBCO INC.

10. UNISTRUT: TYCO INTERNATIONAL, LTD.

END OF SECTION 230548

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING
FOR HVAC

1.1 SUMMARY

A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:

1. AIR SYSTEMS: CONSTANT VOLUME.

1.2 QUALITY ASSURANCE

A. THE CONTRACTOR SHALL PROCURe THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.

1.3 EXECUTION

A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDROSTATIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.

B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDROSTATIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.

C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.

D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.

E. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.

F. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY DOCUMENTED.

G. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.

H. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.

I. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

SECTION 230713 – DUCT INSULATION

1.1 QUALITY ASSURANCE

SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTM E 84.

1.2 FIELD QUALITY CONTROL

A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.

1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE:

A. CONCEALED, RECTANGULAR, ROUND AND FLAT-oval, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:

B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET, MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:

UNCONDITIONED SPACES WITHIN BUILDING: R-6
WITHIN BUILDING ENVELOPE ASSEMBLY: R-8
OUTSIDE OF BUILDING: R-8

1.4 ITEMS NOT INSULATED:

1. FIBROUS-GLASS DUCTS.

2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.

3. FACTORY-INSULATED FLEXIBLE DUCTS.

4. FACTORY-INSULATED PLENUMS AND CASINGS.

5. FLEXIBLE CONNECTORS.

6. VIBRATION-CONTROL DEVICES.

7. FACTORY-INSULATED ACCESS PANELS AND DOORS.

8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

1.5 PRODUCTS

A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:

1. JOHNS-MANVILLE

2. OWENS-CORNING

1.6 ACOUSTICAL TREATMENT

1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1 1/2" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM DENSITY, FIBERGLASS COMPOSITE FLEXIBLE DUCT LINING. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.

END OF SECTION 230713

SECTION 233113 – METAL DUCTS

1.1 CONSTRUCTION

A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 1" WG PRESSURE, SEAL CLASS "A".

B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:

1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH, USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.

2. SHEET STEEL SHALL COMPLY WITH ASTM A653 STANDARD SPECIFICATION FOR SHEET STEEL METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY-COATED (GALVANIZED BY THE HOT-DIP PROCESS AND AZOTIC COATING PROCESS) FOR GENERAL REQUIREMENT FOR SHEET METAL COATED BY THE HOT-DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT, SHALL BE GALVANIZED, CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT, PROVIDE TURNING VAVES ALL 90° ELBOWS.

3. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEAM COMPOUND EQUAL TO BENJAMIN FOSTER NO. 30-03 INSERED. SEAM COMPOUND SHALL BE BRUSHED WITH NO. 30-02 AND COVERED WITH APPROVED SEALING TAPE.

4. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWG A5.2.

C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:

4. COILS AND RELATED COMPONENTS.

5. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VAVES.

6. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VAVES.

7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.

1.4 DUCT SCHEDULE

A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:

1. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

END OF SECTION 233113

SECTION 233713 – DIFFUSERS AND GRILLES

1.1 PRODUCTS

A. DIFFUSERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.

B. MANUFACTURERS: TITUS

1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:

a. CARNES.

b. HART & COOLEY INC.

c. KRUEGER.

d. METALAIR, INC.

e. NAILOR INDUSTRIES INC

C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713

GENERAL NOTES

- A. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
- B. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- C. THE CONTRACTOR SHALL VERIFY EXACT LOCATION OF TRUSSES AND MODIFY DUCTWORK ACCORDINGLY.
- D. PROVIDE ALL NEW DUCTWORK AS SHOWN. DUCT WORK ABOVE CEILING TO BE INSULATED ACCORDING TO HOUSTON ENERGY CODE 2021.
- E. FLEXIBLE AIR CONNECTORS SHALL BE TESTED IN ACCORDANCE WITH UL 181. SUCH DUCTS SHALL BE LISTED AND LABELED AS CLASS 0 OR CLASS 1 FLEXIBLE AIR CONNECTORS. FLEXIBLE AIR CONNECTORS SHALL BE LIMITED IN LENGTH TO 14 FEET.
- F. TEST & BALANCE SYSTEM PRIOR TO CLOSEOUT OF PROJECT. PROVIDE A DETAILED REPORT TO OWNER, ARCHITECT, & ENGINEER.
- G. ALL DUCTWORK SHALL BE FABRICATED, INSTALLED, SEALED, AND INSULATED PER THE LATEST ISSUE OF SMACNA LOW-VELOCITY DUCT MANUAL.
- H. DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSION.
- I. THE CONTRACTOR SHALL VERIFY EXACT LOCATION OF TRUSSES AND MODIFY DUCTWORK ACCORDINGLY.
- J. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS/SLABS. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.
- K. DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET OF THE FAN FOR SIDE-INLET UTILITY FANS APPROVED FLEXIBLE CONNECTIONS MAY BE PROVIDED.
- L. ALL WORK SHALL BE SUBJECT TO THE ACCEPTANCE AND APPROVAL OF THE ARCHITECT AND OWNER. THE ARCHITECT SHALL BE NOTIFIED OF ANY AND ALL DISCREPANCIES BETWEEN FIELD CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK. FAILURE OF PROPER NOTIFICATION DOES NOT RELIEVE THE CONTRACTOR. THE CONTRACTOR SHALL CORRECT ANY AND ALL WORK ARISING FROM SUCH FAILURE TO COORDINATE DISCREPANCIES TO THE SATISFACTION OF THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.
- M. THE CONTRACTOR SHALL, UPON COMPLETION OF PROJECT, PERFORM A COMPLETE TEST AND BALANCE OF ALL EQUIPMENT. PROVIDE A WRITTEN REPORT TO THE ARCHITECT. ALL CAPACITIES MUST BE SET TO WITHIN $\pm 10\%$ OF AMOUNTS INDICATED ON THE FLOOR PLAN AND SCHEDULES.
- N. PROVIDE CORD OPERATED DAMPERS FOR AIR TERMINALS MOUNTED IN INACCESSIBLE CEILINGS.
- O. PROVIDE DUCT INSULATION AS SPECIFIED WITH MINIMUM VALUES AS FOLLOWS:
 - R-6 SUPPLY & RETURN DUCT INSULATION IN UNCONDITIONED SPACES WITHIN BUILDING.
 - R-8 SUPPLY & RETURN DUCT INSULATION WITHIN BUILDING ENVELOPE ASSEMBLY.
 - R-8 SUPPLY & RETURN DUCT INSULATION OUTSIDE OF BUILDING

MECHANICAL FLOOR PLAN KEY NOTES

1 REUSE & RELOCATE EXISTING THERMOSTATS IF IT IS IN GOOD CONDITION. IF NOT OPERABLE, PROVIDE 7-DAY PROGRAMMABLE THERMOSTATS AND RELATED WIRING TO CONTROL RTU-1(E) & RTU-2(E). MOUNT 48" AFF. PROVIDE LOCKABLE COVER. RELOCATE AS/IF REQUIRED. CONFIRM & COORDINATE FINAL LOCATION WITH ARCHITECT/OWNER.

2 INSTALL TYPE-II EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. REFER TO HOODS DRAWINGS ON SHEET H-101 TO H-115 FOR SPECIFICATIONS & MORE DETAILS.

3 20"Ø KITCHEN EXHAUST DUCT FROM HOOD UP THRU ROOF TO KEF-1(N).

4 18"Ø KITCHEN EXHAUST DUCT FROM HOOD UP THRU ROOF TO KEF-2(N).

5 EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM EXISTING ROOFTOP UNITS TO SPACE. EXTEND AS SHOWN. TRANSITION DUCT AS NECESSARY TO MAKE CONNECTION. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.

6 REUSE EXISTING REMOTE TEMP. SENSORS MOUNTED IN RETURN AIR DUCT. PROVIDE NEW TEMP. SENSORS IF EXISTING TEMP. SENSORS ARE DAMAGED OR NOT WORKING PROPERLY.

7 REUSE EXISTING SMOKE DETECTORS. IF EXISTING SMOKE DETECTORS ARE NOT IN GOOD CONDITION TO REUSE, THEN INSTALL NEW ONE. SMOKE DETECTORS SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR & WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTUs UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER NEC. SMOKE DETECTORS SHALL BE SYSTEM SENSOR MODEL DH100ACDCLP.

8 PROVIDE A DRAFT HOOD AND A 4"Ø VENT PIPE FOR THE WATER HEATER. VENTING AS PER THE MANUFACTURER'S RECOMMENDATIONS. ROUTE AND TERMINATE THE VENT PIPE THROUGH THE ROOF.

9 PROVIDE ELECTRIC DUCT HEATERS FOR EXISTING RTUs AS SHOWN. INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS. REFER TO SCHEDULES ON SHEET M-600 FOR ADDITIONAL INFORMATION. PROVIDE 24"x24" ACCESS CLEARANCE FOR UNIT.

10 EXTEND MAKE-UP AIR DUCT FROM MAU-1(N) & MAU-2(N) TO THE SUPPLY DIFFUSER.

11 20"X16" & 12"X12" MAKE-UP AIR DUCT UP THRU ROOF TO MAU-1(N) & MAU-2(N) RESPECTIVELY.

12 EXISTING AIR CURTAIN TO REMAIN. CONTRACTOR TO CHECK THE WORKING CONDITION AND CLEAN IT "LIKE NEW". IF NOT WORKING, REPLACE WITH A NEW ONE SIMILAR IN KIND.

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85°C Bakery Cafe[®]

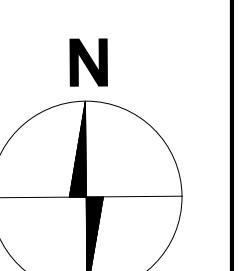
2 MECHANICAL FLOOR PLAN

SCALE: 3/16" = 1'-0"

1 MECHANICAL FLOOR PLAN

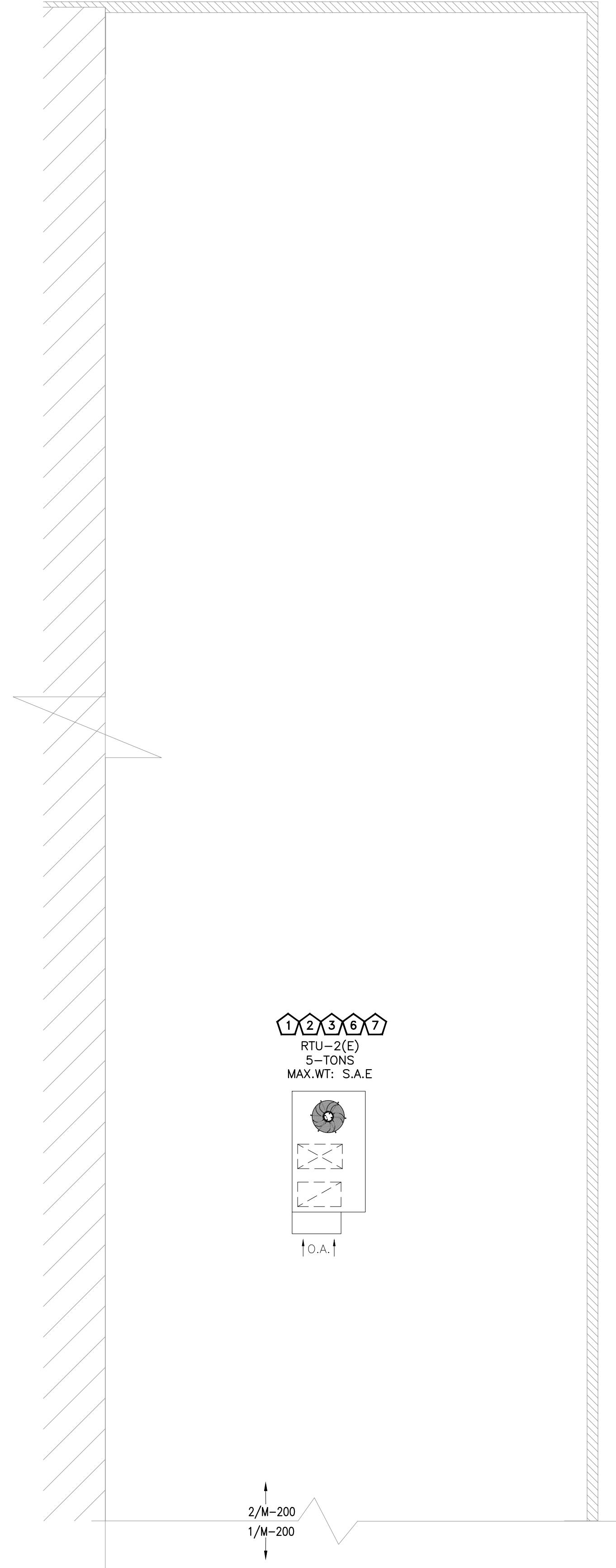
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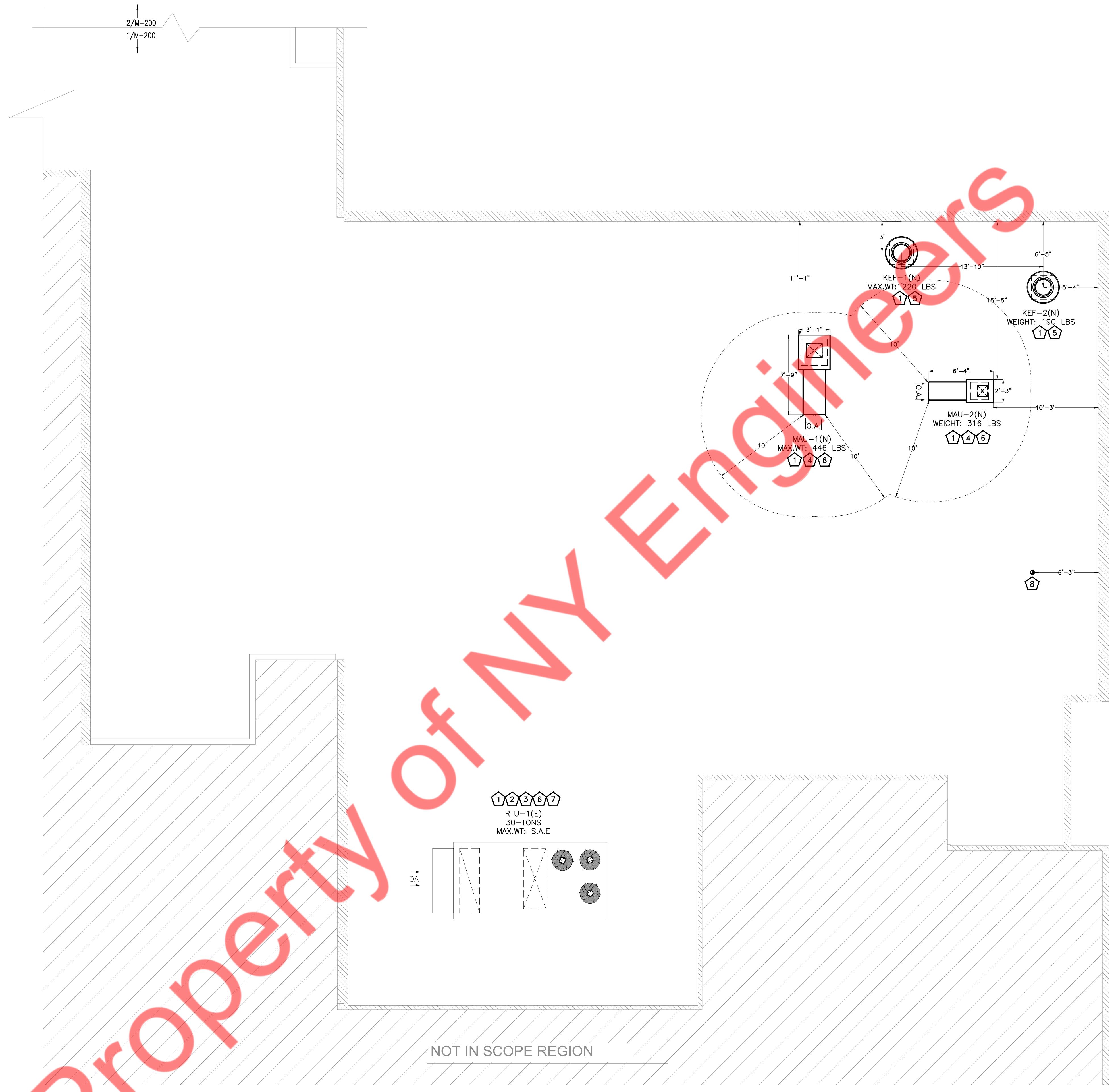


MECHANICAL FLOOR PLAN

M-100



② MECHANICAL ROOF PLAN
SCALE: 3/16" = 1'-0"



① MECHANICAL ROOF PLAN
SCALE: 3/16" = 1'-0"

GENERAL NOTES	
A. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.	
B. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.	
C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.	
D. ALL DUCTWORK, MECHANICAL EQUIPMENT, MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.	
E. EXISTING ROOF CURBS TO BE REUSED WHEREVER POSSIBLE. CONTRACTOR TO CLEAN & REFURBISH EXISTING CURBS. IF EXISTING ROOF CURBS, REPLACE IF NOT IN GOOD CONDITION.	
F. REUSE EXISTING RTUs ON EXISTING ROOF CURBS WHEREVER POSSIBLE. USE CURB ADAPTER AS REQUIRED. CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF EXISTING UNITS.	
G. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO GENERAL CONTRACTOR AND OWNER.	
H. ALL RTU WEIGHTS ARE INCLUDING ROOF CURBS AND/OR ADAPTORS.	
I. PATCH THE EXISTING PENETRATIONS OF THE ROOF IF EXISTING PENETRATION IS NOT FEASIBLE/WORKABLE FOR NEW UNITS. COORDINATE WITH ROOFING CONTRACTOR AS REQUIRED.	
J. IF EXISTING ROOF CURBS ARE DAMAGED OR NOT REUSABLE, REPLACE WITH NEW ROOF CURB REQUIRED AND REDO ROOFING. COORDINATE WITH ROOFING CONTRACTOR.	
K. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.	
L. G.C. TO PATCH & REPAIR EXTRA PENETRATION ON ROOF TO MATCH EXISTING IN ALL ASPECTS.	

MECHANICAL ROOF PLAN KEY NOTES	
①	COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL ENGINEER/DRAWINGS.
②	CONTRACTOR TO COORDINATE THE FINAL LOCATION OF EXISTING RTUs ON ROOF. TRANSITION & CONNECT SUPPLY AND RETURN AIR DUCTWORK FROM BELOW. SET RTU SCHEDULE.
③	EXISTING CONDENSATE DRAIN FROM EXISTING RTUs TO REMAIN AS IS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINES. REPLACE AS/YIF REQUIRED.
④	PROVIDE MAKE-UP AIR UNITS AND ROOF CURBS. PROVIDE FLEXIBLE CONNECTION ON THE SUPPLY DUCT CONNECTION TRANSITION TO DUCT SIZE INDICATED. FIELD VERIFY EXISTING CONDITIONS PRIOR TO BID.
⑤	PROVIDE ROOF MOUNTED KITCHEN EXHAUST FAN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES & A MINIMUM OF 40" ABOVE ROOF.
⑥	CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE SHOULD BE AT LEAST 10' AWAY FROM THE OUTSIDE AIR INTAKE OPENING OF RTUs & MAU.
⑦	EXISTING ROOF TOP UNITS WITH ROOF CURB TO REMAIN & TO BE REUSED. PROVIDE CURB ADAPTER AS/YIF REQUIRED. CLEAN & REFURBISH RTUs TO "LIKE-NEW" CONDITION. REPAIR /REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE A FULLY FUNCTIONING UNIT.
⑧	ROUTE AND TERMINATE THE 4" VENT PIPE ON THE ROOF AT A MINIMUM OF 18" HEIGHT FROM THE FINISHED ROOF LEVEL. TERMINATE WITH EITHER GOOSENECK & BIRD-SCREEN SETUP OR RAINCAP & BIRD-SCREEN SETUP. INSTALL AS PER MANUFACTURES RECOMMENDATIONS.

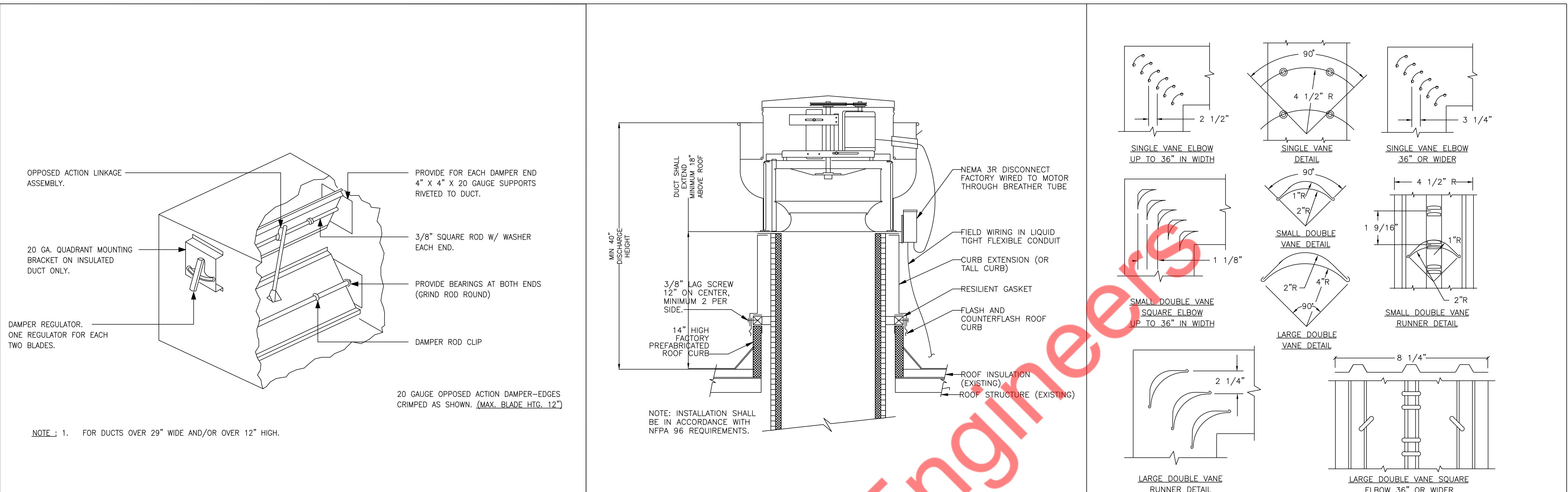
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N
MECHANICAL
ROOF PLAN

M-200

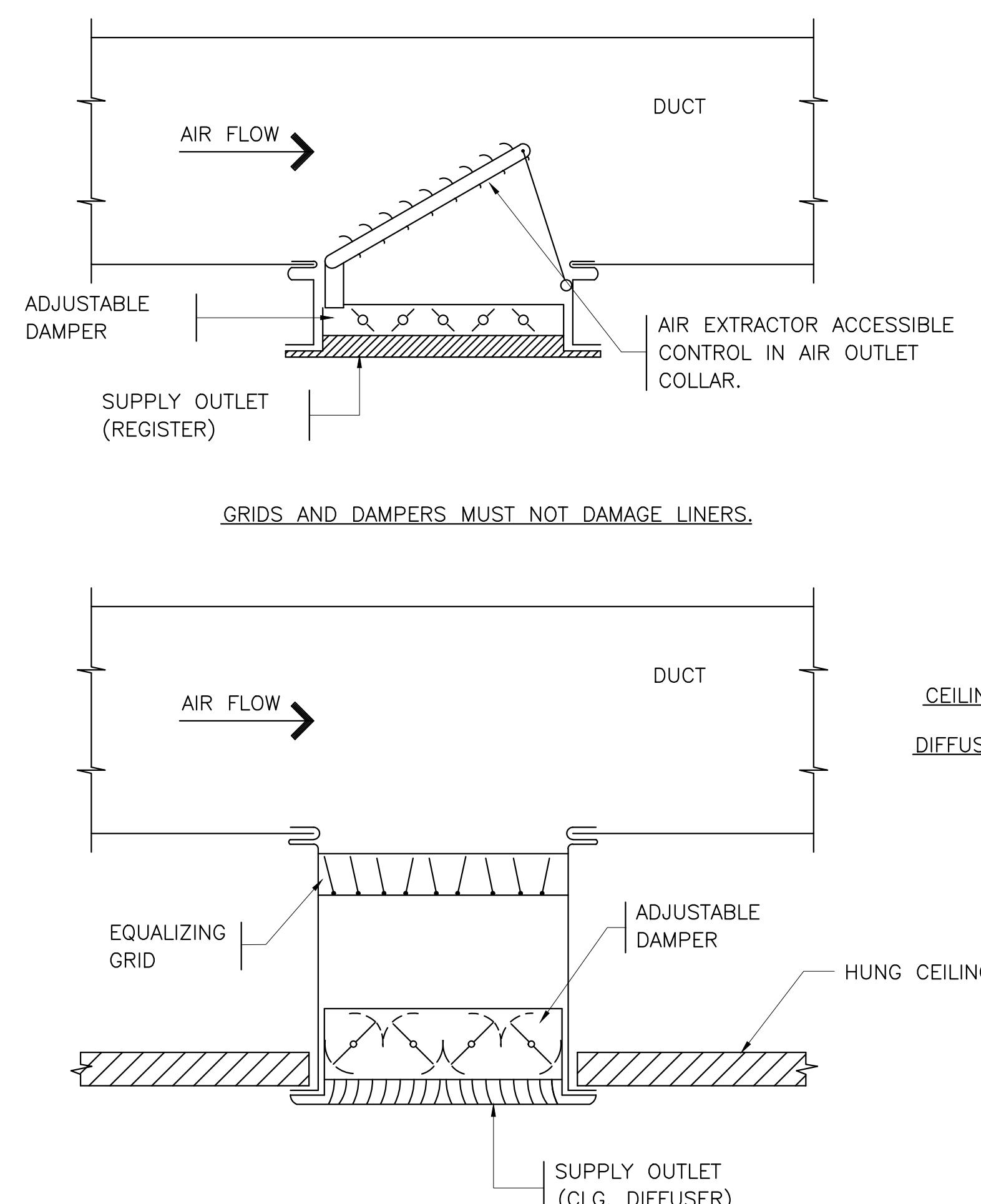
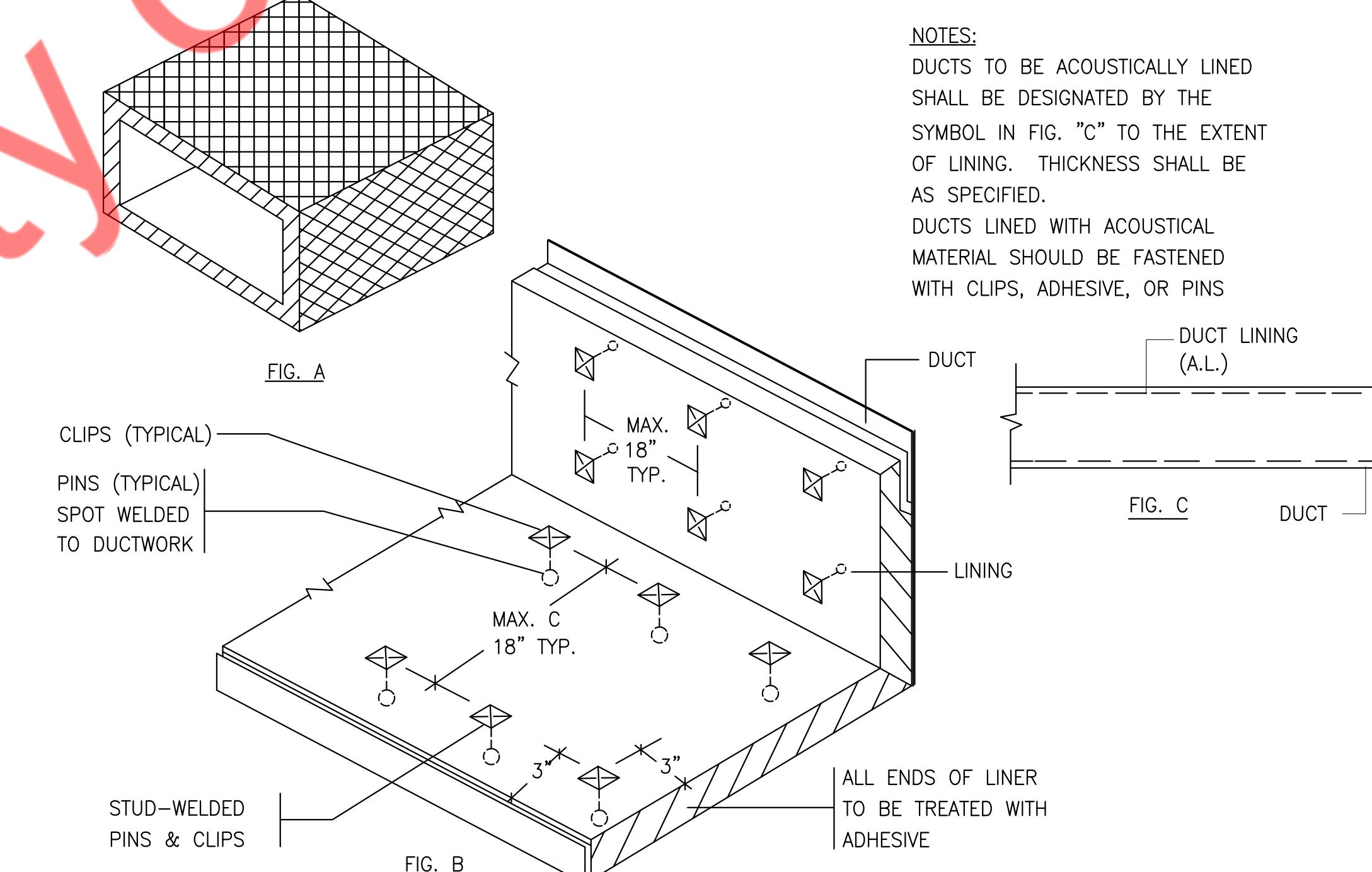
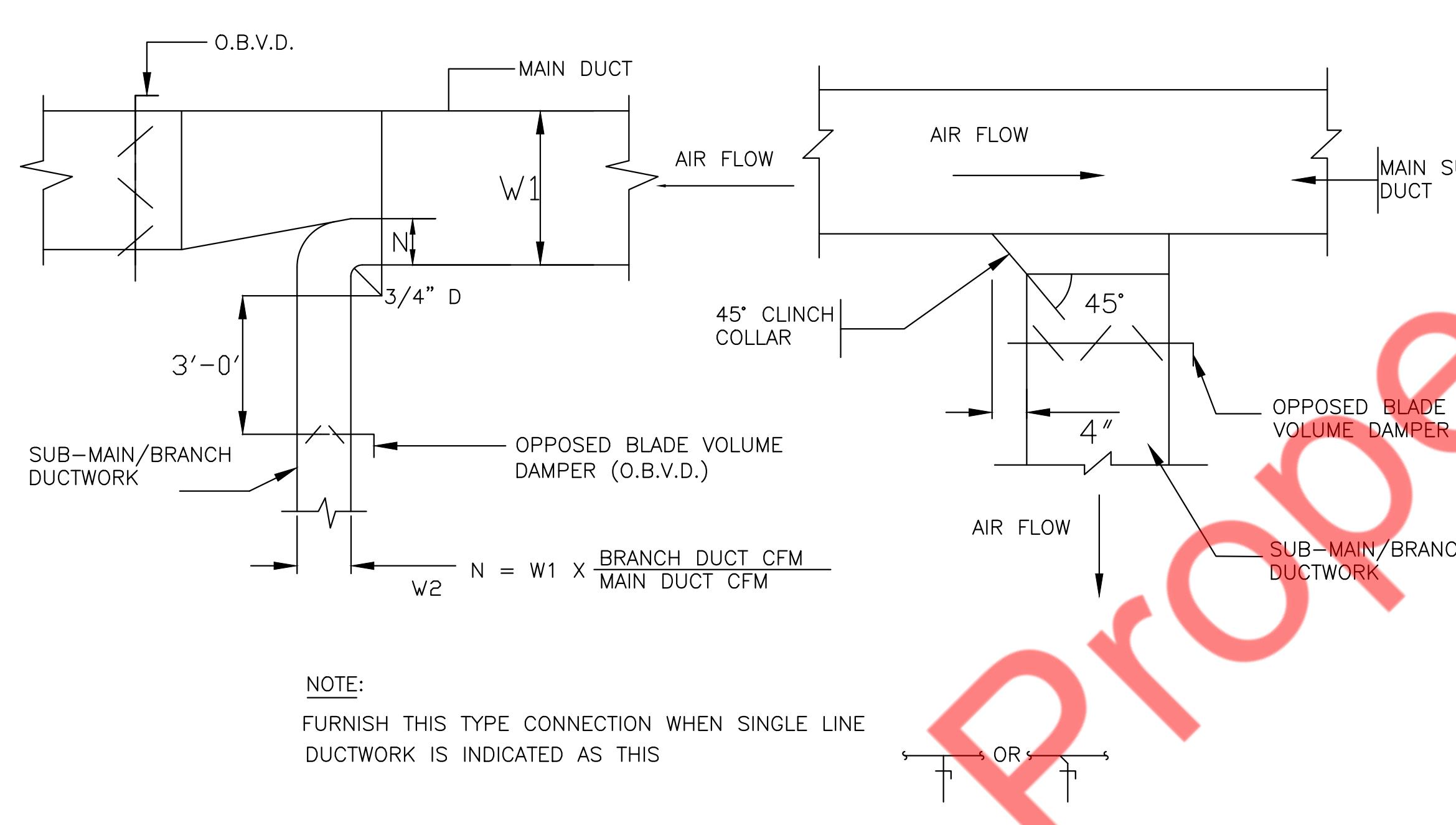


1 LOW PRESSURE BALANCING DAMPER
M-500 N.T.S

2 ROOF MOUNTED KITCHEN EXHAUST FAN DETAIL
M-500 N.T.S

3 LOW VELOCITY DUCTWORK ELBOWS
M-500 N.T.S

PROJECT NUMBER



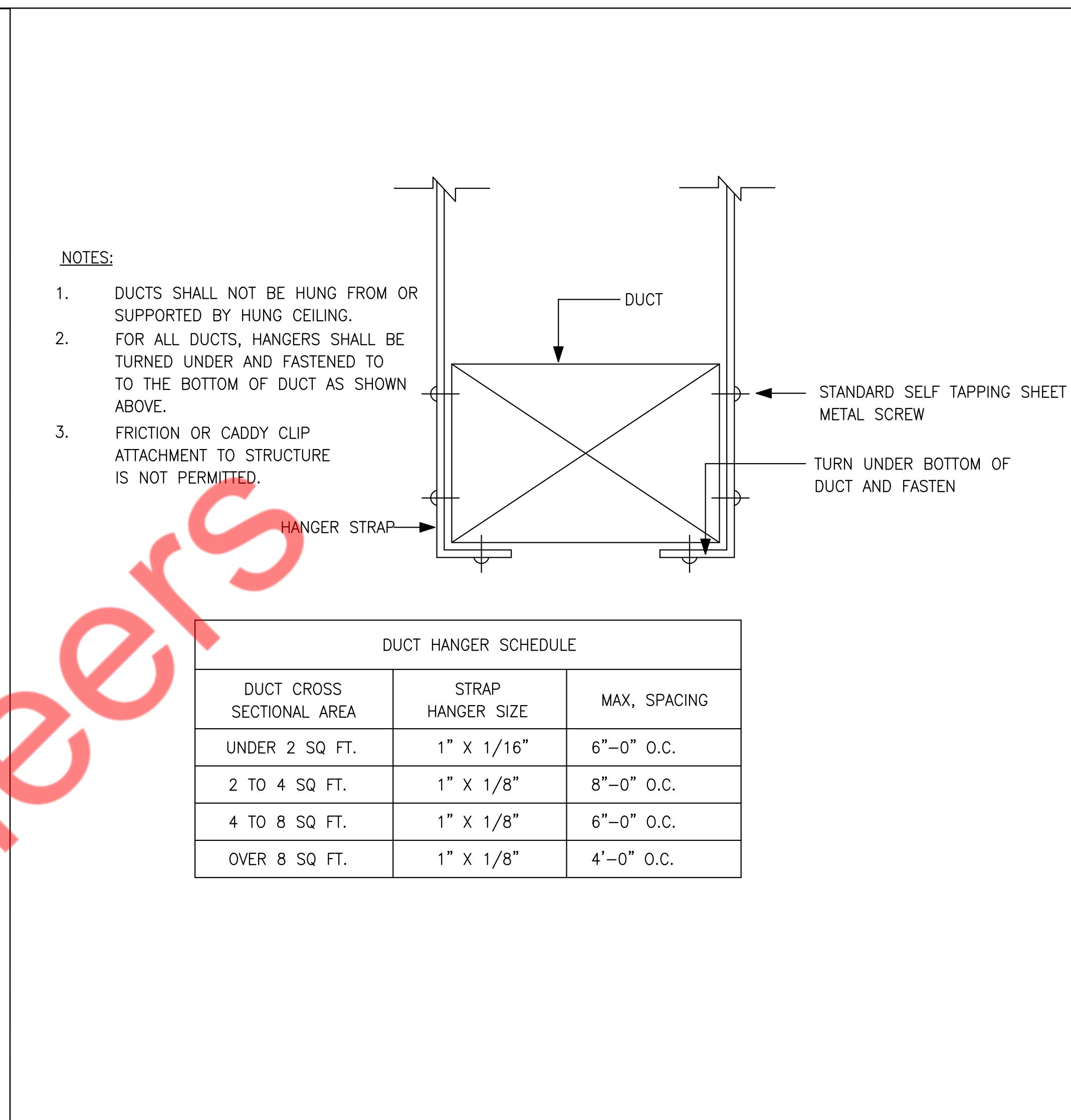
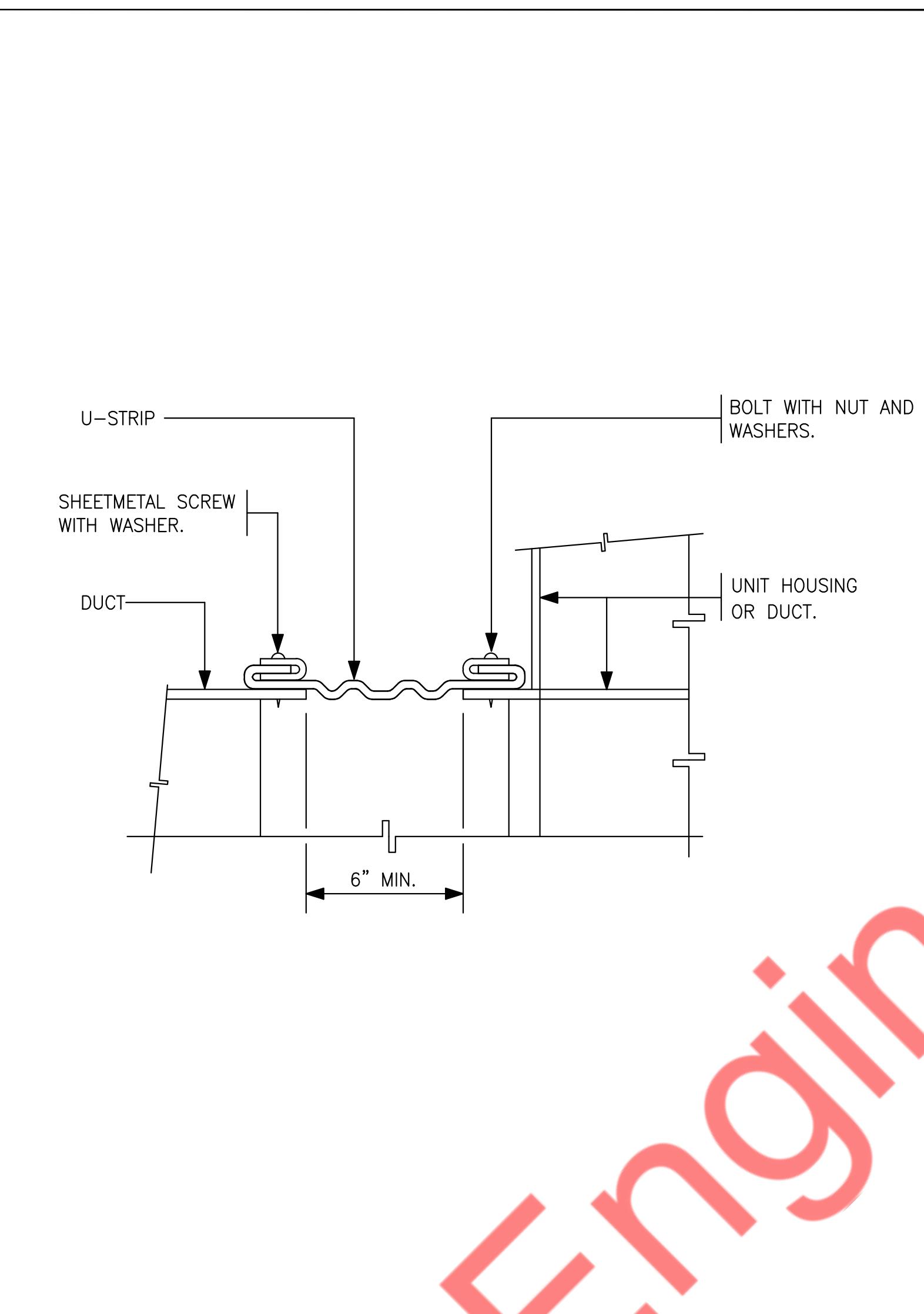
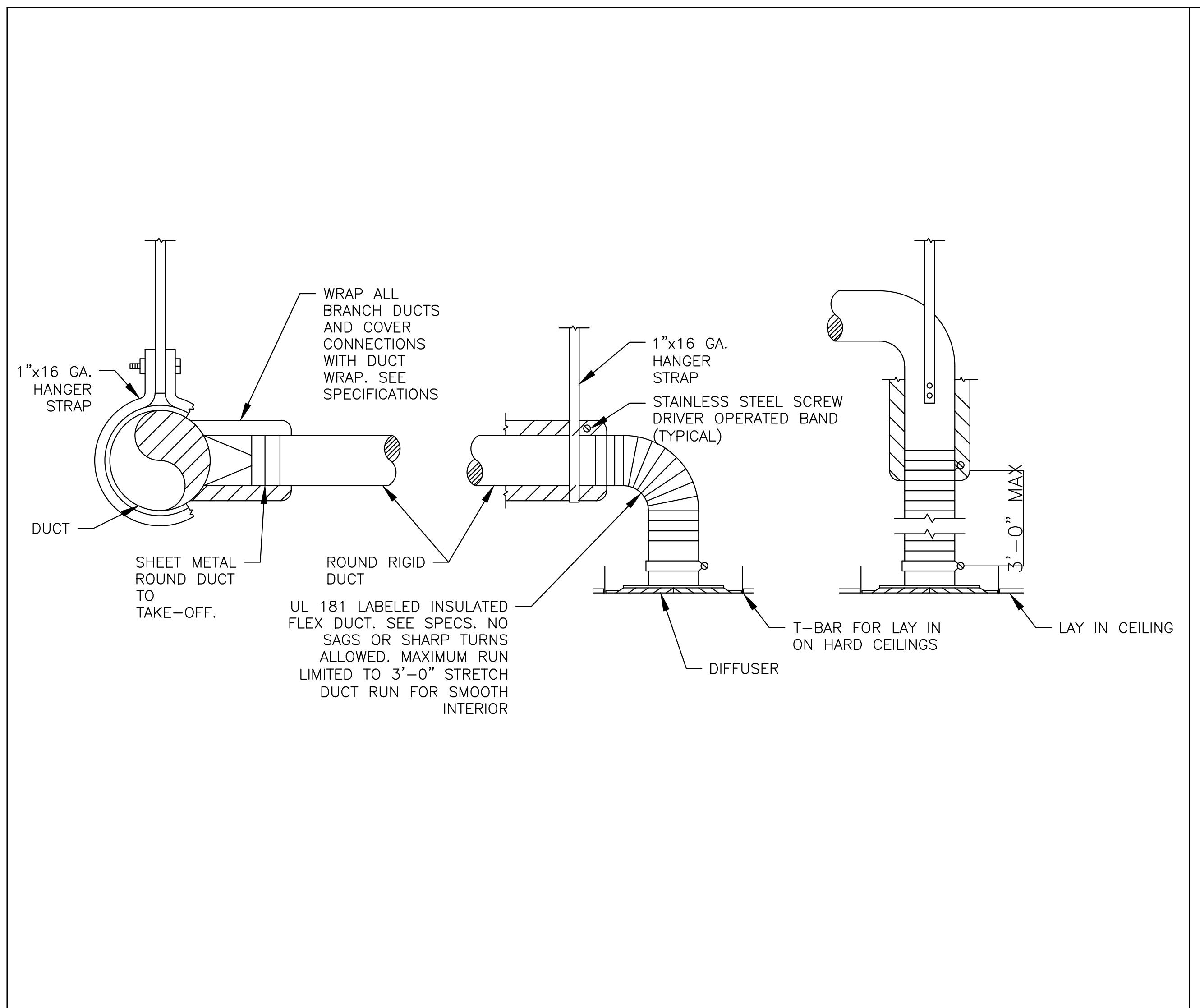
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4 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
M-500 N.T.S

5 ACOUSTICAL TREATMENT DUCT LINING
M-500 N.T.S

6 DIFFUSER AND GRILLE REGISTER CONNECTIONS

MECHANICAL DETAILS (1 OF 2)



1 TYPICAL DIFFUSER CONNECTION DETAIL
M-501 N.T.S.

2 FLEXIBLE CONNECTION (DUCT-EQUIPMENT)
M-501 N.T.S.

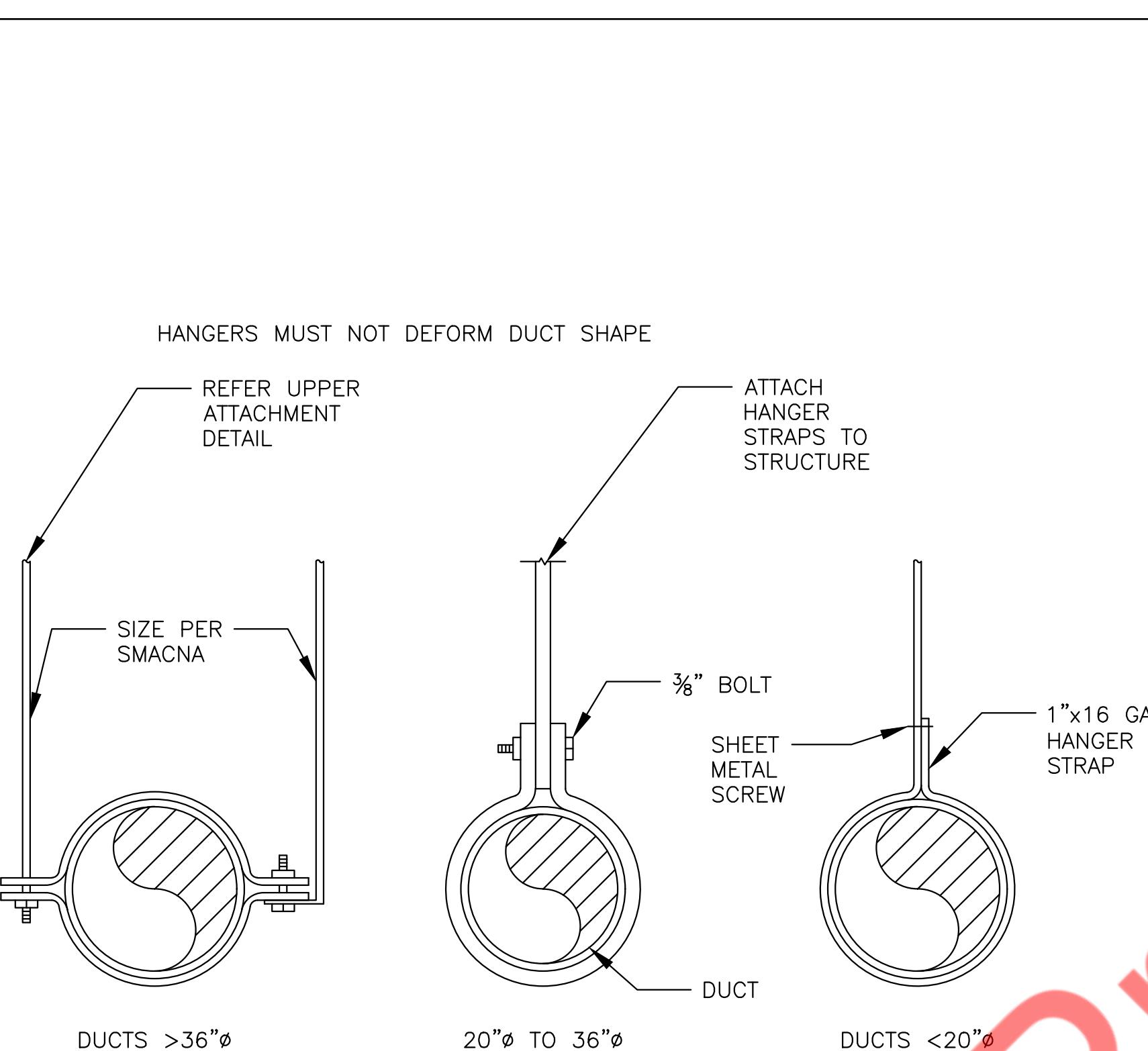
3 DUCT HANGING DETAILS
M-501 N.T.S.

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MECHANICAL DETAILS
(2 OF 2)



4 ROUND DUCT SUPPORT DETAIL
M-501 N.T.S.

M-501

EXISTING ROOF TOP UNIT SCHEDULE																		
UNIT ID	MANUFACTURER	MODEL	AREA SERVED	NOMINAL TONS	SUPPLY FAN			COOLING CAPACITY			ELECTRICAL DATA				EER	IEER	MAX OPERATING WEIGHT (LBS.)	NOTES
					SUPPLY AIR CFM	OUTSIDE AIR CFM	MAX. ESP (IN. OF W.G.)	TOTAL MBH	SENSIBLE DB	AMBIENT TEMP. DB / WB (°F)	ENTERING TEMP. DB	VOLTS	PHASE	MCA (A)	MCOP (A)			
RTU-1(E)	TRANE (V.I.F.)	TCD360A40Z1B6EC1 (V.I.F.)	SEE PLAN	30 (V.I.F.)	12000 (V.I.F.)	1120	S.A.E.	S.A.E.	S.A.E.	S.A.E.	460 (V.I.F.)	3 (V.I.F.)	85 (V.I.F.)	3.10 (V.I.F.)	S.A.E.	S.A.E.	S.A.E.	1-7
RTU-2(E)	TRANE (V.I.F.)		SEE PLAN	5 (V.I.F.)	2000 (V.I.F.)	160	S.A.E.	S.A.E.	S.A.E.	S.A.E.	460 (V.I.F.)	3 (V.I.F.)	31 (V.I.F.)	45 (V.I.F.)	S.A.E.	S.A.E.	S.A.E.	1-7

NOTES FOR EXISTING RTUs:-

1. S.A.E. - SAME AS EXISTING, V.I.F. - VERIFY IN FIELD.
2. EXISTING RTUs WITH ALL ACCESSORIES TO REMAIN AND TO BE REUSED.
3. CONTRACTOR TO CONFIRM IF EXISTING RTUs ARE WORKING AT 100% RATED CAPACITY.
4. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF RTUs ON SITE.
5. IF REQUIRED, PROVIDE NEW THERMOSTATS AND TEMPERATURE SENSORS COMPATIBLE WITH EXISTING RTUs. COORDINATE FINAL LOCATION WITH ARCHITECT/OWNER.
6. CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON EXISTING RTUs TO MATCH VALUES MENTIONED IN ABOVE TABLE.
7. REPLACE ALL FILTERS, IF REQUIRED. PROVIDE MINIMUM MERV-8 FILTERS.

VENTILATION CALCULATION TABLE													
ROOM NAME	AREA (SQ.FT.)	NUMBER OF People/1000 SQ.FT AS PER 2018 IMC	NUMBER OF People AS PER 2018 IMC	FINAL People NO.	MIN OUTSIDE AIR AS PER 2018 IMC	REQUIRED OUTSIDE AIR (CFM/PEOPLE)	PROVIDED OUTSIDE AIR (CFM/SQ.FT)	EXHAUST AIRFLOW RATE (CFM/SQ.FT) OR (CFM/FIXTURE)	REQUIRED EXHAUST (CFM)	PROVIDED EXHAUST (CFM)			
LOBBY	156	10		2	5	0.06	19	20	0	0			
EMPLOYEE LOUNGE	1263	50		64	64	0.06	396	400	0	0			
SEAFOOD SALAD	400	20		8	8	7.5	0.12	108	110	0			
FILLING ROOM	1019	20		21	21	7.5	0.12	280	300	0.7	713.3	5700	
HALLWAY	917	0		0	0	0	0.06	55	60	0	0	0	
IT ROOM	175	0		0	0	0	0.12	21	30	0	0	0	
HR ROOM	95	5		0	0	5	0.06	6	10	0	0	0	
STAGING AREA	2886	0		0	0	0.12	346	350	0	0	0		
TOTAL	6911	-	-	95	-	-	1231	1280	-	713	5700		

KITCHEN MAKE UP AIR UNIT SCHEDULE														
TAG	SERVICE	FLOW RATE	EXTERNAL STATIC	SPEED CFM	FAN DATA			WEIGHT (LBS)	BASIS OF DESIGN		REMARK			
					IN W.G.	RPM	V/PH/HZ		FLA	MCA (A)	MCOP (A)			
MAU-1(N)	HOOD-A1(N) & HOOD-A2(N)	2880	0.5	1083	208/360	6.6	8.3	15	1.5	0.7	446	VENTILATION DIRECT	VA2-20D	1,2,3,4
MAU-2(N)	HOOD-A3(N) & HOOD-A4(N)	1680	0.5	1631	208/360	4.4	5.5	15	1.5	0.6	316	VENTILATION DIRECT	VA1-15D	1,2,3,4

NOTES:

1. PROVIDE ALL NECESSARY ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATIONS.
2. REFER MAKE UP AIR UNIT DATA ON SHEET H-101 TO H-115 FOR DETAILED INFORMATION.
3. CONTRACTOR TO PROVIDE MAKE UP AIR UNIT SELECTION EQUIVALENT TO ABOVE SELECTION.

KITCHEN EXHAUST FAN SCHEDULE												
MARK	MANUFACTURER	MODEL	SERVICE	DRIVE TYPE	RPM	MOTOR HP	EXHAUST AIR DATA		ELECTRICAL DATA		ACCESSORIES	MAX WEIGHT (LBS)
							AIR (CFM)	E.S.P. (IN. W.G.)	VOLTAGE	PHASE		
KEF-1(N)	VENTILATION DIRECT	VXD180	HOOD-A1(N) & HOOD-A2(N)	DIRECT	1192	2	3600	0.786	208	3	RC,FSC,WP	220
KEF-2(N)	VENTILATION DIRECT	VXD180	HOOD-A3(N) & HOOD-A4(N)	DIRECT	863	1	2100	0.786	208	3	RC,FSC,WP	190

ACCESSORIES:

FSC - FACTORY MOUNTED AND WIRED VARIABLE SPEED CONTROL, FACTORY FURNISHED 12" ROOF CURB, WP - NEMA 1 DISCONNECT SWITCH

NOTES:

1. FAN SHALL BE CONTROLLED BY HOOD CONTROLS. INTERLOCK RTU-1(E) TO OPERATE IN OCCUPIED MODE WHILE KITCHEN EXHAUST FAN IS ENERGIZED.
2. REFER TO HOODS DRAWINGS ON SHEET H-101 TO H-115 FOR SPECIFICATIONS AND MORE DETAILS. SCHEDULES SHOWN FOR REFERENCE ONLY.

ELECTRIC DUCT HEATER SCHEDULES											
UNIT ID	MANUFACTURER	QUANTITY	MODEL	LOCATION	TYPE	STAGES	HEATING CAPACITY (kW)	DIMENSIONS (W'XH'D')	VOLTS	PHASE	AMPS
EDH-1(N)	GREENHECK	1	IDHE	SEE ON PLAN	SLIP IN	2	18	20X16X14	480	3	21.65
EDH-2(N)	GREENHECK	1	IDHE	SEE ON PLAN	SLIP IN	2	20	20X18X14	480	3	24.05
EDH-3(N)	GREENHECK	1	IDHE	SEE ON PLAN	SLIP IN	2	48	32X20X23	480	3	57.73
EDH-4(N)	GREENHECK	1	IDHE	SEE ON PLAN	SLIP IN	2	10	14X14X14	480	3	12.02
EDH-5(N)	GREENHECK	1	IDHE	SEE ON PLAN	SLIP IN	2	15	18X12X19	480	3	18.04

NOTES / ACCESSORIES:

1. INSTALL ELECTRIC DUCT HEATER AS PER MANUFACTURER'S RECOMMENDATION.
2. PROVIDE DISCONNECT SWITCH, VAPOR BARRIER, DUCT TIGHT BOX AND FAN INTERLOCK SWITCH.
3. PROVIDE T-STAT & WIRE TO DUCT HEATERS.
4. PROVIDE DUCT HEATER WITH SCR CONTROL & THERMOSTAT.

|--|

HOOD INFORMATION - JOB#7349904

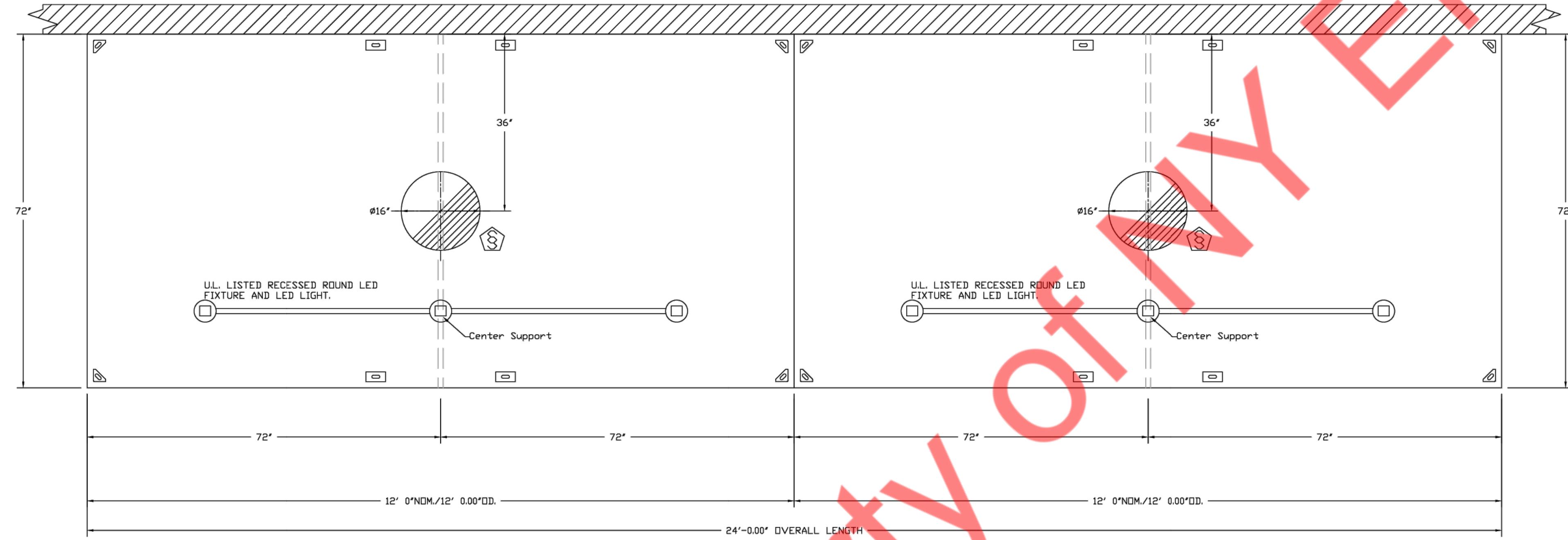
HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S)				HOOD CONSTRUCTION	HOOD CONFIG			
										WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP		
1	Hood-A	7224VXB-G	VENTILATION DIRECT	12' 0"	700 DEG	II	N/A	150	1800			4'	16'	1800	1289	-0.166*	430 SS 100%	LEFT ALONE
2	Hood-A	7224VXB-G	VENTILATION DIRECT	12' 0"	700 DEG	II	N/A	150	1800			4'	16'	1800	1289	-0.166*	430 SS 100%	RIGHT ALONE
3	Hood-A	5424VXB-G	VENTILATION DIRECT	7' 0"	700 DEG	II	N/A	150	1050			4'	12'	1050	1337	-0.129*	430 SS 100%	LEFT ALONE
4	Hood-A	S424VXB-G	VENTILATION DIRECT	7' 0"	700 DEG	II	N/A	150	1050			4'	12'	1050	1337	-0.129*	430 SS 100%	RIGHT ALONE

HOOD INFORMATION

HOOD NO	TAG	FILTER(S)				LIGHT(S)			UTILITY CABINET(S)				FIRE SYSTEM	ELECTRICAL	SWITCHES	FIRE SYSTEM HANGING PIPING	HOOD PIPING WEIGHT
		TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	WIRE GUARD	LOCATION	SIZE	TYPE	SIZE	MODEL #	QUANTITY		
1	Hood-A						3	RECESSED ROUND	NO							NO	411 LBS
2	Hood-A						3	RECESSED ROUND	NO							NO	410 LBS
3	Hood-A						2	RECESSED ROUND	NO							NO	247 LBS
4	Hood-A						2	RECESSED ROUND	NO							NO	247 LBS

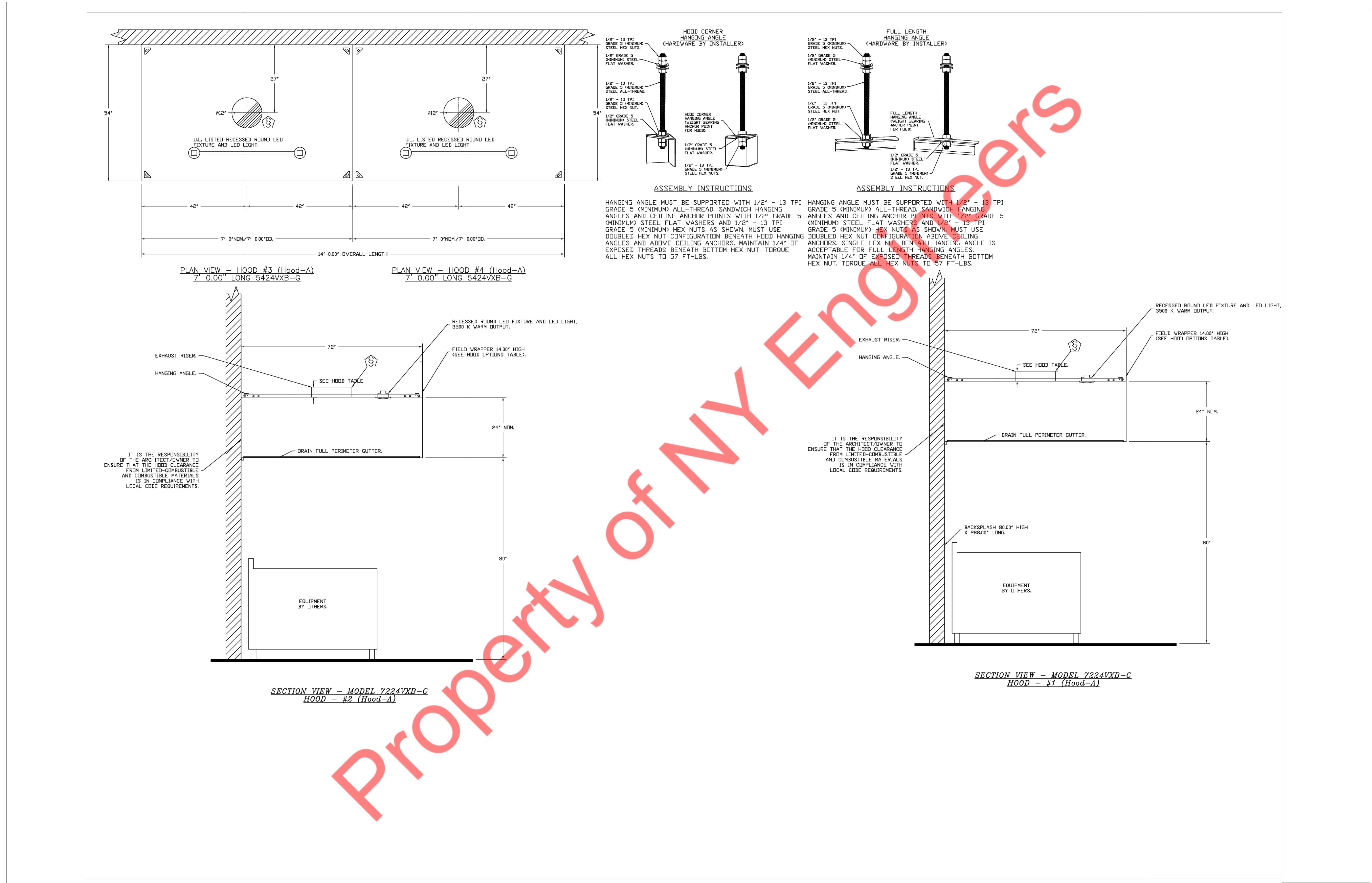
HOOD OPTIONS

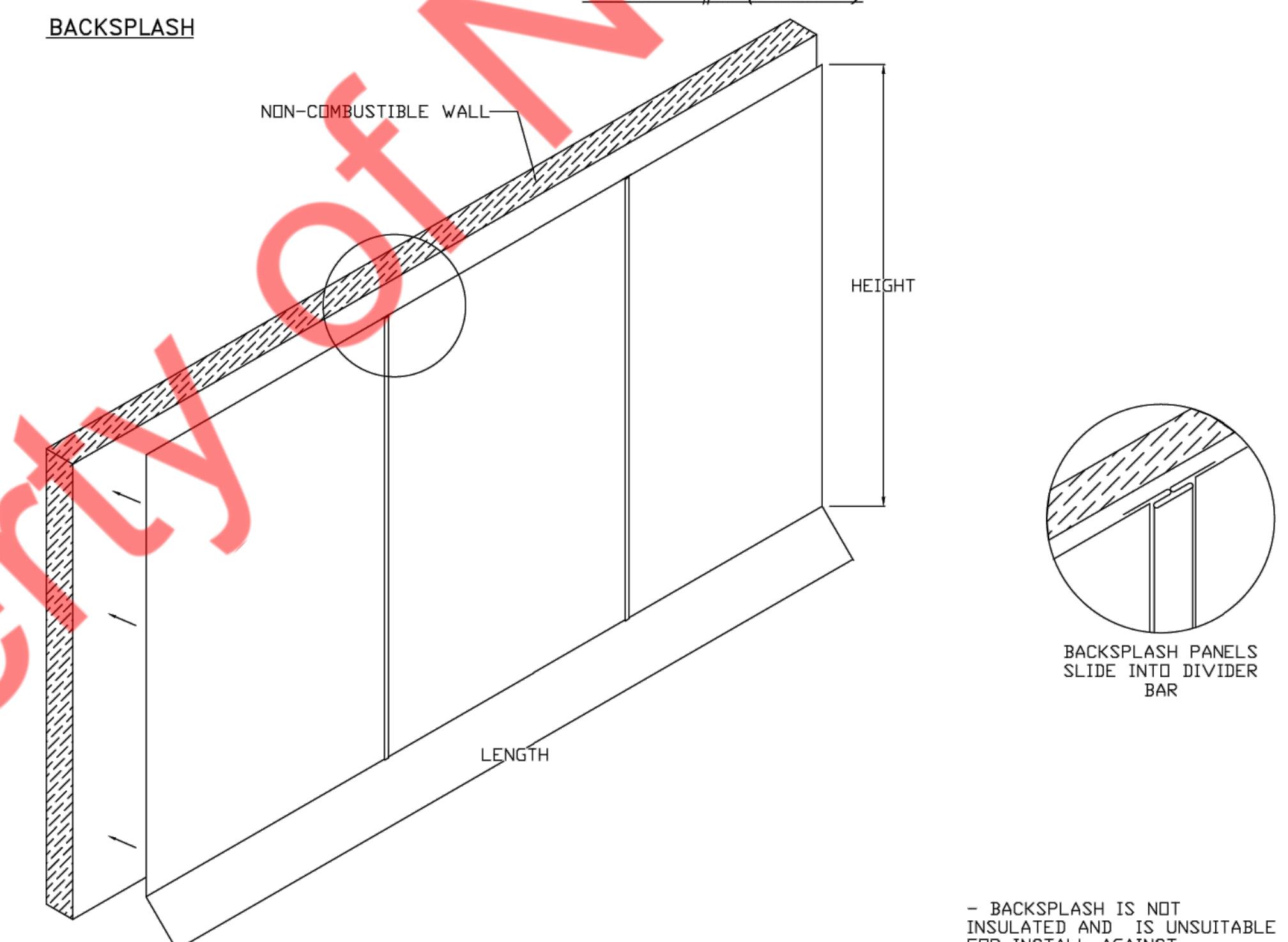
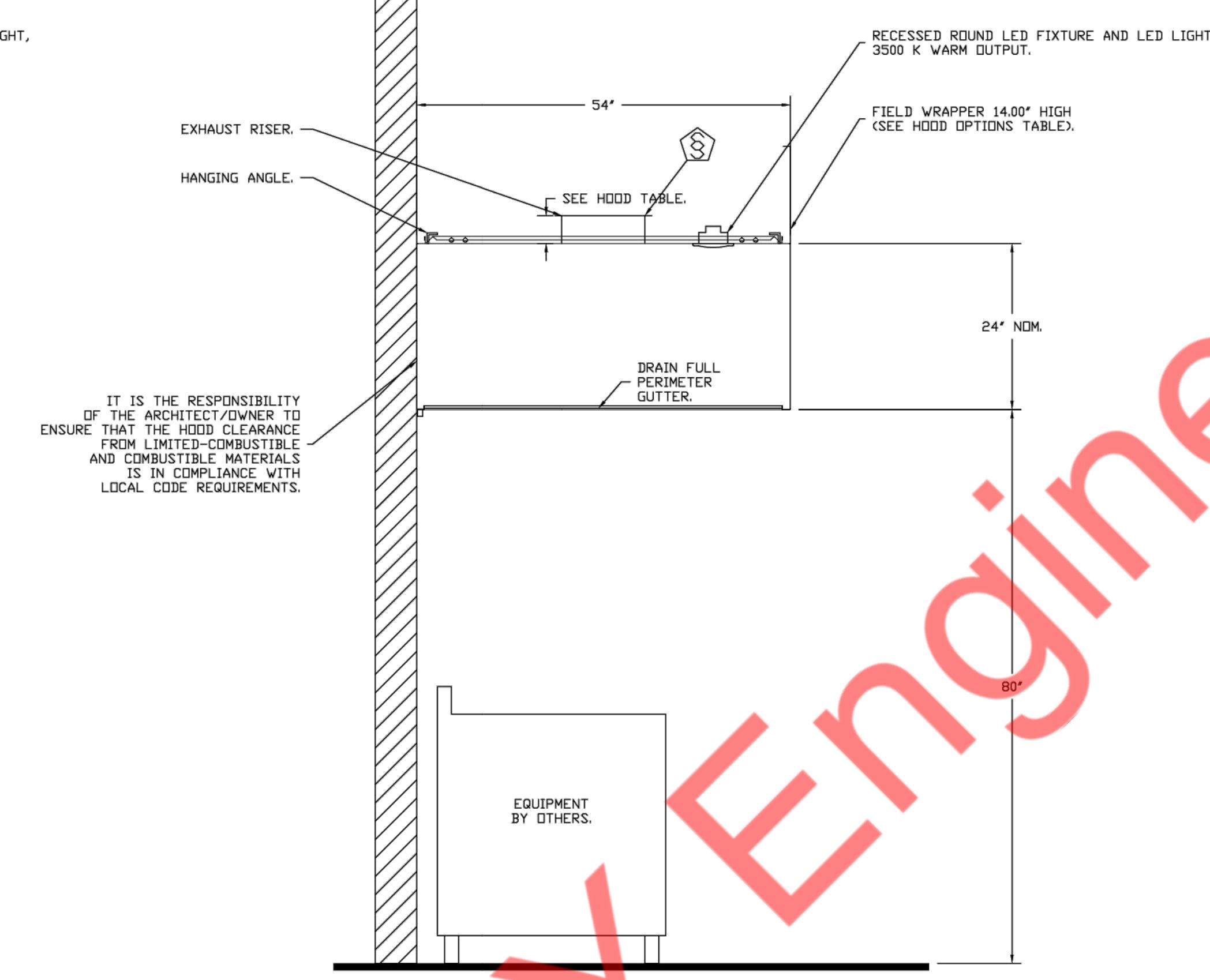
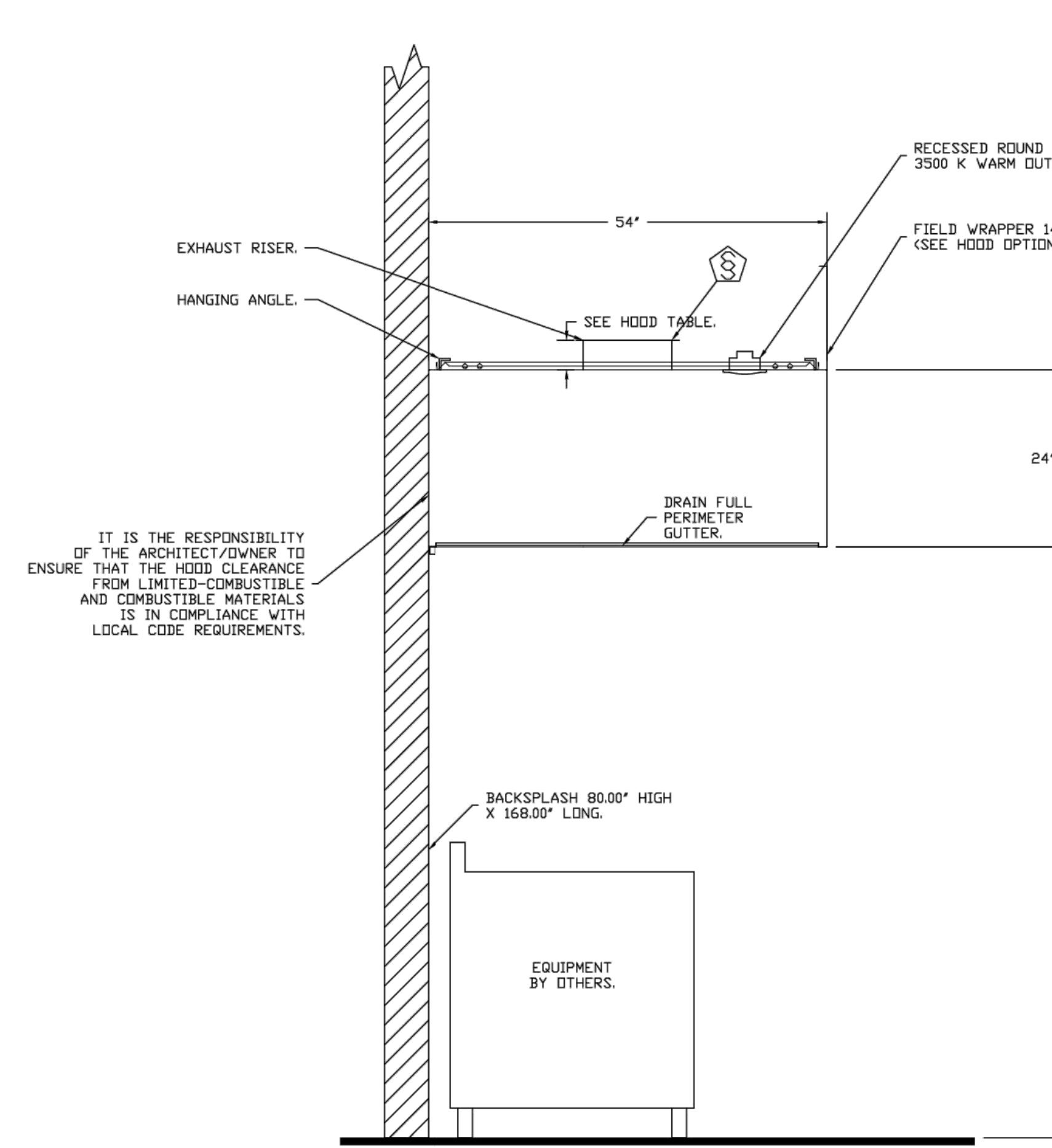
HOOD NO	TAG	OPTION
1	Hood-A	FIELD WRAPPER 14.00" HIGH FRONT, LEFT.
		BACKSPLASH 80.00" HIGH X 288.00" LONG 430 SS VERTICAL.
2	Hood-A	FIELD WRAPPER 14.00" HIGH FRONT, RIGHT.
3	Hood-A	FIELD WRAPPER 14.00" HIGH FRONT, LEFT.
4	Hood-A	BACKSPLASH 80.00" HIGH X 168.00" LONG 430 SS VERTICAL.
		FIELD WRAPPER 14.00" HIGH FRONT, RIGHT.

PLAN VIEW - HOOD #1 (Hood-A)
12' 0.00" LONG 7224VXB-GPLAN VIEW - HOOD #2 (Hood-A)
12' 0.00" LONG 7224VXB-G

NOTE: ADDITIONAL HANGING ANGLES PROVIDED FOR HOODS 12' AND LONGER.

NOTE: ADDITIONAL HANGING ANGLES PROVIDED FOR HOODS 12' AND LONGER.





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EXHAUST FAN INFORMATION - JOB#7349904

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1		1	VXD180	VENTILATION DIRECT	3600	0.600	1192	ODP,PREMIUM	2.000	1.1900	3	208	8.3	831 FPM	177	18.7
2		1	VXD180	VENTILATION DIRECT	2100	0.600	863	ODP,PREMIUM	1.000	0.4600	3	208	3.8	485 FPM	145	8.6

MUA FAN INFORMATION - JOB#7349904

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	MCA	MOP	WEIGHT (LBS)	SONES
3		1	VA2-20D	20MF-2-MOD	A2	1500	2880	0.500	1083	ODP,PREMIUM	1.500	0.7110	3	208	6.6	8.3A	15A	411	10.6
4		1	VA1-15D	15MF-1-MOD	A1	-	1680	0.500	1631	ODP,PREMIUM	1.500	0.6840	3	208	4.4	5.5A	15A	287	19.3

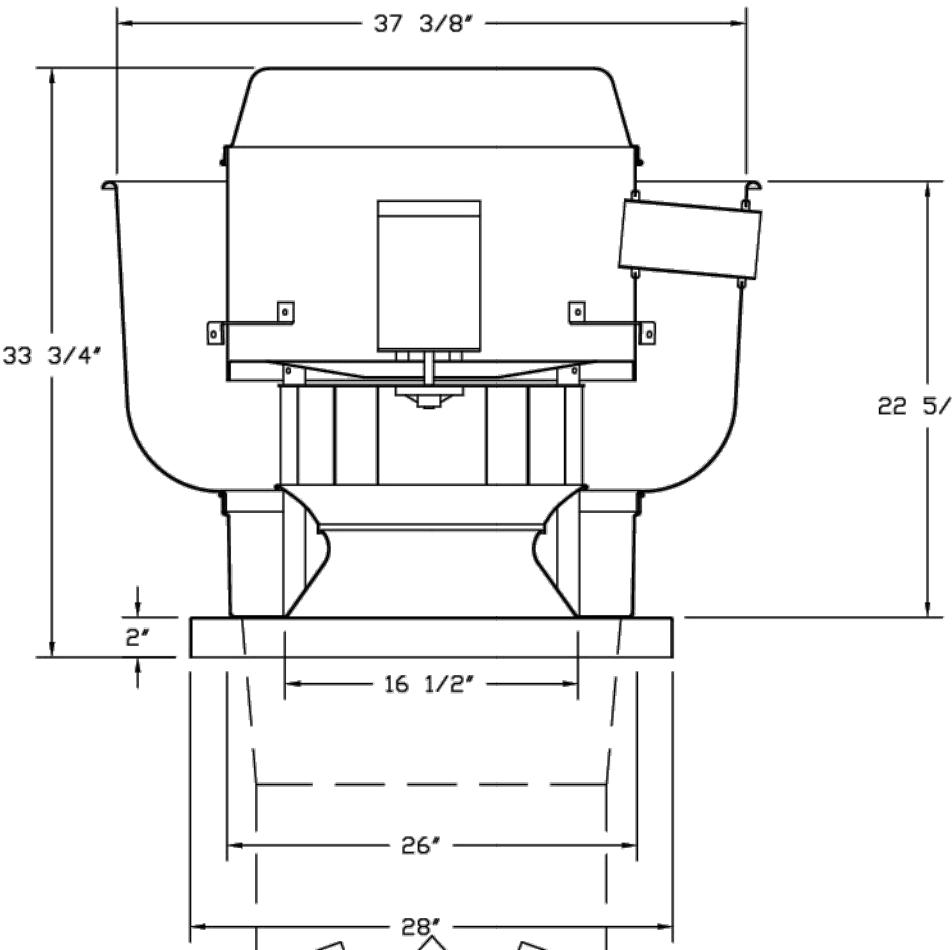
FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1		1	2 YEAR PARTS WARRANTY
2		1	2 YEAR PARTS WARRANTY
3		1	SIZE 2 UNTEMPERED COMMERCIAL DOWN DISCHARGE FOR DIRECT DRIVE AHUS
4		1	2 YEAR PARTS WARRANTY
		1	SIZE 1 UNTEMPERED COMMERCIAL DOWN DISCHARGE FOR DIRECT DRIVE AHUS
		1	2 YEAR PARTS WARRANTY

CURB ASSEMBLIES

NO	ON FAN	WEIGHT	ITEM	SIZE
1	# 1	43 LBS	CURB	26.500" W X 26.500" L X 20.000" H VENTED HINGED.
2	# 2	43 LBS	CURB	26.500" W X 26.500" L X 20.000" H VENTED HINGED.
3	# 3	35 LBS	CURB	31.000" W X 31.000" L X 20.000" H.
4	# 4	29 LBS	CURB	21.000" W X 21.000" L X 20.000" H.

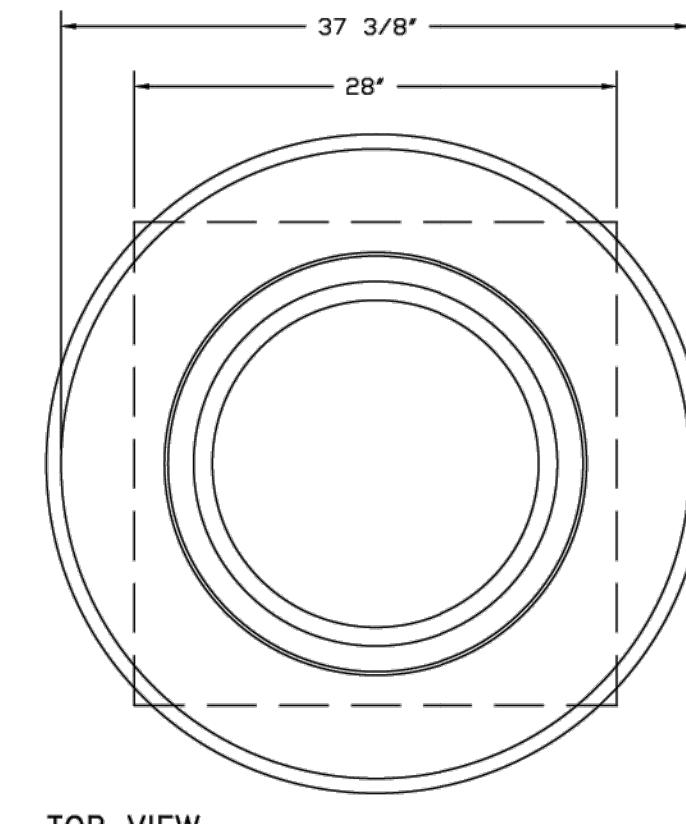
FANS #1, #2 - VXD180 EXHAUST FAN



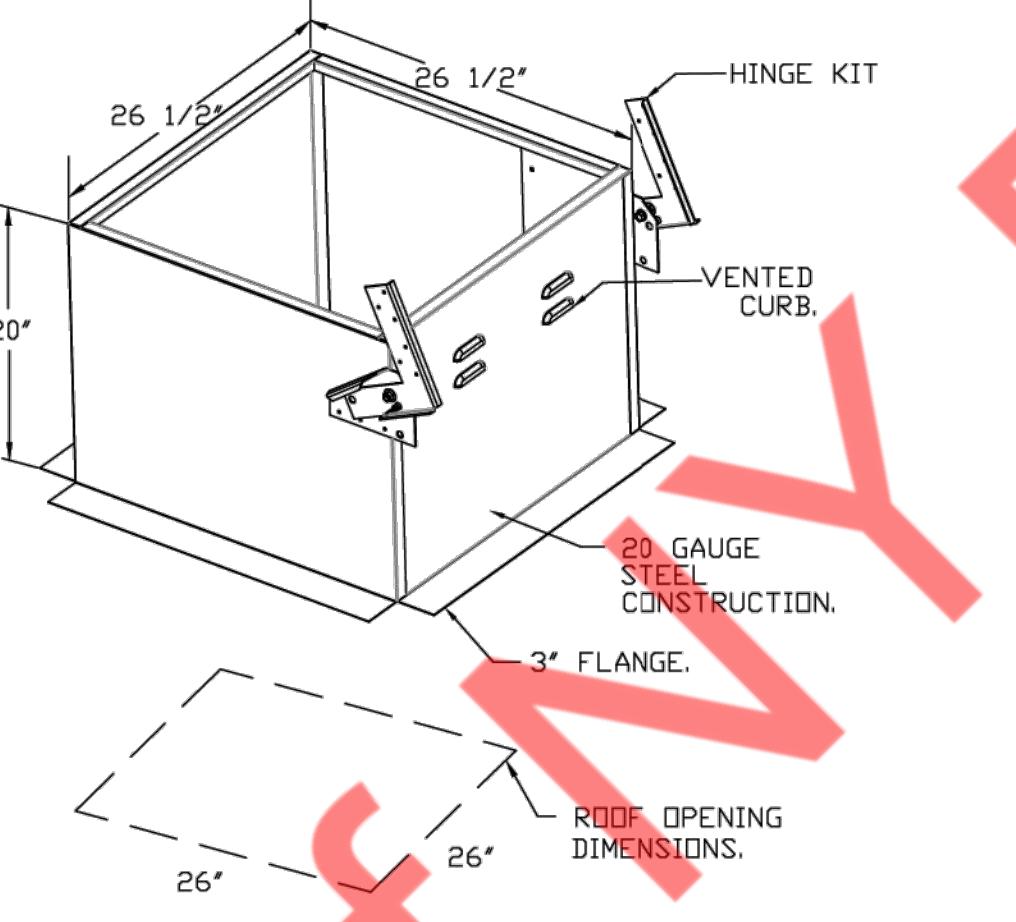
FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- NEMA 3R SAFETY DISCONNECT SWITCH.

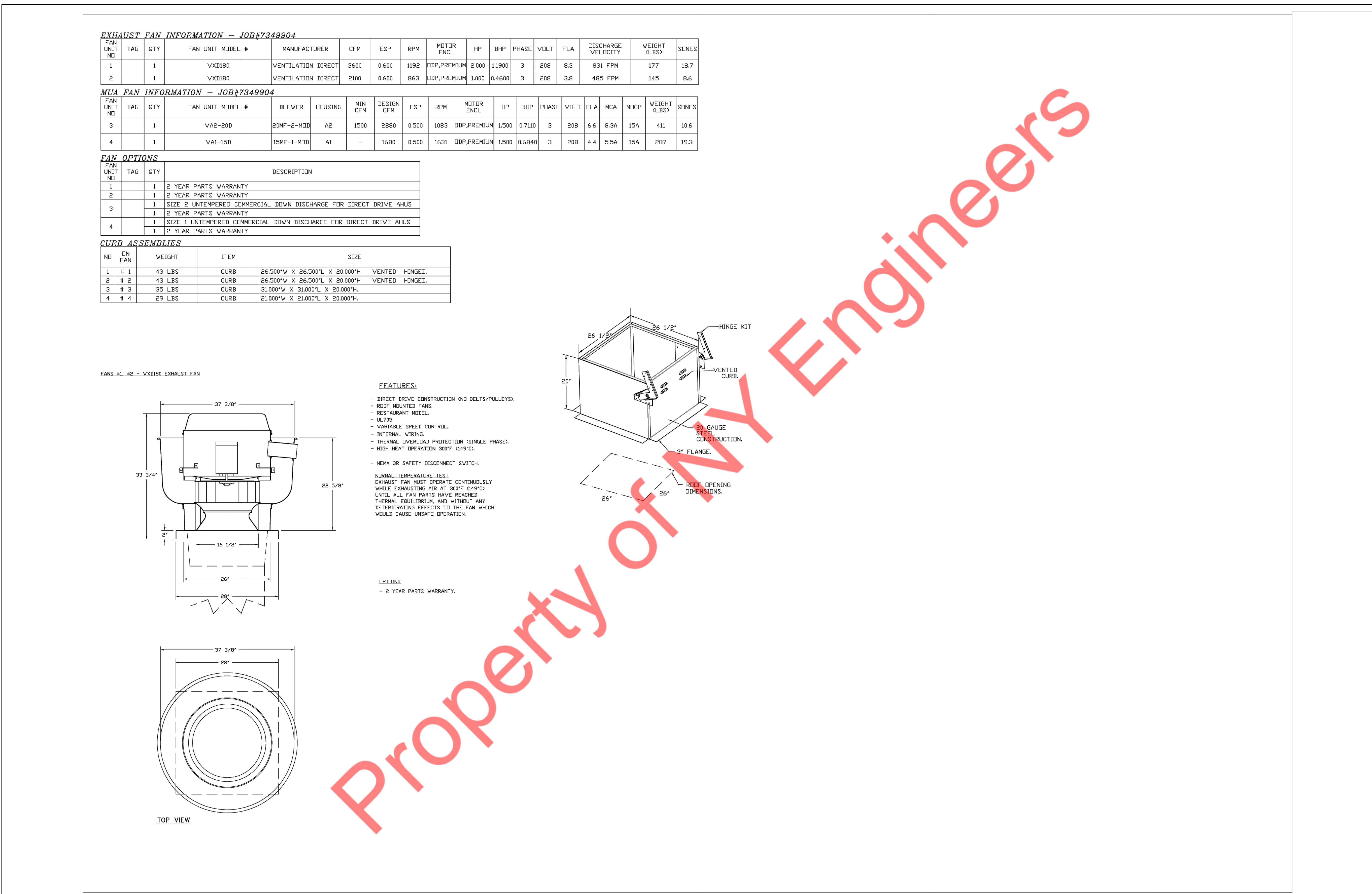
NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) AND 100% HUMIDITY. FAN MUST REACH THERMAL EQUILIBRIUM AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

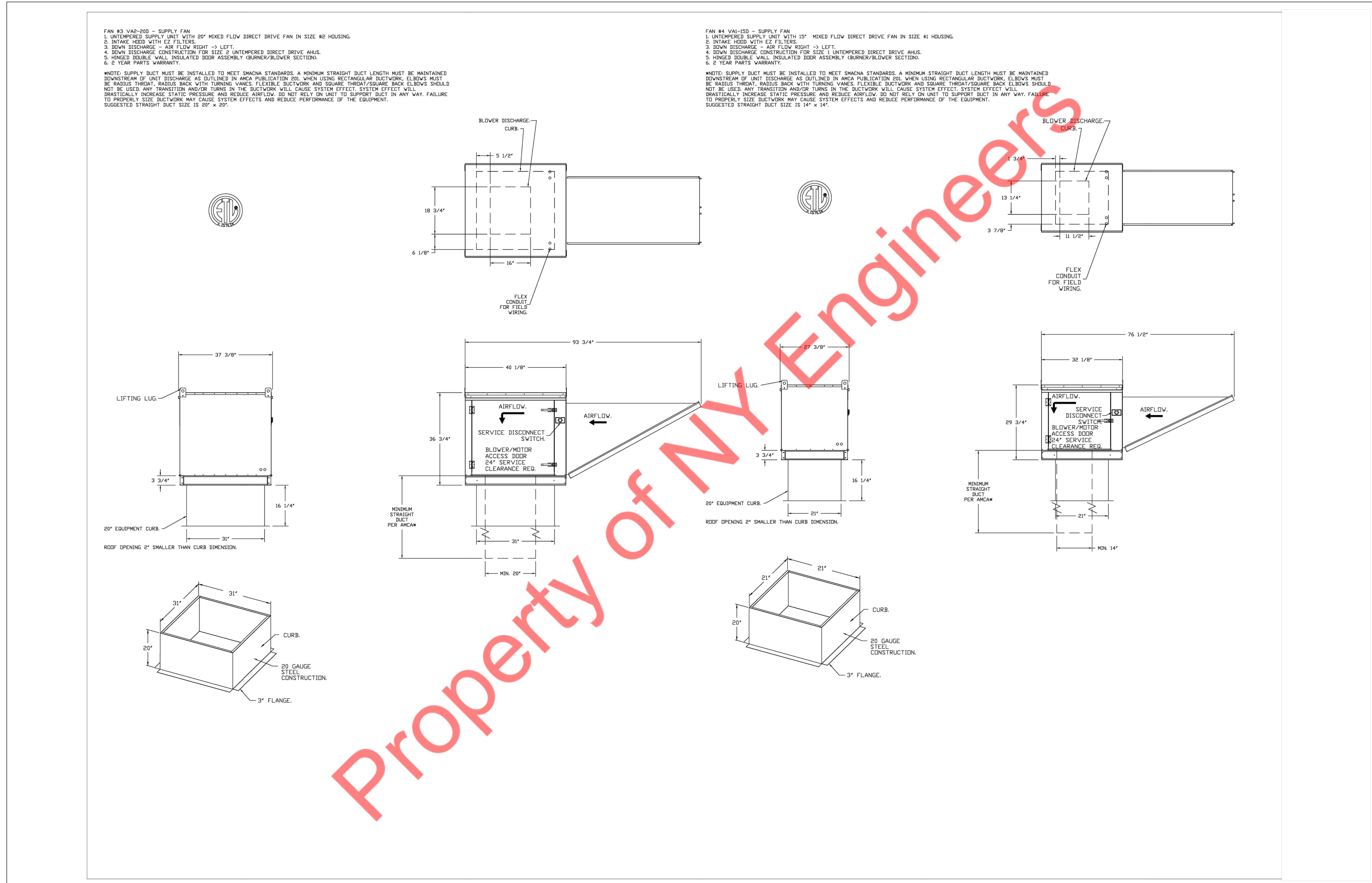


TOP VIEW



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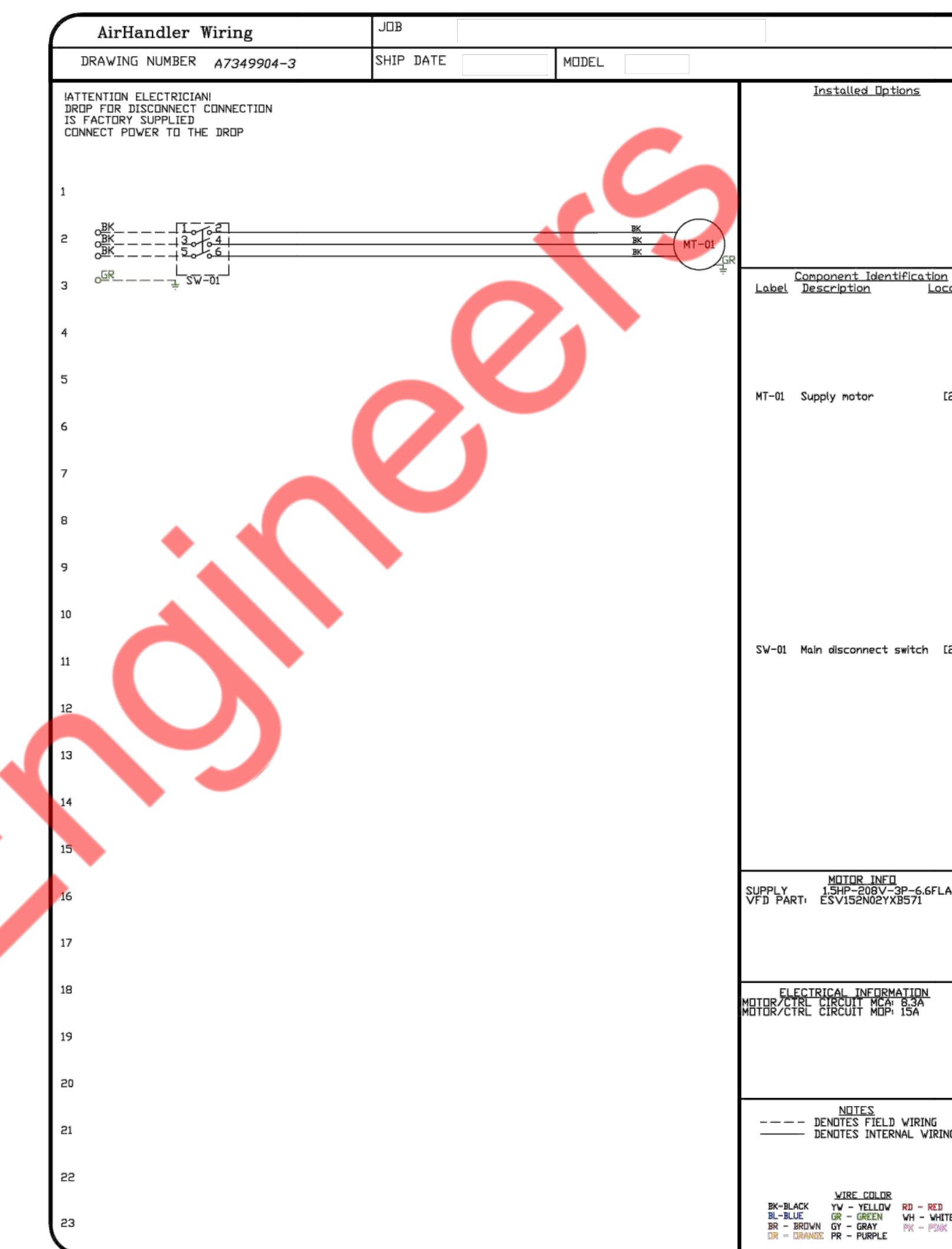
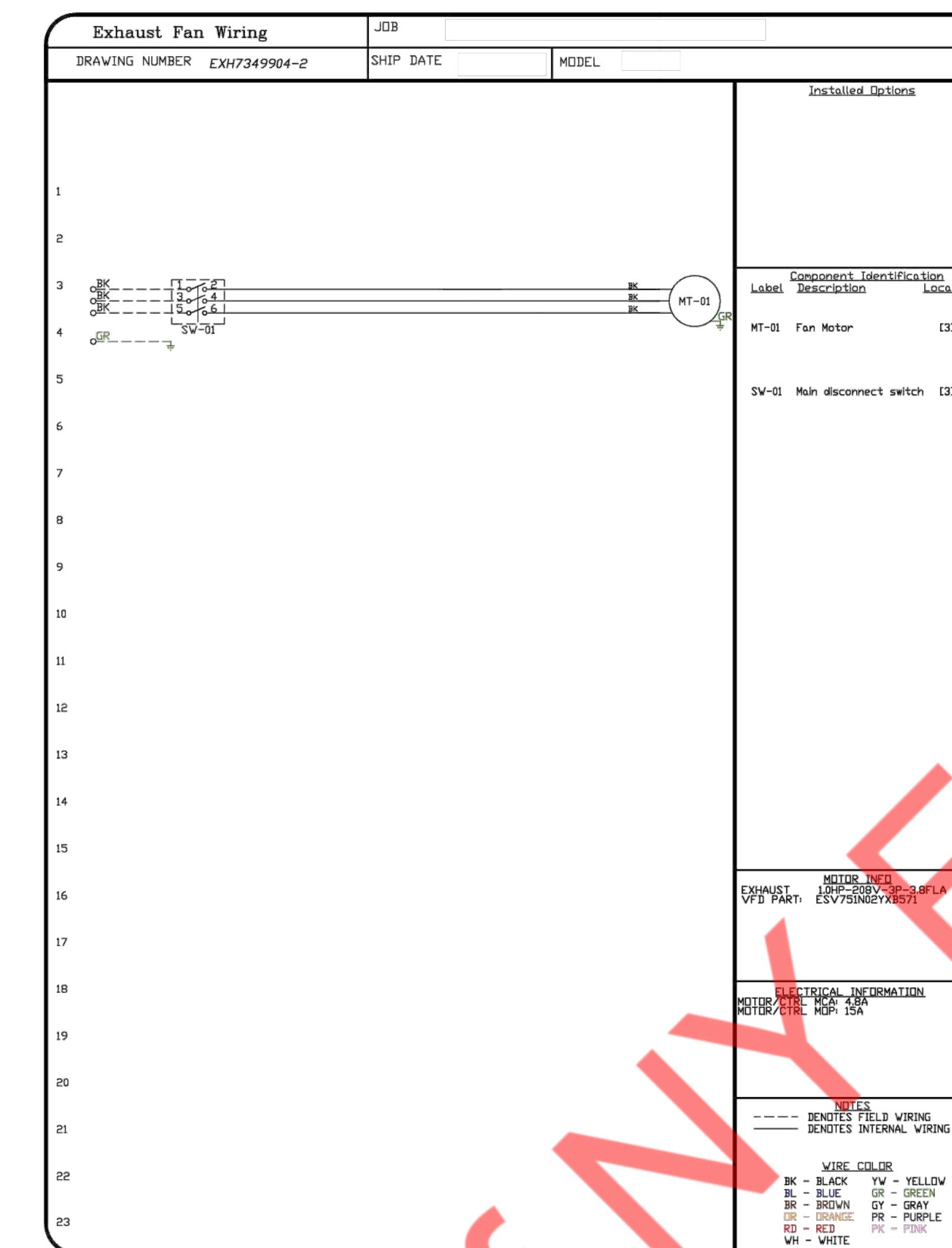
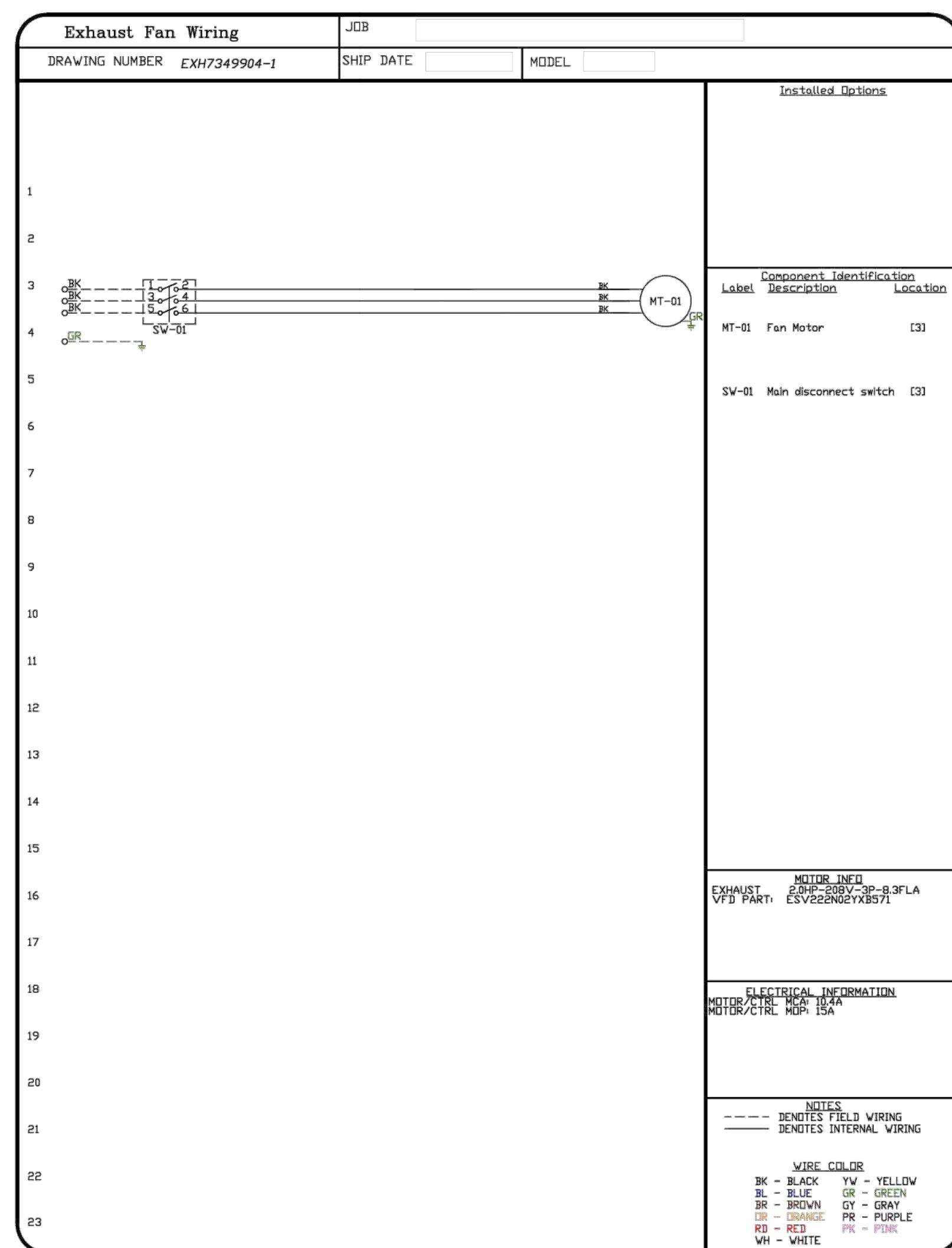
PROJECT NUMBER

85°C Bakery Cafe

REVISIONS

KITCHEN HOOD DRAWINGS (05 OF 15)

H-105



Component Identification

Label	Description	Location
MT-01	Fan Motor	[3]
SW-01	Main disconnect switch	[3]

MOTOR INFO
EXHAUST 2.0HP-208V-3P-8.3FLA
VFD PART: ESV222N02YX8571

ELECTRICAL INFORMATION
MOTOR/CTRL MCA: 10.4A
MOTOR/CTRL MOP: 15A

NOTES
- - - - - DENOTES FIELD WIRING
- - - - - DENOTES INTERNAL WIRING

WIRE COLOR

BK - BLACK	YW - YELLOW
BL - BLUE	GR - GREEN
BR - BROWN	GY - GRAY
OR - ORANGE	PR - PURPLE
RD - RED	PK - PINK
WH - WHITE	

Component Identification

Label	Description	Location
MT-01	Fan Motor	[3]
SW-01	Main disconnect switch	[3]

MOTOR INFO
EXHAUST 1.0HP-208V-3P-8.3FLA
VFD PART: ESV751N02YX8571

ELECTRICAL INFORMATION
MOTOR/CTRL MCA: 4.8A
MOTOR/CTRL MOP: 15A

NOTES
- - - - - DENOTES FIELD WIRING
- - - - - DENOTES INTERNAL WIRING

WIRE COLOR

BK - BLACK	YW - YELLOW
BL - BLUE	GR - GREEN
BR - BROWN	GY - GRAY
OR - ORANGE	PR - PURPLE
RD - RED	PK - PINK
WH - WHITE	

Drop for Disconnect Connection
IS FACTORY SUPPLIED
CONNECT POWER TO THE DROP

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PROJECT NUMBER

REVISIONS

KITCHEN HOOD DRAWINGS (06 OF 15)

H-106

85°C® Bakery Cafe

PROJECT NUMBER

REVISIONS

KITCHEN HOOD DRAWINGS (07 OF 15)

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Diagram showing a power source (BK-BLACK, BL-BLUE, BR-BROWN, OR-ORANGE) connected to a main disconnect switch (SW-01). The switch connects to a supply motor (MT-01) and a VFD (Variable Frequency Drive). The VFD is labeled with MOTOR INFO: 1.5HP-208V-3P-4.4FLA and VFD PART: ESV112N02YXB571. The VFD is connected to a motor control circuit (MCB) with a 5.5A breaker and a motor protection circuit (MOP) with a 15A breaker. A legend indicates that dashed lines denote field wiring and solid lines denote internal wiring. A color key for wire colors is provided: BK-BLACK, BL-BLUE, BR-BROWN, OR-ORANGE, YV-YELLOW, GR-GREEN, GY-GRAY, PR-PURPLE, RD-RED, WH-WHITE, and PK-PINK.

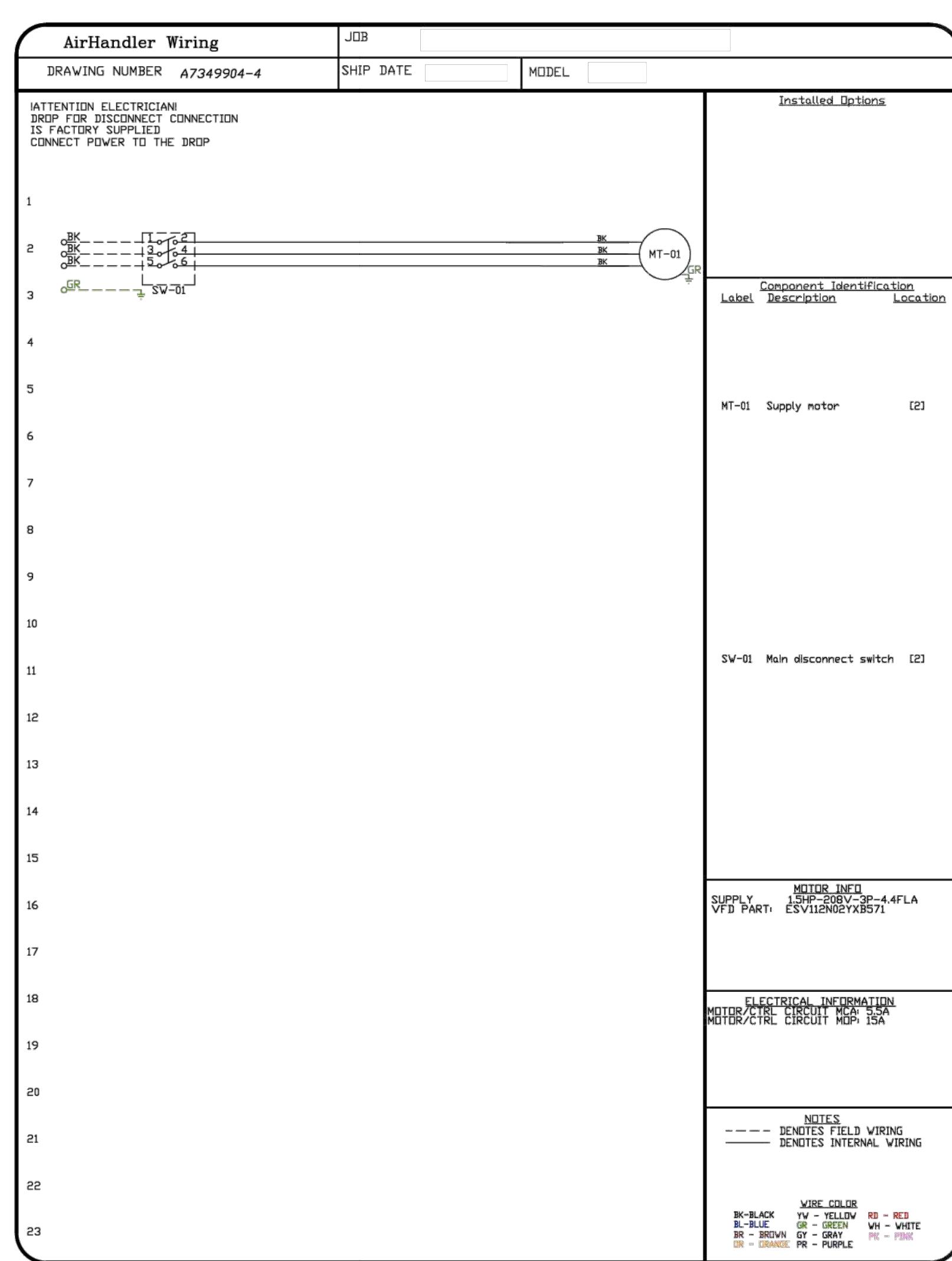
Label	Description	Location
MT-01	Supply motor	[2]
SW-01	Main disconnect switch	[2]

MOTOR INFO
SUPPLY 1.5HP-208V-3P-4.4FLA
VFD PART: ESV112N02YXB571

ELECTRICAL INFORMATION
MOTOR/CTRL CIRCUIT MCB: 5.5A
MOTOR/CTRL CIRCUIT MOP: 15A

NOTES
- - - - - DENOTES FIELD WIRING
- - - - - DENOTES INTERNAL WIRING

	WIRE COLOR
BK-BLACK	YV - YELLOW
BL-BLUE	GR - GREEN
BR-BROWN	GY - GRAY
OR-ORANGE	PR - PURPLE
	RD - RED
	WH - WHITE
	PK - PINK



AirHandler Wiring	JOB
DRAWING NUMBER A7349904-4	SHIP DATE
MODEL	
ATTENTION ELECTRICIAN DROP TO DEDICATED CONNECTION IS FACTORY SUPPLIED CONNECT POWER TO THE DROP	
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Installed Options

Component Identification

Label	Description	Location
MT-01	Supply motor	[2]
SW-01	Main disconnect switch	[2]

MOTOR INFO

SUPPLY: 3PH 480V 3P-44FLA
VFD PART: E5V1250CY-B571

ELECTRICAL INFORMATION

MOTOR/CTRL CIRCUIT MCA: 55A
MOTOR/CTRL CIRCUIT MDP: 15A

NOTES

--- DENOTES FIELD WIRING
— DENOTES INTERNAL WIRING

WIRE COLOR

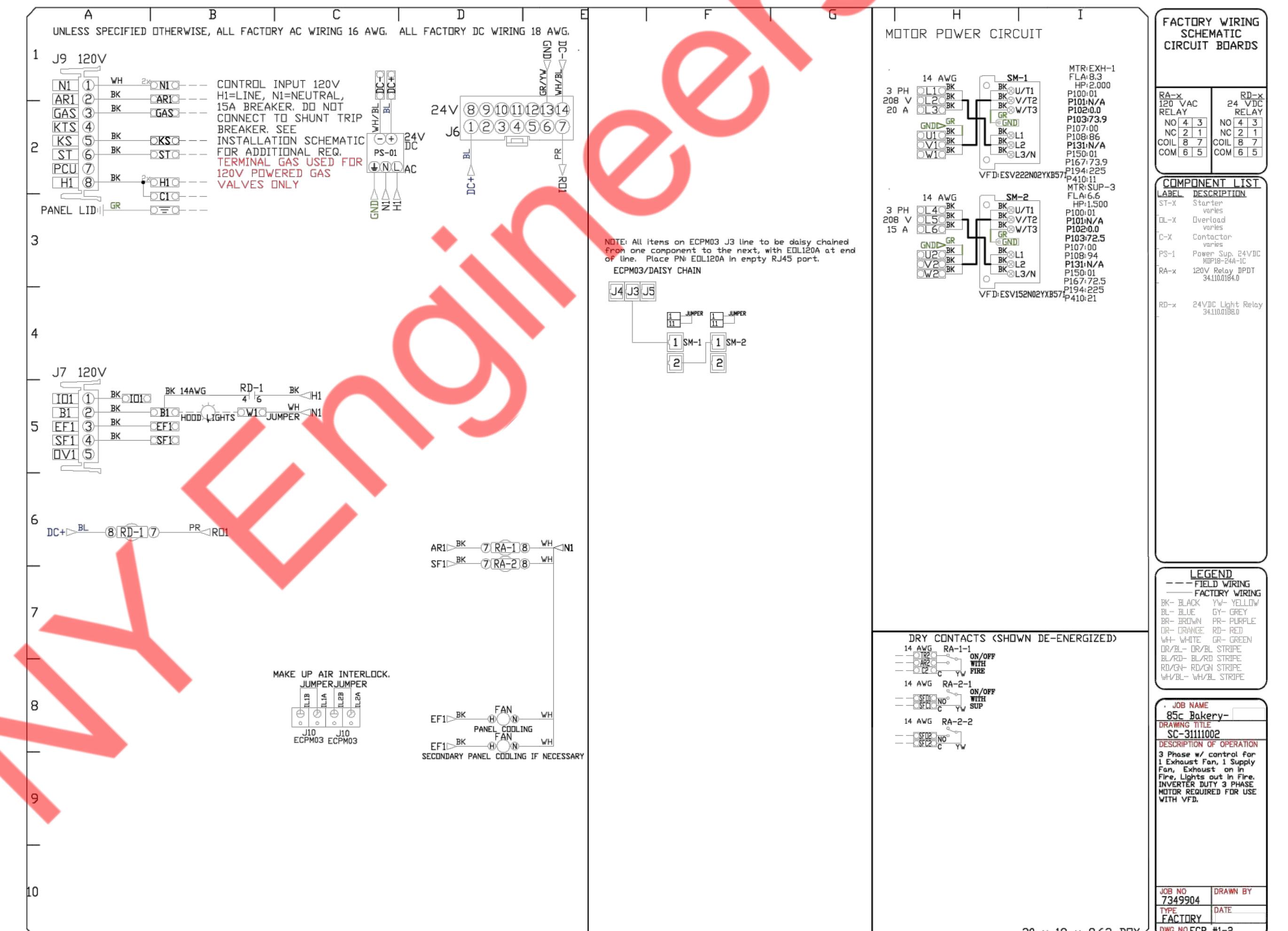
BC-BLACK	Y - YELLOW	RD - RED
BL-BLUE	G - GRAY	PC - PINK
BR - BROWN	PR - PURPLE	
OR - ORANGE		

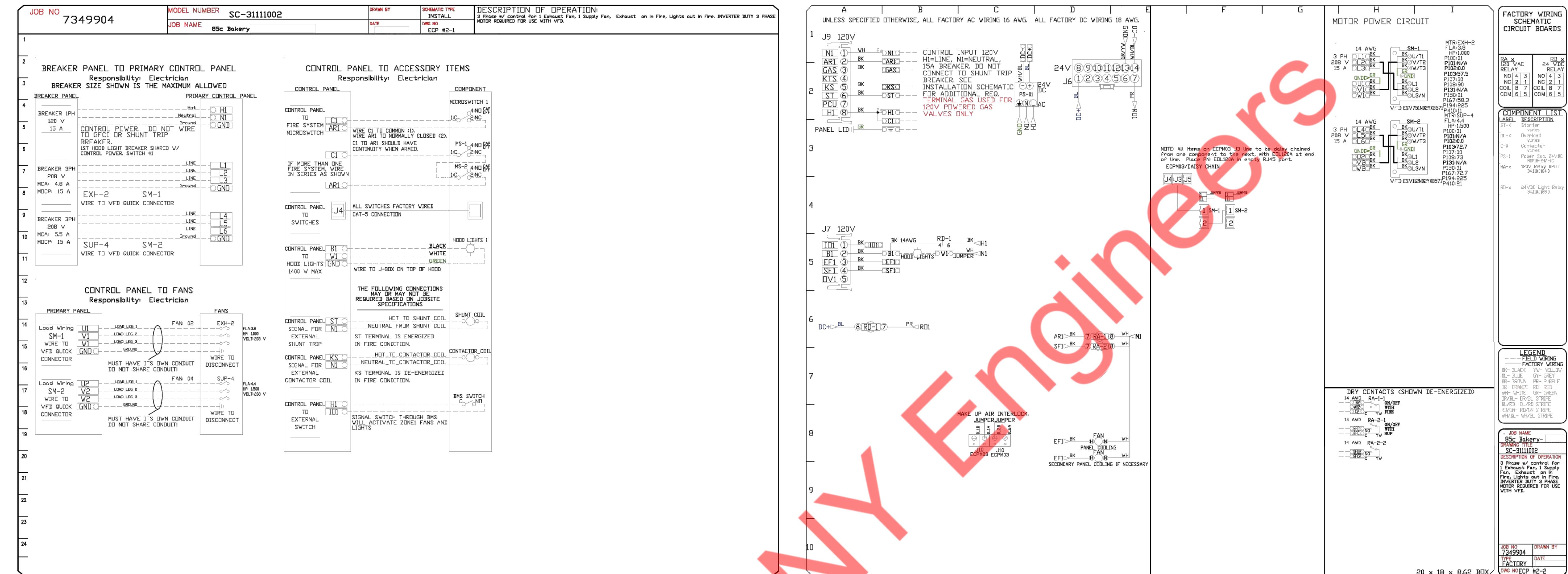
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ELECTRICAL PACKAGE - JOB#7349904

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED				
				LOCATION	QUANTITY		TYPE	Φ	HP	VOLT	FLA
1		SC-3111002	WALL MOUNT IN SS BOX	SS WALL MOUNT BOX	1 LIGHT	SMART CONTROLS BASIC	EXHAUST	3	2.000	208	8.3
2		SC-3111002	WALL MOUNT IN SS BOX	SS WALL MOUNT BOX	1 LIGHT	SMART CONTROLS BASIC	SUPPLY	3	1.500	208	6.6
					1 FAN		EXHAUST	3	1.000	208	3.8
					1 FAN		SUPPLY	3	1.500	208	4.4

JOB NO		MODEL NUMBER	SC-3111002	DRAWN BY	Schematic Type	DESCRIPTION OF OPERATION:	
		JOB NAME	85°C Bakery	DATE	09/04	2 Phase w/ control for 1 exhaust Fan, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire, INVERTER DUTY 3 PHASE	
<p>1</p> <p>2 BREAKER PANEL TO PRIMARY CONTROL PANEL Responsibility: Electrician BREAKER SIZE SHOWN IS THE MAXIMUM ALLOWED</p> <p>3 BREAKER PANEL TO PRIMARY CONTROL PANEL</p> <p>4 BREAKER 1PH 120 V 15 A</p> <p>5 CONTROL POWER OR SHUNT TRIP BREAKER. MUST NOT SHARE W/ CONTROL POWER SWITCH #1</p> <p>6 BREAKER 3PH 208 V MCA 100 A</p> <p>7 MCA 8.2 A</p> <p>8 EXH-1 SM-1 WIRE TO VFD QUICK CONNECTOR</p> <p>9 BREAKER 3PH 208 V MCA 8.2 A</p> <p>10 MCA 15 A SUP-3 SM-2 WIRE TO VFD QUICK CONNECTOR</p> <p>11</p> <p>12</p> <p>13 CONTROL PANEL TO FANS Responsibility: Electrician</p> <p>14 Primary Panel FANS</p> <p>15 SM-1 V1 WIRE TO GND</p> <p>16 WIRE TO DISCONNECT</p> <p>17 SM-2 V2 WIRE TO GND</p> <p>18 WIRE TO DISCONNECT</p> <p>19 MUST HAVE ITS OWN CONDUIT DO NOT SHARE CONDUIT</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p>							





CONTROL PANEL TO ACCESSORY ITEMS
Responsibility: Electrician

CONTROL PANEL

- CONTROL PANEL** TO **FIRE SYSTEM** **ARI1**: WIRE C1 TO COMMON (1), WIRE ARI1 TO NORMALLY CLOSED (2). C1 TO ARI1 SHOULD HAVE CONTINUITY WHEN ARMED. IF MORE THAN ONE FIRE SYSTEMS WIRE IN SERIES AS SHOWN.
- CONTROL PANEL** TO **SWITCHES**: ALL SWITCHES FACTORY WIRED CAT-5 CONNECTION.
- CONTROL PANEL** **B1** TO **HOOD LIGHTS**: BLACK, WHITE, GREEN. 1400 W MAX. WIRE TO J-BOX ON TOP OF HOOD.
- CONTROL PANEL** **ST** SIGNAL FOR **N1**: HOT TO SHUNT COIL, NEUTRAL FROM SHUNT COIL. EXTERNAL SHUNT TRIP. ST TERMINAL IS ENERGIZED IN FIRE CONDITION.
- CONTROL PANEL** **KS** SIGNAL FOR **N1**: HOT TO CONTACTOR COIL, NEUTRAL TO CONTACTOR COIL. EXTERNAL CONTACTOR COIL. KS TERMINAL IS DE-ENERGIZED IN FIRE CONDITION.
- CONTROL PANEL** **H1** TO **EXTERNAL SWITCH**: SIGNAL SWITCH THROUGH BMS WILL ACTIVATE ZONE1 FANS AND LIGHTS.

COMPONENT

- MICROSWITCH 1**: 4IND OFF, 1C, 2NC.
- MS-1**: 4IND OFF, 1C, 2NC.
- MS-2**: 4IND OFF, 1C, 2NC.
- HOOD LIGHTS 1**: BLACK, WHITE, GREEN.
- SHUNT COIL**: HOT TO SHUNT COIL, NEUTRAL FROM SHUNT COIL.
- CONTACTOR COIL**: HOT TO CONTACTOR COIL, NEUTRAL TO CONTACTOR COIL.
- BMS SWITCH**: C NO.

ECPM03/DAISY CHAIN

NOTE: All items on ECPM03 J3 line to be daisy chained from one component to the next, with EOL120A at end of line. Place PN EOL120A in empty RJ45 port.

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PROJECT NUMBER

85°C Bakery Cafe

REVISIONS

KITCHEN HOOD DRAWINGS (09 OF 15)

H-109

DUCTWORK #1 PARTS - JOB#7349904

TAG	PART #	CFM	GPM	ZONE	COVEREDBY	SP	WEIGHT	VELOCITY	QTY	DESCRIPTION
P1	VDW1620ADP17	1800				-0.0167	12.01	1289.16	1	SINGLE WALL DUCT ADAPTER, 16" DUCT DIA TO 20" DUCT DIA, ASSEMBLY - 430 STAINLESS STEEL.
SYSTEM AT P1						-0.1827	0.00			
P2	VDW2090ASY	1800				-0.0331	18.41	825.06	1	SINGLE WALL DUCT 90 DEGREE ELBOW, 20" DUCT, ASSEMBLY.
SYSTEM AT P2						-0.2158	0.00			
P3	VDW2017LT	1800				-0.0009	11.54	825.06	1	SINGLE WALL DUCT 20" DIAMETER, 17" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P3						-0.2179	0.00			
P4	VDW2023LT	1800				-0.0012	15.65	825.06	1	SINGLE WALL DUCT 20" DIAMETER, 23" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P4						-0.2179	0.00			
P5	VDW20SUBRASY						3.58			1 DUCT SUPPORT BRACKET KIT, 20" DUCT, USED FOR HANGING DUCT. 12 GA STEEL, CLEAR ZINC COATING. - 2 RINGS, 4 BRACKETS, & HARDWARE BAG 2.
P6	VDW20TEASY	3600		1		-0.3294	26.16	1650.12	1	SINGLE WALL DUCT TEE, 20" DUCT, ASSEMBLY.
SYSTEM AT P6						-0.5473	0.00			
P7	VDW2017LT	1800				-0.0009	11.54	825.06	1	SINGLE WALL DUCT 20" DIAMETER, 17" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P7						-0.2179	0.00			
P8	VDW2023LT	1800				-0.0012	15.65	825.06	1	SINGLE WALL DUCT 20" DIAMETER, 23" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P8						-0.2179	0.00			
P9	VDW20SUBRASY						3.58			1 DUCT SUPPORT BRACKET KIT, 20" DUCT, USED FOR HANGING DUCT. 12 GA STEEL, CLEAR ZINC COATING. - 2 RINGS, 4 BRACKETS, & HARDWARE BAG 2.
P10	VDW2090ASY	1800				-0.0331	18.41	825.06	1	SINGLE WALL DUCT 90 DEGREE ELBOW, 20" DUCT, ASSEMBLY.
SYSTEM AT P10						-0.2158	0.00			
P11	VDW1620ADP17	1800				-0.0167	12.01	1289.16	1	SINGLE WALL DUCT ADAPTER, 16" DUCT DIA TO 20" DUCT DIA, ASSEMBLY - 430 STAINLESS STEEL.
SYSTEM AT P11						-0.1827	0.00			
P12	VDW2047LT	3600				-0.01	31.08	1650.12	1	SINGLE WALL DUCT 20" DIAMETER, 47" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P12						-0.5829	0.00			
P13	VDW2047LT	3600				-0.01	31.08	1650.12	1	SINGLE WALL DUCT 20" DIAMETER, 47" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P13						-0.5829	0.00			
P14	VDW2035LT	3600				-0.0074	23.51	1650.12	1	SINGLE WALL DUCT 20" DIAMETER, 35" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P14						-0.5829	0.00			
P15	VDW2048AJDKIT	3600				-0.0083	37.95	1650.12	1	SINGLE WALL DUCT ADJUSTABLE, 20" DIAMETER, 47.5" LONG, FLANGE AT ONE END WITH A 20" ADJUSTABLE COLLAR - STAINLESS STEEL.
ASSEMBLED W/P16						-0.5829	0.00			
SYSTEM AT P15										
P16	ASSEMBLED W/P15 D=8 VDW2620TP	3600				9.42		1650.12	1	DUCT TO CURB TRANSITION, 26-1/2" CURB TO 20" DUCT, 16 GA ALUMINIZED. USED ON BDU20.
V3M-2000PLUS						0.80			5	DUCT - 3M FIRE BARRIER 2000 PLUS SILICONE - USED AS SEALANT TO SEAL DUCT JOINTS.
VDW16CLASY						1.18			2	DUCT 'V' CLAMP WITH NEW DESIGN 14 GA BRACKETS, 16" DUCT, ASSEMBLY.
VDW20CLASY						1.41			12	DUCT 'V' CLAMP WITH NEW DESIGN 14 GA BRACKETS, 20" DUCT, ASSEMBLY.
TOTAL WEIGHT						304.86				

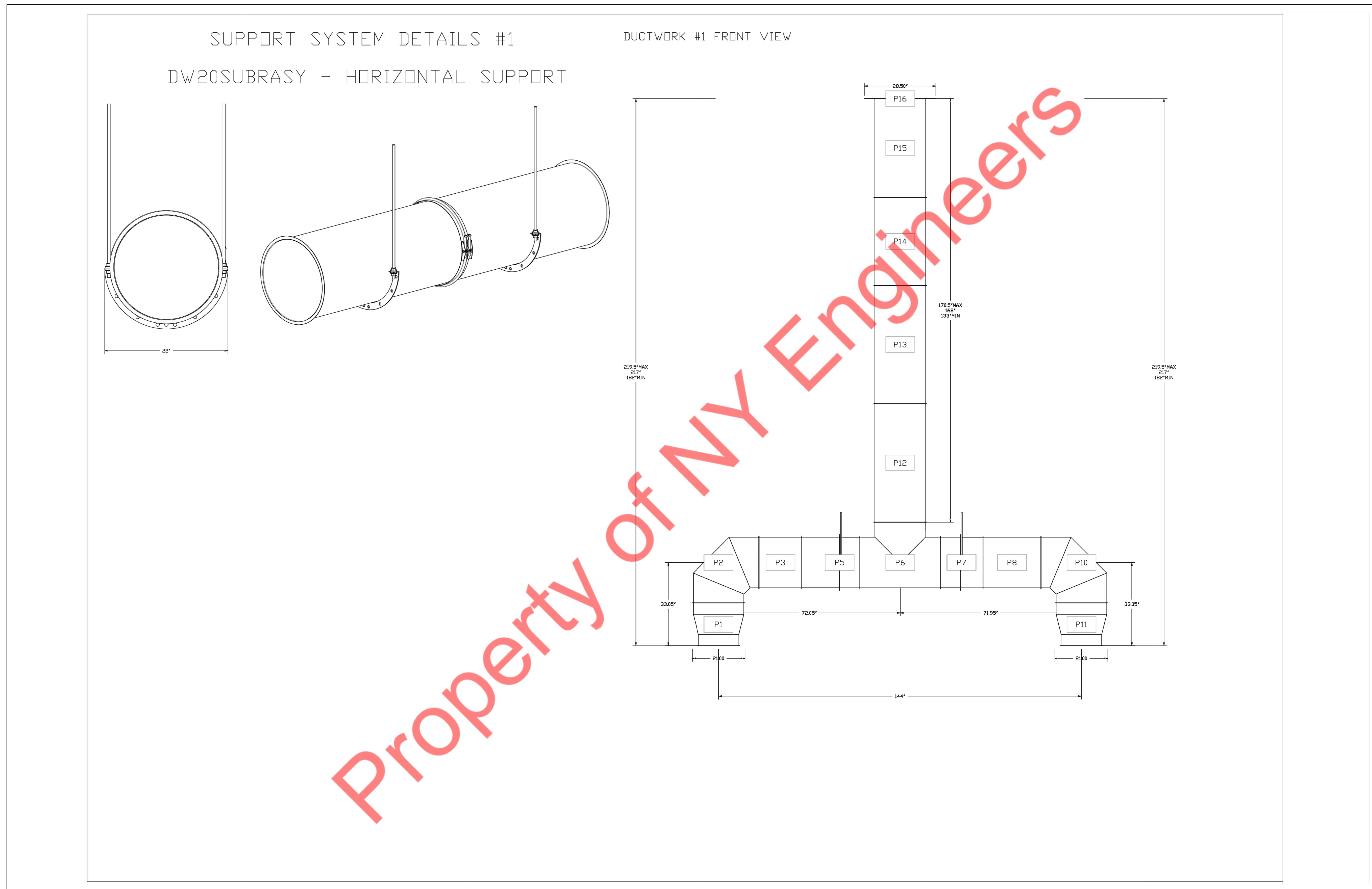
SINGLE WALL FACTORY BUILT DUCTWORK

- ALL DUCTWORK IS REQUIRED TO BE INSTALLED WITH THE MAXIMUM SUPPORT SPACING LISTED BELOW.
- FOR A COMPLETE LIST OF APPROVED SUPPORT METHODS, SEE THE INSTALLATION AND OPERATION MANUAL.
- DUCTWORK SHALL SLOPE NOT LESS THAN 1/16" PER LINEAR FOOT TOWARDS THE HOOD OR AN APPROVED GREASE COLLECTION RESERVOIR.
- WHERE HORIZONTAL DUCTS EXCEED 75 FEET IN LENGTH, THE SLOPE SHALL NOT BE LESS THAN 3/16" PER LINEAR FOOT.

DUCT DIAMETER	HORIZONTAL SUPPORT (FT)	VERTICAL WALL SUPPORT (FT)	VERTICAL CURB SUPPORT (FT)
5"	10'	10'	24'
6"	10'	10'	24'
7"	10'	10'	24'
8"	10'	10'	24'
10"	10'	10'	24'
12"	10'	10'	24'
14"	10'	10'	24'
16"	10'	10'	24'
18"	10'	10'	24'
20"	10'	10'	24'
22"	10'	10'	24'
24"	10'	10'	24'
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28"	10'	10'	24'
30"	10'	10'	24'
32"	10'	10'	24'
34"	10'	10'	24'
36"	10'	10'	24'

DO NOT LEAK TEST USING SMOKE BOMBS CONTAINING CHLORINES/CHLORIDES. CONSULT WITH VENTILATION DIRECT FOR PROPER LEAK TESTING METHODS.

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PROJECT NUMBER

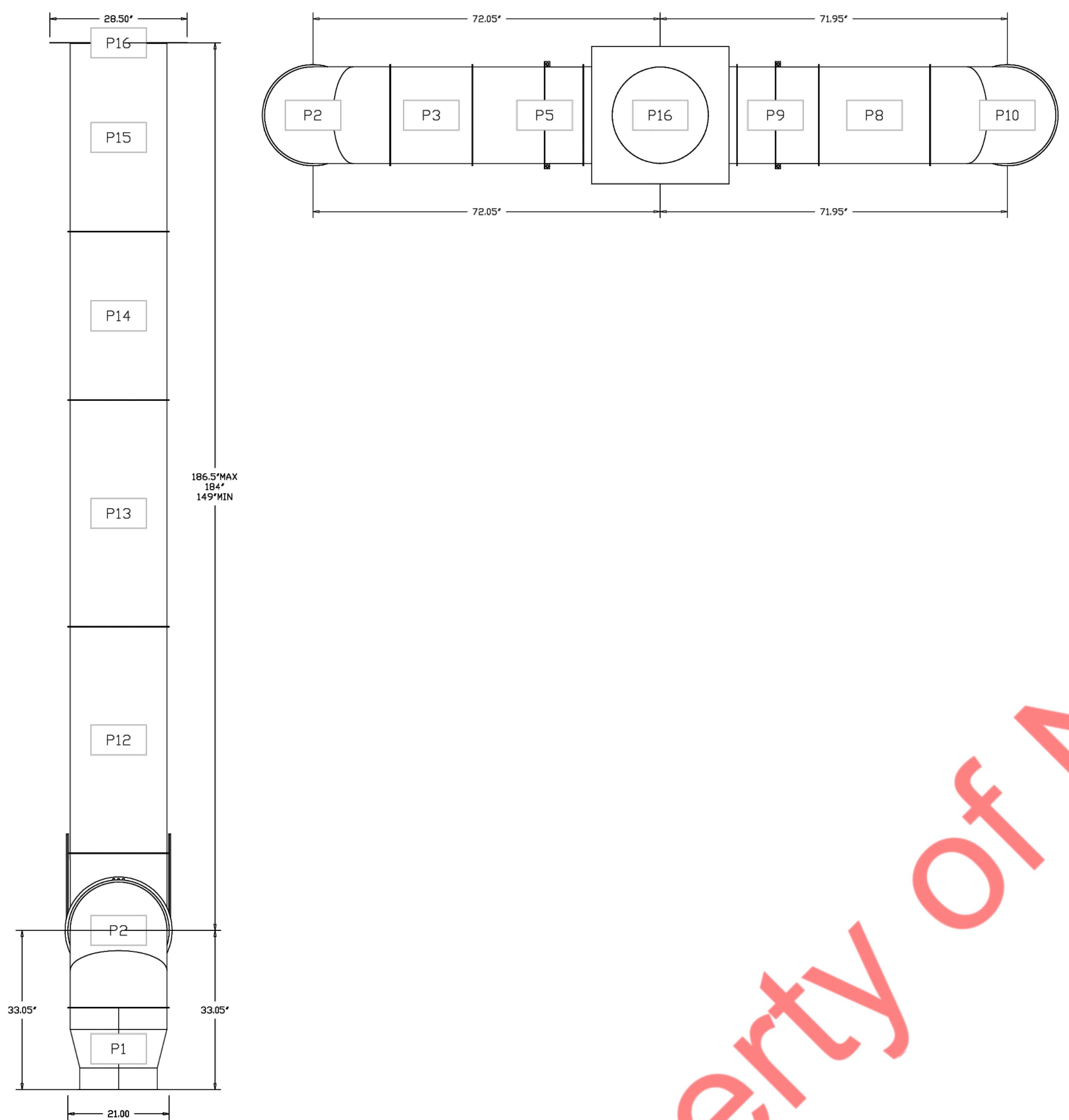
85°C Bakery Cafe

REVISIONS

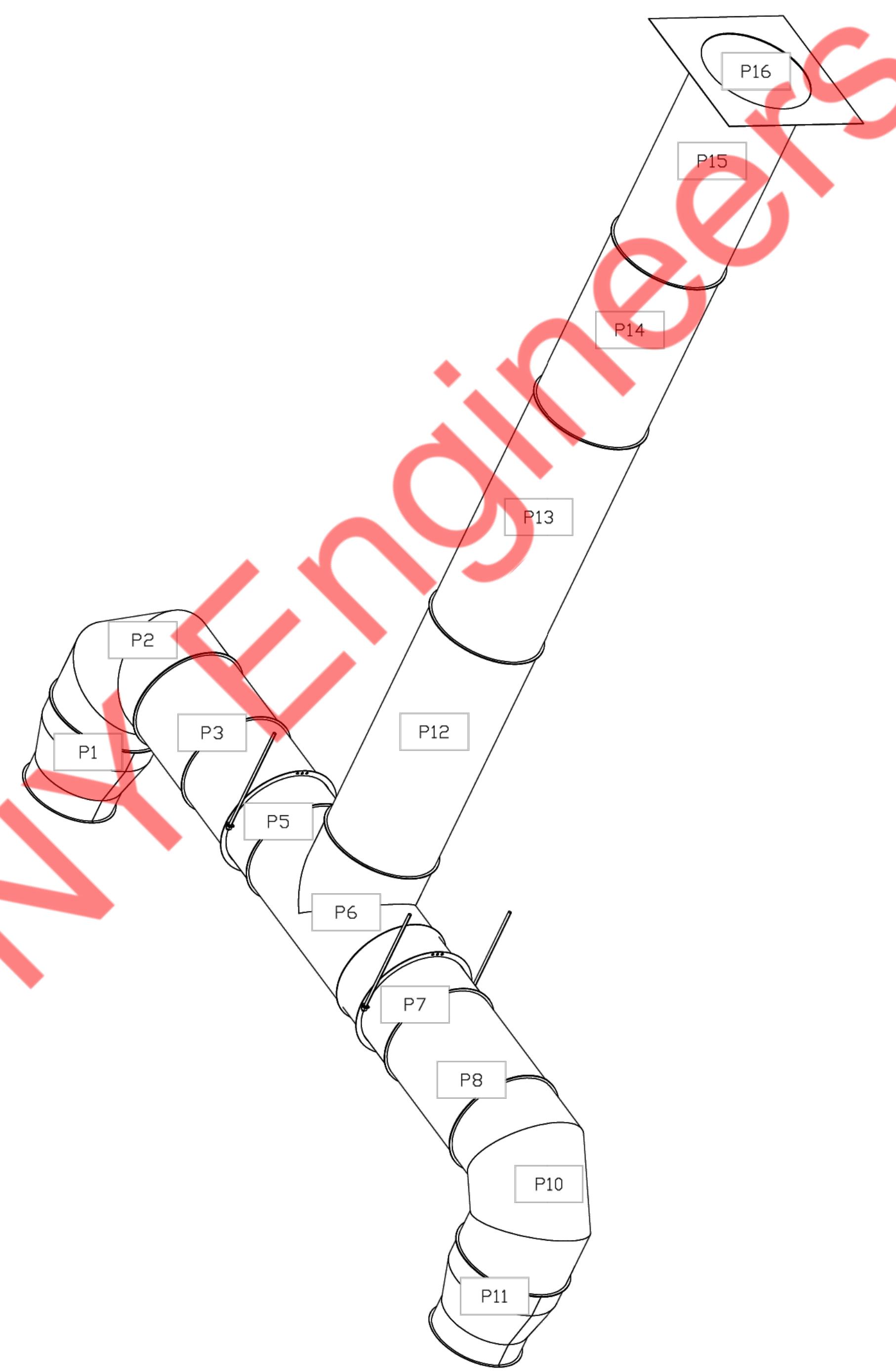
KITCHEN HOOD
DRAWINGS
(11 OF 15)

H-111

DUCTWORK #1 SIDE VIEW DUCTWORK #1 TOP VIEW



DUCTWORK #1 SE VIEW



PROJECT NUMBER

85°C Bakery Cafe

REVISIONS

KITCHEN HOOD
DRAWINGS
(12 OF 15)

H-112

DUCTWORK #2 PARTS - JOB#7349904

TAG	PART #	CFM	GPM	ZONE	COVERED BY	SP	WEIGHT	VELOCITY	QTY	DESCRIPTION
P1	VDW1216ADP17	1050				-0.0344	9.44	1336.90	1	SINGLE WALL DUCT ADAPTER, 12" DUCT DIA TO 16" DUCT DIA, ASSEMBLY - 430 STAINLESS STEEL.
SYSTEM AT P1						-0.1634	0.00			
P2	VDW1690ASY	1050				-0.0253	13.00	752.01	1	SINGLE WALL DUCT 90 DEGREE ELBOW, 16" DUCT, ASSEMBLY.
SYSTEM AT P2						-0.0887	0.00			
P3	VDW1607LT	1050				-0.0005	4.14	752.01	1	SINGLE WALL DUCT 16" DIAMETER, 7" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P3						-0.1897	0.00			
P4	VDW1607LT	1050				-0.0005	4.14	752.01	1	SINGLE WALL DUCT 16" DIAMETER, 7" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P4						-0.1897	0.00			
P5	VDW16TEASY	2100		1		-0.3212	19.23	1504.01	1	SINGLE WALL DUCT TEE, 16" DUCT, ASSEMBLY.
SYSTEM AT P5						-0.5109	0.00			
P6	VDW1607LT	1050				-0.0005	4.14	752.01	1	SINGLE WALL DUCT 16" DIAMETER, 7" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P6						-0.1897	0.00			
P7	VDW1615AJDKIT	1050				-0.0005	16.29	752.01	1	SINGLE WALL DUCT ADJUSTABLE, 16" DIAMETER, 14.50" LONG, FLANGE AT ONE END WITH A 16" ADJUSTABLE COLLAR - STAINLESS STEEL.
SYSTEM AT P7						-0.1897	0.00			
P8	VDW16SUBRASY						3.18		1	DUCT SUPPORT BRACKET KIT, 16" DUCT, USED FOR HANGING DUCT. 12 GA STEEL, CLEAR ZINC COATING - 2 RINGS, 4 BRACKETS, & HARDWARE BAG 2.
P9	VDW1690ASY	1050				-0.0253	13.00	752.01	1	SINGLE WALL DUCT 90 DEGREE ELBOW, 16" DUCT, ASSEMBLY.
SYSTEM AT P9						-0.0887	0.00			
P10	VDW1216ADP17	1050				-0.0344	9.44	1336.90	1	SINGLE WALL DUCT ADAPTER, 12" DUCT DIA TO 16" DUCT DIA, ASSEMBLY - 430 STAINLESS STEEL.
SYSTEM AT P10						-0.1634	0.00			
P11	VDW1647LT	2100				-0.0138	24.89	1504.01	1	SINGLE WALL DUCT 16" DIAMETER, 47" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P11						-0.5604	0.00			
P12	VDW1647LT	2100				-0.0138	24.89	1504.01	1	SINGLE WALL DUCT 16" DIAMETER, 47" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P12						-0.5604	0.00			
P13	VDW1635LT	2100				-0.0103	18.67	1504.01	1	SINGLE WALL DUCT 16" DIAMETER, 35" LONG, FLANGE AT BOTH ENDS. STAINLESS STEEL.
SYSTEM AT P13						-0.5604	0.00			
P14	ASSEMBLED W/P15	VDW1648AJDKIT	2100			-0.0115	30.39	1504.01	1	SINGLE WALL DUCT ADJUSTABLE, 16" DIAMETER, 47.5" LONG, FLANGE AT ONE END WITH A 16" ADJUSTABLE COLLAR - STAINLESS STEEL.
SYSTEM AT P14						-0.5604	0.00			
P15	ASSEMBLED W/P14 D=8	VDW2616TP	2100				11.62	1504.01	1	DUCT TO CURB TRANSITION, 26-1/2" CURB TO 16" DUCT, 16 GA ALUMINIZED. USED ON BDU18.
	V3M-2000PLUS						0.80		4	DUCT - 3M FIRE BARRIER 2000 PLUS SILICONE - USED AS SEALANT TO SEAL DUCT JOINTS.
	VDW12CLASY						0.94		2	DUCT "V" CLAMP WITH NEW DESIGN 14 GA BRACKETS, 12" DUCT, ASSEMBLY.
	VDW16CLASY						1.18		12	DUCT "V" CLAMP WITH NEW DESIGN 14 GA BRACKETS, 16" DUCT, ASSEMBLY.
TOTAL WEIGHT							225.70			

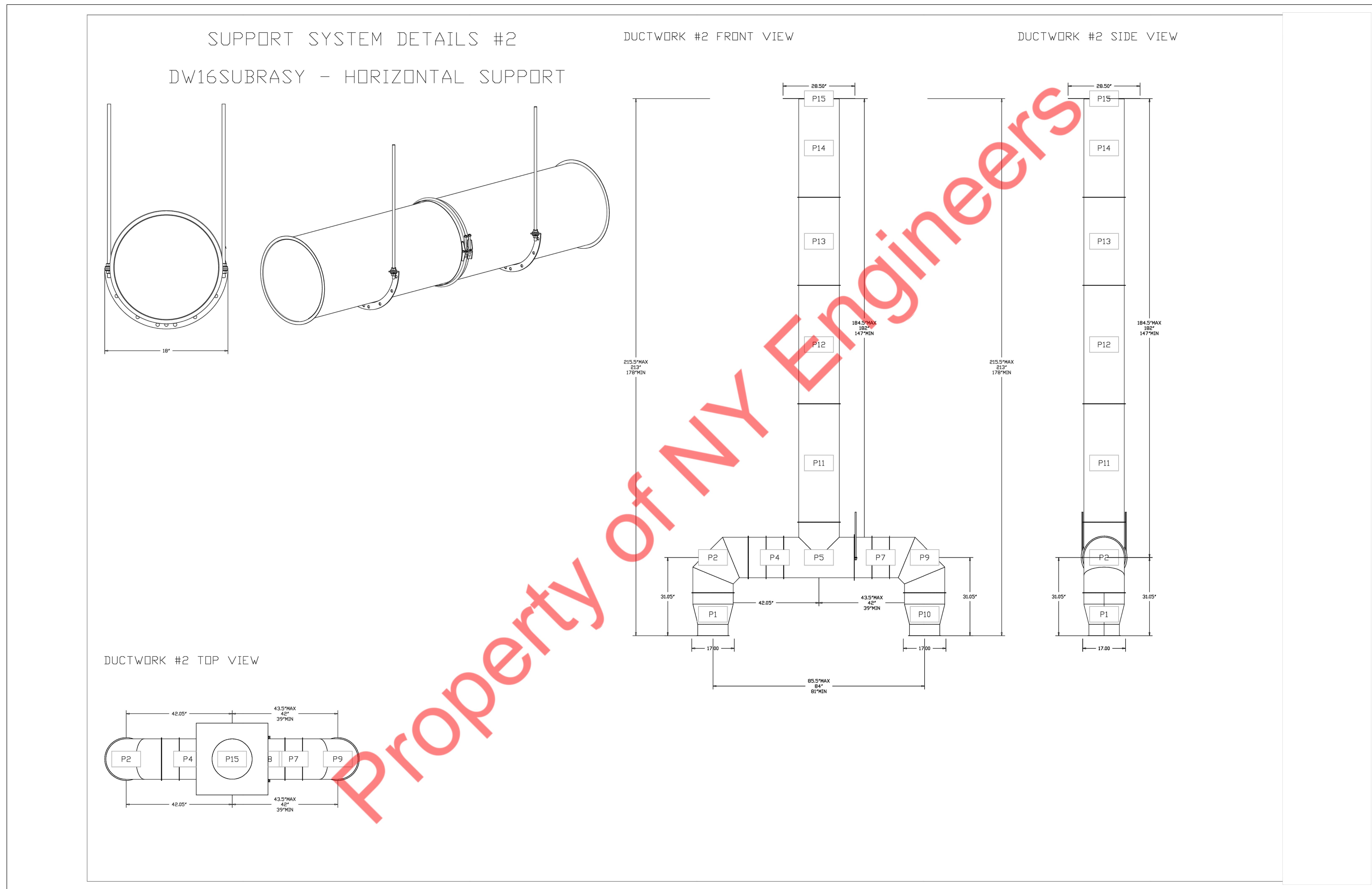
SINGLE WALL FACTORY BUILT DUCTWORK

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5"	10'	10'	24'
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8"	10'	10'	24'
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14"	10'	10'	24'
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Property of NY Engineers



PROJECT NUMBER

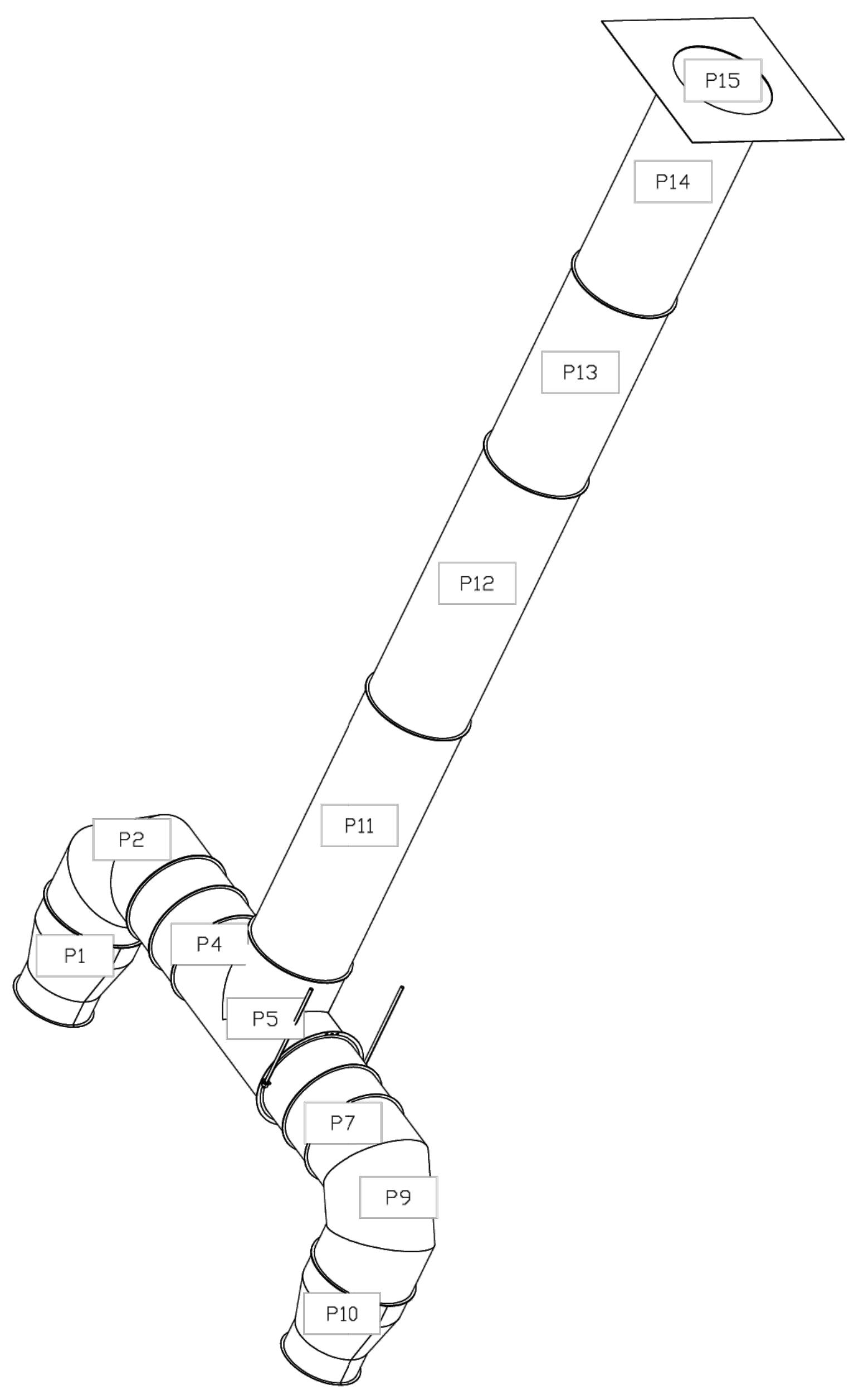
85°C Bakery Cafe

REVISIONS

KITCHEN HOOD
DRAWINGS
(14 OF 15)

H-114

DUCTWORK #2 SE VIEW



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PROJECT NUMBER

85°C Bakery Cafe

REVISIONS

KITCHEN HOOD
DRAWINGS
(15 OF 15)

H-115

LIGHTING PLAN LEGEND	
\$A	SWITCH TYPE (SUPERSCRIPT IN UPPERCASE) 20A, 120V SPST WALL SWITCH (UON) SWITCH TAG (SUBSCRIPT IN LOWERCASE)
\$OS	WALL SWITCH WITH OCCUPANCY SENSOR
\$VS	WALL SWITCH WITH VACANCY SENSOR
\$T	WALL SWITCH WITH TIMER
\$D,T	WALL SWITCH WITH DIMMER & TIMER
\$3	3 WAY WALL SWITCH (SPDT)
\$4	4 WAY / INTERMEDIATE WALL SWITCH (DPDT)
\$R	WALL SWITCH WITH SPEED REGULATOR
\$M	MOTOR RATED WALL SWITCH
\$Th	THERMOSTAT WALL SWITCH
\$MO	MANUAL OVERRIDE WALL SWITCH
[PC]	PHOTOCELL WALL MOUNTED
[OS]	OCCUPANCY SENSOR WALL MOUNTED
[OS]	OCCUPANCY SENSOR CEILING MOUNTED
[VS]	VACANCY SENSOR CEILING MOUNTED
[DS]	DAY LIGHT SENSOR CEILING MOUNTED
[TC]	TIME CLOCK - DUAL CHANNEL
[LC]	LIGHTING CONTACTOR

POWER AND COMMUNICATION PLAN LEGEND	
∅	WALL MOUNTED SIMPLEX RECEPTACLE, RATING SHALL BE SAME AS BREAKER OR AS NOTED
∅	20A, 120V WALL MOUNTED DUPLEX RECEPTACLE
∅U	20A, 120V WALL MOUNTED RECEPTACLE WITH USB OUTLET
∅\$	20A, 120V WALL MOUNTED HALF SWITCHED DUPLEX RECEPTACLE WITH SWITCH
∅\$	20A, 120V WALL MOUNTED FULL SWITCHED DUPLEX RECEPTACLE WITH SWITCH
∅	20A, 120V WALL MOUNTED GFCI DUPLEX RECEPTACLE
∅CL	20A, 120V CEILING MOUNTED DUPLEX RECEPTACLE
∅FL	20A, 120V FLOOR MOUNTED DUPLEX RECEPTACLE
∅	20A, 120V WALL MOUNTED QUAD RECEPTACLE
∅	WALL MOUNTED SPECIAL RECEPTACLE, RATING SHALL BE SAME AS BREAKER OR AS NOTED
▽#	DATA OUTLET - QUANTITY AS INDICATED
▽#	TELEPHONE OUTLET - QUANTITY AS INDICATED
▽#	DATA / TELEPHONE COMBINATION OUTLET - QUANTITY AS INDICATED
DR+TDB	DATA RACK + TELEPHONE DISTRIBUTION BOARD - AS REQUIRED
TV	CABLE TV OUTLET
□	NON FUSED DISCONNECT SWITCH - RATING EQUAL TO OR MORE THAN BREAKER RATING
□	FUSED DISCONNECT SWITCH - FUSE RATING AS NEEDED -

ANNOTATION	
#[#]	KEYED NOTE
#[#]	EQUIPMENT TAG
○	CALLOUT: DETAIL NUMBER ON TOP DRAWING NUMBER ON BOTTOM
○	DETAIL OR ELEVATION REFERENCE
#1	CIRCUIT 1 IN PANEL A

CODE COMPLIANCE	
ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:	
NEC: 2020 NATIONAL ELECTRICAL CODE	
IICC: 2018 INTERNATIONAL ENERGY CONSERVATION CODE	
IBC: 2018 INTERNATIONAL BUILDING CODE	

ELECTRICAL DRAWING LIST	
E-001	ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES
E-002	ELECTRICAL SPECIFICATIONS 1 OF 2
E-003	ELECTRICAL SPECIFICATIONS 2 OF 2
E-100	ELECTRICAL LIGHTING PLAN
E-200	ELECTRICAL POWER PLAN
E-201	ELECTRICAL POWER ROOF PLAN
E-300	ELECTRICAL DETAILS
E-400	ELECTRICAL RISER DIAGRAM
E-500	ELECTRICAL PANEL SCHEDULE

ELECTRICAL ABBREVIATIONS	
A	AMPERES
AF	AMPERE FRAME / AMP FUSE
AFF	ABOVE FINISHED FLOOR
AS	AMP SWITCH
AIC	AMPS INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
C/B, CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
COMM	COMMUNICATION
CT	CURRENT TRANSFORMER
CU	COPPER
°C	DEGREE CELSIUS
CL	CURRENT LIMITER
DWG	DRAWING
DPS	DOUBLE POLE SINGLE THROW
DPDT	DOUBLE POLE DOUBLE THROW
E	EXISTING
EF	EXHAUST FAN
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
ER	EXISTING TO BE RELOCATED
ETR	EXISTING TO REMAIN
EOR	ENGINEER OF RECORD
°F	DEGREE FAHRENHEIT
FA	FIRE ALARM
G	GROUND
GFI	GROUND FAULT INTERRUPTER
GC	GENERAL CONTRACTOR
HD	HAND DRYER
HP	HORSEPOWER
Hz	HERTZ
IG	ISOLATED GROUND
IC	INTERRUPTING CAPACITY
JB	JUNCTION BOX
KCMIL	ONE THOUSAND CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT-AMPERES
KW	KILOWATTS
LP	LIGHTING PANEL
LL	LAND LORD
LTC	LIGHTING
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MIN	MINIMUM
MLO	MAIN LUGS ONLY
N	NEUTRAL
NIC	NOT IN CONNECT
NL	NIGHT LIGHT
NTS	NOT TO SCALE
PP	POWER PANEL
PVC	POLYVINY CHLORIDE
PWR	POWER
R	REMOVE
RE	RELOCATED EXISTING
RR	REMOVE & RELOCATE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
TR	TAMPER RESISTANT
TYP	TYPICAL
USB	USB JACK
UON	UNLESS OTHERWISE NOTED
VA	VOLT AMPERE
VIF	VERIFY IN FIELD
WP	WEATHER PROOF
W	WIRE / WATT
XMER	TRANSFORMER

DEMOLITION NOTES	
1.	IN EVERY INSTANCE OF DEMOLITION AND/OR REMODELING, THE ELECTRICAL CONTRACTOR SHALL FIGURE A COMPLETE JOB AS NONE OTHER SHALL BE ACCEPTED.
2.	THE DRAWINGS ARE TO BE USED ONLY AS A GUIDELINE FOR DEMOLITION. THE ELECTRICAL CONTRACTOR MUST VISIT THE SITE PRIOR TO BIDDING TO VERIFY ALL WORK REQUIRED FOR A COMPLETE JOB & INCLUDE THE COST OF SUCH WORK IN HIS BID.
3.	THE ELECTRICAL CONTRACTOR SHALL MAINTAIN EXISTING SERVICES TO & IN THE EXISTING AREA AS REQUIRED.
4.	IF NECESSARY, THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY SERVICES IN THE EXISTING AREAS.
5.	THE ELECTRICAL CONTRACTOR SHALL DISCONNECT & REMOVE ELECTRIC SERVICE TO ALL MECHANICAL EQUIPMENT BEING REMOVED AS A RESULT OF THE REMODELING.
6.	ELECTRICAL EQUIPMENT & DEVICES SHALL BE REMOVED COMPLETE INCLUDING CONDUIT & WIRE.
7.	FLUSH MOUNTED WALL OUTLETS SHALL BE BLANKED-OFF WITH A COVER PLATE. COVER PLATE COLOR SHALL BE SELECTED BY ARCHITECT.
8.	ANY EXISTING CONDUIT, WIRING AND/OR ELECTRICAL & MECHANICAL DEVICES BEING DISTURBED BY THE WORK SHALL BE REWORKED BY THIS CONTRACTOR A REQUIRED TO RETURN TO ITS FORMER EXISTING OPERATING CONDITION.
9.	ANY CIRCUITS FEEDING THROUGH DEVICES OR EQUIPMENT BEING RELOCATED, REWORKED, OR ABANDONED & SERVING OTHER ELECTRICAL DEVICES, AND/OR EQUIPMENT SHALL BE MAINTAINED BY PROVIDING J-BOXES OR OTHER ACCEPTABLE METHOD AS REQUIRED.
10.	ALL WALLS, CEILINGS, FLOORS, ETC. BEING DISTURBED BY THE WORK SHALL BE RESTORED TO FINISHED CONDITIONS TO MATCH EXISTING BY THE ELECTRICAL CONTRACTOR & HE SHALL DO HIS OWN CUTTING & PATCHING AS NECESSARY UNDER HIS CONTRACT.
11.	EXISTING MATERIALS SHALL BE TURNED OVER TO THE OWNER. IF NOT REQUIRED BY OWNER, THE ELECTRICAL CONTRACTOR SHALL REMOVE THESE MATERIALS FROM THE PREMISES.
12.	ALL CONDUIT AND CABLING SHALL BE PROPERLY SUPPORTED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE AND/OR REWORK EXISTING CONDUIT AND/OR CABLING THAT IS NOT IN COMPLIANCE WITH THIS REQUIREMENT.
13.	CONTRACTOR SHALL FIELD VERIFY SLAB ON GRADE FLOOR CONSTRUCTION TYPE PRIOR TO CUTTING. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR CUT A STRUCTURAL FLOOR SLAB THICKER THAN FOUR (4") INCHES WITHOUT PRIOR WRITTEN APPROVAL FROM ENGINEER OF RECORD. NOTIFY ENGINEER OF RECORD OF ANY SLAB THICKNESS GREATER THAN FOUR (4") INCHES PRIOR TO PROCEEDING WITH ANY SAW CUTTING.

ELECTRICAL SHEET GENERAL NOTES	
1.	CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
2.	CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
3.	FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
4.	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. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
5.	LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
6.	VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
7.	CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
8.	ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
9.	CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.
10.	MINIMUM SIZE OF CONDUIT SHALL BE $\frac{3}{4}$ ", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
11.	CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
12.	PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVIDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CONCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
13.	SUPPORT PANEL, JUNCTION AND PILLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
14.	FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
15.	ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAIN-TIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
16.	ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
17.	ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
18.	ALL CONDUITS AND EQUIPMENT TO BE CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
19.	ALL EQUIPMENT AND MATERIALS INSTALLED IN PLUMED CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
20.	OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE-RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE-RATED BOXES OR PUTTY PADS ARE UTILIZED.
21.	COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.
22.	COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
23.	REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
24.	REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
25.	LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
26.	NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANEL BOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANEL BOARD.

ELECTRICAL SPECIFICATIONS 1 OF 2

- GENERAL:
 - THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
 - 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 THEIR PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
 - BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSIONS OF PROPOSALS WILL BE CONSIDERED AS EVIDENCE THAT SUCH EXAMINATION HAS BEEN MADE. ANY LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
 - INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE, AND REPAIR. MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
 - REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS SHALL BE COMpletely DESCRIBED IN THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
 - 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 CHARGE. AT TIMES, NOT TO EXCEED ONE HOUR, DURING 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.
 - DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
 - 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.
 - SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
 - PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
 - ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR, WITH THE EXCEPTION OF SPECIFIC EQUIPMENT OR APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
 - 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.
 - UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL PAINT AND PAINTING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
 - ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
 - INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
 - 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 CERTIFICATE OF INSPECTION AND APPROVAL.
- GENERAL PROVISIONS FOR ELECTRICAL WORK:
 - DEFINITIONS:
 - "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
 - "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
 - "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
 - "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
 - "WIRING": RACEWAY, FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
 - "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.
 - "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
 - "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
 - TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
 - QUALITY ASSURANCE
 - QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION

- GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
- GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
- HEIGHTS OF OUTLETS:
 - REFER TO ARCHITECTURAL AND/OR INTERIOR DESIGNER'S PLANS FOR DEVICE HEIGHTS IN NON BOH SPACES.
 - FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
 - RECEPTACLES AND TELEPHONES: 1 FT-6 IN.
 - WALL SWITCHES: 4 FT-0 IN.
 - WALL FIXTURES: 7 FT-0 IN.
 - MOTOR CONTROLLERS: 5 FT-0 IN.
 - CLOCKS: 7 FT-6 IN
- EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
- REFER TO ARCHITECTURAL AND/OR INTERIOR DESIGNER'S PLANS FOR DEVICE HEIGHTS IN NON BOH SPACES.
- PRODUCT DELIVERY, STORAGE AND HANDLING
 - MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
 - 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.
- MATERIALS
 - NAMENPLATES: PROVIDE BLACK LAMACOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMENPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
 - CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULL BOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
 - INSERTS AND SUPPORTS:
 - 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.
 - SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
 - GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
 - WHERE BUILDING CONSTRUCTION INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- SUBMIT ELECTRICAL POWER SYSTEM STUDIES INCLUDING SUPPORTING DATA AND RECOMMENDATIONS FOR THE FOLLOWING:
 - SHORT CIRCUIT CURRENT AND PROTECTIVE DEVICE COMBINATION.
 - ARC FLASH HAZARD ANALYSIS.
 EQUIPMENT SHOP DRAWINGS SHALL NOT BE SUBMITTED UNTIL THESE STUDIES HAVE BEEN COMPLETED.
- 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 ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND 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 SHALL MATCH SURROUNDING WALL BEING USED FOR MATED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIMER COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR; MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND ACCESSORIES.
- FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.
- ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- SCOPE OF WORK:
 - SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE CODE WITH LOCAL AMENDMENTS, AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
 - 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, SUPPLIED OR SPECIFIED HEREIN.
 - THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR EQUIPMENT AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORK, EQUIPMENT AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF 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 OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
 - THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, 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.
- CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE NYC BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.
- AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.
- SHOP DRAWINGS
 - 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 ARCHITECT AND ENGINEER.
 - INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
 - PROJECT NAME AND LOCATION
 - NAME OF ARCHITECT AND ENGINEER
 - ITEM IDENTIFICATION
 - APPROVAL STAMP OF PRIME CONTRACTOR
 - SUBMISSIONS:
 - 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND THREE COPIES. THE CONTRACTOR SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL, AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
 - 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
 - SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
 - SAFETY/DISCONNECT SWITCHES
 - FUSES
 - CIRCUIT BREAKERS
 - DISTRIBUTION EQUIPMENT INCLUDING SWITCHBOARDS, TRANSFORMERS, PANELBOARDS AND LOAD CENTERS.
 - RACEWAYS
 - WIRE AND CABLE
 - LIGHTING CONTROL DEVICES
 - INSERTION RECEPTACLES
 - MOMENTARY CONTACT SWITCHES
 - TIME SWITCHES
 - LIGHTING FIXTURES, BALLASTS AND LAMPS.
 - FIRE ALARM EQUIPMENT AND DEVICES.
 - MOTOR STARTERS.
- SUBMIT ELECTRICAL POWER SYSTEM STUDIES INCLUDING SUPPORTING DATA AND RECOMMENDATIONS FOR THE FOLLOWING:
 - SHORT CIRCUIT CURRENT AND PROTECTIVE DEVICE COORDINATION
 - ARC FLASH HAZARD ANALYSIS.
 EQUIPMENT SHOP DRAWINGS SHALL NOT BE SUBMITTED UNTIL THESE STUDIES HAVE BEEN COMPLETED.
- ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING, PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.
- AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
 - UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
 - THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
 - THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
 - REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
- LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
 - PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
 - ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.
 - DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY.

- EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808FT. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810FT. KNOB-LOAD TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE, QUICK-BREAK, UL CLASS R UP TO 600 AMP, MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.
- FUSES:
 - OVERCURRENT AND SHORT CIRCUIT PROTECTION WITHIN FUSIBLE SWITCHES SHALL BE CLASS L CURRENT LIMITING TIME DELAY FUSES FOR SWITCHES RATED 800A AND LARGER AND CLASS RK-1 CURRENT LIMITING TIME DELAY FUSES FOR SWITCHES RATED 600A AND SMALLER. MANUFACTURER SHALL BE BUSSMANN.
 - INDIVIDUAL MOTOR STARTERS SHALL INCLUDE TWO SETS OF NORMALLY OPEN CONTACTS, ONE SET OF NORMALLY CLOSED CONTACTS, THREE OVERLOAD RELAYS, AND ONE SET OF CONTACTS, HAVING OFF AUTO SELECTOR SWITCH FOR AUTOMATIC START AND PILOT. REQUIRED COMBINATION STARTER DISCONNECTS SHALL INCLUDE FUSIBLE SWITCHES. CONTACTORS SHALL BE NEMA TYPE WITH REPLACEABLE COIL AND CONTACT TIPS. MANUFACTURER SHALL BE EATON, SIEMENS OR SQUARE D.
 - ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
 - PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.
 - CIRCUIT BREAKERS: MOLED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLTON 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 A ND CLOSE MOTOR OPERATOR AND ALARM INDICATION ENCLOSURES SHALL BE SUITABLE FRONT, BACK, AND SIDE. 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) 120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM
- DISTRIBUTION PANEL BOARDS, CIRCUIT BREAKER TYPE:
 - DISTRIBUTION PANEL BOARDS SHALL BE FULLY RATED WITH COPPER PHASE, NEUTRAL, AND GROUND BUS, BRAZED AT 65000 AIC FOR 480/277 VOLT SYSTEM AND 42000 AIC FOR 208Y/120 VOLT SYSTEM, OR MORE TO BE GREATER THAN THE AVAILABLE SHORT CIRCUIT CURRENT. ISOLATED GROUND BUS SHALL BE AS REQUIRED. MANUFACTURERS SHALL BE EATON, SIEMENS OR SQUARE D.
 - BRANCH PANEL BOARDS SHALL BE FULLY RATED WITH COPPER PHASE, NEUTRAL AND GROUND BUS, BRAZED AT 14000 AIC FOR 480/277 VOLT SYSTEM AND 10000 AIC FOR 208Y/120 VOLT SYSTEM, OR MORE TO BE GREATER THAN THE AVAILABLE SHORT CIRCUIT CURRENT. NEUTRAL BUS SHALL BE RATED AT 200 PERCENT WITHIN PANELS SERVING NON-LINEAR LOADS. ISOLATED GROUND BUS SHALL BE AS REQUIRED. MANUFACTURER SHALL BE EATON, SIEMENS, OR SQUARE D.
- DISTRIBUTION PANEL BOARDS, SWITCH AND FUSE:
 - THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
 - NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.
 - PANEL BOARD SHALL BE CONSTRUCTED OF CODE-GAUGE STEEL, GRAY FINISH OVER RUST INHIBITOR, FOR SURFACE MOUNTING. BOX AND PANEL FRAME SHALL BE FLANGED AND REINFORCED FOR RIGID SUPPORT OF INTERIOR AND ACCURATE ALIGNMENT OF INTERIOR WITH FRONT. TRIMS TO BE FASTENED TO BACK BOX WITH SCREWS.
 - ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMICOID NAMEPLATES (BLACK WITH WHITE CORE).
- DISCONNECTS
 - DISCONNECT SWITCHES SHALL CONFORM TO NEMA AND UL STANDARDS, AND SHALL BE HORSEPOWER RATED.
 - SWITCHING MECHANISM SHALL BE QUICK-MAKE, QUICK-BREAK, SINGLE THROW WITH EXTERNAL OPERATING HANDLE MECHANICALLY INTERLOCKED WITH ENCLOSURE COVER TO PROVIDE ACCESS TO INTERIOR WHEN DISCONNECT IS IN OFF POSITION ONLY. PROVIDE MEANS TO LOCK OPERATING HANDLE IN THE OPEN AND CLOSED POSITION. DESIGNATE ON THE ENCLOSURE THE OPEN AND CLOSED POSITION OF THE OPERATING HANDLE.
 - SWITCHES SHALL BE OF THE DOUBLE STATIONARY CONTACT TYPE.
 - SWITCHES SHALL BE EQUIPPED WITH REJECTION TYPE FUSE HOLDERS, FUSIBLE AS SHOWN ON THE DRAWINGS; PROVIDE COMPLETE WITH FUSES AS SCHEDULED.
- INSTALLATION
 - DISTRIBUTION PANEL BOARD SHALL BE MOUNTED TO STRUCTURAL STEEL CHANNEL (KINDORF) WHICH SHALL BE BOLTED TO THE WALL USING EXPANSION ANCHORS FOR LARGE PANELS.
- IDENTIFICATION
 - PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD SERVED.
 - NAMEPLATES SHALL BE MOUNTED ON THE FRONT COVER SECURED WITH SELF-TAPPING SCREWS OR NUTS AND BOLTS. NAMEPLATES SHALL BE LAMINATED PHENOLIC, BLACK WITH A MINIMUM OF 1/4" HIGH WHITE LETTERING.

- DISTRIBUTION AND SUB-DISTRIBUTION PANEL BOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- POWER PANEL BOARDS SHALL BE SIMILAR TO GENERAL ELECTRIC TYPE 100P, AS MANUFACTURED BY ATLAS SWITCH COMPANY, ELECTRIC SWITCHBOARD COMPANY OR APPROVED EQUAL.
- PANEL BOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.
- PANEL BOARD SHALL HAVE ENGRAVED WHITE CORE BLACK LAMACOID NAMEPLATE SCREWED ONTO PANEL TRIM WITH DESIGNATION LISTED (PANEL BOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).
- MATERIALS
 - RACEWAYS:
 - RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
 - ELECTROMETALIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
 - FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP,
 - WIREWAYS: STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
 - SURFACE METAL RACEWAY: SURFACE METAL RACEWAY INCLUDING POWER DEVICES, FITTINGS, CONNECTORS, FEEDER ELBOWS, COUPLINGS, BLANKS, TEES, WIRE CLIPS, DEVICE BRACKETS, DEVICE COVERS AND OTHER ASSOCIATED APPARATUS SHALL BE SIZED TO FACILITATE PULLING THE QUANTITY AND SIZE OF WIRES AND CABLES, AND INSTALLING THE DEVICES CONTAINED. RACEWAY SHALL BE OF CODE GAUGE GALVANIZED STEEL, SHALL INCLUDE MOUNTING KNOCK-OUTS, AND SHALL BE FINISHED AS DIRECTED BY THE ARCHITECT. MANUFACTURER SHALL BE WIREMOLD.
 - FITTINGS AND ACCESSORIES:
 - RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
 - ELECTROMETALIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
 - FLEXIBLE METAL CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
 - BUSHINGS: METALLIC INSULATED TYPE.

85°C Bakery Cafe

REVISIONS

E-002

ELECTRICAL SPECIFICATIONS 1 OF 2

ELECTRICAL SPECIFICATIONS 2 OF 2

3) BOXES:
 a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP, BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION. Manufacturer shall be Appleton, Raco or Steel City.

b. 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 AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE ADJUSTABLE CONCRETE, LIGHT PRESENT, WITH BROWN FLANGE AND COVER. FLUSH FLOOR BOXES SHALL INCLUDE MASS TRIM AND HINGED OUTLET OPENING COVERS. FIRE RATED POKE-THROUGH FLOOR FITTINGS SHALL BE UL LISTED AND APPROVED FOR THE FLOOR. SLAB FIRE RATING. FLOOR MOUNTED SERVICE FITTING FOR SERVICE FITTINGS FOR CONNECTION TO UNDER-FLOOR ELECTRIFIED METAL DECK SHALL BE COMPATIBLE WITH THE DECK MANUFACTURER. ACCESS FLOOR MOUNTED FITTINGS FOR USE WITH RAISED FLOOR SHALL BE FLUSH TYPE WITH SPACE FOR EQUIPMENT CORD PLUG DEVICES AND SUITABLE FLIP TYPE COVER. MANUFACTURER SHALL BE HUBBELL, WIREMOLD, OR STEEL CITY

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 FOR RACEWAYS AND CONCEALED IN CONCRETE OR ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS, TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR, PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

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 MASONRY, LAMPS OR FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAIGHT 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, STEAM 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.

MANTAIN 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. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS.

FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS INACCESSIBLE FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE. PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER 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.

RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

D. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN NEC TABLE 300.19(A).

E. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FUZZING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE

WITH BUILDING FINISH, SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

F. PANEL, 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. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

G. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITION ROOMS.

H. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

9. WIRE AND CABLE:
 a. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REQUIREMENT 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 CABLE SHALL BE NO. 125 VOLTS, 100 FEET AND OVER 100 FT CIRCUIT LENGTH. PROVIDE NO. 10 MINIMUM AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH. PROVIDE NO. 10 MINIMUM. MANUFACTURER SHALL BE AMERICAN INSULATED WIRE CORP., CERRO, COLLYER, CAPITOL WIRE AND CABLE, OKONITE, SENATOR, SOUTH WIRE OR TRIANGLE.

c. 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.

d. INTERNAL SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPECA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).

e. ARMORED CABLE (BX) 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 HOSPITAL GRADE 'BX'.

f. METAL-CLAD CABLE, NFPA 70 ARTICLE 330 TYPE MC:
 1) INTERLOCKED FLEXIBLE GALVANIZED STEEL ARMOR SHEATH, CONFORMING TO UL REQUIREMENTS FOR TYPE MC METAL CLAD CABLE.
 2) INSULATED COPPER CONDUCTORS, SUITABLE FOR 600 VOLTS, RATED 90°C, ONE OF THE TYPES LISTED IN NFPA 70 TABLE 310.3(A) OR OF A TYPE IDENTIFIED FOR USE IN TYPE MC CABLE.
 3) INTERNAL FULL SIZE COPPER GROUND CONDUCTOR WITH GREEN INSULATION.
 4) ACCEPTABLE COMPANIES: AFC CABLE SYSTEMS INC., SOUTHWIRE, GENERAL CABLE.
 5) CONNECTORS FOR MC CABLE: AFC FITTING INC.'S AFC SERIES, ARLINGTON INDUSTRIES INC.'S SADDLE GRIP, OR THOMAS & BETTS CO.'S TITE-BITE WITH ANTI-SHORT BUSHINGS.

g. COLOR CODING SHALL BE AS FOLLOWS:
 120/208 VOLT SYSTEM:
 BLACK FOR A PHASE
 RED FOR B PHASE
 BLUE FOR C PHASE

1) 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 TAPE IN ACCESSIBLE LOCATIONS.

h. PROVIDE FLAMEPROOF LINEN OR FIBER TAPE 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.

i. 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. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BONDED PRESSURE OR HYDRAULIC COMPRESSION TYPE. USING MANUFACTURER'S RECOMMENDED TAPPING. 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.

j. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS 120/208 AND 265/460 VOLTS SYSTEMS. EXCEPT 460 VOLTS MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLTS CONTROL WIRING, THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

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

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

m. 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.

10. WIRING DEVICES:
 a. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.

b. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/277 VOLTS, AC, SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).

c. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.

1) SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).

2) INSERTION RECEPTACLES SHALL BE HOSPITAL GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, GROUNDED, EXCEPT AS NOTED.

2) HEALTH CARE FACILITIES:
 a. DUPLEX, 20 AMP, 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT: SIMILAR TO HUBBELL NO. 8300 HOSPITAL GRADE.
 b. SINGLE, 20 AMP, 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT: SIMILAR TO HUBBELL NO. 8310 HOSPITAL GRADE.

3) GROUND FAULT INTERRUPTER RECEPTACLES:
 a. 20 AMP DUPLEX FEED-THROUGH TYPE. SIMILAR TO NO. GF8300.

e. DEVICE PLATES: SEE ARCHITECT FOR TYPE, FOR RECEPTACLES WITH OTHER THAN 120 VOLTS, INSCRIBED VOLTAGE AVAILABLE.

f. COLORS: COORDINATE COLORS WITH ARCHITECT.

g. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

11. LIGHTING FIXTURES:
 a. FIXTURES TO BE AS SPECIFIED BY ARCHITECT U.O.N. AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.

b. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.

c. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ETI AND CEM APPROVED. ENERGY SAVING TYPE, TRIGGER START FOR 24-INCH LAMPS AND RAPID START FOR 48-INCH, TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.

d. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.

e. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE. DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.

f. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUAKER STATE, A SUBSIDIARY OF CONED. CONED CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.

g. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED FOR USE IN THE CITY. AC POWER WITH 120V LOW-VOLTAGE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3-HOUR RUN TIME. PROVIDE AN INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

12. GROUNDING AND BONDING:
 a. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH 2011 NATIONAL ELECTRICAL CODE WITH NYC AMENDMENTS, AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM.

b. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.

c. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.

d. WHERE FLEXIBLE METALLIC CONDUIT IS USED AS INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.

e. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:

1) CIRCUITS SERVING ANY WALL BOX DIMMER.

2) CIRCUITS SERVING ANY ISOLATED GROUNDED RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDED CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE, OR AS OTHERWISE NOTED ON DRAWINGS.

3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES.

4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

13. INTERCOM CONDUIT SYSTEM:
 a. PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, J-BOXES, SLEEVES AND FISHWIRES.

b. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF INTERCOM MANUFACTURER.

c. J-BOXES SHALL BE:
 1) WALL: 4 IN. SQUARE WITH SINGLE GANG COVER PLATE.

d. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.

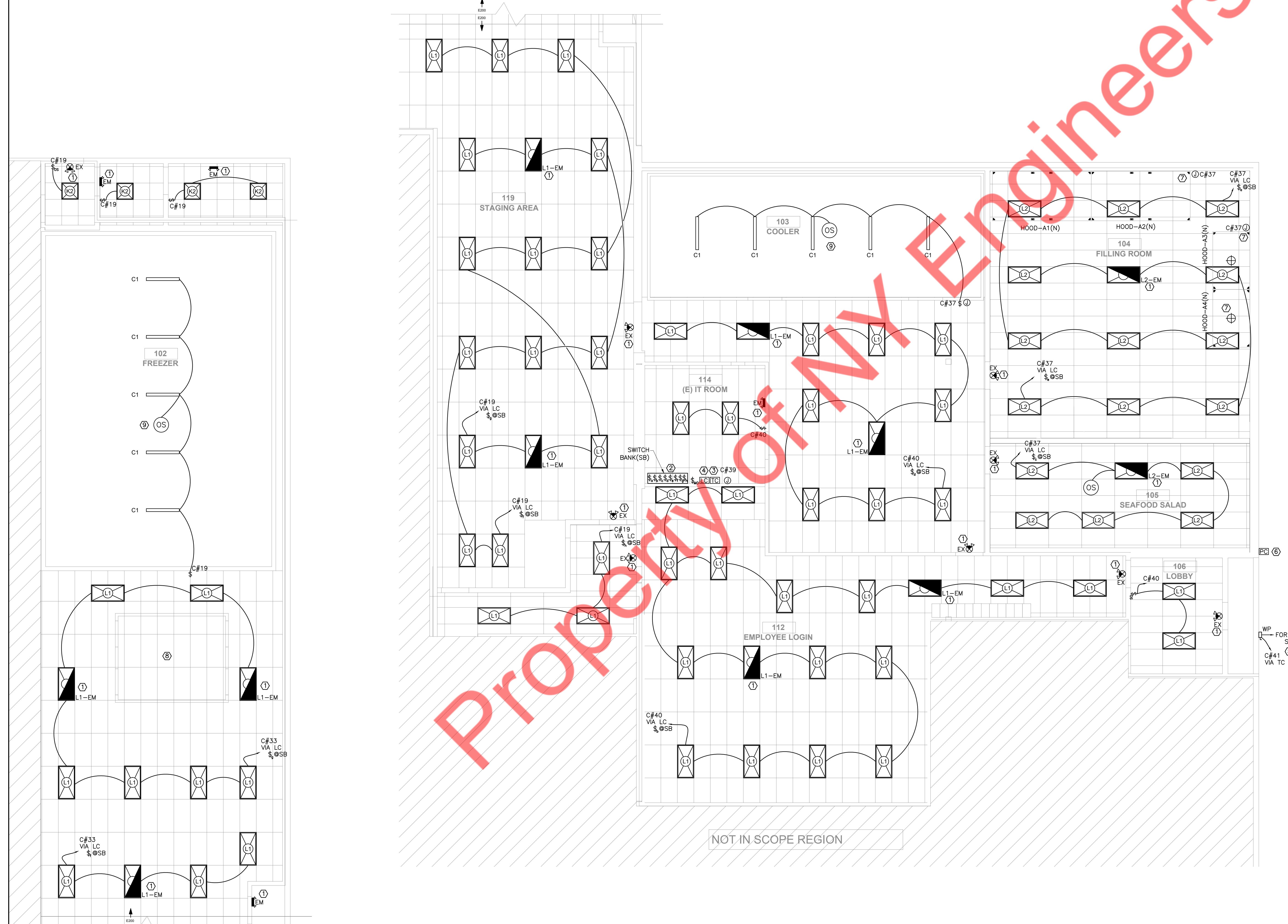
e. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM EACH APARTMENT TO MAIN INTERCOM CONTROLLER AT ENTRANCE.

PROJECT NUMBER: **85°C Bakery Cafe**

REVISIONS:

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E-003



1 ELECTRICAL LIGHTING PLAN

SCALE: 3/16" = 1'-0"

LIGHT SWITCHING SCHEDULE								
1- COORDINATE EXACT LOADING CAPACITY OF THE SWITCH AND SENSOR WITH THE VENDOR.							2- NUMBER OF SENSOR AND SWITCHES REQUIRED MAY VARY BASED ON THE LOADING CAPACITY OF THE SENSOR AND SWITCH.	
CIRCUIT #	CONTACTOR/RELAY#	AUTOMATIC CONTROL SWITCH#	SWITCH TYPE	SWITCH BANK	LOAD IN VA	NOTES		
C#37	CONTACTOR#1	TIME CONTROL	Sa	REGULAR	SB	220.8	1	
C#35	CONTACTOR#1	TIME CONTROL	Sb	REGULAR	SB	552	1	
C#37	CONTACTOR#1	TIME CONTROL	Sc	REGULAR	SB	220.8	1	
C#35	CONTACTOR#2	TIME CONTROL	Sd	REGULAR	SB	404.8	1	
C#37	CONTACTOR#2	TIME CONTROL	Se	REGULAR	SB	220.8	1	
C#33	CONTACTOR#2	TIME CONTROL	Sf	REGULAR	SB	441.6	1	
C#33	CONTACTOR#3	TIME CONTROL	Sg	REGULAR	SB	625.6	1	
C#33	CONTACTOR#3	TIME CONTROL	Sh	REGULAR	SB	110.4	1	
C#35		OCCUPANCY SENSOR	-	-	LOCAL	73.6	1,2	
C#35		OCCUPANCY SENSOR	-	-	LOCAL	73.6	1,2	

TAG	QTY	DESCRIPTION	MANUFACTURER	MODEL NUMBER	LAMP	WATTAGE	COMMENTS	NOTES
C1	10	COOLER LIGHTS	TBD	TBD	LED	20W	FOOD-SAFE LENSE	1,2,5
L1	55	2X4 RECESSED EMERGENCY TROFFER	COPPER / METALUX	TBD	LED	36.8		1,2,4,5
L1-EM	9	2X4 RECESSED EMERGENCY TROFFER	COPPER / METALUX	TBD	LED	36.8	FIXTURES DESIGNATED FOR EMERGENCY LIGHTING SHALL HAVE 90 MIN. BATTERY BACKUP	1,2,4,5
L2-EM	2	TBD	TBD	TBD	LED	36.8	FIXTURES DESIGNATED FOR EMERGENCY LIGHTING SHALL HAVE 90 MIN. BATTERY BACKUP	1,2,4,5
K2	4	TBD	TBD	TBD	LED	20	-	1,2,4,5
L2	16	TBD	TBD	TBD	LED	36.8	-	1,2,5
EX	9	EMERGENCY BUG LIGHT	LITHONIA LIGHTING	LPR RMR 120/277 ELN	LED	-	MIN. 90 MIN BATTY BACKUP	4
EM	3	ILLUMINATED EMERGENCY EXIT SIGNS	LITHONIA LIGHTING	#ELM6L	LED	-	MIN. 90 MIN BATTY BACKUP	4

NOTE:

- 1 COORDINATE WITH THE ARCHITECT FOR THE EXACT MODEL NO./MAKE, FINAL FINISH, COLOR AND QTY. OF THE LIGHT FIXTURE.
- 2 ALL LIGHTING CONTROLS SHALL BE PER AHJ AND CODE COMPLIANCE.
- 3 COORDINATE REQUIREMENT OF THE CURRENT LIMITER WITH THE VENDOR AND PROVIDE AS NEEDED.
- 4 THE LIGHT FIXTURE SHALL HAVE MINIMUM OF 90 MINUTES OF BATTERY BACKUP.
- 5 THE LIGHT FIXTURE WATTAGE HAS BEEN ASSUMED FOR THE COMCHECK AND LOAD CALCULATION PURPOSES ONLY. COORDINATE FINAL SELECTION BY ARCHITECT.

ELECTRICAL LIGHTING PLAN GENERAL NOTES	
A. SOME 24 HOUR, 7 DAY-A-WEEK OPERATIONAL FACILITIES DO NOT REQUIRE AUTOMATIC SHUT OFF (TIME CLOCK CONTROLLED) LIGHTING. VERIFY WITH OWNER AND AUTHORITY HAVING JURISDICTION.	
B. ALL LIGHT FIXTURES NOT ON TIME CLOCK OR OCCUPANCY SENSOR SHALL BE CONTROLLED BY LIGHTING CONTACTOR(S). E.C. SHALL PROVIDE AUTOMATIC CONTACTOR AND WIRE TO THE LIGHTING DETAILS SHEET FOR TYPICAL DETAILS OF LIGHTING CONTACTOR.	
C. ALL WIRING SHALL BE THHN RATED FOR 75°C, COPPER.	
D. MINIMUM #12 AWG COPPER WIRING SHALL BE USED FOR THE LIGHTING CIRCUIT.	
E. THE NEUTRAL AND GROUNDING ARE NOT SHOWN ON THE DRAWING. E.C. TO PROVIDE AS REQUIRED.	
F. EMERGENCY LIGHT SHALL TURN ON DURING POWER FAILURE WHEREAS ALL EXIT SIGNS SHALL BE PERMANENTLY ON.	

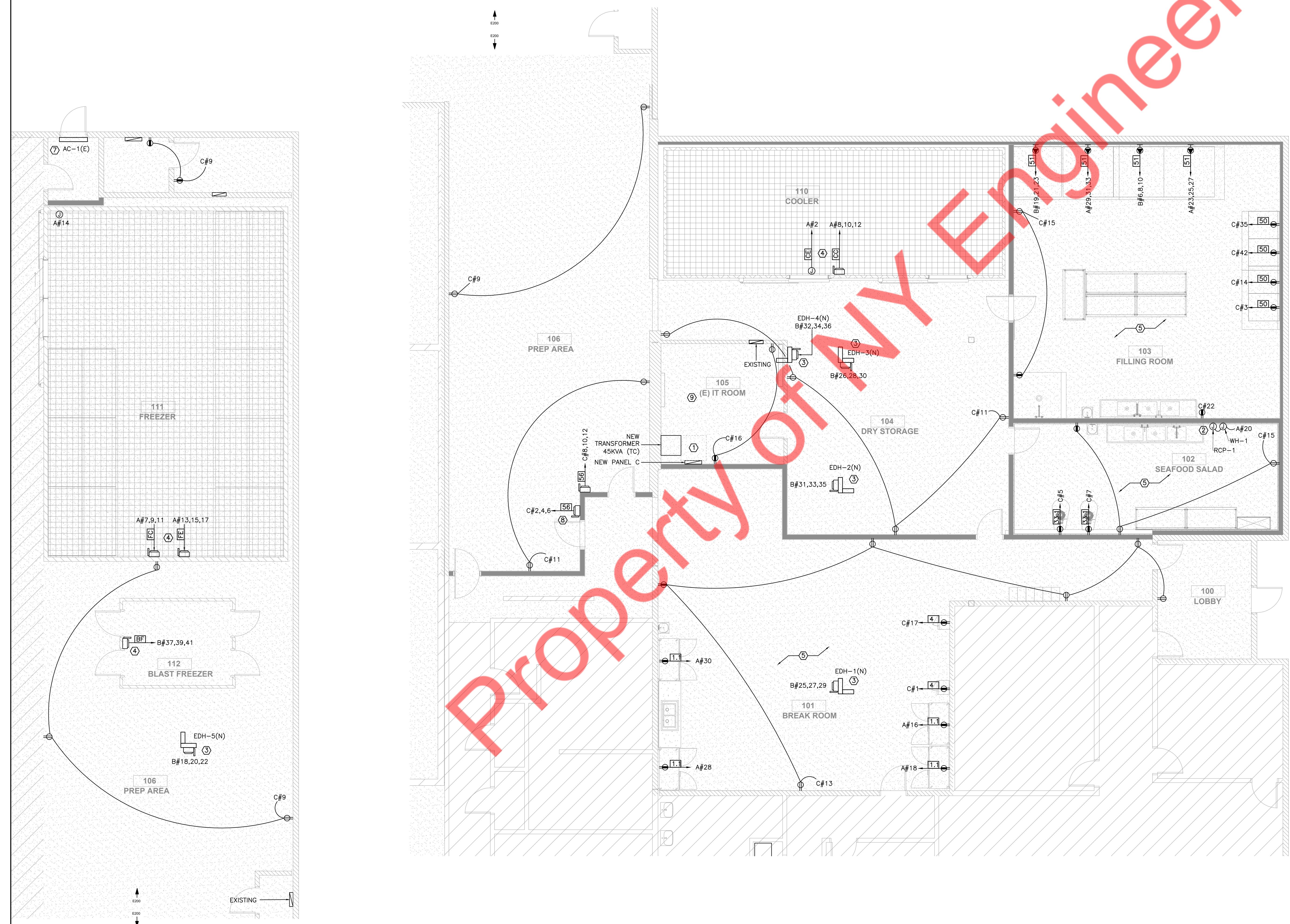
LIGHTING FIXTURE SCHEDULE GENERAL NOTES	
A. ALL LIGHTING FIXTURES SHOWN ON THE LIGHTING FIXTURES SCHEDULE ARE SUBJECT TO THE ARCHITECT'S APPROVAL. E.C. SHALL COORDINATE MAKE, MODEL, FINISHES, AND OTHER CRITICAL PARAMETERS WITH THE ARCHITECT BEFORE PURCHASING.	
B. THE ADDITIONAL ACCESSORIES (VIZ. DRIVERS AND CURRENT LIMITERS) REQUIRED FOR THE PROPER WORKING OF THE LIGHTING FIXTURES MIGHT NOT BE PROVIDED BY THE VENDOR. E.C. SHALL PURCHASE IT SEPARATELY.	
C. ALL LIGHTING FIXTURES ARE RATED FOR 120V UNLESS OTHERWISE NOTED.	
D. ALL EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS SHALL HAVE A MINIMUM OF 90 MINUTES OF BATTERY BACKUP OR AS REQUIRED BY AHJ.	
E. WATTS PER FACE FOR EXIT SIGNS SHALL NOT EXCEED 5 WATTS	
F. LIGHTING AND CONTROLS SUPPLIERS TO COORDINATE LED DRIVERS WITH DIMMERS TO ENSURE COMPATIBILITY AND FUNCTIONALITY.	
G. SWITCH AND DIMMER LOCATIONS ARE SUGGESTION ONLY. COORDINATE EXACT LOCATION IN FIELD WITH OWNER/ARCHITECT.	
H. HATCHED LIGHT FIXTURE INDICATE EMERGENCY CIRCUIT OR BATTERY BACK-UP. EMERGENCY LIGHT FIXTURE SHALL BE WIRED TO REMAIN ON AT ALL TIMES AND SERVE AS NIGHT LIGHTS WHEN SURROUNDING FIXTURES ARE SWITCHED OFF UNLESS NOTED OTHERWISE ON PLANS.	

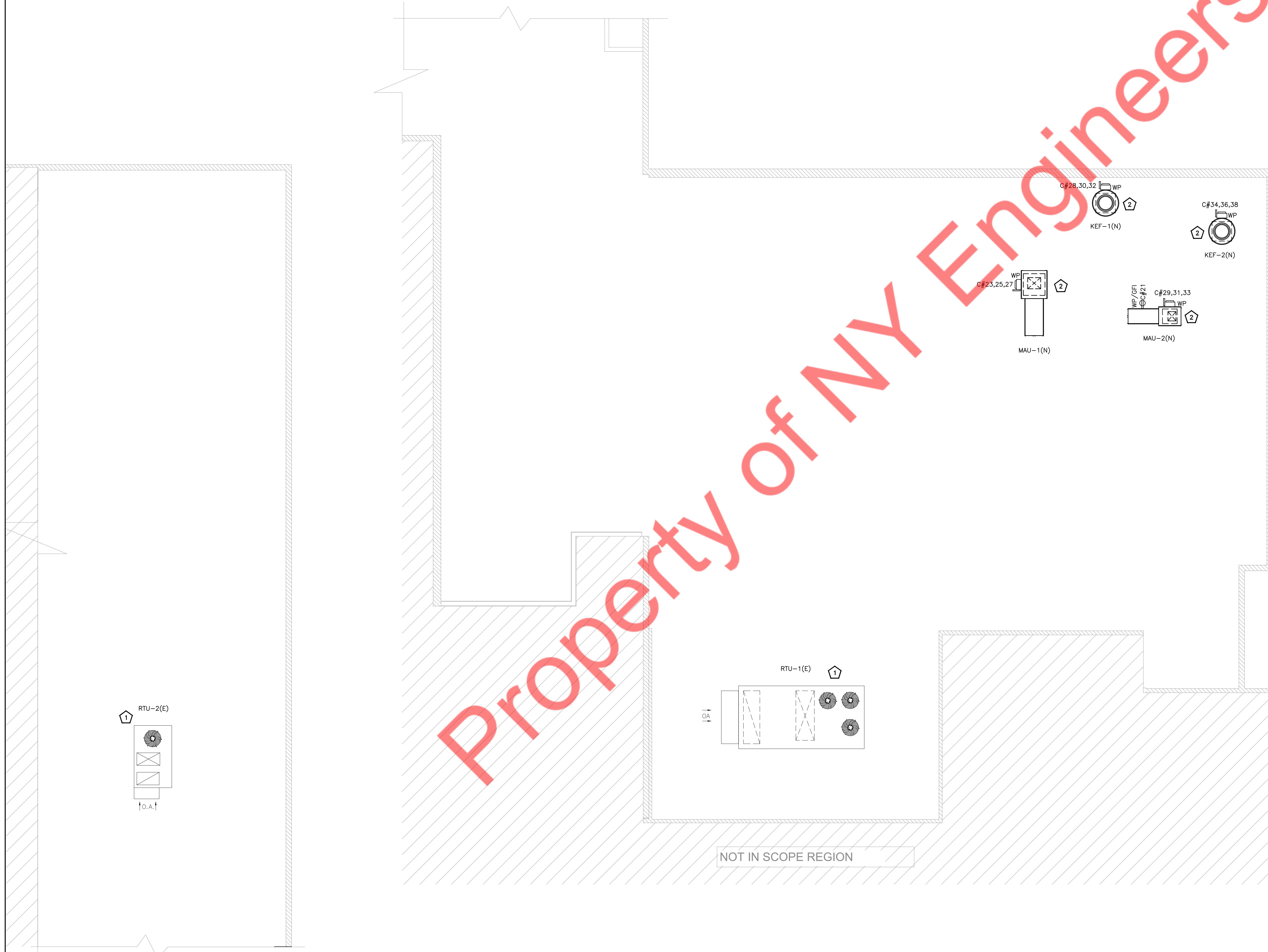
ELECTRICAL LIGHTING PLAN KEYED NOTES	
1. EMERGENCY LIGHTS SHALL BE WIRED TO THE HOT LEAD OF THE CLOSEST LOCAL LIGHTING CIRCUIT, CONNECT TO BATTERY POWERED EMERGENCY LIGHT AHEAD OF ANY CONTROLS / SWITCHES.	
2. E.C. SHALL COORDINATE THE EXACT LOCATION OF THE SWITCH BANK IN THE FIELD. ALL THE SWITCHES TAGGED AS (\$ SB) IN THE PLAN SHALL BE INSTALLED IN THE SWITCH BANK. REFER TO THE LIGHTING PLAN FOR THE NUMBER OF THE SWITCHES REQUIRED. REFER TO THE LIGHTING CONTACTOR CONNECTION DETAIL FOR MORE INFORMATION.	
3. E.C. SHALL COORDINATE EXACT LOCATION OF TIME CLOCK & LIGHTING CONTACTOR WITH ARCHITECT/OWNER IN THE FIELD.	
4. MANUAL OVERRIDE SWITCH. THE OVERRIDE SWITCH, WHEN INITIATED, SHALL LIMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2 HOURS. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER IN THE FIELD.	
5. E.C. SHALL VERIFY AVAILABILITY OF THE DISCONNECT SWITCH FOR BUILDING SIGNAGE. VERIFY OPERABLE CONDITION. PROVIDE NEW CIRCUIT AND PROVIDE NEW DISCONNECT AS SHOWN. IF NOT AVAILABLE OR INOPERABLE CONDITION, BASE BID ACCORDINGLY.	
6. COORDINATE EXACT LOCATION OF THE PHOTO CELL IN THE FIELD.	
7. PROVIDE JUNCTION BOX, CIRCUIT, AND SWITCH FOR HOOD LIGHTING. COORDINATE THE EXACT LOCATION OF THE SWITCH IN THE FIELD.	
8. BLAST FREEZER LIGHTING FIXTURES AND RELATED LOCAL CONTROLS SHALL BE PROVIDED BY EQUIPMENT SUPPLIER. E.C. SHALL MAKE ALL FINAL CONNECTION TO FIXTURES AS REQUIRED TO ENSURE A COMPLETE OPERATION. PROVIDE CIRCUIT AND CONTROL AS REQUIRED	
9. E.C. SHALL COORDINATE WITH VENDOR/ARCHITECT FOR LIGHTING CONTROL. PROVIDE CONTROL AS REQUIRED.	

REVISIONS

ELECTRICAL LIGHTING PLAN

E-100





1 ELECTRICAL POWER ROOF PLAN

SCALE: 3/16" = 1'-0"

85°C Bakery Cafe

REVISIONS



ELECTRICAL POWER
ROOF PLAN

E-201

ELECTRICAL ROOF POWER PLAN GENERAL NOTES

- A. ELECTRICAL CONTRACTOR SHALL COORDINATE DISCONNECT FOR MECHANICAL UNIT WITH MECHANICAL CONTRACTOR AND EQUIPMENT MANUFACTURER PRIOR TO ROUGH-IN AND PROVIDE AS REQUIRED. COORDINATE LOCATION OF DISCONNECT WITH MANUFACTURER AND MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. LOCATE AS REQUIRED TO MAINTAIN NEC CLEARANCES.
- B. ROOF RECEPTACLES SHALL BE GFI/WP/WR TYPE.
- C. ALL THE ELECTRICAL ELEMENTS VIZ. CONDUITS, WIRING, AND DISCONNECT SWITCHES SHALL BE RATED FOR THE EXTERIOR USE.
- D. EXISTING (E) MECHANICAL UNITS SHALL REMAIN CONNECTED TO THE EXISTING CIRCUIT. E.C. TO VERIFY THE OPERABLE CONDITION OF THE ELECTRICAL CIRCUIT AND CONTROLS IN THE FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
- E. E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE HVAC UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.
- F. GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI BREAKER IN THE PANEL FOR THE INDICATED CIRCUIT IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE.
- G. A 125-VOLT, SINGLE-PHASE, 15- OR 20-AMPERE-RATED RECEPTACLE OUTLET SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION WITHIN 7.5 M (25 FT) OF THE EQUIPMENT AS SPECIFIED IN 210.63(A) AND (B) AS PER NEC 210.63.

1 ELECTRICAL ROOF POWER PLAN KEY NOTES

1. EXISTING (E) MECHANICAL UNITS SHALL REMAIN CONNECTED TO THE EXISTING CIRCUIT IN THE EXISTING PANEL. E.C. TO VERIFY THE AVAILABILITY AND OPERABLE CONDITION OF THE ELECTRICAL CIRCUIT AND CONTROLS IN THE FIELD. PROVIDE NEW BREAKER IN THE PANEL, WIRING AND CONTROL AS NEEDED. INFORM THE ENGINEER OF RECORD FOR ANY DISCREPANCY BEFORE BID.
2. E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE HVAC UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.

MANUAL MODE OPERATION:

1. PUSHBUTTON PRESS IS REQUIRED TO TURN LOAD ON.
2. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR BY PRESSING PUSH BUTTON.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

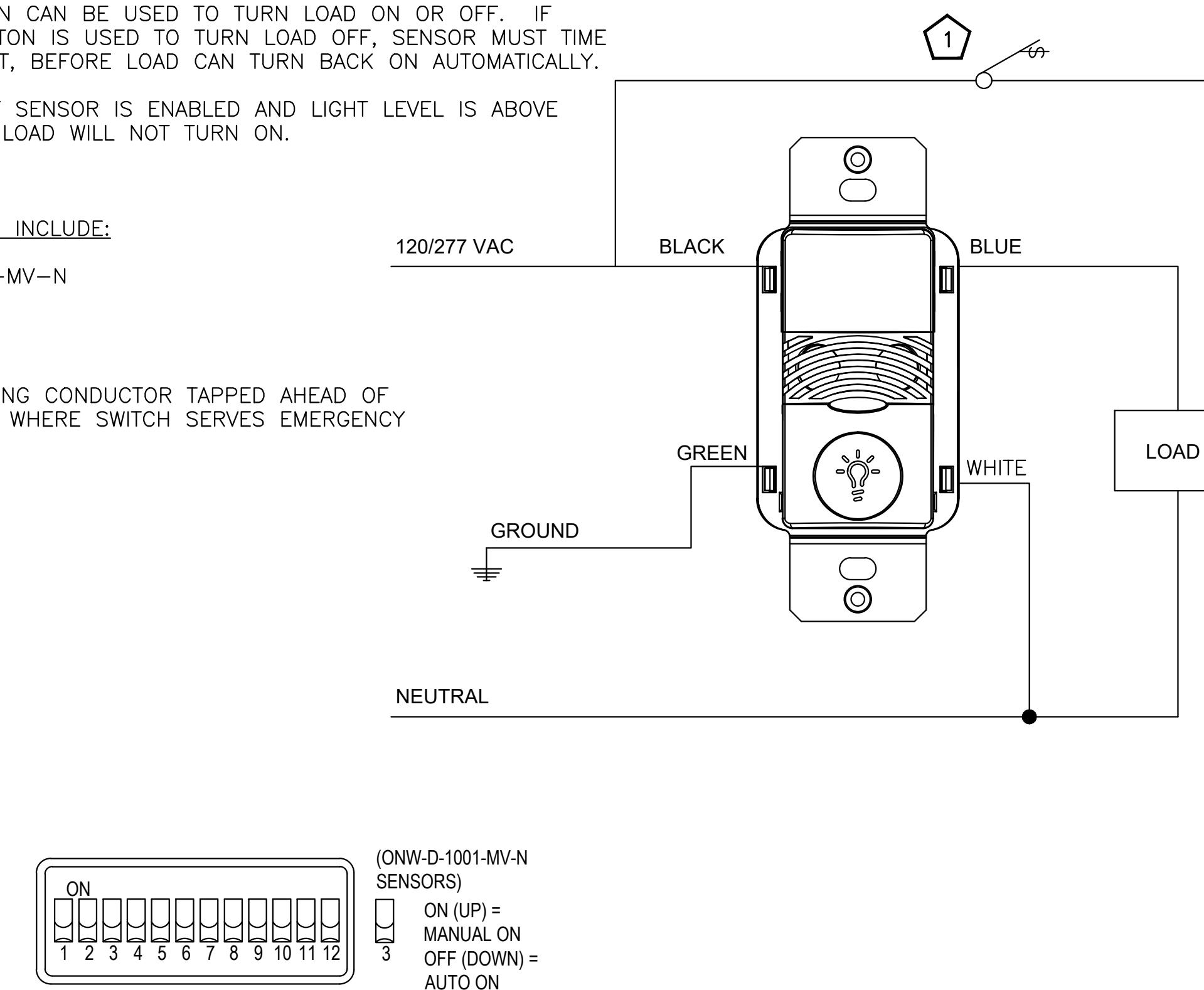
AUTOMATIC MODE OPERATION:

1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. PUSHBUTTON CAN BE USED TO TURN LOAD ON OR OFF. IF PUSHBUTTON IS USED TO TURN LOAD OFF, SENSOR MUST TIME OUT FIRST, BEFORE LOAD CAN TURN BACK ON AUTOMATICALLY.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

SENSOR TYPES INCLUDE:

ONW-D-1001-MV-N

① PROVIDE SENSING CONDUCTOR TAPPED AHEAD OF ANY SWITCHES WHERE SWITCH SERVES EMERGENCY FIXTURES.



AUTOMATIC MODE OPERATION:

1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. LOAD TURNS OFF, WITHIN 20 MINUTES OF OCCUPANT LEAVING SPACE.
3. IF DAYLIGHT SENSOR IS ENABLED, AND LIGHT LEVEL IS ABOVE PRESET SETPOINT, LOAD WILL NOT TURN ON.

SENSOR TYPES INCLUDE:

OAC-DT-2000-MV,
OAC-U-2000-MV,
OAC-P-0500-MV, OAC-P-1500-MV

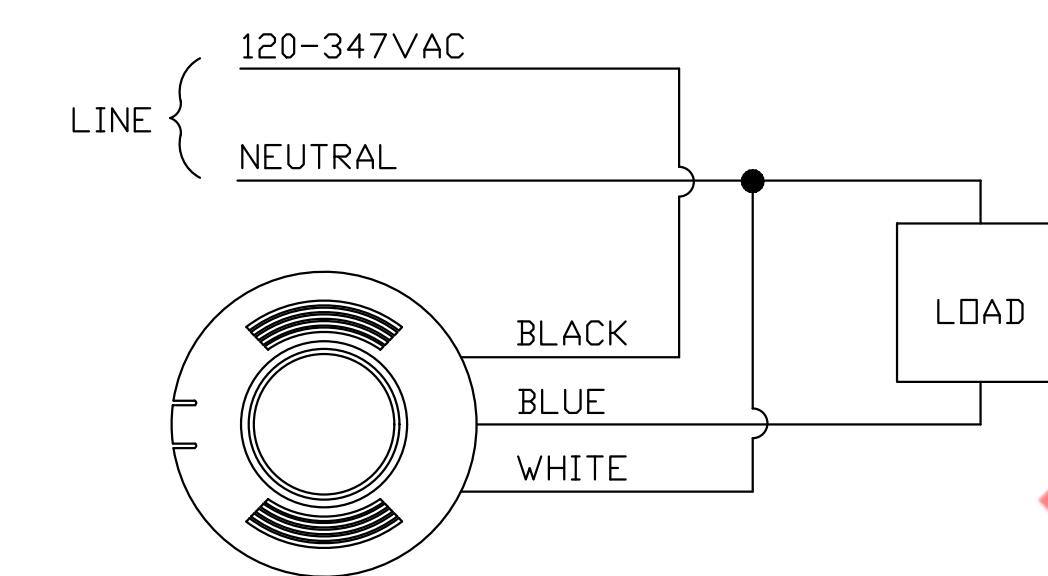
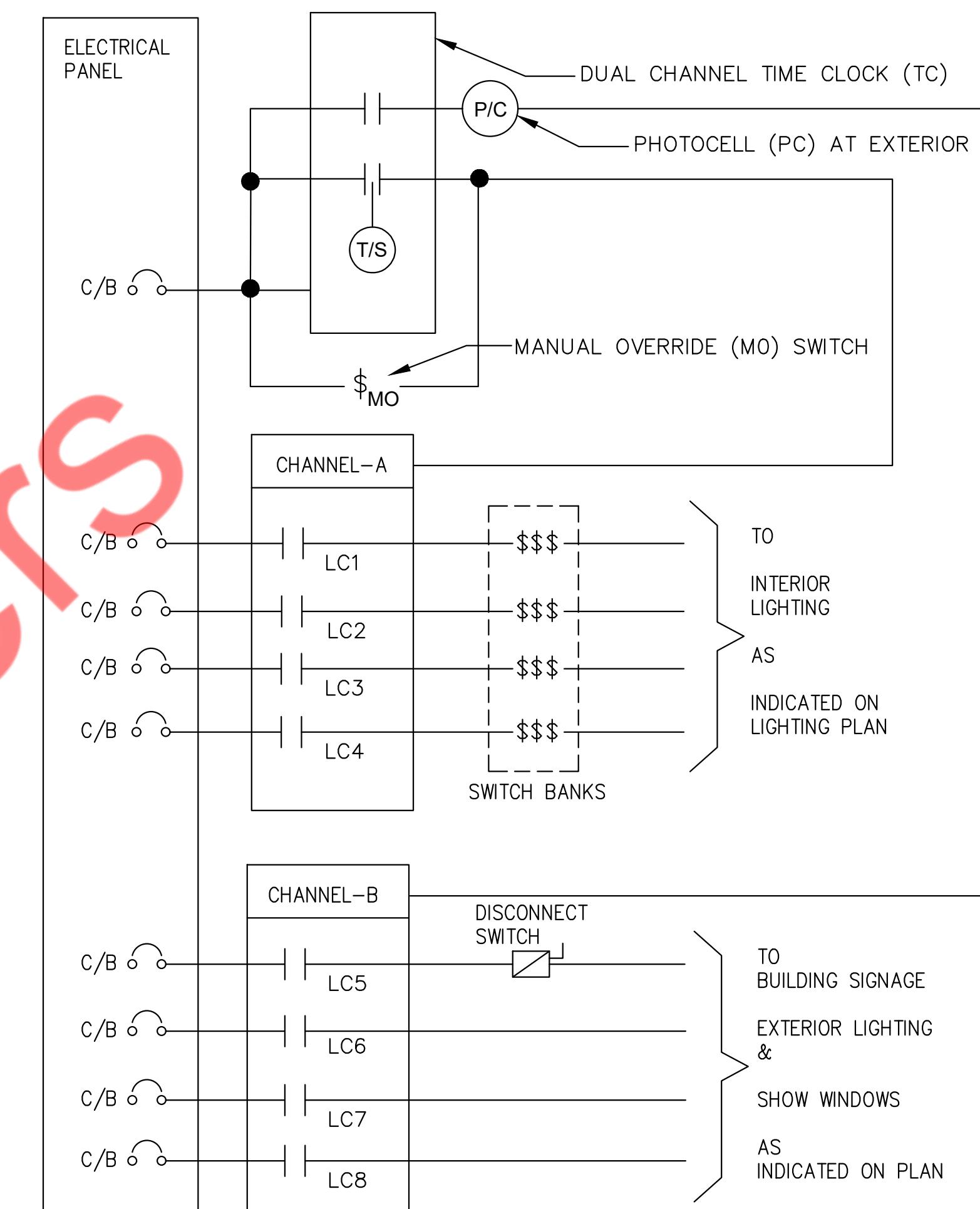


DIAGRAM BELOW INDICATES THE GENERAL ARRANGEMENT OF THE LIGHTING CONTACTORS. SEE ELECTRICAL LIGHTING PLAN FOR CIRCUIT AND CONTROL DETAILS. CONTRACTOR SHALL SELECT THE QUANTITY OF THE CONTACTORS AS REQUIRED.

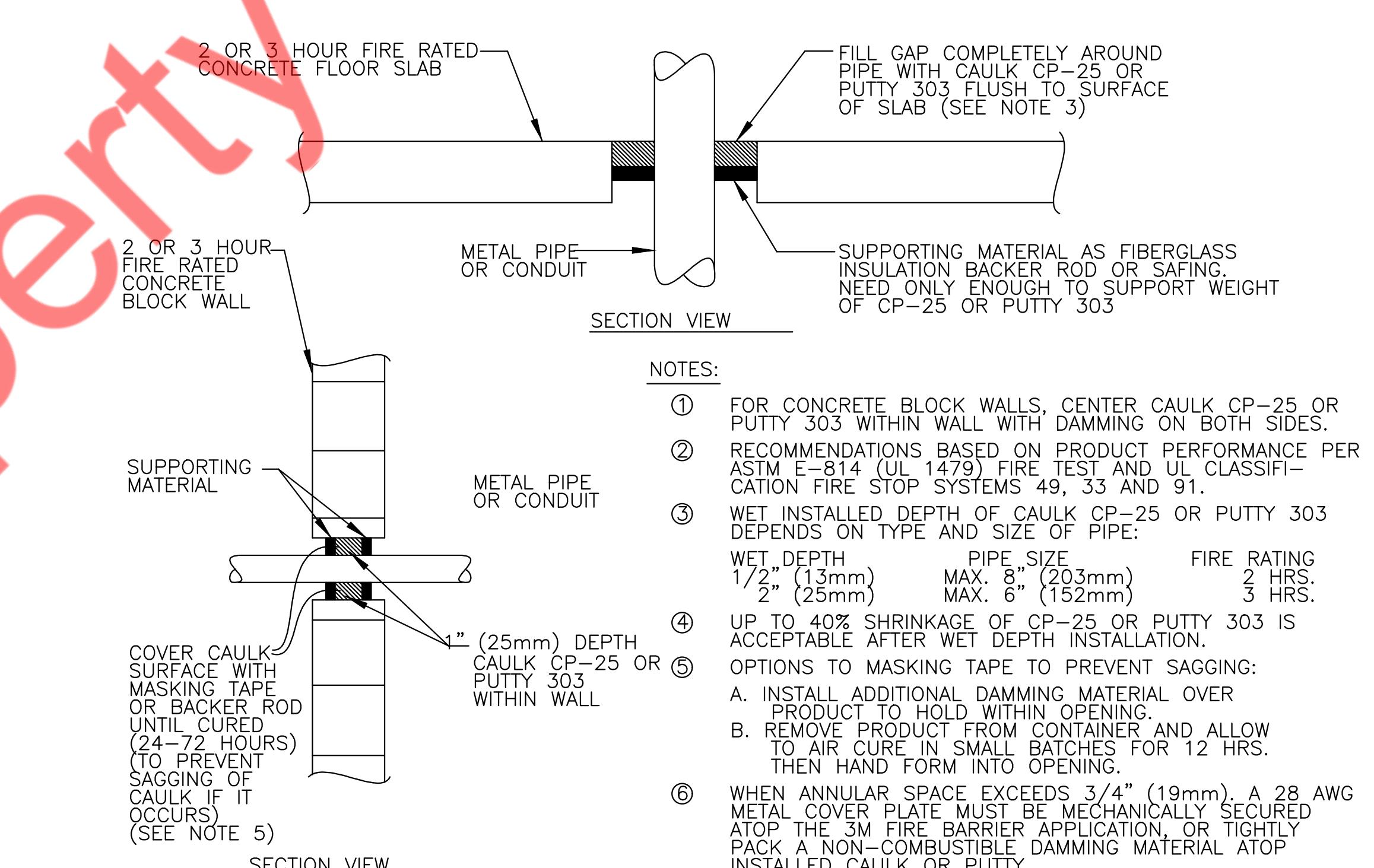
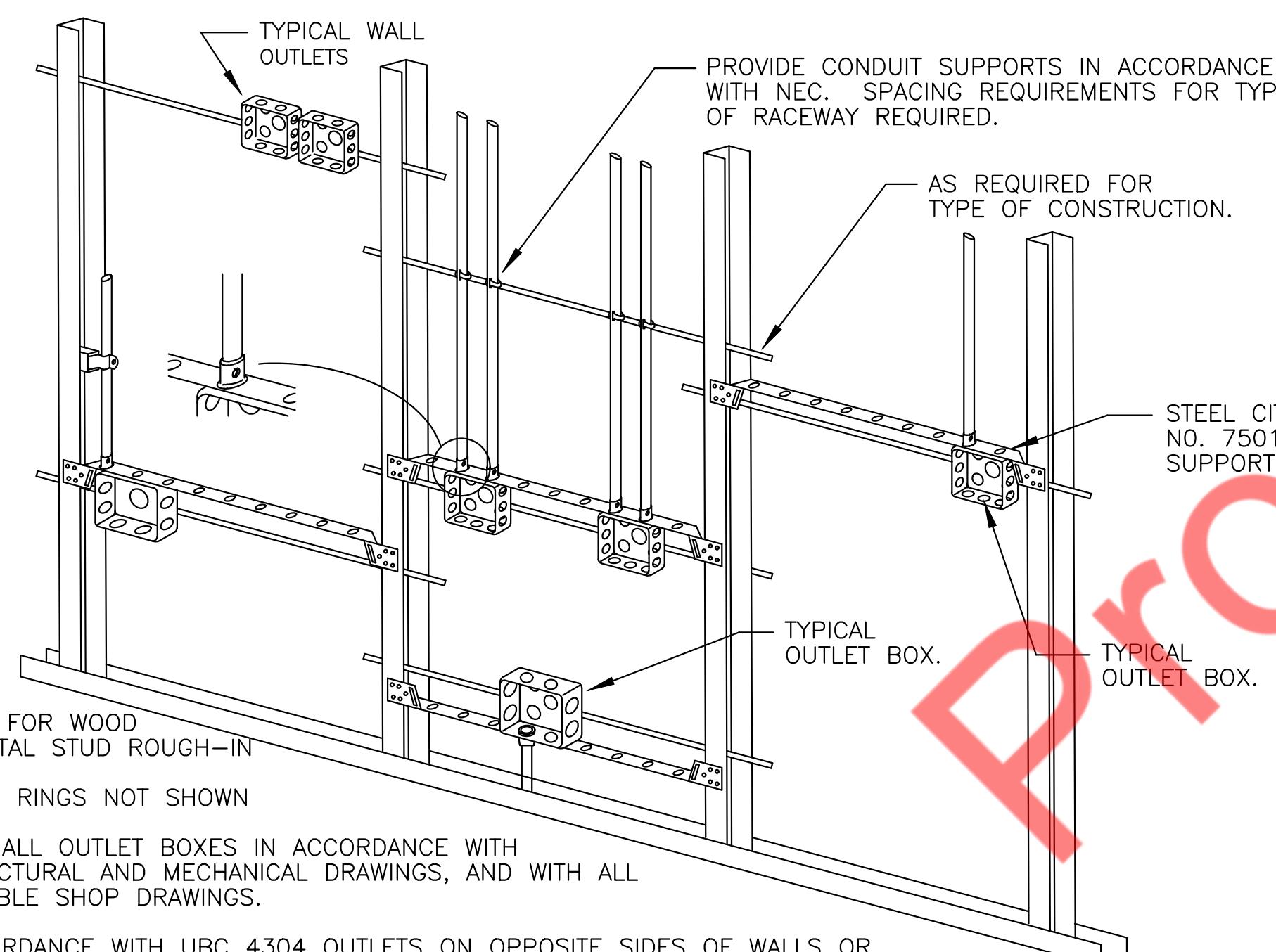


1 WIRING DIAGRAM-LINE VOLTAGE WALL SWITCH SENSOR(NEUTRAL CONNECTION) OCCUPANCY/VACANCY-SINGLE LEVEL
E-300 N.T.S

2 OCCUPANCY-SINGLE RELAY
WIRING DIAGRAM-LINE VOLTAGE CEILING SENSOR
E-300 N.T.S

3 LIGHTING CONTACTORS DETAIL (TYPICAL)
E-300 N.T.S

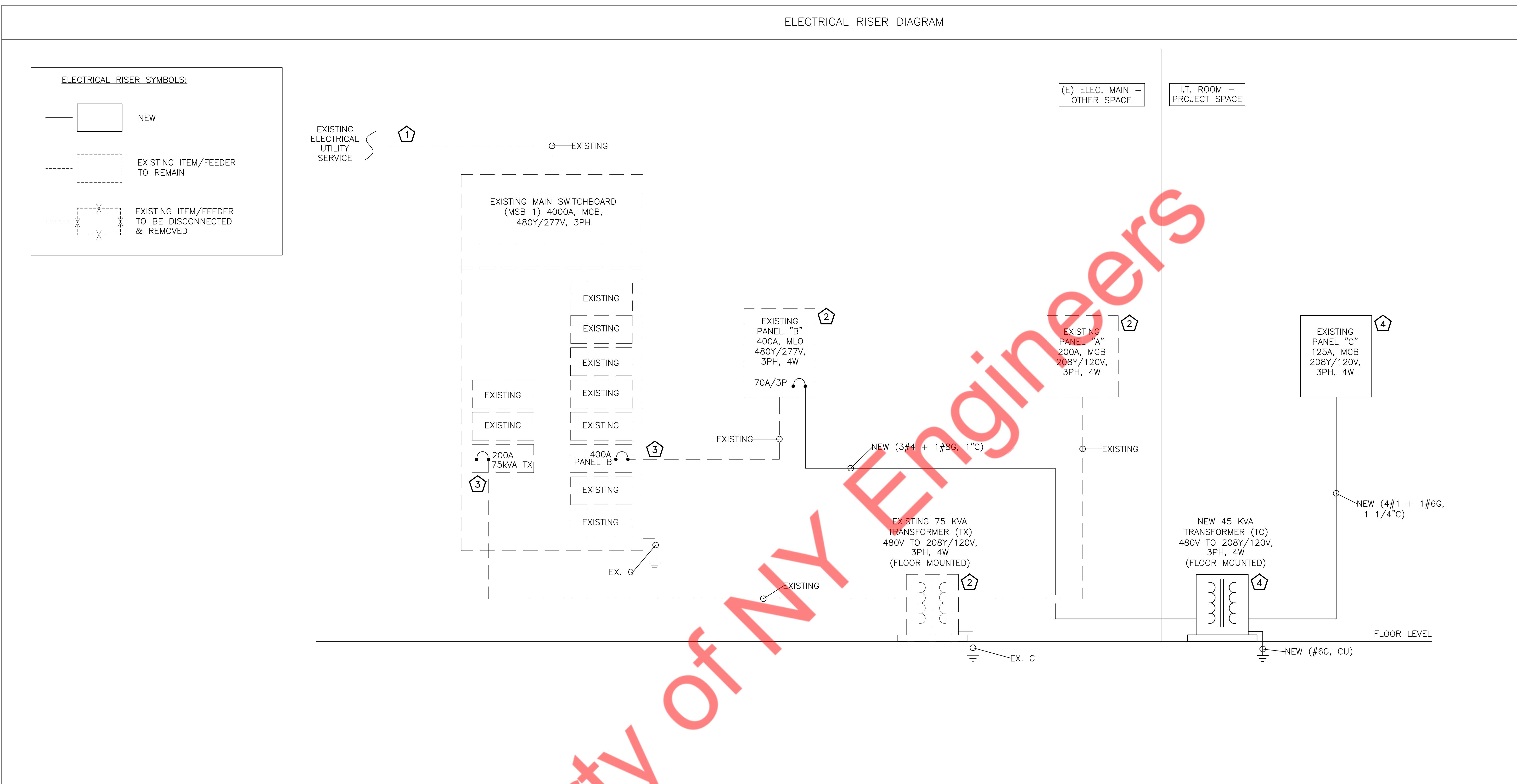
NOTES:
① TYPICAL FOR WOOD AND METAL STUD ROUGH-IN
② PLASTER RINGS NOT SHOWN
③ LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
④ IN ACCORDANCE WITH UBC 4304 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE.



4 DETAIL TYPICAL ROUGH-IN REQUIREMENTS
E-300 N.T.S

5 FIRE STOP DETAIL
E-300 N.T.S

ELECTRICAL RISER DIAGRAM



85°C Bakery Cafe®

RISER DIAGRAM GENERAL NOTE:

- A. E.C. SHALL VERIFY/COORDINATE THE FOLLOWING INFORMATION IN THE FIELD WITH THE UTILITY/LANDLORD/OWNER AND INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY.
- B. THE EXACT POWER DISTRIBUTION AND SCOPE OF WORK WITH THE LANDLORD/OWNER BEFORE BID.
- C. THE ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE NEC, LOCAL CODES AND AHJ.
- D. COORDINATE THE EXACT LOCATION OF ALL THE ELECTRICAL DEVICES SHOWN ON THE RISER. ENSURE THE CLEAR WORKING AND DEDICATED SPACE HAS BEEN PROVIDED AS PER NEC 110.26.
- E. COORDINATE AVAILABLE FAULT CURRENT (AIC RATING) WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH EQUIPMENT IN THE FIELD. AIC RATING SHALL BE WRITTEN ON EACH EQUIPMENT AS PER STANDARD.
- F. ENSURE THE COMBINED VOLTAGE DROP OF THE FEEDER AND BRANCH CIRCUIT SHALL NOT EXCEED 5% PER CODE.
- G. PROVIDE GEC AND EGC AS PER 250.66 & 250.122 RESPECTIVELY, AS NEEDED. PROVIDE SEPARATE GROUND CONDUCTORS IN ALL CONDUITS.
- H. THE PART OF RISER MARKED AS EXISTING IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY THE RISER IN THE FIELD. INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY FOUND.
- I. SPARE AMPS AVAILABLE IN THE EXISTING ELECTRICAL SERVICE ARE MORE THAN THE NEWLY ADDED DEMAND AMPS.
- J. VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF ALL THE EXISTING DEVICES BEING REUSED. REPLACE IF FOUND INOPERABLE (WITHIN THE SCOPE OF WORK). BASE BID ACCORDINGLY.
- K. REFER POWER PLAN FOR THE LOCATION OF THE TRANSFORMERS AND PANELS. INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY.
- L. ADDITION OR ALTERATION TO THE EXISTING SYSTEM SHALL NOT BE DONE WITHOUT THE WRITTEN CONSENT OF THE OWNER.
- M. E.C. SHALL COORDINATE METER REQUIREMENT WITH OWNER/LANDLORD. INFORM EOR. BEFORE BID.

RISER DIAGRAM KEYNOTES :

1. EXISTING 4000A, 480Y/277V, 3PH, 4W ELECTRICAL SERVICE FEEDER FROM UTILITY TO EXISTING MAIN SWITCHBOARD REMAIN.
2. E.C. SHALL VERIFY THE EXACT LOCATION, RATING, AND OPERABLE CONDITION OF EVERY EQUIPMENT MARKED EXISTING IN THE FIELD. INFORM THE ENGINEER OF RECORD OF ANY DISCREPANCY, BEFORE BIDING.
3. E.C. SHALL VERIFY OPERABLE CONDITION, RATING OF EXISTING BREAKER IN EXISTING MAIN SWITCHBOARD FOR THE PROJECT SPACE. INFORM EOR OF ANY DISCREPANCY BEFORE THE BID.
4. COORDINATE THE EXACT LOCATION OF THE NEW ELECTRICAL EQUIPMENT IN THE FIELD.

REVISIONS

ELECTRICAL RISE DIAGRAM

PANEL:	A	(EXISTING)	-						MOUNTING: SURFACE				
208Y/120 VOLTS		PHASE: 3	WIRE: 4	-	-	-	DEMAND LOAD: 64.82	DEMAND CURRENT: 180.14	PANEL LOCATION: (E) ELEC. MAIN	FED FROM: TRANSFORMER (TX)			
200	MCB												
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)		NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	30/3P					0.37		RWC	0.37	O	CE COOLER EVAPORATOR COIL	20/1P	2
3						0.00					SPARE	20/1P	4
5						0.00					SPARE	15/1P	6
7	90/3P	FC_FREEZER CONDENSING UNIT	O	8.32	RWC,NBEP	12.06		RWC,NBEP	3.74	O	CC_COOLER CONDENSING UNIT	40/3P	8
9			O	8.32		12.06			3.74	O		10	
11			O	8.32		12.06			3.74	O		12	
13	45/3P	FE_FREEZER EVAPORATOR COIL	O	4.04	RWC,NBEP	4.14		RWC	0.10	O	FREEZER MISCELLANEOUS LOAD	20/1P	14
15			O	4.04		4.39		RWC	0.35	E	1.1 REFRIGERATOR	20/1P	16
17			O	4.04		4.39		RWC	0.35	E	1.1 REFRIGERATOR	20/1P	18
19	20/1P	SPARE				0.30		RWC	0.30	O	WH-1 & RCP-1	20/1P	20
21	20/1P	SPARE				0.00					SPARE	20/1P	22
23			E	3.81	RWC,NBEP	3.81					SPARE	20/1P	24
25	40/3P	S1_GAS HEATED MIXER	E	3.81	RWC,NBEP	3.81		RWC	0.35	E	1.1 REFRIGERATOR	20/1P	26
27			E	3.81		4.15		RWC	0.35	E	1.1 REFRIGERATOR	20/1P	28
29			E	3.81		4.15		RWC	0.35	E	1.1 REFRIGERATOR	20/1P	30
31	40/3P	S1_GAS HEATED MIXER	E	3.81	RWC,NBEP	3.81					SPARE	20/1P	32
33			E	3.81		3.81					SPARE	20/1P	34
35	20/1P	SPARE				0.00					SPARE	20/2P	36
37	20/1P	SPARE				0.00					SPARE	20/1P	38
39		SPARE				0.00					SPARE	20/1P	40
41	20/1P	SPARE				0.00					SPARE	20/1P	42
						24.48	24.41						

PANEL SCHEDULE GENERAL NOTES											
1. E.C. SHALL VERIFY IF THE RATING OF THE BREAKERS AND FEEDER SIZE FOR EACH AND EVERY EQUIPMENT IS CORRECT AND ALL THE EQUIPMENT HAVE BEEN INCLUDED IN THE PANEL SCHEDULE. PRIOR TO BID, INFORM ENGINEER ON RECORD IN CASE OF ANY DISCREPANCY.											
2. THE RECEPTACLES MARKED AS "GFI" ON THE FLOOR PLAN INDICATES THAT THE RECEPTACLE SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE GFI BREAKER IN PANEL IF GFI RECEPTACLE IS NOT READILY ACCESSIBLE OR FOR THE RECEPTACLES OTHER THAN 20A.											
3. E.C. SHALL VERIFY THE OPERABLE CONDITION OF THE BREAKERS IN THE EXISTING PANEL IN THE FIELD, REPLACE OR PROVIDE NEW BREAKER IN THE EXISTING PANEL TO BE IN LINE WITH THE PANEL SCHEDULE, IF REQUIRED. BASE BID ACCORDINGLY.											
4. COORDINATE AVAILABLE FAULT CURRENT (AIC RATING) WITH UTILITY/LANDLORD/OWNER. CALCULATE THE EXACT AIC RATING OF EACH PANEL IN THE FIELD. AIC RATING SHALL BE WRITTEN ON EACH PANEL AS PER STANDARD.											
5. THE BREAKER FEEDING HVAC UNITS SHALL BE HACR TYPE.											
6. THE ELECTRICAL LOAD IS BALANCED WITHIN 10% FOR ALL 3 PHASES.											

PANEL:	B	(EXISTING)	-						MOUNTING: SURFACE				
480Y/277 VOLTS		PHASE: 3	WIRE: 4	-	-	-	DEMAND LOAD: 190.69	DEMAND CURRENT: 229.64	PANEL LOCATION: (E) ELEC. MAIN	FED FROM: EX. SWITCHBOARD			
400	MLB												
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)		NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20/1P	SPARE				0.00					SPARE	20/1P	2
3	20/1P	SPARE				0.00					SPARE	20/1P	4
5	20/1P	SPARE				3.81		RWC,NBEP	3.81	E	S1_GAS HEATED MIXER	40/3P	6
7	20/1P	SPARE				3.81						8	
9	20/1P	SPARE				3.81						10	
11	20/1P	SPARE				0.00						12	
13	20/1P	SPARE				0.00						14	
15	20/1P	SPARE				0.00						16	
17	20/1P	SPARE				0.00						18	
19	40/3P	S1_GAS HEATED MIXER	E	3.60	RWC,NBEP	8.62		RWC	5.02	H	EDH-5(N)	30/3P	20
21			E	3.60		8.62			5.02	H	EDH-5(N)	30/3P	22
23			E	3.60		3.60			5.02	H	SPARE	20/1P	24
25			H	6.03	RWC	22.02		RWC, NBE	15.99	H	EDH-3(N)	80/3P	26
27	30/3P	EDH-1(N)	H	6.03	RWC	22.02			15.99	H	EDH-3(N)	80/3P	28
29			H	6.03		22.02			15.99	H		30	
31	30/3P	EDH-2(N)	H	6.70	RWC	10.04		RWC	3.35	H	EDH-4(N)	20/3P	32
33			H	6.70		10.04			3.35	H	EDH-4(N)	20/3P	34
35			O	10.26		21.67		RWC	11.41	O	PANEL C	70/3P	36
37	50/3P	BF_BLAST FREEZER	O	10.26	RWC, NBEP	21.67			11.41	O	PANEL C	70/3P	38
39			O	10.26		21.67			11.41	O	PANEL C	70/3P	40
41	20/1P		O	10.26		21.67			11.41	O	PANEL C	70/3P	42
						66.16	66.16						

PANEL:	C	(NEW)	-						MOUNTING: SURFACE		
208Y/120 VOLTS		PHASE: 3	WIRE: 4	-	-	-	DEMAND LOAD: 34.24	DEMAND CURRENT: 95.14	PANEL LOCATION: IT ROOM	FED FROM: PANEL B VIA TC	
125	MCB										
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)		NOTES	LOAD (KVA)</		

PLUMBING LEGENDS

— SAN —	SANITARY SEWER (UNDER FLOOR)
— GSAN —	GREASE SANITARY SEWER (UNDER FLOOR)
— EX.SAN —	EXISTING SANITARY SEWER (UNDER FLOOR)
— VENT PIPING —	VENT PIPING
— COLD WATER PIPING —	COLD WATER PIPING
— HOT WATER PIPING —	HOT WATER PIPING
— HOT WATER RETURN PIPING —	HOT WATER RETURN PIPING
— G —	GAS PIPING
— P-TRAP —	P-TRAP
— PIPE UP —	PIPE UP
— PIPE DROP —	PIPE DROP
— CLEANOUT —	CLEANOUT
— PLUGGED OUTLET/CLEANOUT —	PLUGGED OUTLET/CLEANOUT
— POINT OF CONNECTION —	POINT OF CONNECTION
— ISOLATION VALVE —	ISOLATION VALVE
— GAS SHUT-OFF VALVE —	GAS SHUT-OFF VALVE
— FLOOR SINK —	FLOOR SINK
— FLOOR DRAIN —	FLOOR DRAIN

PLUMBING ABBREVIATIONS

CO	CLEANOUT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
V	VENT
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
DN	DOWN
AFF	ABOVE FINISH FLOOR
FD	FLOOR DRAIN
BFP	BACK FLOW PREVENTER
WH	WATER HEATER
N.I.C.	NOT IN SCOPE
ET	EXPANSION TANK
RCP	RE-CIRCULATION PUMP
EX	EXISTING

PLUMBING DRAWING LIST

P-001 PLUMBING SYMBOLS, NOTES, ABBREVIATIONS & SPECIFICATIONS
 P-100 PLUMBING SANITARY FLOOR PLAN
 P-101 PLUMBING WATER AND GAS PLANS
 P-500 PLUMBING DETAILS
 P-600 PLUMBING SCHEDULES AND RISERS

BUILDING DEPARTMENT PLUMBING NOTES

- ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF INTERNATIONAL PLUMBING CODE (IPC 2018).
- INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 702.2
- PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
- TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.
- RODENT PROOFING AS PER PC 304.
- MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 604, PC 701, PC 903, PC 1102.
- EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
- DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708.
- DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
- VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308.
- WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610.
- THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
- VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTION PC 901 THROUGH PC 912 THROUGH PC 917.
- INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 312.

PLUMBING SPECIFICATION

- BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS
- SCOPE
- PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
- OBTAINT ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
- THE GENERAL CONDITIONS OF THE CONTRACT, AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
- THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.
- IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.
- ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.
- COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
- MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.
- THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.

1.04 DEFINITIONS

- FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.
- INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
- PROVIDE: TO FURNISH AND INSTALL.
- PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

1.05 DRAWINGS

- THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.
- PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.
- REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
- REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.
- VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.
- LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

1.06 PRODUCTS

- SANITARY AND VENT PIPING:
- ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM 4 BANDS PER COUPLING.
- SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO DRAIN.
- PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLENUM SPACES.
- ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.

1.02 SUBMITTALS

- SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.
- PIPE AND FITTINGS
- VALVES
- HANGERS AND SUPPORTS
- PLUMBING PIPING LAYOUT
- TESTS
- PLUMBING FIXTURES
- WATER HEATERS & ACCESSORIES
- GREASE INTERCEPTOR
- MIXING VALVES
10. ALL SCHEDULED PLUMBING EQUIPMENT
- SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.
- C. THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
- D. REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND THE SECOND REVIEW OF ANY RESUBMITTED DRAWINGS. IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.
- E. SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.
- F. SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.
- G. FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.
- H. RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.

1.03 SUBSTITUTIONS

- ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
- THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.

CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECTS:

- INTERNATIONAL BUILDING CODE 2018 WITH LOCAL AMENDMENTS
- INTERNATIONAL MECHANICAL CODE 2018 WITH LOCAL AMENDMENTS
- INTERNATIONAL PLUMBING CODE 2018 WITH LOCAL AMENDMENTS
- NATIONAL ELECTRICAL CODE 2020 WITH LOCAL AMENDMENTS
- INTERNATIONAL ENERGY CONSERVATION CODE 2018 WITH LOCAL AMENDMENTS
- INTERNATIONAL FUEL GAS CODE 2018 WITH LOCAL AMENDMENTS

9. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2018 INTERNATIONAL ENERGY CONSERVATION CODE, C404.5.1. THE HOT WATER PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE (INCHES)	MAXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAV	OTHER FIXTURES
1/2"	2'	43'
3/4"	0.5'	21'
1"	0.5'	13'
1 1/4"	0.5'	8'
1 1/2"	0.5'	6'
2" OR LARGER	0.5'	4'

10. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.

11. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

B. HANGERS AND SUPPORTS:

- HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
- SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.
- PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
- SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

C. VALVES:

- PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
- ALL FIXTURES WITH THE EXCEPTION OF FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED, PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
- ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
- ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
- ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

D. GAS PIPING:

GAS PIPING SHALL BE SIZED IN ACCORDANCE WITH PIPE SIZING TABLES OR SIZING EQUATIONS IN ACCORDANCE WITH 2018 IFCC CHAPTER 4 FUEL GAS PIPING SECTION 402

- INDIVIDUAL OUTLETS TO GAS RANGES SHALL NOT BE LESS THAN 3/4 INCHES NPS.
- METALLIC PIPE SHALL COMPLY WITH IFCC 2018 FUEL GAS PIPING SECTIONS 403.4
- PLATING SYSTEM INSTALLATION SHALL COMPLY WITH REQUIREMENTS OF IFCC 2018 CHAPTER 4 FUEL GAS PIPING SECTION 404.
- THE GAS PIPING IS ENCASED IN A CONDUIT OF WROUGHT IRON OR STEEL PIPE TO WITH STAND THE SUPERIMPOSED LOADS.
- SHUTOFF VALVES SHALL BE LOCATED IN PLACES SO AS TO PROVIDE ACCESS FOR OPERATION AND SHALL BE INSTALLED SO AS TO BE PROTECTED FROM DAMAGE.

E. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.

F. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.

G. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.

H. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.

I. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.

8. AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2018, C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER DURING THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.

J. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.

K. PROVIDE DIELECTRIC FITTINGS BETWEEN DISIMILAR METALS.

L. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.

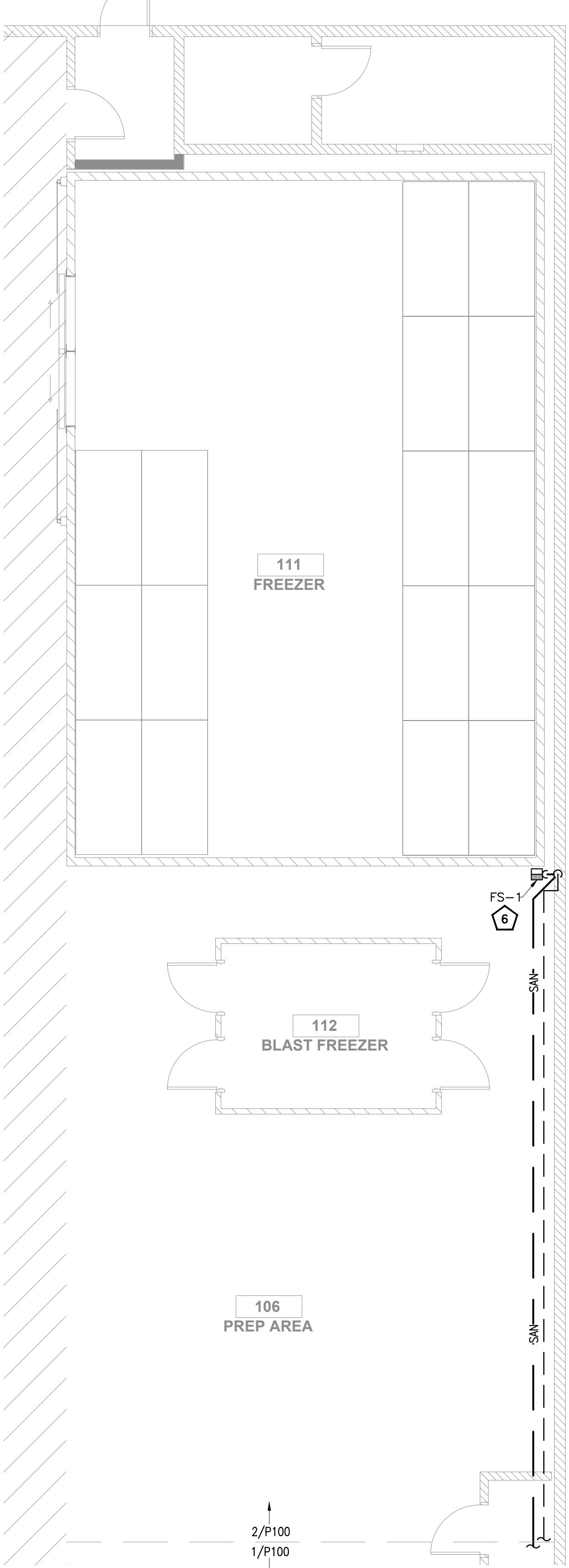
M. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.

N. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.

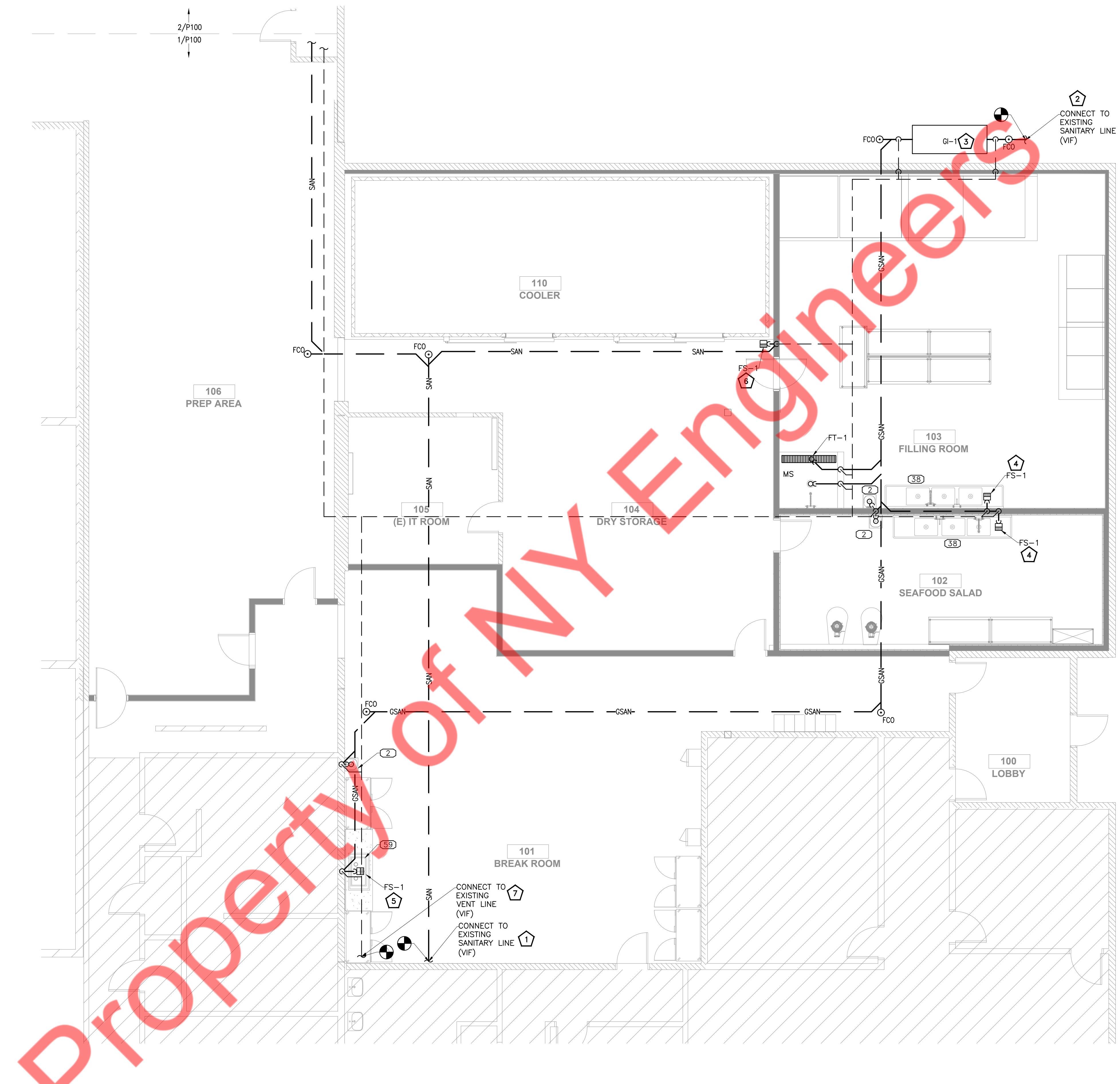
O. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.

P. WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.

Q. AT ALL INDIRECT WASTE DRAINS



② PLUMBING SANITARY FLOOR PLAN
SCALE: 3/16" = 1'-0"



① PLUMBING SANITARY FLOOR PLAN
SCALE: 3/16" = 1'-0"

SANITARY PIPING GENERAL NOTES:

- REFER RISER DIAGRAMS FOR PIPE SIZING.
- UNLESS OTHERWISE NOTED, SLOPE OF DRAINAGE SYSTEM TO BE 1/8" PER FOOT OF RUN FOR PIPE 3" OR LARGER, AND 1/4" PER FOOT FOR PIPE SMALLER THAN 3".
- CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
- ANY UNUSED PLUMBING PIPING MUST BE COMPLETELY REMOVED OR CAPPED. DO NOT ABANDON IN PLACE.
- PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.

PLUMBING SANITARY KEYED NOTES:

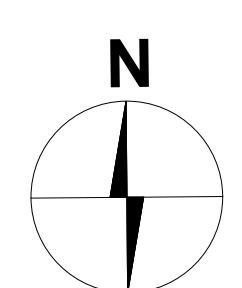
- CONNECT NEW 4" SANITARY PIPE TO EXISTING SANITARY PIPE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY PIPE SIZE, LOCATION AND INVERT BASE BID ACCORDINGLY.
- CONNECT NEW 4" SANITARY WASTE PIPING FROM GREASE INTERCEPTOR TO EXISTING SANITARY PIPING. CONTRACTOR TO FIELD VERIFY THE EXISTING SANITARY PIPE EXACT LOCATION, SIZE AND INVERT BASE BID ACCORDINGLY.
- GB-250 EXTERIOR GREASE INTERCEPTOR. CONTRACTOR TO INSTALL GREASE INTERCEPTOR AS PER MANUFACTURER RECOMMENDATION AND LOCAL GUIDELINES. CONTRACTOR TO COORDINATE FINAL LOCATION WITH LANDLORD OR ARCHITECT.
- INDIRECT WASTE FROM 3 COMPARTMENT SINK(38) TO FLOOR SINK WITH APPROVED AIR GAP.
- INDIRECT WASTE FROM DOUBLE COMPARTMENT SINK TO FLOOR SINK WITH APPROVED AIR GAP.
- EXTEND CONDENSATE DRAIN FROM COOLER TO FLOOR SINK AND SPILL WITH MIN. 2" AIR GAP. COORDINATE LOCATION OF DRAIN CONNECTION WITH COOLER SUPPLIER.
- CONNECT NEW 3" VENT TO EXISTING VTR. CONTRACTOR TO FIELD VERIFY LOCATION AND SIZE OF EXISTING VTR.

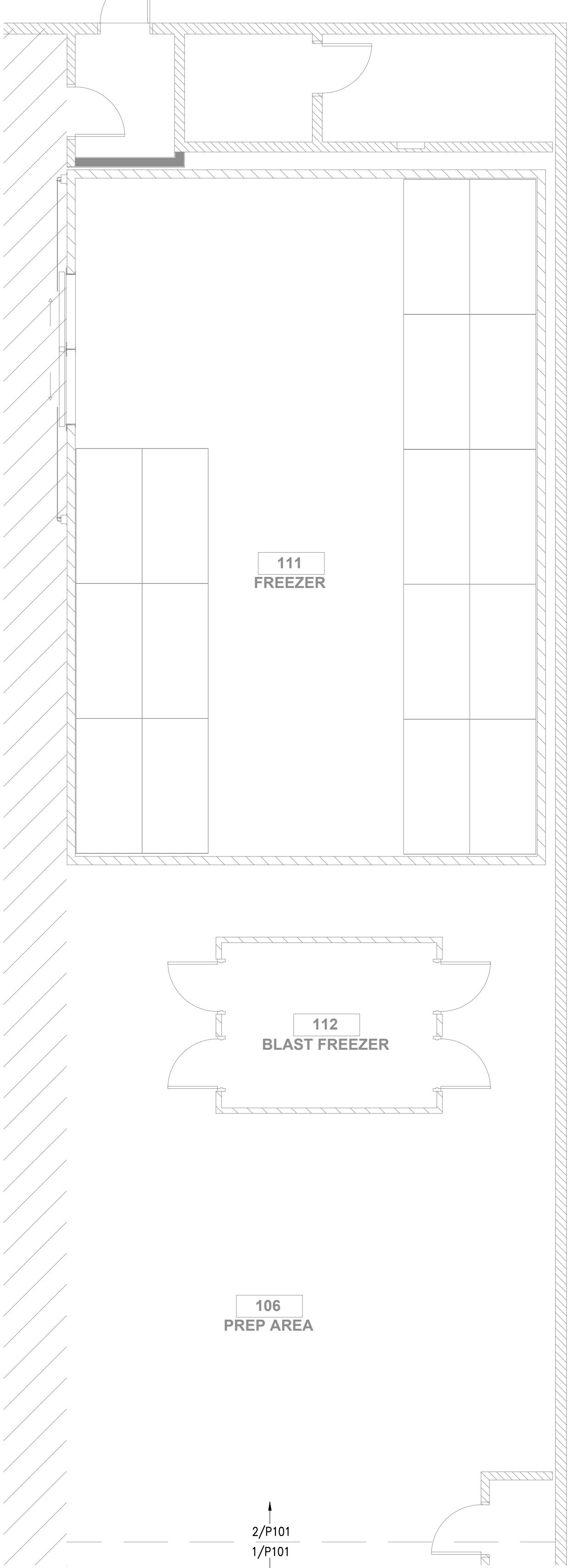
PROJECT NUMBER

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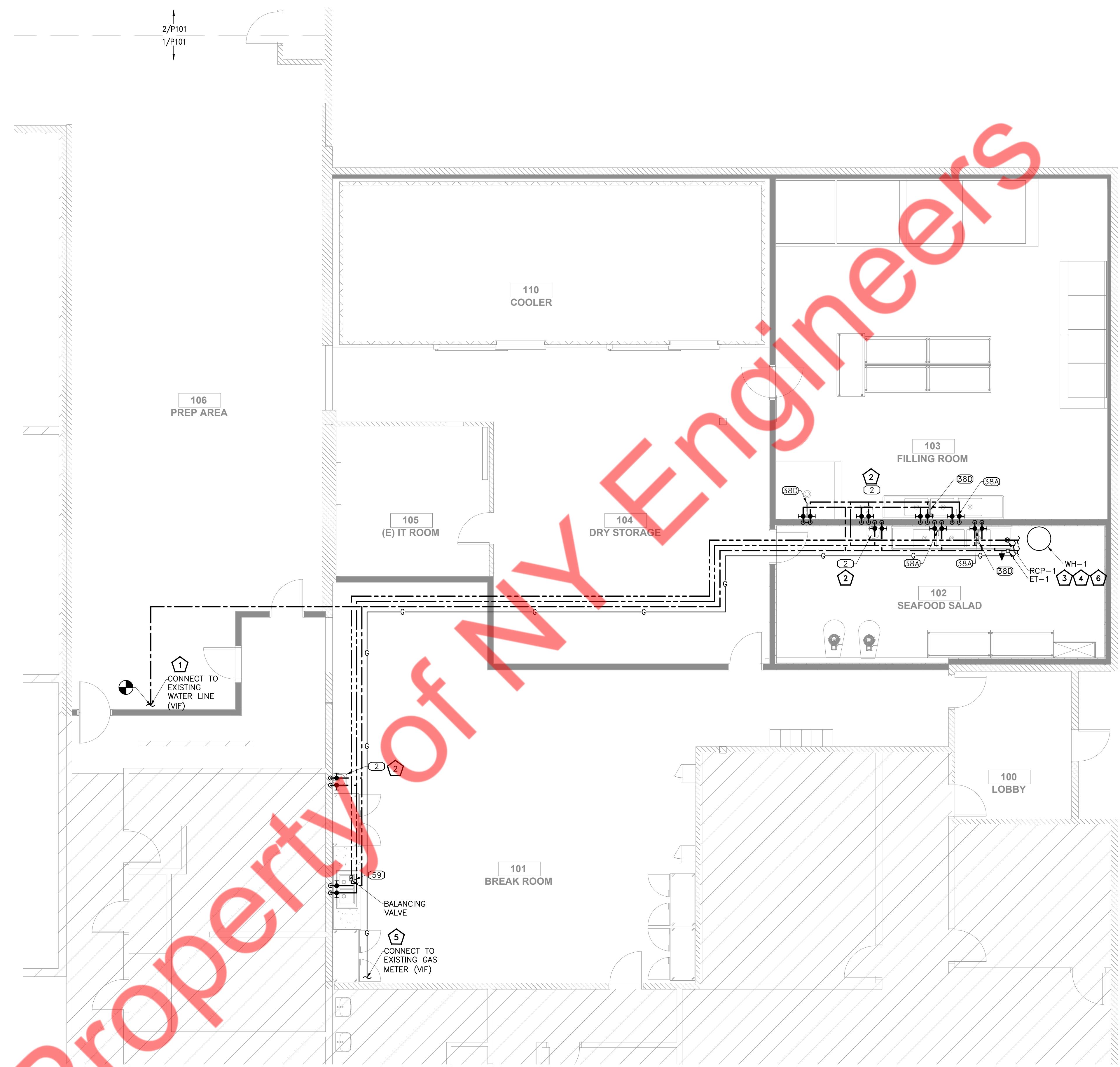
PLUMBING SANITARY FLOOR PLAN

P-100





2 PLUMBING WATER AND GAS FLOOR PLAN
SCALE: 3/16" = 1'-0"



1 PLUMBING WATER AND GAS FLOOR PLAN
SCALE: 3/16" = 1'-0"

WATER PIPING GENERAL NOTES:

- CW/RW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CODE 2018 (REFER SHEET P-001)
- REFER RISER DIAGRAMS FOR PIPE SIZING.
- PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
- CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
- ANY UNUSED PLUMBING PIPING MUST BE COMPLETELY REMOVED OR CAPPED. DO NOT ABANDON IN PLACE.
- PROVIDE TRAP PRIMER/ SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION.

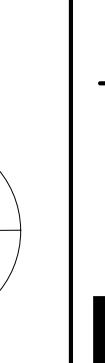
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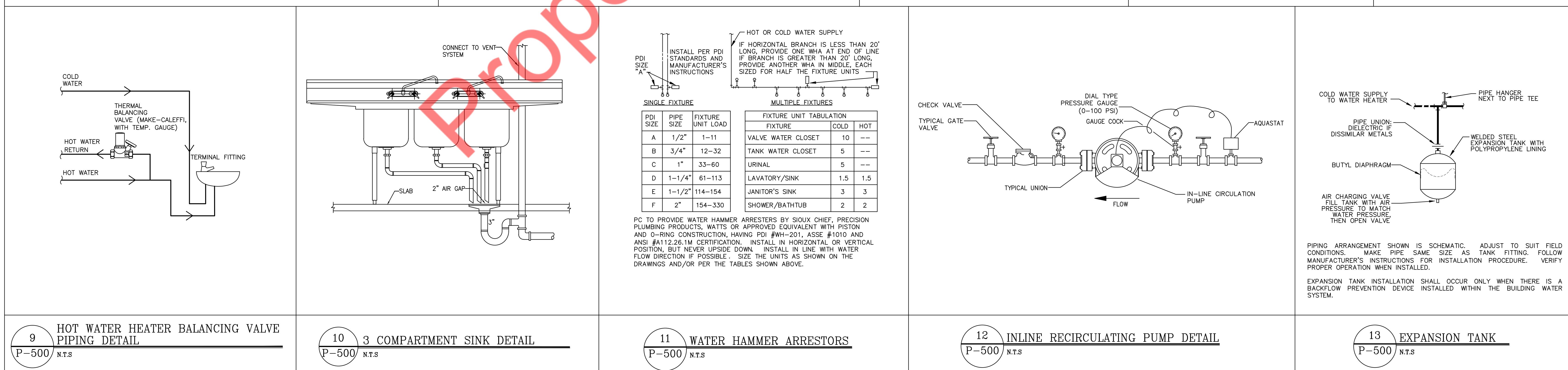
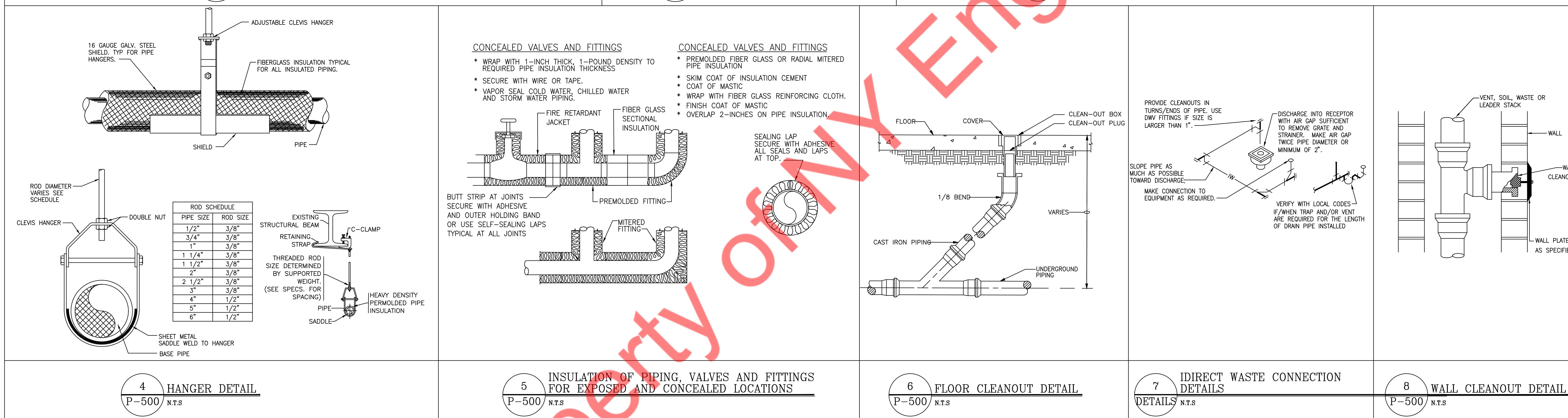
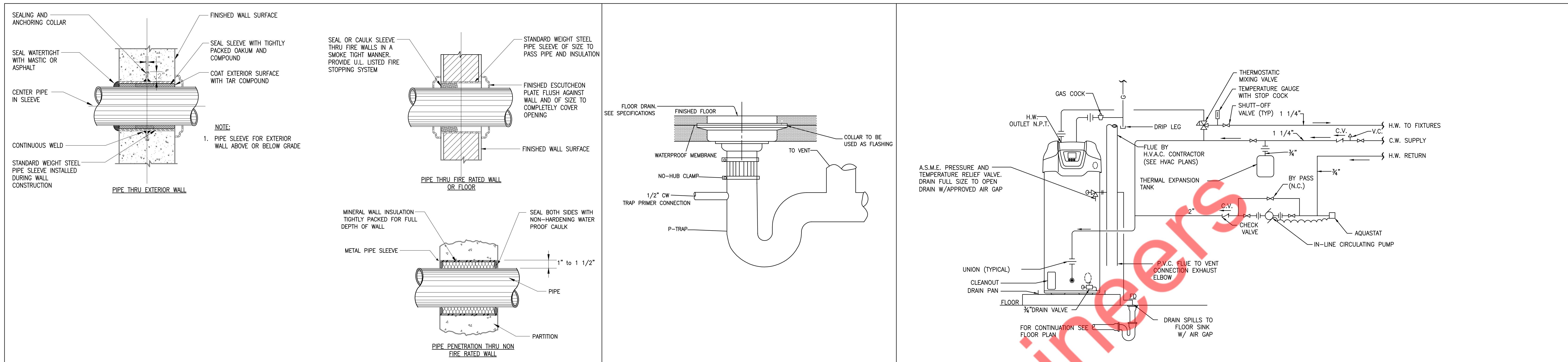
- EXTEND AND CONNECT NEW 1" CW PIPING TO THE EXISTING WATER SERVICE LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING PIPE SIZE, LOCATION AND PRESSURE. UPGRADE EXISTING PIPE SIZE IF REQUIRED.
- PROVIDE ASSE 107 OR SIMILAR THERMOSTATIC MIXING VALVE AT ALL HAND SINK. SET AT 110°F MAXIMUM.
- ROUTE CONDENSATE DRAIN FROM PROPOSED WATER HEATER TO THE NEAREST FLOOR SINK WITH APPROVED AIR GAP.
- PROVIDE NEW WATER HEATERS (WH-1) WITH RE-CIRCULATION PUMP (RCP-1) AND THERMAL EXPANSION TANK (ET-1). CONTRACTOR TO INSTALL WATER HEATER AS PER MANUFACTURER'S GUIDELINE. PROVIDE CLEARANCE AS REQUIRED.
- CONNECT NEW 1" GAS LINE TO EXISTING GAS METER, AND ADD NEW LOAD OF 150 MBH TO EXISTING GAS METER. CONTRACTOR TO FIELD VERIFY EXISTING GAS METER CAPACITY AND PRESSURE AT EXISTING GAS METER. UPGRADE GAS METER IF REQUIRED. COORDINATE ALL WORK WITH UTILITY COMPANY AND LANDLORD.
- PROVIDE ADEQUATE INLET PRESSURE TO WATER HEATER.

PROJECT NUMBER

REVISIONS

PLUMBING WATER AND GAS PLANS





PLUMBING FIXTURE SCHEDULE									
TAG	PLUMBING FIXTURE	MANUFACTURER	MODEL	CONNECTION SIZE - INCHES					REMARKS
				TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	
2	WALL MOUNT HAND SINK, L/R SIDE SPLASH	GSW	HS-1615S	1½"	2"	1½"	½"	½"	P-TRAP
38	3 COMPARTMENT SINK	—	—	—	2"	—	—	—	IW DRAIN TO FLOOR SINK
38A	3 COMPARTMENT SINK FAUCET	FISHER	19798	—	—	—	¾"	¾"	—
38D	PRE-RINSE SPRAY FAUCET	FISHER	52922	—	—	—	¾"	¾"	—
59	DOUBLE COMPARTMENT SINK	BLANCO	442768	—	2"	—	¾"	¾"	IW DRAIN TO FLOOR SINK
MS	MOP SINK	—	—	3"	3"	2"	¾"	¾"	P-TRAP
FS-1	FLOOR SINK	—	—	3"	3"	2"	—	—	P-TRAP
FT-1	FLOOR THROUGH DRAIN	—	—	4"	4"	2"	—	—	P-TRAP

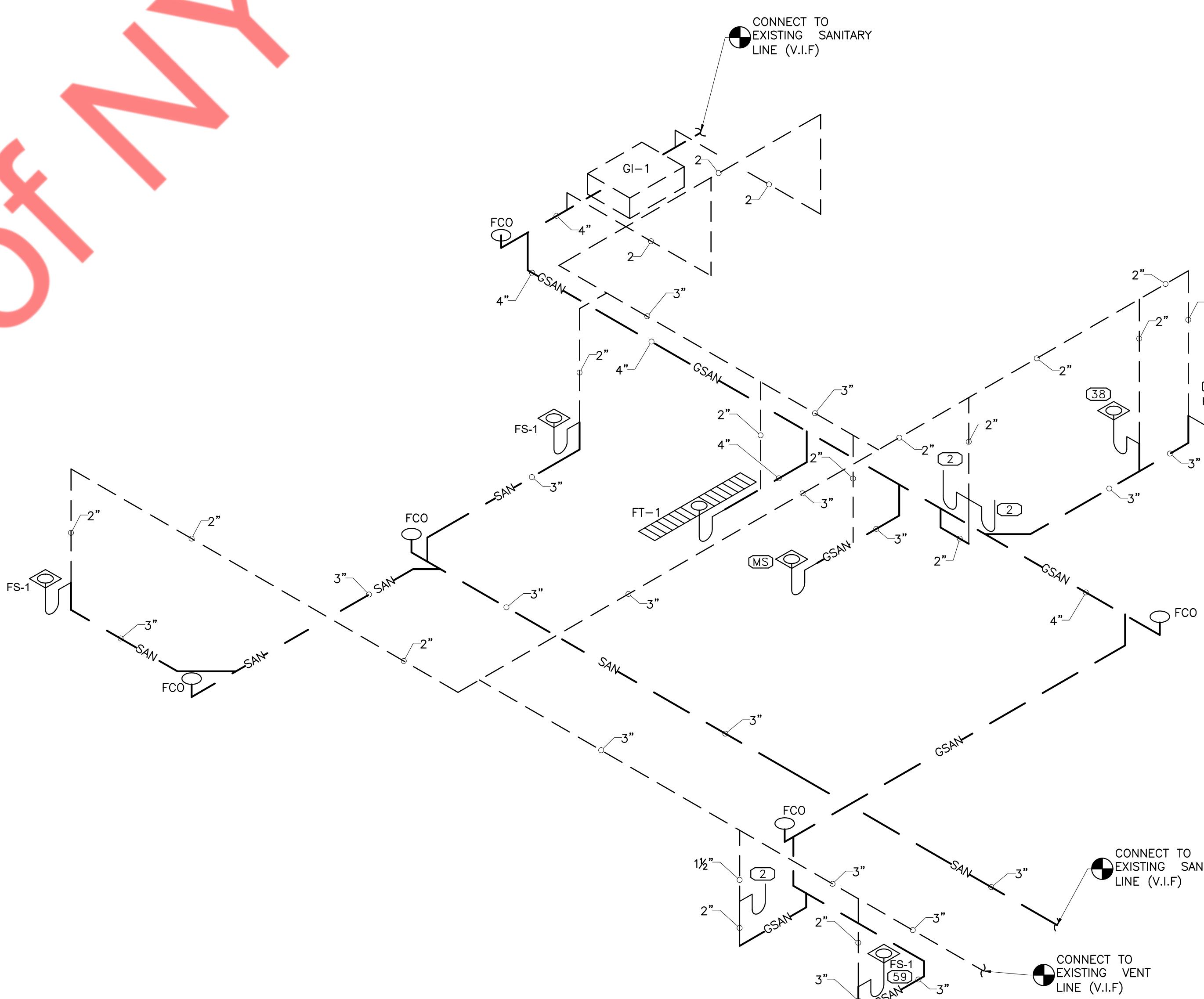
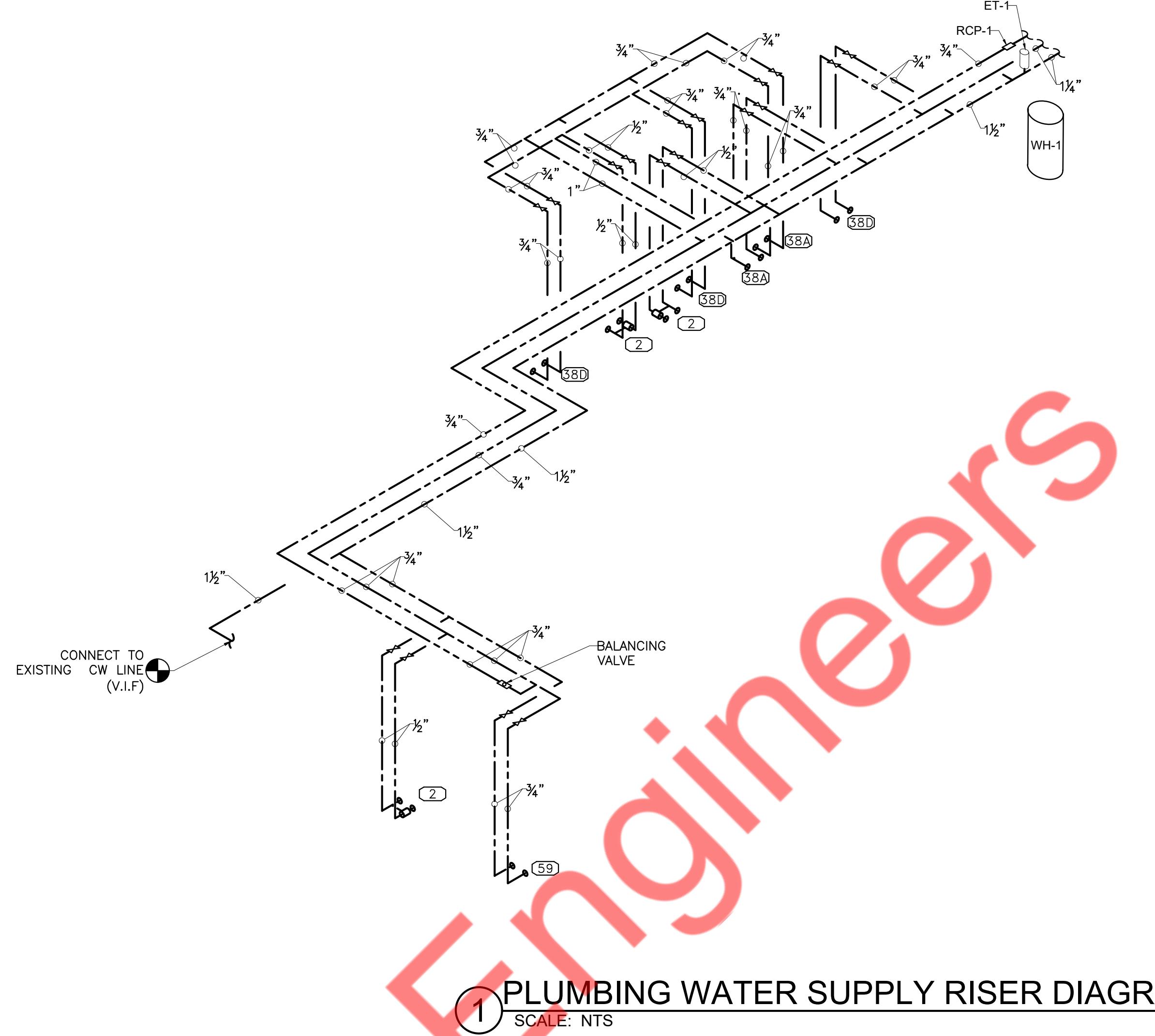
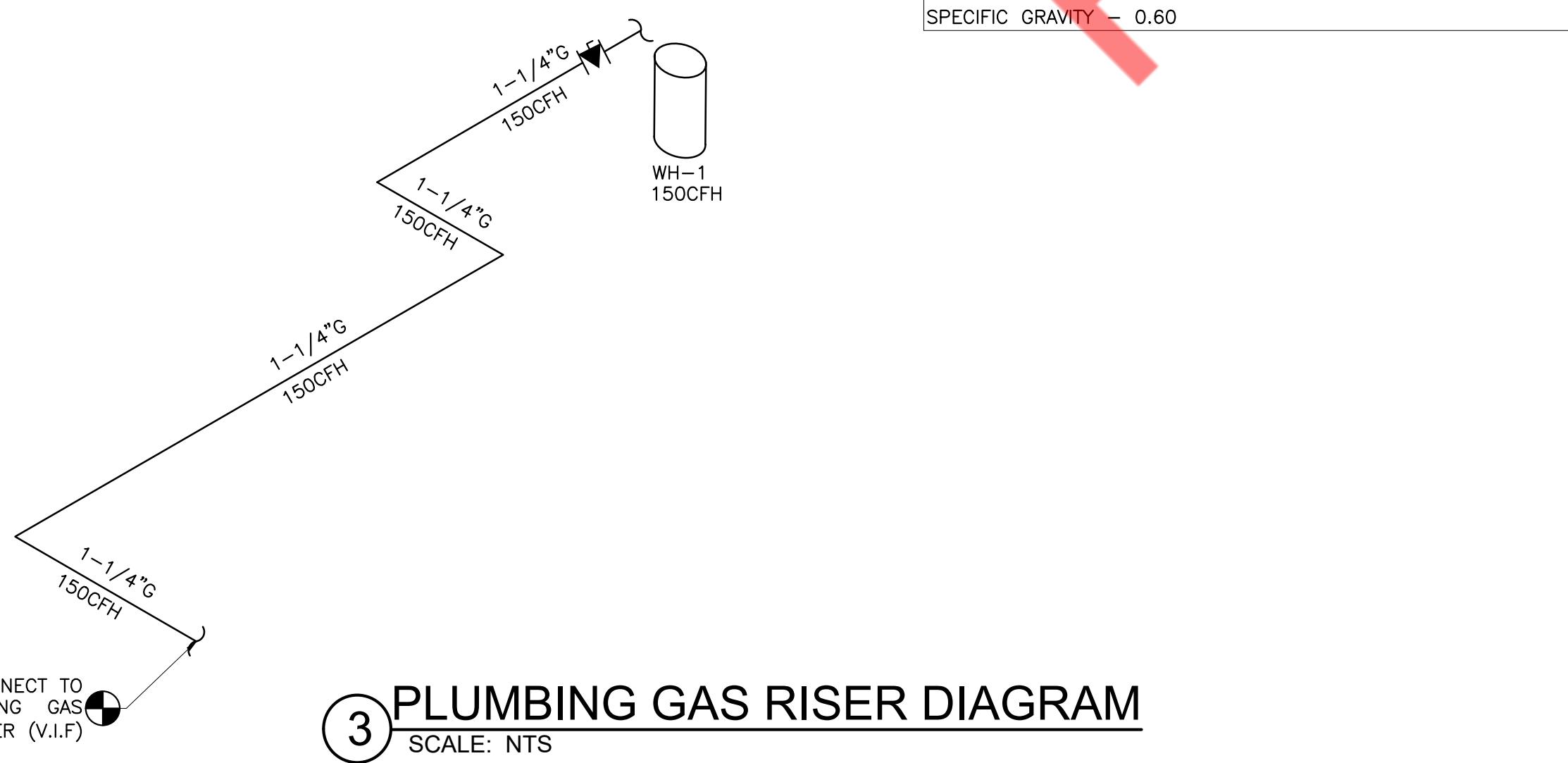
<u>GREASE INTERCEPTOR SCHEDULE</u>						
ITEM	SERVICE	LOCATION	FLOW CAPACITY (GPM)	LIQUID CAPACITY (GAL.)	GREASE CAPACITY (LBS)	MANUFACTURER AND MODEL
GREASE INTERCEPTOR GI-1	KITCHEN WASTE	UNDERGROUND OUTDOOR	200	277	1,996	SCHIER GB-250

NOTE— CONTRACTOR TO PROVIDE ALL REQUIRED ACCESSORIES FOR SATISFACTORY WORKING OF GREASE TRAP AS PER SITE CONDITIONS.

GAS LOAD SUMMARY	
SIZE	GAS LOAD(CFH)
3/4"	63
1"	119
1-1/4"	244
1-1/2"	366
2"	704
2-1/2"	1120
3"	1980

NOTES:

1. GAS PIPING TO BE SCHEDULE 40 STEEL PIPE W/125 CAST IRON SCREWD FITTINGS
2. GAS SYSTEM TO BE INSTALLED BY QUALIFIED LICENSED CONTRACTOR.
3. VERIFY ALL EQUIPMENT BTU'S PRIOR TO INSTALLATION. ADJUST PIPE SIZE ACCORDING TO 2018 INTERNATIONAL FUEL GAS CODE TABLE 402.4(2)
4. CONTRACTOR TO FIELD VERIFY FINAL TOTAL EQUIVALENT LENGTH AND SIZE.
5. CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF EXISTING GAS METER LOCATION, PRESSURE AND CAPACITY.



PLUMBING SANITARY RISER DIAGRAM

PROJECT NUMBER

85°C Bakery Cafe

REVISIONS

PLUMBING SCHEDULE AND RISERS

P-600