

MECHANICAL SYMBOLS LIST

EQUIPMENT SYMBOL	MECHANICAL ABBREVIATIONS
	AC-1 EF-1
	POINT OF NEW CONNECTION TO EXISTING
	AIR DEVICES
	CEILING DIFFUSER SUPPLY
	CEILING DIFFUSER RETURN/EXHAUST

EQUIPMENT SYMBOL	MECHANICAL ABBREVIATIONS
	DUCT ACCESSORIES
	BACKDRAFT DAMPER
	FIRE DAMPER W/ ACCESS DOOR
	MOTORIZED DAMPER W/ ACCESS DOOR
	VOLUME DAMPER W/ ACCESS DOOR

EQUIPMENT SYMBOL	MECHANICAL ABBREVIATIONS
	CONTROLS AND SENSORS
	THERMOSTAT
	TEMPERATURE SENSOR
	DUCT SMOKE DETECTOR
	CO2 DETECTOR

EQUIPMENT SYMBOL	MECHANICAL ABBREVIATIONS
	DUCTWORK
	AIR DUCT W/ 1.5" ACOUSTICAL LINING
	FLEXIBLE DUCT
	FLEXIBLE CONNECTION
	RECTANGULAR DUCT (WIDTH X DEPTH)
	ROUND DUCT (DIAMETER)
	ROUND DUCT CROSS SECTION
	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	RETURN AIR RECTANGULAR DUCT CROSS SECTION

EQUIPMENT SYMBOL	MECHANICAL ABBREVIATIONS
	PIPE FITTINGS AND EQUIPMENT
	ISOLATION BALL VALVE
	GLOBE VALVE
	STRAINER
	2-WAY MOTORIZED VALVE
	3-WAY MOTORIZED MIXING VALVE
	UNION
	PRESSURE GAUGE W/ COCK
	TEMPERATURE GAUGE
	AIR VENT

APPLICABLE CODES

- A. 2015 INTERNATIONAL BUILDING CODE.
- B. 2015 INTERNATIONAL MECHANICAL CODE.
- C. 2020 MASSACHUSETTS ENERGY CODE.
- D. 248 CMR UNIFORM STATE PLUMBING CODE
- E. 2023 NATIONAL ELECTRIC CODE

BRAINTREE, MA BUILDING DEPARTMENT NOTES

- THE CONTRACTOR SHALL ENGAGE THE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- 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.
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH 2015 IMC 401.
- 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 2015 IMC 403.3
- ALL FIRE DAMPERS SHALL BE ACCEPTED FOR USE BY THE DEPARTMENT OF BUILDINGS. FIRE DAMPERS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH UL 555, STANDARDS FOR FIRE DAMPERS AND CEILING DAMPERS.
- COMBINATION FIRE/SMOKE DAMPERS AND SMOKE DAMPERS SHALL BE ACCEPTED FOR USE BY DEPARTMENT OF BUILDINGS AND SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH UL 555S.
- SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION MC 606 TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN.
- FIRE DAMPERS, SMOKE DAMPERS, AND COMBINATION FIRE/SMOKE DAMPERS LOCATED WITHIN THE AIR DISTRIBUTION AND SMOKE CONTROL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION MC 606.
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- 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.
- SMOKE DETECTOR SHALL MEET UL268A.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.

MECHANICAL DRAWING LIST	
M-0.01	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M-0.02	MECHANICAL SPECIFICATION (1 OF 2)
M-0.03	MECHANICAL SPECIFICATIONS (2 OF 2)
M-1.01	MECHANICAL FLOOR PLAN
M-5.01	MECHANICAL DETAILS (1 OF 3)
M-5.02	MECHANICAL DETAILS (2 OF 3)
M-5.03	MECHANICAL DETAILS (3 OF 3)
M-6.01	MECHANICAL SCHEDULES

GENERAL NOTES

- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- 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.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFOR SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL MAKE ALLOWANCE IN PRICING FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED.
- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEET & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
- PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- 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.
- MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.

21. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.

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

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

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

25. 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.

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

DEFINITIONS:

- "PROVIDE": TO SUPPLY, 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.

SCOPE OF WORK

- SCOPE OF WORK
- 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, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFIS, ETC. FOR THIS PROJECT WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
 - 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 THEREFOR. 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.
 - THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL HVAC NOTES

GENERAL:

- 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.
- CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- 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.
- WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO 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.
- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S 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.
- ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- MAINTAIN A MINIMUM 6"-8" CLEARANCE TO THE UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
- LOCATE ALL TEMPERATURE, PRESSURE, 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.
- NOTHING IS PERMITTED TO BE ATTACHED TO, SUSPENDED FROM, OR PENETRATE LANDLORD'S STRUCTURE, FLOOR DECK, OR ROOF DECK. TENANT MAY ATTACH NON-DESTRUCTIVELY, TO OR SUSPEND FROM THE TOP CHORD OF THE JOIST OR THE STRUCTURAL STEEL WHICH EXISTS ABOVE THE TENANT SPACE. WHEN ATTACHING TO LANDLORD'S STRUCTURE, DO NOT DRILL, WELD, SCREW, OR SHOOT INTO STRUCTURE. ALTERNATIVE METHODS OF ATTACHMENT ONLY, NOTHING TO DAMAGE LANDLORD'S BASE BUILDING STRUCTURE. TENANT SHALL PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS, BY A STRUCTURAL ENGINEER WITH LEGALLY ACTIVE REGISTRATION AS INDICATED BY ALL JURISDICTIONAL REQUIREMENTS, FOR ALL STRUCTURAL MODIFICATIONS FOR LANDLORD RECORDS.
- ALL PENETRATIONS TO ROOF MUST BE APPROVED BY LANDLORD. ROOF RELATED WORK MUST BE DONE BY MALL'S DESIGNATED ROOFING CONTRACTOR, AT TENANT'S EXPENSE. COORDINATE ALL WORK WITH PROPERTY MANAGEMENT ON SITE.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
- MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
- ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
- ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- TENANT MUST REMOVE ALL ABANDONED ROOFTOP AND/OR MECHANICAL EQUIPMENT ABOVE THE LEASED PREMISES AND WITHIN THE LEASED PREMISES, AT TENANT EXPENSE. PATCH AND REPAIR ROOF AS NEEDED.

- TENANT'S GC TO LABEL ALL ROOF TOP EQUIPMENT WITH TENANT NAME SPACE NUMBER AND EQUIPMENT IDENTIFICATION (RTU-1, EF-1), PER MALL SPECIFICATIONS/ STANDARDS.
- ALL PIPING ON ROOF SHALL BE SUPPORTED ON PRE-MANUFACTURED PIPE SUPPORTS INSTALLED ON CARRY TREAD, SPACED PROPERLY TO SUPPORT PIPING. TREATED WOOD SUPPORTS ARE NOT PERMITTED.
- ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. CONDENSATE DRAIN PIPING SHALL BE COPPER. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED. HVAC SYSTEM MUST BE TESTED & BALANCED BY A LICENSED CONTRACTOR. COPY OF BALANCE REPORT MUST BE PROVIDED TO THE PROPERTY MANAGEMENT OFFICE ON-SITE.
- 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.

PIPING

- PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE PIPING SYSTEMS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED AND REQUIRED BY CODE.
- UNLESS OTHERWISE NOTED, ALL PIPING IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE OR SLAB, WITH SPACE FOR INSULATION IF REQUIRED.
- INSTALL PIPING SO ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
- ALL VALVES SHALL BE INSTALLED SO THAT THE VALVE REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING ON THE EQUIPMENT SIDE OF THE VALVE IS REMOVED.
- ALL BALANCING VALVES AND BUTTERFLY VALVES SHALL BE PROVIDED WITH POSITION INDICATORS AND THE MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS).
- ALL VALVES (EXCEPT CONTROL VALVES) AND STRAINERS SHALL BE THE FULL SIZE OF THE PIPE BEFORE REDUCING IN SIZE TO MAKE CONNECTIONS TO EQUIPMENT AND CONTROLS.
- UNIONS AND/OR FLANGES SHALL BE INSTALLED AT EACH PIECE OF EQUIPMENT, IN BYPASSES, AND IN LONG PIPING RUNS (100 FT. OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATION AND REPAIRS.
- INSTALL ALL PIPING WITHOUT FORCING OR SPRINGING.
- ALL PIPING SHALL CLEAR DOORS AND WINDOWS.
- ALL VALVES SHALL BE ADJUSTED FOR SMOOTH AND EASY OPERATION.
- ALL PIPING SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- PROVIDE FLEXIBLE CONNECTIONS IN ALL PIPING SYSTEMS CONNECTED TO PUMPS, AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AS CLOSE TO THE EQUIPMENT AS POSSIBLE OR AS INDICATED ON THE DRAWINGS.
- SLOPED REFRIGERANT PIPING 1% IN THE DIRECTION OF OIL RETURN. LIQUID LINES MAY BE INSTALLED LEVEL.
- INSTALL HORIZONTAL REFRIGERANT HOT GAS DISCHARGE PIPING WITH 1/2" PER 10 FT. DOWNWARD SLOPE AWAY FROM THE COMPRESSOR.
- INSTALL HORIZONTAL REFRIGERANT SUCTION LINES WITH 1/2" PER FT. TO FLOOR. DOWNWARD SLOPE TO THE COMPRESSOR, WITH NO LONG TRAPS OR DEAD ENDS THAT MAY CAUSE OIL TO SEPARATE FROM THE SUCTION GAS AND RETURN TO THE COMPRESSOR IN DAMAGING SLUGS.
- PROVIDE A LINE SIZE STRAINER UPSTREAM OF EACH AUTOMATIC VALVE. PROVIDE A SHUT-OFF VALVE ON EACH SIDE OF A STRAINER.
- PROVIDE REPLACEABLE CARTRIDGE FILTER DRYERS WITH A THREE-VALVE BYPASS ASSEMBLY FOR SOLENOID VALVES, ADJACENT TO RECEIVERS.

SPECIFICATIONS

SECTION 0001 - NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

- THE BIDDER BY 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.
 - THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
 - 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.
 - 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.
 - THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

- 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.
- THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

1.3 RESPONSIBILITIES

- 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.
- THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON-TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE GENERAL CONTRACTOR.
- THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE GENERAL CONTRACTOR AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

SECTION 0101 - QUALITY OF WORK

1.1 WORKMANSHIP

- ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR GENERAL CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

1.2 CODE COMPLIANCE

- ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

END OF SECTION 0101

SECTION 0102 -REQUIRED DOCUMENTS

1.1 SHOP DRAWINGS

- A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.

1.2 SUBMITTALS

- WITHIN 90 DAYS, EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.

1.3 RECORD DRAWINGS

- WITHIN 90 DAYS, UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.

1.4 EQUIPMENT OPERATING INSTRUCTIONS

- WITHIN 90 DAYS, ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS, EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL 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. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.
- THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

SECTION 0101 - QUALITY OF WORK

1.1 WORKMANSHIP

- ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

1.2 CODE COMPLIANCE

- ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

END OF SECTION 0101

SECTION 0102 -REQUIRED DOCUMENTS

1.1 SHOP DRAWINGS

- A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.

1.2 SUBMITTALS

- EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.

1.3 RECORD DRAWINGS

- UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.

1.4 EQUIPMENT OPERATING INSTRUCTIONS

- ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS, EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL 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. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.

- THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

SECTION 078413-PENETRATION FIRE-STOPPING

1.1 QUALITY ASSURANCE

- INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A UL-QUALIFIED FIRE-STOP CONTRACTOR.
- FIRE-TEST-RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL.

1.2 PENETRATION FIRESTOPPING

- PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: F-RATINGS PER ASTM E 814 OR UL 1479.
- PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND T-RATINGS PER ASTM E 814 OR UL 1479.
- PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.
- W-RATINGS: PER UL 1479.

1.3 INSTALLATION

- IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.

1.4 FIELD QUALITY CONTROL

- INSPECTION OF INSTALLED FIRE-STOPPING: BY OWNER-ENGAGED AGENCY ACCORDING TO ASTM E 2174.

1.5 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

WHERE UL-CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.

FOR THE FOLLOWING SYSTEMS:

METALLIC AND NON-METALLIC PIPES, CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED PIPES, GROUPINGS OF PENETRANTS, USE ON OR MORE THE FOLLOWING MATERIALS:

- LATEX SEALANT
- SILICONE SEALANT
- INTUMESCENT PUTTY
- MORTAR
- SILICONE FOAM
- PILLOWS/BAGS
- INTUMESCENT WRAP STRIPS
- INTUMESCENT COMPOSITE SHEET

1.6 MANUFACTURERS

- HILTI CONSTRUCTION CHEMICAL, INC
- TREMCO INC.
- 3M FIRE PROTECTION PRODUCTS

END OF SECTION 078413

SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

1.1 SLEEVE-SEAL SYSTEMS

- FIELD-ASSEMBLED, MODULAR SEALING-ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE.

- SEALING ELEMENTS: EPDM RUBBER OR NBR.
- PRESSURE PLATES: CARBON STEEL, PLASTIC, STAINLESS STEEL.

- CONNECTING BOLTS AND NUTS: CARBON STEEL WITH CORROSION-RESISTANT COATING, STAINLESS STEEL.

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

- ADVANCE PRODUCTS & SYSTEMS, INC.
- CALPICO, INC.
- METRAFLEX COMPANY (THE).
- PIPELINE SEAL AND INSULATOR, INC.

1.2 SLEEVE-SEAL FITTINGS

- MANUFACTURED PLASTIC, SLEEVE-TYPE, PLASTIC OR RUBBER WATER-STOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.

1.3 GROUT

- NON-SHRINK, FACTORY PACKAGED.

1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

- USE SLEEVES AND SLEEVE SEALS FOR THE FOLLOWING PIPING-PENETRATION APPLICATIONS:

1. INTERIOR PARTITIONS:

- PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES, PVC-PIPE SLEEVES.
- PIPING NPS 6 (DN 150) AND LARGER: GALVANIZED-STEEL-SHEET SLEEVES.

END OF SECTION 230517

SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- ONE-PIECE, CAST-BRASS TYPE: WITH POLISHED, CHROME-PLATED AND ROUGH-BRASS FINISH AND SETSCREW FASTENER.

2.2 FLOOR PLATES

- ONE-PIECE FLOOR PLATES: CAST-IRON FLANGE WITH HOLES FOR FASTENERS.

PART 3 - EXECUTION

3.1 INSTALLATION

- INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.

- INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.

1. ESCUTCHEONS FOR NEW PIPING:

- PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE-PIECE, DEEP-PATTERN TYPE.
- INSULATED PIPING: ONE-PIECE, STAMPED-STEEL TYPE.
- BARE PIPING AT WALL AND FLOOR PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.
- BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.

3.2 FIELD QUALITY CONTROL

- REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.

END OF SECTION 230518

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.

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

2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED–AIR BELLOWES.

C. RESTRAINED VIBRATION ISOLATION ROOF–CURB RAILS: FACTORY–ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR–AND WATER-TIGHT 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 AND VARIABLE VOLUME SYSTEMS.
2. MOTORS.
3. HYDRONIC SYSTEM

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 HYDRONIC 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 HYDRONIC 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 FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

F. 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.

G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.

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

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

J. 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–12
OUTSIDE OF BUILDING: R–12

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 1.5" THICK R–6 AS MANUFACTURED BY DUCTMATE, 1–1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. 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 INCH 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 STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY–COATED (GALVANNEALED) BY HOT DIP PROCESS, AND AS24 STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR SHEET METAL–COATED BY 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 VANES ALL 90° ELBOWS.

3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT–RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.

4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33 00.

5. PROVIDE EXPANDED TAKE–OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90–DEGREE TAKE–OFF FITTINGS OR TRAITGH TAPS WILL NOT BE ACCEPTED.

6. BUTTON PUNCH SNAP–LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.

7. ROUND DUCTS MAY BE SUBSTITUTED FOR RECTANGULAR DUCTS IF SIZED IN ACCORDANCE WITH ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY WRITTEN PERMISSION OF THE ENGINEER.

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:

USG MAX. SIDE INCHES TRANSVERSE JOINTS AND BRACING

22 UP TO 12 S SLIP, DRIVE SLIP, ONE INCH POCKET LOCK ON 8 FOOT CENTERS

22 13 TO 24 1"x1"x1/8" ANGLES ON 4 FOOT CENTERS

20 25 TO 35 1"x1"x1/8" ANGLES ON 2 FOOT CENTERS

D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:

1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.

E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU OF RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3–6 AND AS SHOWN IN FIG. 3–1 AND 3–2 FOR ROUND DUCTWORK.

F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.

1.2 MATERIALS

A. SINGLE–WALL RECTANGULAR DUCTS AND FITTINGS.

B. SINGLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.

C. SHEET METAL MATERIALS:

1. GALVANIZED SHEET STEEL.
2. STAINLESS–STEEL SHEETS.
3. ALUMINUM SHEETS.
4. FACTORY–APPLIED ANTI–MICROBIAL COATING.

D. DUCT LINER:

1. FIBROUS GLASS, TYPE I, FLEXIBLE.
 - a. WITH ANTI–MICROBIAL EROSION–RESISTANT COATING.
2. FLEXIBLE ELASTOMERIC.
3. NATURAL FIBER.

E. SEALANT MATERIALS:

1. TWO–PART TAPE SEALING SYSTEM.
2. WATER–BASED JOINT AND SEAM SEALANT.
3. SOLVENT–BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
5. FLANGE GASKETS.
6. ROUND DUCT JOINT O–RING SEALS.

1.3 DUCT CLEANING

A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING, ADJUSTING, AND BALANCING.

B. CLEAN THE FOLLOWING ITEMS:

1. AIR OUTLETS AND INLETS.
2. SUPPLY, RETURN, AND EXHAUST FANS.
3. AIR–HANDLING UNITS.
4. COILS AND RELATED COMPONENTS.
5. RETURN–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
6. SUPPLY–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.

1.4 DUCT SCHEDULE

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

8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

END OF SECTION 233113

SECTION 233713 – DIFFUSERS, REGISTERS, AND GRILLES

1.1 PRODUCTS

A. DIFFUSERS, REGISTERS 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.
- f. RUSKIN

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

PIPING INSULATION

PIPING SERVING AS PART OF A HEATING OR COOLING SYSTEM SHALL BE THERMALLY INSULATED IN ACCORDANCE WITH TABLE C403.11.3

FLUID OPERATING TEMP. RANGE & USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (IN.)				
	CONDUCTIVITY BTU.IN./ (H.FT2.F)	MEAN RATING TEMP., °F	<1	1 TO <1-1/2	1-1/2 TO <4	4 TO <8	≥8
201 – 250	0.27 – 0.30	150	2.5	2.5	2.5	3.0	3.0
141 – 200	0.25 – 0.29	125	1.5	1.5	2.0	2.0	2.0
105 – 140	0.21 – 0.28	100	1.0	1.0	1.5	1.5	1.5
40 – 60	0.21 – 0.27	75	0.5	0.5	1.0	1.0	1.0
< 40	0.20 – 0.26	50	0.5	1.0	1.0	1.0	1.5

THERMOSTATIC CONTROL NOTES:

A. C403.4.1 THERMOSTATIC CONTROLS (MANDATORY):

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, NOT FEWER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

EXCEPTION:

INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:

1. THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ± 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM).
2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.

B. C403.4.1.2 DEADBAND (MANDATORY)

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5° F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTIONS:

1. THERMOSTATS REQUIRING MANUAL CHANGEVER BETWEEN HEATING AND COOLING MODES.
2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.

C. C403.4.1.3 SETPOINT OVERLAP RESTRICTION (MANDATORY)

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE CONFIGURED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.4.1.2.

D. C403.4.2 OFF–HOUR CONTROLS (MANDATORY)

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

EXCEPTIONS:

1. ZONES THAT WILL BE OPERATED CONTINUOUSLY.
2. ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A MANUAL SHUTOFF SWITCH LOCATED WITH READY ACCESS.

E. C403.4.2.1 THERMOSTATIC SETBACK (MANDATORY)

THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55° F (13°C) OR UP TO 85° F (29°C).

F. C403.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN (MANDATORY)

AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

G. C403.4.2.3 AUTOMATIC START (MANDATORY)

AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.

SEQUENCE OF OPERATIONS

1) FIRE AND SMOKE DAMPER

a) SMOKE DETECTION/TEST/POWER FAILURE OPERATION

WHEN SMOKE IS DETECTED (VIA A SMOKE DETECTOR), DURING TESTING OR IF POWER FAILURE OCCURS, THE DAMPER WILL CLOSE AND REMAIN CLOSED. WHEN THE SMO

SMOKE EVACUATION AIR CHANGE CALCULATIONS				
ROOM NAME	AREA (SQ.FT.)	ROOM HEIGHT (FT.)	ACPH (AS PER 2015-IBC 910.4.3)	SMOKE EXHAUST CFM
SALES AREA	8100	19.75	2	5333
ENTRANCE	310	10.75	2	111
BOH	1800	12	2	720
STOCK ROOM	1000	19.75	2	658
RESTROOMS	110	9	2	33
TOTAL	11320	-	-	6855

FIELD VERIFY ALL CONDITIONS

- A. DESIGN DRAWINGS ARE SCHEMATIC AND ARE BASED ON AS-BUILT/RECORD DRAWINGS PROVIDED BY OWNER. THE CONTRACTOR SHALL VISIT PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIAL NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITION.
- B. THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATION OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATION MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTOR COST.
- C. BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COST FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND THE SPECIFICATION NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT THE ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

SEQUENCE OF OPERATION

OCCUPIED CYCLE:

- A. DURING THE HEATING MODE, THE DIGITAL PROGRAMMABLE SPACE THERMOSTAT SHALL CYCLE THE AIR HANDLING UNITS TO MAINTAIN THE SPACE OCCUPIED HEATING SET-POINT.
- B. DURING THE COOLING MODE, THE DIGITAL PROGRAMMABLE SPACE THERMOSTAT SHALL CYCLE THE AIR HANDLING UNIT TO MAINTAIN SPACE OCCUPIED COOLING SET-POINT

UNOCCUPIED CYCLE:

- A. DURING THE HEATING MODE, THE DIGITAL PROGRAMMABLE SPACE THERMOSTAT SHALL CYCLE THE AIR HANDLING UNITS TO MAINTAIN THE SPACE UNOCCUPIED HEATING SET-POINT.
- B. DURING THE COOLING MODE, THE DIGITAL PROGRAMMABLE SPACE THERMOSTAT SHALL CYCLE THE AIR HANDLING UNIT TO MAINTAIN SPACE UNOCCUPIED COOLING SET-POINT

DEMAND CONTROL VENTILATION OCCUPIED DAMPER CONTROL:

CO2 DAMPER CONTROL SHALL BE ENABLED WHEN THE FOLLOWING CONDITION ARE TRUE:

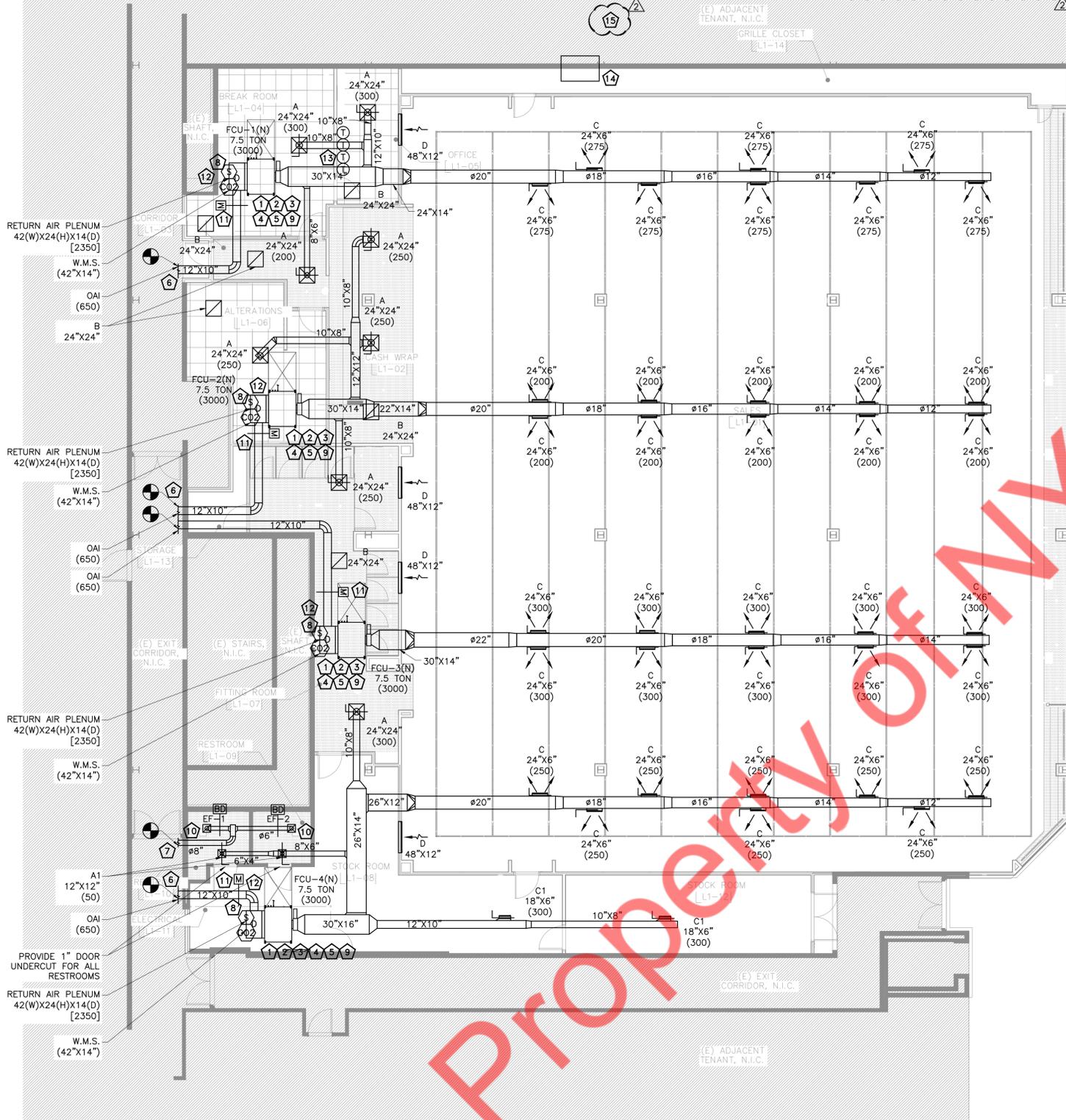
- A. AN ASSOCIATED ZONE IS AT OR ABOVE THE ZONE CO2 LEVEL SET-POINT FOR 15 MINUTES OR MORE.
- B. THE OUTDOOR CO2 LEVEL IS BELOW THE INDOOR LEVEL SET-POINT.
- C. WHEN DEMAND CONTROL VENTILATION IS ENABLED.
- D. MODULATE DA DAMPER BETWEEN SCHEDULED MINIMUM DAMPER POSITION AND FULLY OPEN DAMPER POSITION AS REQUIRED TO MAINTAIN CO2 LEVEL AT SET POINT.
- E. WHEN ALL ASSOCIATED ZONES ARE WITHIN THE CO2 LEVEL SET POINT, THE UNIT WILL RESUME IN THE OCCUPIED MODE.

MECHANICAL GENERAL NOTES

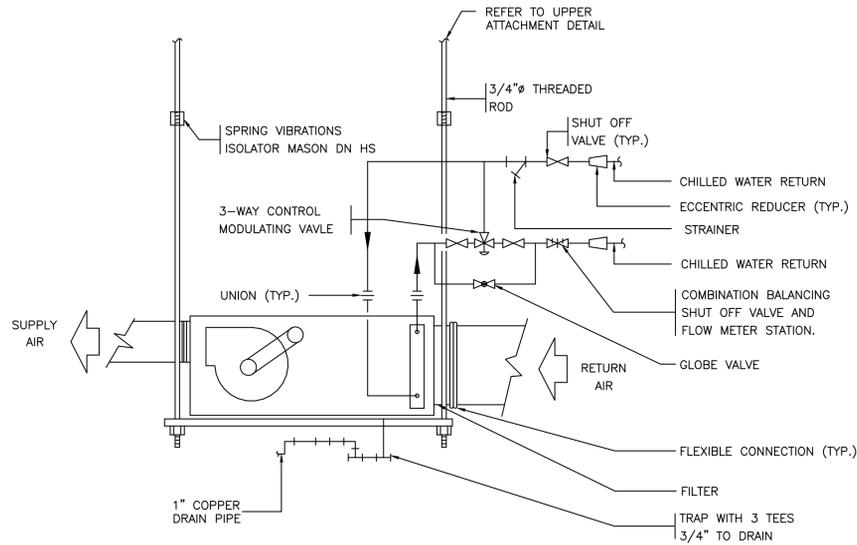
- A. REFER TO THE ARCHITECTURAL DRAWING FOR THE EXACT LOCATION AND MOUNTING HEIGHT OF VARIOUS EQUIPMENT. ALL SUCH EQUIPMENT AND EQUIPMENTS COLORS AND FINISH SHALL BE COORDINATED WITH THE ARCHITECT. MOUNTING HEIGHT SHALL BE APPROVED BY THE ARCHITECT.
- B. CONTRACTOR SHALL BALANCE EACH AIR TERMINAL WITH THE CFM SHOWN ON PLANS.
- C. DUCTWORK SHOWN ON PLANS ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR DUCTWORK ROUTING, OFFSET AND RUN DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
- D. ALL FLEX DUCT SHALL COMPLY WITH ALL LOCAL CODES, UL LISTED, R-6, FOIL-BACKED, CLASSIFIED AS A CLASS 1 AIR DUCT. MAXIMUM LENGTH SHALL BE 5'-0" OR LESS.
- E. COORDINATE LOCATIONS AND SIZES OF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.
- F. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
- G. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS. ALLOW FOR DUCT INSULATION.
- H. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
- I. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- J. PROVIDE 1.5" THICK R-6 FOIL FACE INSULATION (INTERNAL FOR EXPOSED DUCTS AND EXTERNAL FOR CONCEALED DUCTS) FOR SUPPLY & RETURN AIR DUCTS. PROVIDE ACOUSTIC INSULATION ON MAIN SUPPLY AND RETURN DUCTS UP TO 10 FT. FROM HVAC UNIT.
- K. 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.
- L. NEW DUCTWORK IN OPEN CEILING AREA SHALL BE SPIRAL DUCTWORK, NEW DUCTWORK IN CONCEALED AREAS MAY BE RECTANGULAR WITH EQUIVALENT CROSS SECTIONAL FLOW AREA.
- M. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS AND TRADES.
- N. CONTRACTOR SHALL PROVIDE ALL REQUIRED HVAC PERMITS SHALL COMPLY WITH ALL STATE AND LOCAL CODES.
- O. AIR FILTER SHALL BE OF THE DISPOSABLE TYPE AND HAVE INITIAL SHARE WEIGHT ARRESTANCE OF 10% AND A CLEAN PRESSURE DROP OF 0.15" W.C. PROVIDE TWO SETS, ONE DURING CONSTRUCTION AND ONE FOR USE AFTER OCCUPANCY.
- P. THE CONTRACTOR SHALL PROVIDE WRITTEN GUARANTEE THAT SHALL WARRANT ALL WORKMANSHIP AND MATERIAL FOR ONE (1) YEAR FROM THE FINAL WORK ACCEPTANCE BY THE OWNER.
- Q. ANY CHANGES AND/ OR UPGRADES TO TENANTS EXISTING MECHANICAL SYSTEMS SHALL COMPLY WITH ALL CODES AND MALL CRITERIA. EXISTING SYSTEMS SHALL POSSESS THE CAPACITY TO HANDLE ANY AND ALL CHANGES IN LOAD.
- R. NO PITCH POCKETS ARE PERMITTED ON THE ROOF FOR ANY CONDENSATE DRAINS, REFRIGERANT PIPING, POWER OR CONTROL WIRING. ALL CONNECTIONS ARE TO BE MADE INSIDE THE EQUIPMENT CURB OR THROUGH PRE-MANUFACTURED PIPING CURB.
- S. NOTHING IS PERMITTED TO BE ATTACHED TO, SUSPENDED FROM, OR PENETRATE LANDLORD'S STRUCTURE, FLOOR DECK, OR ROOF DECK. YOU MAY ATTACH, NON-DESTRUCTIVELY, TO OR SUSPEND FROM THE TOP CHORD OF THE JOIST OR THE STRUCTURAL STEEL WHICH EXISTS ABOVE THE TENANT SPACE. WHEN ATTACHING TO LANDLORD'S STRUCTURE, DO NOT DRILL, WELD, SCREW, OR SHOOT INTO STRUCTURE. ALTERNATIVE METHODS OF ATTACHMENT ONLY. NOTHING TO DAMAGE LANDLORD'S BASE BUILDING STRUCTURE. TENANT SHALL PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS, BY A STRUCTURAL ENGINEER WITH LEGALLY ACTIVE REGISTRATION AS INDICATED BY ALL JURISDICTIONAL REQUIREMENTS, FOR ALL STRUCTURAL MODIFICATIONS FOR LANDLORD RECORDS.
- T. ALL PENETRATIONS TO ROOF MUST BE APPROVED BY LANDLORD. ALL RELATED ROOF WORK MUST BE DONE BY MALL'S DESIGNATED ROOFING CONTRACTOR, AT TENANT'S EXPENSE. COORDINATE ALL WORK WITH PROPERTY MANAGEMENT ON SITE.
- U. TENANT MUST REMOVE ALL ABANDONED ROOFTOP AND/ OR MECHANICAL EQUIPMENT ABOVE THE LEASED PREMISES AND WITHIN THE LEASED PREMISES, AT TENANT'S PATCH AND REPAIR ROOF AS NEEDED.
- V. TENANTS GC TO LABEL ALL ROOF TOP EQUIPMENT WITH TENANT NAME SPACE NUMBER AND EQUIPMENT IDENTIFICATION (RTU-1, EF-1), PER MALL SPECIFICATIONS/ STANDARDS.
- W. ALL PIPING ON ROOF SHALL BE SUPPORTED ON PRE-MANUFACTURED PIPE SUPPORTS INSTALLED ON CARRY TREAD, SPACED PROPERLY TO SUPPORT PIPING. TREATED WOOD SUPPORTS ARE NOT PERMITTED.
- X. AT CONCLUSION OF PROJECT, HVAC SYSTEM MUST BE TESTED AND BALANCED BY A LICENSED CONTRACTOR. COPY OF BALANCE REPORT MUST BE PROVIDED TO PROPERTY MANAGEMENT OFFICE ON-SITE.
- Y. USE ENERGY STAR PRODUCTS AND/OR EQUIPMENT WHENEVER POSSIBLE DURING TENANT BUILD OUT, WHICH CAN REDUCE ENERGY CONSUMPTION.

MECHANICAL FLOOR PLAN KEY NOTES

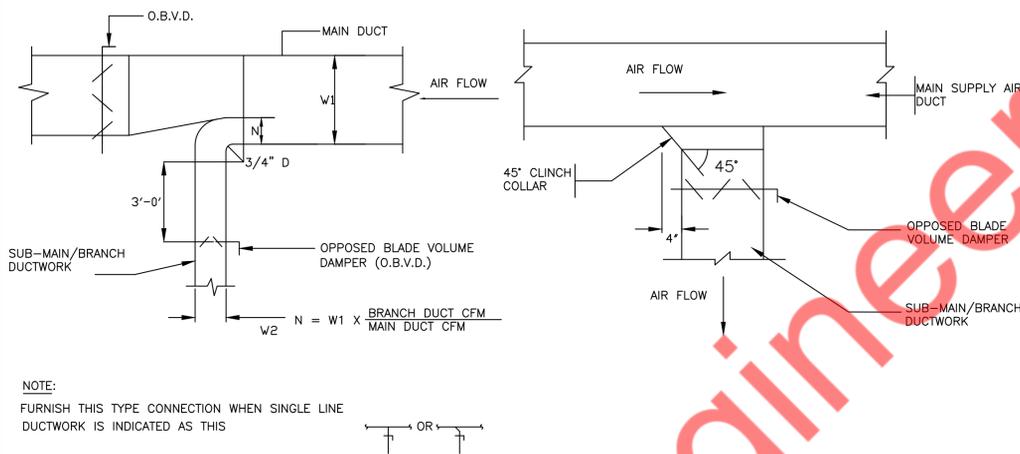
- 1 LANDLORD TO PROVIDE, INSTALL & ACTIVATE CHILLED WATER FAN COIL UNITS (SUSPENDED FROM STRUCTURE) WITH MAIN SUPPLY & RETURN AIR DUCTS STUBBED INTO THE SPACE. MAINTAIN MANUFACTURER RECOMMENDED CLEARANCES AROUND THE UNIT FOR SERVICE & MAINTENANCE. LANDLORD TO PROVIDE ALL NECESSARY POWER TO THE UNITS AND CONTROLS WITH SPARE CABLE SPOOLED WITHIN THE SPACE.
- 2 PROVIDE SECONDARY DRAIN PAN UNDER FAN COIL UNIT WITH WATER LEAKAGE SENSOR AND ALARM TO SHUT DOWN THE UNIT.
- 3 CONNECT SUPPLY AND RETURN DUCT TO FULL SIZE OF FAN COIL UNIT SUPPLY AND RETURN CONNECTION WITH FLEXIBLE CONNECTION AT UNIT. TRANSITION AS REQUIRED PER SPECIFICATION.
- 4 CONNECT 1" CONDENSATE DRAIN LINES FROM FAN COIL UNITS TO THE NEAREST PLUMBING DRAIN IN AN APPROVED MANNER. INSTALL CONDENSATE DRAIN WITH 1% SLOPE TOWARD SINK. CONDENSATE DRAIN LINE SHALL BE OF COPPER PIPE. COPPER PIPE SHALL BE INSULATED AS PER REQUIRED 2020 MASSACHUSETTS ENERGY CODE C403.11.3
- 5 CONNECT TO EXISTING CHILLED WATER PIPING CONNECTION. CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING PIPING CONNECTION PRIOR TO INSTALLATION.
- 6 CONNECT TO EXISTING OUTSIDE AIR DUCT, PROVIDE MOTORIZED DAMPER. CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING DUCTING CONNECTION PRIOR TO INSTALLATION.
- 7 CONNECT TO MALL TOILET EXHAUST AIR DUCT, CONTRACTOR TO FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING DUCTING CONNECTION PRIOR TO INSTALLATION.
- 8 PROVIDE SMOKE DETECTOR MOUNTED IN RETURN AIR DUCT. PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR, UPON DETECTION OF SMOKE, DETECTOR SHALL SIGNAL L.L. FIRE ALARM SYSTEM AND FCU SHALL SHUT DOWN. PROVIDE CO2 DETECTOR AND MOTORIZED DAMPER FOR DEMAND CONTROL VENTILATION. COORDINATE ALL REQUIREMENT WITH ARCHITECT/OWNER.
- 9 PROVIDE ISOLATION VALVE AT INLET AND OUTLET OF FCU AND MANUFACTURER RECOMMENDED VALVE FITTING. COMPATIBLE VALVE TYPE & CONTROLS TO BE CONFIRMED BY LANDLORD & UNIQLO EMS VENDOR. COORDINATE WITH ELECTRICAL CONTRACTOR FOR ANY POWER REQUIREMENT AS/IF REQUIRED.
- 10 PROVIDE NEW CEILING MOUNTED EXHAUST FAN. INTERLOCK EXHAUST FAN WITH FCU-4(N) FAN SHALL BE SUSPENDED STRUCTURE ABOVE. VERIFY EXACT LOCATION OF STRUCTURE MEMBER PRIOR TO INSTALLATION. PROVIDE BACK DRAFT DAMPER.
- 11 INTERLOCK MOTORIZED DAMPER WITH RESPECTIVE UNIT.
- 12 PROVIDE TEMPERATURE SENSORS IN RETURN AIR DUCT AND WIRE BACK TO T-STAT.
- 13 NEW FULLY DIGITAL 7-DAY PROGRAMMABLE TYPE THERMOSTAT WITH REMOTE SENSING CAPABILITIES, AUTO CHANGE-OVER AND AUTO SET BACK. MOUNT THERMOSTAT AT 4 FT. ABOVE FINISHED FLOOR. THERMOSTAT SERVING THE SAME TEMPERATURE ZONE SHALL BE INTERLOCKED TO PREVENT SIMULTANEOUS HEATING AND COOLING. COORDINATE LOCATION WITH THE OWNER/ARCHITECT. COORDINATE WITH UNIQLO EMS VENDOR FOR EXACT REQUIREMENTS AND EQUIPMENT. LABEL EACH THERMOSTAT AND SENSOR IDENTIFYING THE HVAC UNIT IT CONTROLS USING BLACK ENGRAVED PHENOLIC LABEL WITH 3/16" LETTERS.
- 14 EXISTING TRANSFER OPENINGS FOR SMOKE RELIEF TO REMAIN. FIELD VERIFY EXACT LOCATIONS OF EXISTING OPENINGS. RELOCATE/RESIZE OPENINGS AS REQUIRED WHEN OBSTRUCTED BY CEILING OR SOFFIT TO MAINTAIN AIRFLOW. DO NOT OBSTRUCT THE SMOKE RELIEF TRANSFER DUCTS IN ANY CONDITION. MINIMUM OPENING SHALL BE 14 SQ.FT. OR EQUIVALENT. PROVIDE EGG-CRATE GRILLES OR W.M.S. ON BOTH SIDES OF THE OPENINGS.
- 15 CONTRACTOR TO FIELD VERIFY EXISTING SMOKE EVACUATION SYSTEM INSTALLED ON SITE. CONTRACTOR TO CONFIRM IF ALL THE COMPONENTS OF THE EXISTING SMOKE EVACUATION SYSTEM ARE IN GOOD OPERATING CONDITIONS. IF DAMAGED, REPAIR OR REPLACE THE DAMAGED COMPONENTS WITH THE SIMILAR KIND. COORDINATE WITH BASE-BUILDING ENGINEER FOR EXACT SMOKE EVACUATION OPERATION AND SYSTEM LAYOUT. CONTRACTOR TO CONFIRM IF EXISTING SMOKE FANS HAVE ENOUGH EXHAUST CAPACITIES AS PER THE LOCAL CODE REQUIREMENTS.



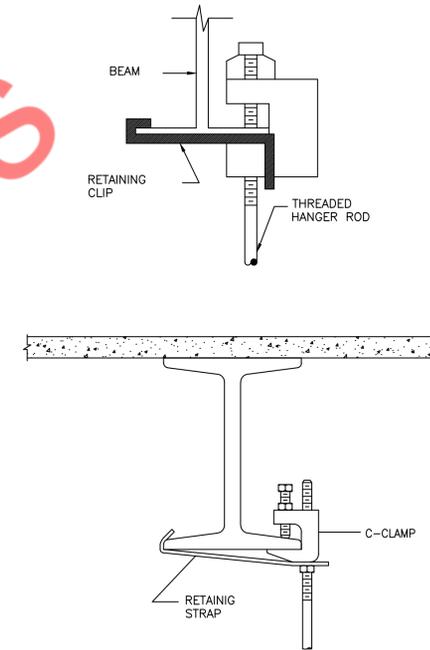
MECHANICAL FLOOR PLAN | 1
1/8" = 1'-0"



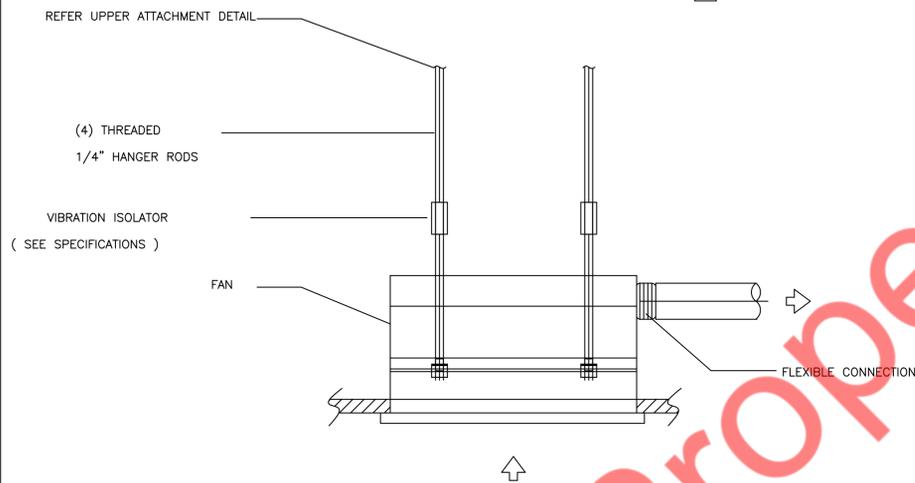
1 FAN COIL PIPING DETAIL
M5.01 N.T.S



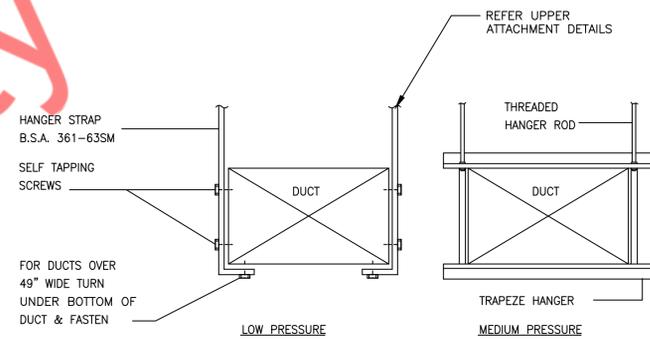
2 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
M5.01 N.T.S



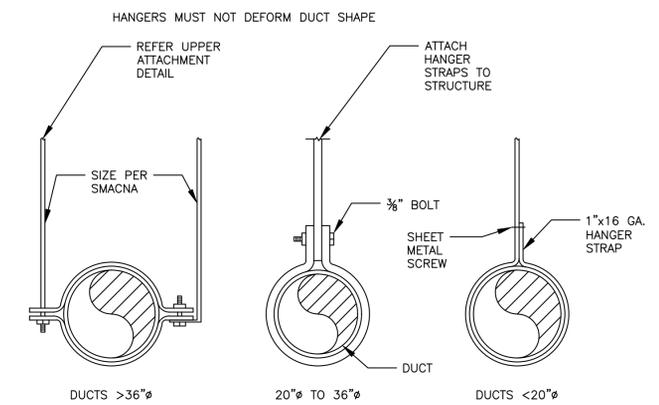
3 UPPER ATTACHMENT
M5.01 N.T.S



4 CEILING FAN HANGING SUPPORT DETAIL
M5.01 N.T.S



5 METHOD OF HANGING DUCTWORK
M5.01 N.T.S



6 ROUND DUCT SUPPORT DETAIL
M5.01 N.T.S

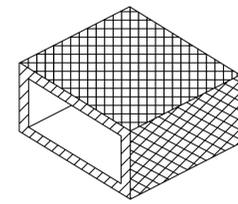


FIG. A

NOTES:
 DUCTS TO BE ACOUSTICALLY LINED SHALL BE DESIGNATED BY THE SYMBOL IN FIG. "C" TO THE EXTENT OF LINING. THICKNESS SHALL BE AS SPECIFIED.
 DUCTS LINED WITH ACOUSTICAL MATERIAL SHOULD BE FASTENED WITH CLIPS, ADHESIVE, OR PINS

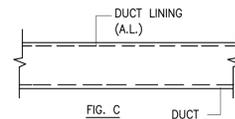


FIG. C

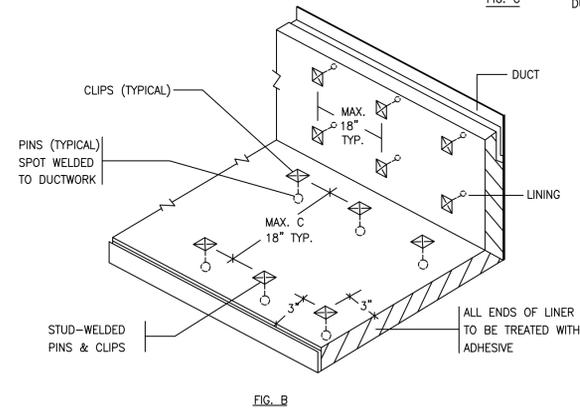
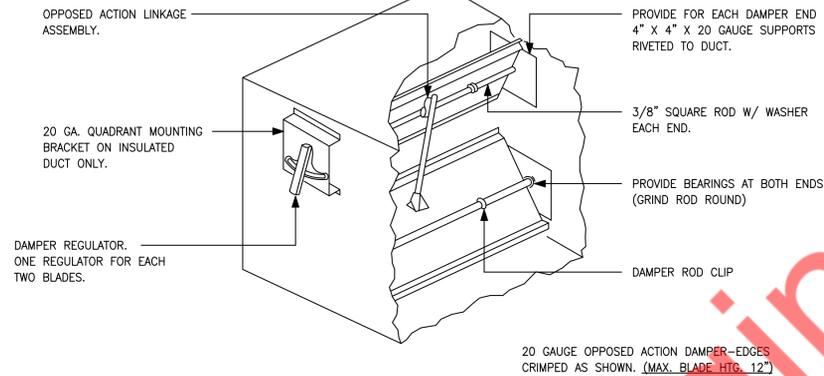


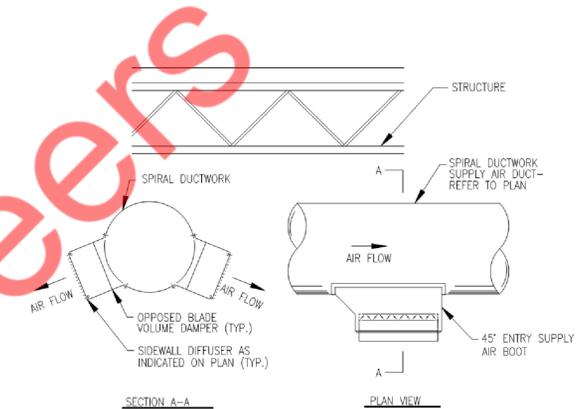
FIG. B

1 ACOUSTICAL TREATMENT DUCT LINING
 M5.02 N.T.S

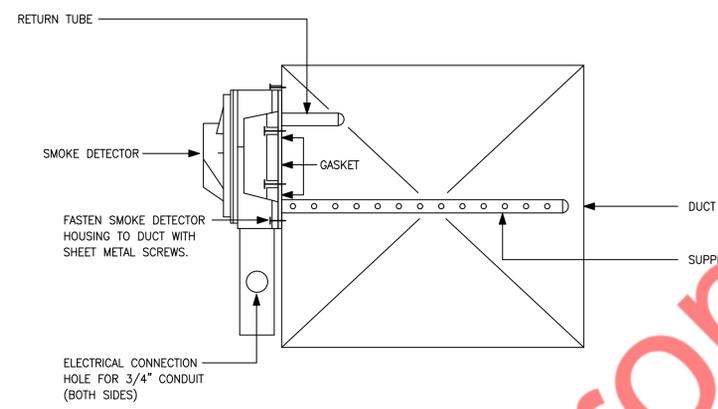


NOTE: 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.

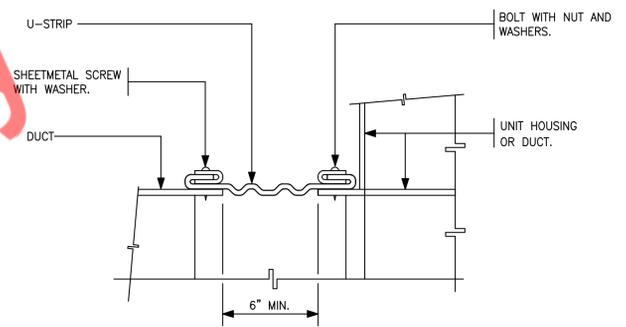
2 LOW PRESSURE BALANCING DAMPER
 M5.02 N.T.S



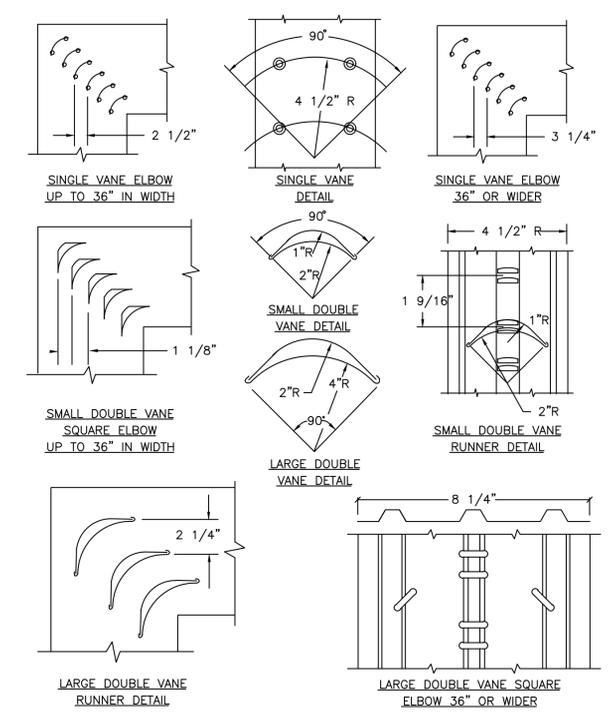
3 DUCT MOUNTED FLAT-FACED GRILLE
 M5.02 N.T.S



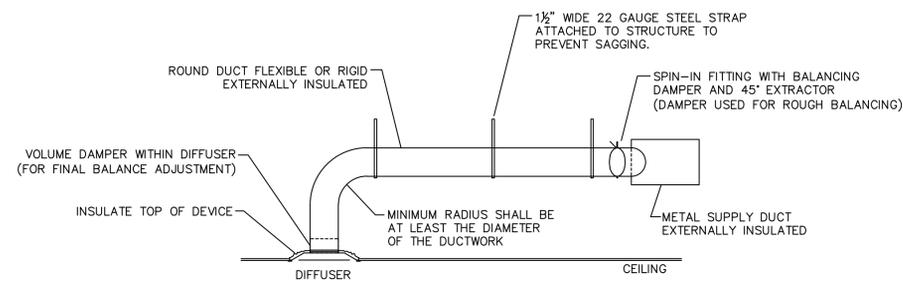
4 SMOKE DETECTOR MOUNTING DETAIL
 M5.02 N.T.S



5 FLEXIBLE CONNECTION (DUCT-EQUIPMENT)
 M5.02 N.T.S



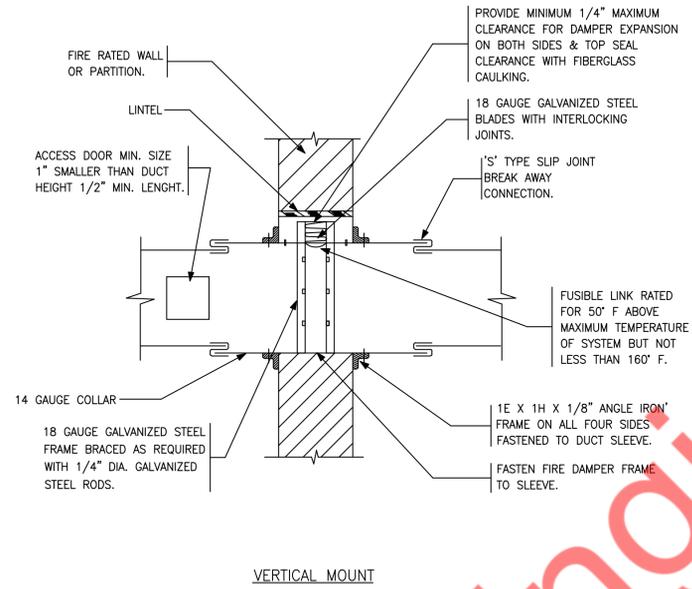
6 LOW VELOCITY DUCTWORK ELBOWS
 M5.02 N.T.S



COMMENTS:

1. REFER TO THE MECHANICAL EQUIPMENT SCHEDULE FOR COMPONENT AND DEVICE SPECIFICATIONS.
2. SUPPORTS FOR FLEX DUCTWORK SHALL BE SPACED AT 4'-0" MAX. FLEX DUCT SHALL SAG NO MORE THAN 1/2" PER FOOT OF RUN.
3. ALL DUCT INSULATION SHALL HAVE A MINIMUM INSULATING VALUE OF R-6.
4. APPLY MASTIC DUCT SEALER AT EACH JOINT OR SEAM OR CONNECTION.
5. APPLY MASTIC TO DIFFUSER COLLAR AND SLIDE FLEX OVER WHILE STILL WET, BAND CLAMP AND TAPE.
6. SUPPORT DUCTWORK WITH 1 1/2" WIDE 22 GAUGE STEEL STRAPS FIRMLY ATTACHED TO THE BUILDING STRUCTURE. SPACING SHALL BE MAXIMUM 10'-0" FOR RIGID DUCTWORK, AND MINIMUM 4'-0" FOR FLEXIBLE DUCTWORK. 12 GAUGE WIRE MAY BE SUBSTITUTED FOR STRAPS IF 1 1/2" WIDE 22 GAUGE STEEL SADDLES ARE USED TO FULLY ENCIrcLE DUCT. REFER TO THE HVAC DUCT CONSTRUCTION STANDARDS PUBLISHED BY SMACNA FOR ADDITIONAL DETAILS. FULLY COMPLY WITH MECHANICAL CODES.

1
M5.03 N.T.S. TYPICAL DIFFUSER CONNECTION DETAIL



VERTICAL MOUNT

2
M5.03 N.T.S. DETAIL OF SHUTTER TYPE FIRE DAMPER

Property of NY Engineers

FAN COIL UNIT SCHEDULE																							
TAG	LOCATION	AREA SERVED	TYPE	SUPPLY FAN DATA					COOLING COIL DATA					HEATING DATA		ELECTRICAL DATA			MAKE: TRANE OR EQUIVALENT				
				CAPACITY (TON)	OUTDOOR CFM	TOTAL CFM	MAX. RATED ESP. (IN. WG.)	MOTOR (HP)	EAT °DB/°WB	LAT °DB/°WB	TOTAL MBH	SENSIBLE MBH	CHW ROWS	GPM	WATER PD (FT)	Ew/T/LWT °F	ELECTRIC HEAT CAPACITY (kW)	PHVOLT/Hz	MCA (A)	MCOP (A)	DIMENSIONS (LXWXD)	WEIGHT (LBS)	MODEL
FCU-1(N)	SEE LOCATION	SEE LOCATION	BLOWER COIL AIR HANDLER (CEILING HUNG)	7.5	650	3000	1	3	80/67	57.58/56.29	101.03	74.12	6R	13.33	2.16	42/58	30	3/460/60	52	50	53X50X27	400	BCHE090 OR EQUIVALENT
FCU-2(N)	SEE LOCATION	SEE LOCATION	BLOWER COIL AIR HANDLER (CEILING HUNG)	7.5	650	3000	1	3	80/67	57.58/56.29	101.03	74.12	6R	13.33	2.16	42/58	30	3/460/60	52	60	53X50X27	400	BCHE090 OR EQUIVALENT
FCU-3(N)	SEE LOCATION	SEE LOCATION	BLOWER COIL AIR HANDLER (CEILING HUNG)	7.5	650	3000	1	3	80/67	57.58/56.29	101.03	74.12	6R	13.33	2.16	42/58	30	3/460/60	52	60	53X50X27	400	BCHE090 OR EQUIVALENT
FCU-4(N)	SEE LOCATION	SEE LOCATION	BLOWER COIL AIR HANDLER (CEILING HUNG)	7.5	650	3000	1	3	80/67	57.58/56.29	101.03	74.12	6R	13.33	2.16	42/58	30	3/460/60	52	60	53X50X27	400	BCHE090 OR EQUIVALENT

NOTES

- HORIZONTAL SUSPENDED UNIT WITH FRONT SUPPLY AND REAR RETURN CONNECTIONS.
- 2" FLAT FILTER RACK WITH 2" MERV 8 FILTER
- REFER TO PLAN FOR COIL AND CONDENSATE CONNECTION SIDE.
- SS AUXILIARY DRAIN PAN
- DIRECT DRIVE PLENUM FAN
- SUPPLY AIR CFM BASED ON HIGH SPEED.
- PROVIDE MOUNTING BRACKET AND ALL ASSOCIATED ACCESSORIES.
- ALL PIPING TO BE SIZED PER MANUFACTURER'S RECOMMENDATIONS.
- INDOOR UNIT AND PIPING VALVE FITTING ACCESS PANEL FIELD PROVIDED.
- ALL AC UNIT TO BE INSTALLED WITH VIBRATION ISOLATION TO MINIMIZE SOUND AND VIBRATION INTO THE SPACE.
- PROVIDE CO2 SENSOR FOR DEMAND CONTROLLED VENTILATION

FAN SCHEDULE														
UNIT ID	MANUFACTURER	MODEL	CFM	TYPE	DRIVE	FAN RPM	E.S.P. (IN. W.G.)	HP	VOLTS (V)	PHASE	FLA (A)	SERVICE	NOTES / ACCESSORIES	WEIGHT (LBS)
EF-1,2(N)	GREENHECK	SP-A390-VG	70	CEILING	DIRECT	991	0.5	-	115	1	1.5	RESTROOM	1-4	24

NOTES / ACCESSORIES:

- THERMAL OVERLOAD PROTECTION.
- GRAVITY BACKDRAFT DAMPER.
- AMCA SEAL & UL CERTIFIED.
- ALL RESTROOM EXHAUST FANS TO RUN CONTINUOUSLY DURING WORKING HOURS.

VENTILATION CALCULATION												
ROOM NAME	AREA (SQ.FT.)	NUMBER OF PEOPLE/1000sq.ft AS PER MMC 2015	NUMBER OF PEOPLE AS PER MMC 2015	NUMBER OF CHAIR	FINAL PEOPLE NO.	MIN OUTSIDE AIR AS PER MMC 2015 CFM/PEOPLE	CFM/SQ.FT.	REQ. OA (CFM)	Provided OA (CFM)	EXHAUST AIRFLOW RATE (CFM/SQ.FT OR /FIXT.)	TOTAL EXHAUST (CFM)	PROVIDED EXHAUST (CFM)
STOCK ROOM	988	0	0	0	0	0	0.12	119	120	0	0	0
FITTING ROOM	512	0	0	10	10	7.5	0.12	136	140	0	0	0
ALTERATION ROOM	298	5	2	5	5	5	0.06	43	50	0	0	0
CORRIDOR	89	5	1	0	1	5	0.06	10	10	0	0	0
BREAK ROOM	340	5	2	5	3	5	0.06	35	40	0	0	0
OFFICE	135	5	1	2	2	5	0.06	18	20	0	0	0
CASH WRAP	328	15	5	3	5	7.5	0.12	77	80	0	0	0
SALES	8735	15	132	3	135	7.5	0.12	2061	2140	0	0	0
RESTROOMS	115	0	0	0	0	0	0	0	0	70	140	140
TOTAL	11540	-	-	-	-	-	-	2499	2600	-	-	140

AIR TERMINAL DEVICES SCHEDULE						
TAG	SIZE (IN.)	DESCRIPTION	CONSTRUCTION	BASIS OF DESIGN		REMARKS
				MANUFACTURER	MODEL	
A	24X24	ALUMINUM SQUARE LOUVERED FACE DIFFUSER, WITH 3-CONE CONSTRUCTION, ALL DIFFUSERS SHALL BE 4-WAY BLOW UNLESS SHOWN OTHERWISE.	ALUMINUM	TITUS	TM5A	1,2,3
A1	12X12	ALUMINUM SQUARE LOUVERED FACE DIFFUSER, WITH 3-CONE CONSTRUCTION, ALL DIFFUSERS SHALL BE 4-WAY BLOW UNLESS SHOWN OTHERWISE.	ALUMINUM	TITUS	TM5A	1,2,3
B	24X24	ALUMINUM RETURN GRILLE WITH ALUMINUM BORDER. WITH 1/2"x1/2"x1" CORE SIZES.	ALUMINUM	TITUS	50F	2
C	SEE ON PLAN	ALUMINUM DOUBLE DEFLECTION SPIRAL DUCT MOUNTED GRILLE, 3/4" BLADE SPACING, WITH RADIUS END CAP BLADE PARALLEL TO LONG DIMENSION	ALUMINUM	TITUS	S300FL	1,2
C1	SEE ON PLAN	ALUMINUM DOUBLE DEFLECTION SUPPLY GRILLE, 3/4" BLADE SPACING, FRONT BLADE PARALLEL TO SHORT DIMENSION	ALUMINUM	TITUS	300RS	1,2
D	SEE ON PLAN	ALUMINUM RETURN GRILLE WITH ALUMINUM BORDER. WITH 1/2"x1/2"x1" CORE SIZES.	ALUMINUM	TITUS	50F	2

GENERAL NOTES:-

- ACCEPTABLE MANUFACTURERS BY: TITUS, KRUGER, TUTTLE & BAILEY NAILOR
- PROVIDE DUCT TRANSITIONS AS NECESSARY.
- PAINT ALL SURFACES VISIBLE THROUGH FACE OF RETURN AIR GRILLE FLAT BLACK. THIS SHALL INCLUDE PIPING, CONDUIT, DUCTWORK AND STRUCTURAL MEMBERS.
- PROVIDE FRAME FOR MOUNTING AIR DEVICE IN LAY-IN GRID CEILING UNLESS REFLECTED CEILING PLAN INDICATES HARD CEILING. IN AREAS WITH HARD CEILINGS, PROVIDE FRAMES FOR SURFACE MOUNTING.
- UNLESS OTHERWISE NOTED, BRANCH DUCTS SERVING AIR DEVICES SHALL BE SAME SIZE AS NECK OF AIR DEVICE.
- COORDINATE FINAL COLOR/FINISH WITH ARCHITECT/OWNER.
- MAXIMUM NOISE CRITERION RATING < 25 DBA.
- PROVIDE AIR SCOOP DEVICE FOR DUCT MOUNTED SPIRAL GRILLES.

SCHEDULE REMARKS

- PROVIDE DUCT-MOUNTED VOLUME CONTROL DAMPER.
- COORDINATE THE EXACT BORDER TYPE & FINISH WITH ARCHITECT.
- SQUARE TO ROUND ADAPTER

FOR ROUND NECK DIFFUSER NECK SIZE SHALL BE :

16" DIA : 751-900
14" DIA : 551-750
12" DIA : 401-550
10" DIA : 226-400
8" DIA : 101-225
6" DIA : 0-100

AIR BALANCE						
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR	
FCU-1(N)	SEE PLAN	3000 CFM	650 CFM	2350 CFM	0 CFM	
FCU-2(N)	SEE PLAN	3000 CFM	650 CFM	2350 CFM	0 CFM	
FCU-3(N)	SEE PLAN	3000 CFM	650 CFM	2350 CFM	0 CFM	
FCU-4(N)	SEE PLAN	3000 CFM	650 CFM	2350 CFM	0 CFM	
EF-1(N)	SEE PLAN	-	-	-	70 CFM	
EF-2(N)	SEE PLAN	-	-	-	70 CFM	
TOTAL:		12000 CFM	2600 CFM	9400 CFM	140 CFM	
BUILDING PRESSURE:					2460 CFM	POSITIVE

1. CONTRACTOR TO ADJUST MOTORIZED DAMPER ON OUTSIDE AIR TAP TO PROVIDE OUTSIDE AIR AS MENTIONED IN ABOVE TABLE.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	SINGLE POLE TOGGLE SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	THREE WAY TOGGLE SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	FOUR WAY TOGGLE SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	SINGLE POLE KEYED TOGGLE SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	THREE WAY KEYED TOGGLE SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	FOUR WAY KEYED TOGGLE SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	DIMMER SWITCH WITH MOMENTARY ON/OFF BUTTON - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	MOMENTARY ON/OFF SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	LOW VOLTAGE ON/OFF SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	LOW VOLTAGE ON/OFF/DIMMING SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	WALL MOUNTED DUAL TECHNOLOGY VACANCY SENSOR SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH - MOUNT AT 48" A.F.F. SUB-SMALL LETTER INDICATED SWITCH LEG.
	THERMAL OVERLOAD SWITCH - MOUNT AT FRACTIONAL HP MOTOR
	CEILING MOUNTED OCCUPANCY SENSOR - DUAL TECHNOLOGY SUB-SMALL LETTER INDICATED SWITCH LEG.
	CEILING MOUNTED VACANCY SENSOR - DUAL TECHNOLOGY SUB-SMALL LETTER INDICATED SWITCH LEG.
	PHOTOCELL
	INVERTER WITH INTEGRAL BACK-UP BATTERY
	POWER PACK SUB-SMALL LETTER INDICATED SWITCH LEG.
	GROUNDING DUPLEX RECEPTACLE (NEMAS-20R) - MOUNT AT 15" A.F.F. U.N.O.
	GROUNDING DUPLEX RECEPTACLE (NEMAS-20R) - MOUNT ABOVE COUNTER BACKSPLASH OR 42" A.F.F.
	GROUNDING DUPLEX RECEPTACLE (NEMAS-20R) - MOUNT AT CEILING
	GROUNDING DUPLEX RECEPTACLE (NEMAS-20R) - GF TYPE - MOUNT AT 18" A.F.F. U.N.O.
	GROUNDING DUPLEX GF RECEPTACLE (NEMAS-20R) W/ "WEATHER-PROOF WHILE IN USE" COVER
	GROUNDING DUPLEX RECEPTACLE (NEMAS-20R) WITH TOP RECEPTACLE CONTROLLER BY SWITCH/SENSOR. CONTROLLED RECEPTACLE SHALL NOT BE CONTROLLED BY SWITCH/SENSOR. CONTROLLED RECEPTACLE SHALL BE PERMANENTLY MARKED AS PER NEC 406.3 (E) AND PROVIDED IN GREEN COLOR.
	GROUNDING DUPLEX RECEPTACLE WITH INTEGRAL USB-A & USB-C CHARGING PORTS (EQUAL TO HUBBELL #US2920C2) - MOUNT AT 15" A.F.F. U.N.O.
	SPECIAL PURPOSE RECEPTACLE - MATCH NEMA CONFIGURATION OF EQUIPMENT SERVED - MOUNT AT 15" A.F.F. U.N.O.
	GROUNDING DOUBLE DUPLEX RECEPTACLE (NEMAS-20R) - MOUNT AT 15" A.F.F. U.N.O.
	GROUNDING DOUBLE DUPLEX RECEPTACLE (NEMAS-20R) WITH TOP RECEPTACLE CONTROLLER BY SWITCH/SENSOR AND BOTTOM RECEPTACLE SHALL NOT BE CONTROLLED BY SWITCH/SENSOR. CONTROLLED RECEPTACLE SHALL BE PERMANENTLY MARKED AS PER NEC 406.3 (E) AND PROVIDED IN GREEN COLOR.
	DATA OUTLET W/ JACKS, BACK BOX, 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS AND CAT6 PLENUM RATED CABLES TO IT RACK - MOUNT AT 15" A.F.F. U.N.O. "X" INDICATE NUMBER OF JACKS IN OUTLET: 1. ONE DATA 2. TWO DATA 3. THREE DATA 4. FOUR DATA
	WIRELESS ACCESS POINT (WAP) WITH JUNCTION BOX, 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS WITH TWO (2) CAT6 PLENUM RATED DATA CABLES TO IT RACK
	FLUSH MOUNTED FLOOR BOX WITH RECEPTABLES AS LISTED ABOVE
	FLUSH MOUNTED FLOOR BOX WITH DATA DEVICES AS LISTED ABOVE
	FLUSH MOUNTED FLOOR BOX WITH RECEPTABLE/DATA DEVICES AS LISTED ABOVE
	JUNCTION BOX
	MOTORIZED DAMPER
	MOTOR
	EMERGENCY SWITCH - MOUNT AT 48" A.F.F. M - MASTER, S = SLAVE
	NON-FUSED SAFETY DISCONNECT SWITCH - MOUNT TOP AT 75" A.F.F. U.N.O.
	FUSED SAFETY DISCONNECT SWITCH - MOUNT TOP AT 75" A.F.F. U.N.O.
	PUSH BUTTON
	BUZZER SYSTEM
	STEP DOWN TRANSFORMER
	SURFACE MOUNTED ELECTRIC PANEL - REFER TO PANEL SCHEDULES & POWER RISER DIAGRAM FOR VOLTAGE, RATING AND FEEDER SIZE.
	RECESSED MOUNTED ELECTRIC PANEL - REFER TO PANEL SCHEDULES & POWER RISER DIAGRAM FOR VOLTAGE, RATING AND FEEDER SIZE.
	TRANSFORMER
	LIGHTING CONTROL RELAY PANEL
	TIMECLOCK
	CEILING MOUNTED SPEAKER. PROVIDE JUNCTION BOX AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. COORDINATE WIRING'S REQUIREMENT WITH SOUND SYSTEMS VENDOR.
	WALL MOUNTED SPEAKER. PROVIDE JUNCTION BOX AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. COORDINATE WIRING'S REQUIREMENT WITH SOUND SYSTEMS VENDOR.
	VOLUME CONTROL. PROVIDE JUNCTION BOX AND 1" CONDUIT WITH PULL STRING TO ANY RACK. COORDINATE WIRING'S REQUIREMENT WITH SOUND SYSTEMS VENDOR.
	BRANCH CIRCUIT WIRING
	BRANCH CIRCUIT FEEDER
	UNSWITCHED BRANCH CIRCUIT WIRING
	ELECTRICAL GROUND

SECURITY DEVICES LEGEND

SYMBOL	DESCRIPTION
	SECURITY SYSTEM CAMERA. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM CARD READER. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM DOOR LOCK. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM ELECTRIC STRIKE. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM KEYPAD. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM MONITOR. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM REQUEST TO EXIT "REX" PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM DOOR CONTACT. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM MOTION SENSOR. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM PANIC BUTTON. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR
	SECURITY SYSTEM DOOR CONTACT. PROVIDE BACK BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS - COORDINATE WIRING'S REQUIREMENT WITH SECURITY VENDOR

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	2x2 CEILING RECESSED MOUNTED LIGHT FIXTURE SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE. SUB-SMALL LETTER INDICATES DESIGNATED SWITCH LEG, REFER TO PLAN.
	PENDANT LINEAR LIGHT FIXTURE SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE. SUB-SMALL LETTER INDICATES DESIGNATED SWITCH LEG, REFER TO PLAN.
	RECESSED DOWNLIGHT SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE. SUB-SMALL LETTER INDICATES DESIGNATED SWITCH LEG, REFER TO PLAN.
	TRACK LIGHTING SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE. SUB-SMALL LETTER INDICATES DESIGNATED SWITCH LEG, REFER TO PLAN.
	FAÇADE LIGHT SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE. SUB-SMALL LETTER INDICATES DESIGNATED SWITCH LEG, REFER TO PLAN.
	SINGLE/DOUBLE FACE EXIT SIGN WALL/CEILING MOUNTED WITH INTEGRAL BACK-UP BATTERY AND DIRECTIONAL ARROWS AS SHOWN. SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE.
	EMERGENCY LIGHT FIXTURE WITH INTEGRAL BACK-UP BATTERY. SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE.
	CONCEALED EMERGENCY LIGHT FIXTURE WITH INTEGRAL BACK-UP BATTERY. SUB-CAPITAL LETTER INDICATES TYPE, REFER TO LIGHTING FIXTURES SCHEDULE.

ABBREVIATION

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A	AMPERE	J	JUNCTION BOX
A.F.F.	ABOVE FINISH FLOOR	KEF	KITCHEN EXHAUST FAN
APS	AUXILIARY POWER SUPPLY	LCF	LIGHTING CONTROL PANEL
C	CONDUIT	LTG	LIGHTING
CKT	CIRCUIT	LV	LOW VOLTAGE
CU	CONDENSING UNIT	MCB	MAIN CIRCUIT BREAKER
DE	DEMOLITION	MO	MOTORIZED DAMPER
DF	DESTRATIFICATION FAN	MDP	MAIN DISTRIBUTION PANEL
DWCP	DOMESTIC WATER CIRCULATING PUMP	MH	MOUNTING HEIGHT
E.C.	ELECTRICAL CONTRACTOR	MLO	MAIN LUGS ONLY
EF	EXHAUST FAN	N	NEW
EM	ITEM PROVIDED WITH OR CONNECTED TO EMERGENCY POWER	NL	NIGHT LIGHT
EMT	ELECTRICAL METALLIC TUBING	P	POLE
ER	EXISTING TO REMAIN	PP	PRIMARY ELECTRICAL SERVICE
ETR	ELECTRONIC TRAP PRIMER	PVC	POLYVINYL CHLORIDE CONDUIT
EX	EXISTING TO REMAIN	RE	RELOCATE
EV	EVAPORATOR UNIT	RGS	RIGID GALVANIZED STEEL CONDUIT
EWC	ELECTRIC WATER COOLER	RTU	ROOF TOP UNIT
EWH	ELECTRIC WATER HEATER	SF	SAFETY SWITCH
EX	EXISTING TO REMAIN	SW	SWITCHBOARD
FACP	FIRE ALARM CONTROL PANEL	T B Q	TO BE DETERMINED
FATC	FIRE ALARM TERMINAL CABINET	TV	TELEVISION
G.C.	GENERAL CONTRACTOR	TX	TRANSFORMER
GFI	GROUND FAULT INTERRUPTER	U.N.O.	UNLESS NOTED OTHERWISE
HT	HEAT TRACE	WH	WATER HEATER
HVAC	HEATING VENTILATION AIR CONDITIONING	WP	WEATHER PROOF
IG	ISOLATED GROUND	ZD	ZONE DAMPER

APPLICABLE CODES

- A. 2015 INTERNATIONAL BUILDING CODE
- B. 2015 INTERNATIONAL MECHANICAL CODE
- C. 2002 MASSACHUSETTS ENERGY CODE
- D. 248 CARLISLE STATE PLUMBING CODE
- E. 2023 NATIONAL ELECTRIC CODE

ELECTRICAL GENERAL NOTES

- ALL WORK SHALL BE PERFORMED IN COMPLIANCE WITH CURRENT APPLICABLE CODES, ORDINANCES, THE REGULATORY AGENCIES HAVING JURISDICTION AND THE SPECIFICATIONS. THE SPECIFICATIONS MAY EXCEED THE REQUIREMENTS OF THE CODE, THE MOST STRINGENT CONDITION WILL APPLY.
- THE INTENT OF THESE DOCUMENTS IS FOR THE MEP TRADES TO FURNISH AND INSTALL COMPLETE MECHANICAL AND ELECTRICAL SYSTEMS. THE SPECIFIED ELECTRICAL SYSTEM SHALL BE COMPLETE IN ALL RESPECTS, OPERATIONAL, TESTED, ADJUSTED, APPROVED BY THE AUTHORITIES HAVING JURISDICTION AND READY FOR BENEFICIAL USE BY THE OWNER.
- THE TRADES SHALL OBTAIN AND REVIEW ALL CONTRACT DOCUMENTS BEFORE SUBMITTING A BID. INFORMATION IS PROVIDED ON THE VARIOUS DRAWINGS, SCHEDULES, SPECIFICATIONS AND ALL OF THE VARIOUS DOCUMENTS IN THE BIDDING PACKAGE. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY AND FORM A TOTAL PROJECT DESIGN AND INFORMATION SOURCE FOR CONSTRUCTION PURPOSES.
- THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. COORDINATE THE LOCATION OF EQUIPMENT WITH OTHER TRADES BEFORE AND DURING CONSTRUCTION. ANY MODIFICATION TO THE EQUIPMENT LAYOUT, REQUIRED FOR INSTALLATION, IS TO BE PERFORMED UNDER THE CONTRACT AGREEMENT, AT NO ADDITIONAL COST. REFER TO DETAILS, SCHEDULES AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- THE CONTRACTOR SHALL BECOME THOROUGHLY FAMILIAR WITH THE PROJECT DOCUMENTS OF ALL TRADES. THE DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL ARRANGEMENT OF EQUIPMENT AND CONDUITS. THE CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF EQUIPMENT AND CONDUITS INSTALLATION WITH ALL THE TRADES BEFORE COMMENCING WORK.
- EQUIPMENT SHALL BE INSTALLED IN ACCESSIBLE LOCATIONS, WHEN EQUIPMENT MUST BE LOCATED ABOVE AN INACCESSIBLE CEILING (GYP BOARD OR EQUIVALENT), OR BEHIND A WALL, AN APPROPRIATE ACCESS DOOR SHALL BE PROVIDED. IF AN ACCESS DOOR IS REQUIRED, IT SHALL BE OF A RATING APPROPRIATE FOR THE WALL/CEILING IN WHICH IT IS TO BE INSTALLED. THE CONTRACTOR SHALL COORDINATE LOCATIONS OF ACCESS PANELS FOR ALL DEVICES, REQUIRING ACCESS, WITH THE ARCHITECT, PRIOR TO INSTALLATION OF SUCH DEVICES OR OTHER APPURTENANCES.
- WHERE A CONFLICT OCCURS BETWEEN THE DOCUMENTS, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. CARRY AS PART OF THE BID THE LARGER QUANTITY AND/OR MORE EXPENSIVE ITEM(S).
- THIS CONTRACT SHALL INCLUDE ALL THE NECESSARY CONDUITS, FITTINGS, TRANSITIONS ETC. AS REQUIRED TO INSTALL CONDUITS AND EQUIPMENT, AND TO AVOID ANY CONFLICTS WITH OTHER TRADES AND THE BUILDING STRUCTURE. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS, OMISSIONS OR ERRORS HE MAKES AS A RESULT OF HIS FAILURE TO COORDINATE WITH OTHER TRADES OR BECOME FULLY FAMILIAR WITH THE PROJECT DOCUMENTS OF ALL TRADES.
- DO NOT INSTALL ANY ELECTRICAL PANELS, TRANSFORMERS, SPECIAL EQUIPMENT, BELOW PIPING OR THROUGH MECHANICAL ROOMS, THAT ARE NOT ASSOCIATED WITH OR SERVE THE RESPECTIVE ROOMS. COORDINATE THE LOCATION OF MECHANICAL EQUIPMENT IN THE FIELD AND ADJUST AS NECESSARY.
- CONTRACTOR TO FOLLOW EXISTING BASE BUILDING PHASING COLOR CODE. IF BASE BUILDING PHASING COLOR CODE IS UNKNOWN, FOLLOW COLOR CODE AS MENTIONED IN SPECIFICATION.
- FIELD VERIFY WITH MANUFACTURER'S PROVIDED EXACT ELECTRICAL CHARACTERISTICS AND CONNECTION REQUIREMENTS OF ALL OPERATIONAL EQUIPMENT PRIOR TO MAKING ELECTRICAL POWER CONNECTION. FURNISH AND INSTALL SAFETY DISCONNECT AS REQUIRED BY NEC.
- ELECTRICAL CONTRACTOR SHALL COORDINATE ALL LOCATIONS OF EQUIPMENT WITH DIV. 21, 22 AND 23 PRIOR TO ROUGHING OR INSTALLING OUTLETS.
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE OWNER. ALL LOCATIONS OF EQUIPMENT BEING FURNISHED BY THE OWNER PRIOR TO ROUGHING OR INSTALLING OUTLETS.
- REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATIONS AND EXACT LOCATION OF DEVICES PRIOR TO ROUGHING OR INSTALLATION OF OUTLETS.
- REFER TO ARCHITECTS REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF CEILING MOUNTED DEVICES.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY MISCELLANEOUS STEEL FOR THE SUPPORT OF ALL EQUIPMENT, PIPING, CONDUIT AND DUCTWORK, SUSPENDED FROM SLAB, STEEL, WALL OR TRUSSWORK.
- ELECTRICAL CONTRACTOR SHALL SEAL ALL CONDUITS PENETRATING EXTERIOR WALLS WITH FIRE STOPPING MATERIAL.
- ALL PENETRATIONS OF FLOORS AND WALLS (WHETHER OR NOT FIRE RESISTANCE RATED) SHALL BE PROVIDED WITH A THROUGH PENETRATION PROTECTION SYSTEM (PRESTOPPING). EACH THROUGH PENETRATION PROTECTION SYSTEM SHALL BE TESTED IN ACCORDANCE WITH ASTM E814 AND BE LISTED FOR THE TYPE OF FLOOR OR WALL ASSEMBLY PENETRATED AND THE TYPE OF PROTECTION SYSTEM.
- IT IS NOT THE INTENTION TO SHOW EVERY FITTING, HANGER, WIRE OR DEVICE. ALL SUCH ITEMS SHALL BE FURNISHED AND INSTALLED AS NECESSARY FOR A COMPLETE SYSTEM.
- SEE SPECIFICATION SECTION "ELECTRICAL IDENTIFICATION" FOR PROPERLY LABELING EQUIPMENT WIRING, PANELS, SWITCHBOARD, DISCONNECT SWITCHES, BOXES, CONDUITS, ... ETC.
- CONTRACTOR SHALL DETERMINE THE QUANTITY OF CONDUCTORS REQUIRED FOR PROPER OPERATION OF ALL SWITCHING SCHEMES.
- SEISMICALLY SUPPORT THE EQUIPMENT AS REQUIRED BY CODE, THE AUTHORITY HAVING JURISDICTION, AND/OR AS SPECIFIED. SUBMIT ENGINEERED INSTALLATION DETAILS PER THE SPECIFICATIONS. THE CONTRACTOR'S SEISMIC ENGINEER SHALL REVIEW THE INSTALLATION AND PROVIDE A DETAILED REPORT FOR THE RECORD.
- PROVIDE ALL BONDING AND GROUNDINGS REQUIRED BY THE NATIONAL ELECTRIC CODE, NFPA 70 AND AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.
- ALL REQUIRED BONDING CONDUCTORS SHALL BE MINIMUM #10 AWG INSULATED COPPER. PROVIDE ALL NECESSARY FITTINGS, JUNCTION BOXES, END FITTINGS, ETC. FOR A COMPLETE, CONTINUOUS INSTALLATIONS.
- ALL BONDING/GROUNDING CONNECTIONS SHALL BE MADE BY LISTED CLAMP OR CONNECTORS AS REQUIRED BY ARTICLE 250 OF NFPA 70, THE NATIONAL ELECTRIC CODE (CURRENT ADOPTED EDITION).
- AN INSULATED (GREEN) EQUIPMENT GROUND WIRES SHALL BE PROVIDED WITH ALL FEEDERS AND BRANCH CIRCUITS.
- AN EXTRA SEPARATE ISOLATED GROUND CONDUCTOR SHALL BE PROVIDED FOR EACH ISOLATED GROUND RECEPTACLE IN ADDITION TO THE REGULAR GROUND CONDUCTOR. THIS EXTRA SEPARATE ISOLATED GROUND CONDUCTOR SHALL BE TERMINATED AT THE GROUND BAR OF THE MAIN PANEL. BONDING AND IS NOT ALLOWED TO GROUND RACKWAYS, BOXES, ETC.
- ISOLATED GROUND RECEPTABLES SHALL BE IDENTIFIED BY ORANGE TRIANGLE LOCATED ON THE FACE OF THE RECEPTACLE.
- RECEPTACLE CONTROLLED BY SWITCH SHALL BE PERMANENTLY MARKED AS PER NEC 406.3 (E).
- RECEPTABLES LOCATED WITHIN 6' OF A WATER SOURCE, OR OUTSIDE, AND WHERE REQUIRED BY CODE SHALL BE PROVIDED WITH GFCI PROTECTION, WHETHER INDICATED OR NOT.
- EXTERIOR RECEPTABLES SHALL BE PROVIDED WITH "CAST ALUMINUM" LOCKABLE COVERS RATED "WEATHER-PROOF WHILE IN USE". LOCKS SHALL BE KEPT ALIVE.
- ALL 15- AND 20- AMPERE, 125V- AND 250-VOLT NON-LOCKING RECEPTACLE SHALL BE LISTED TAMPER RESISTANT.
- WHERE INDICATED, PROVIDE FIXTURES WITH EMERGENCY BATTERY TO OPERATE LAMPS FOR 1 1/2 HOURS UPON LOSS OF NORMAL POWER. WIRE EMERGENCY BATTERY AND EXIT LIGHTS TO LINE SIDE OF AREA LIGHTING CIRCUIT.
- DIRECTIONAL CHEVRONS FOR EXIT SIGN SHALL CONFORM TO NFPA 5-10.4.1.2 AND SHALL BE IDENTIFIABLE AS A DIRECTIONAL INDICATOR AT A MINIMUM OF 40 FT. UNDER ALL PLACE CONDITIONS. PROVIDE DIRECTIONAL CHEVRONS AS INDICATED ON PLAN.
- VERIFY ALL LIGHT FIXTURE FINISHES WITH ARCHITECT/OWNER PRIOR TO PURCHASE.
- VERIFY ALL LIGHT FIXTURE MOUNTING HEIGHTS WITH ARCHITECT/OWNER PRIOR TO INSTALLING LIGHT FIXTURE.
- VERIFY LOCATION OF ALL OUTLETS WITH OWNER PRIOR TO ANY WORK.
- ALL 1 POLE, 15 AND 20 AMPERE BRANCH CIRCUITS SERVING RECEPTACLE OR LIGHTING SHALL BE 2 WIRE CIRCUITS PROVIDING AN INDIVIDUAL NEUTRAL CONDUCTOR FOR EACH UNGROUNDED (HOT) CIRCUIT CONDUCTOR. DO NOT SHARE NEUTRAL CONDUCTORS.
- BRANCH CIRCUIT WIRING IS SHOWN ON THE FLOOR PLANS. NUMERALS ADJACENT TO THE HOMERUN SYMBOLS FOR LIGHTING, RECEPTABLES, MOTORS, APPLIANCES, ETC. INDICATE THE CIRCUIT NUMBER TO WHICH THE ITEMS ARE TO BE CONNECTED. PROVIDE BRANCH CIRCUIT WIRING FOR ALL ITEMS SHOWN IN ACCORDANCE WITH THESE GENERAL NOTES AND THE ELECTRICAL SPECIFICATIONS.
- ALL FEEDERS & BRANCH CIRCUITS SHALL BE COPPER.
- ALL HOMERUNS SHALL BE 2#12, #12G, 3/4" TO 20A-1P CIRCUIT BREAKER IN PANEL DESIGNATED UNLESS OTHERWISE NOTED.
- ALL 120 VAC CIRCUITS EXCEEDING 75' IN LENGTH SHALL BE INCREASED TO 2#10, #10G, 3/4" CONDUIT.
- ALL 120 VAC CIRCUITS EXCEEDING 150' IN LENGTH SHALL BE INCREASED TO 2#8, #10G, 3/4" CONDUIT.
- ALL BRANCH CIRCUITS SHALL BE PROVIDED WITH SEPARATE NEUTRALS. USE OF COMMON NEUTRALS WILL NOT BE ALLOWED.

ELECTRICAL DEMOLITION GENERAL NOTES

- BEFORE SUBMITTING BID, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BECOME FULLY FAMILIAR WITH THE EXISTING CONDITIONS AND THE DOCUMENTS OF OTHER TRADES UNDER WHICH THEIR WORK WILL BE ACCOMPLISHED. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS, OMISSIONS OR ERRORS MADE AS A RESULT OF FAILURE TO BECOME FULLY FAMILIAR WITH THE EXISTING CONDITIONS.
- THE CONTRACTOR SHALL COORDINATE AND SCHEDULE ANY DAILY INTERRUPTIONS OR SHUTDOWNS OF THE EXISTING SYSTEMS IN ADVANCE WITH OWNERS DESIGNATED REPRESENTATIVE. THIS SHALL INCLUDE SERVICES INTERRUPTIONS AND CONNECTIONS, MECHANICAL AND ELECTRICAL DISRUPTIONS EFFECTING OTHER TRADES. INCLUDE ALL WORK REQUIRED TO ALLOW PHASED CONSTRUCTION WHERE NECESSARY.
- DEMOLITION DRAWINGS ARE STRICTLY DIAGRAMMATIC AND SHOW GENERAL ARRANGEMENT AND APPROXIMATE LOCATION OF EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT. IT IS NOT THE INTENT OF THESE DRAWINGS TO SHOW ALL EQUIPMENT, PIPING OR CONDUIT TO BE REMOVED. EQUIPMENT NOT BEING REUSED SHALL BE REMOVED, INCLUDING ALL ASSOCIATED HANGERS, SUPPORTS, PIPES, CONDUITS, WIRES, AND CONTROLS BACK TO THE POINT OF ORIGIN.
- REFER TO THE ARCHITECTURAL DEMOLITION DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS. THE FULL EXTENT OF THE DEMOLITION AND RECONSTRUCTION SCOPE OF WORK SHALL BE DETERMINED BY THE ENTIRE SET OF BID DOCUMENTS.
- THE CONTRACTORS SHALL COORDINATE THE DEMOLITION SCOPE OF WORK WITH THE GENERAL CONTRACTORS OR CONSTRUCTION MANAGER'S PHASING SCHEDULE PRIOR TO COMMENCEMENT OF WORK. CARE MUST BE TAKEN SO AS NOT TO DESTROY, REMOVE OR DEMOLISH ANY EQUIPMENT, APPURTENANCES OR DEVICES INTENDED TO REMAIN. PROVIDE TEMPORARY SERVICES AND SYSTEM MODIFICATIONS TO ACCOMMODATE CONTINUOUS OPERATION OF ACTIVE SYSTEM.
- THE LOCATION OF EXISTING ELECTRICAL AND SYSTEM SHOWN ON FLOOR PLANS IS BASED ON THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL FIELD VERIFY PRIOR TO COMMENCEMENT OF CONSTRUCTION, EXACT QUANTITY AND LOCATIONS OF EXISTING EQUIPMENT, PANELS, CONDUITS, LIGHTING, ETC. TO BE REMOVED AND ADJUST AS NECESSARY.
- ALL EQUIPMENT AND ASSOCIATED WIRING, CONDUITS INDICATED TO BE REMOVED OR RELOCATED SHALL BE DISCONNECTED AND REMOVED, INCLUDING HANGERS AND OTHER COMPONENTS. NO EQUIPMENT, WIRING OR CONDUITS SHALL BE ABANDONED IN PLACE, UNLESS SPECIFICALLY NOTED.
- ALL SYSTEMS TO BE REMOVED SHALL BE REMOVED BACK TO THE POINT OF SOURCE. THE CONTRACTOR SHALL VERIFY WHICH SYSTEMS MUST REMAIN ACTIVE TO SERVE ADJACENT SPACES DURING CONSTRUCTION. SHOULD THE CONTRACTOR ENCOUNTER, DURING DEMOLITION OF EXISTING WALLS OR CHASES, ANY WIRING OR CONDUIT WHICH MUST REMAIN ACTIVE, IMMEDIATELY GIVE NOTICE TO THE ENGINEER, GENERAL CONTRACTOR OR CONSTRUCTION MANAGER.
- ALL SALVAGEABLE MATERIALS OR EQUIPMENT TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER AT THE END OF EACH DAY. ITEMS REMOVED AND NOT REUSED OR CLAIMED BY THE OWNER SHALL BECOME PROPERTY OF THE TRADE CONTRACTOR AND SHALL BE TRANSPORTED FROM THE SITE. SITE STORAGE OF REMOVED ITEMS WILL NOT BE PERMITTED.
- PROPERLY DISPOSE OF ALL DEMOLISHED EQUIPMENT IN COMPLIANCE WITH CODES AND REGULATIONS. THIS APPLIES TO HAZARDOUS MATERIALS AND CONTAMINATED ITEMS TO BE DEMOLISHED.
- THE CONTRACTOR SHALL OBTAIN EXISTING ELECTRICAL DRAWINGS FROM THE OWNER IF AVAILABLE TO HELP DETERMINE FULL SCOPE OF WORK.
- PROMPTLY REPAIR DAMAGES CAUSED TO ADJACENT FACILITIES BY DEMOLITION WORK.
- RETURN ELEMENTS OF CONSTRUCTION AND SURFACES TO REMAIN TO CONDITION EXISTING PRIOR TO START OF DEMOLITION. REPAIR ADJACENT CONSTRUCTION OR SURFACES SOILED OR DAMAGED BY DEMOLITION WORK.
- CONTRACTOR SHALL DEMOLISH THE WIRING THAT IS NO LONGER IN SERVICE COMPLETELY BACK TO SOURCE. EXISTING CONDUIT AND WIRING FOR BRANCH CIRCUITS SHALL NOT BE REUSED UNLESS OTHERWISE NOTED. CIRCUITS THAT REMAIN SHALL BE LEFT IN OPERATING CONDITION.
- WHERE EXISTING CONDUITS ARE CONCEALED, REMOVE EXISTING CONDUCTORS AND CUT CONDUIT FLUSH WITH SURROUNDING SURFACE AND CAP.
- CONTRACTOR SHALL PROVIDE HEAVY DUTY COVER FOR BACK BOXES INSTALLED IN COLUMNS OR EXISTING WALLS TO REMAIN. PAINT COVER TO MATCH SURROUNDING SURFACE.
- CONTRACTOR TO SEAL ANY PENETRATION WITH FIRE STOPPING MATERIALS.
- ANY UNUSED ELECTRICAL EQUIPMENT, FEEDERS, CONDUITS, PANELS, ETC WITHIN THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.
- CONTRACTOR SHALL CONFIRM THAT ANY CONDUIT, WIRING CIRCUITS, FIRE ALARM LOOPS, ETC THAT FEED ANY EQUIPMENT OUTSIDE OF SCOPE OF WORK SPACE SHALL MAINTAINED AND KEPT IN GOOD WORKING CONDITIONS.
- CONTRACTOR SHALL REFERENCE ARCHITECTURAL AND ELECTRICAL PLANS FOR MORE INFORMATION.
- COORDINATE DEMOLITION WORK WITH ALL OTHER TRADES.
- CONTRACTOR IS RESPONSIBLE TO VERIFY THE EXACT LOCATION OF ALL EXISTING DEVICES (LIGHTING FIXTURES, RECEPTABLES, SWITCHES, TELEPHONE/DATA OUTLETS, FIRE ALARM DEVICES, PANELS, ... ETC) AT THE FILED.
- CONTRACTOR SHALL CONFIRM THAT ANY CONDUITS, WIRING, CIRCUITS, FIRE ALARM LOOPS, DEVICES, EQUIPMENT, ETC RELATED FOR LANDLORD'S SYSTEM INSIDE TENANT'S SPACE TO REMAIN.
- INDICATED HERE OF EXISTING LAYOUT IS GENERAL IN NATURE AND SHALL NOT RELIEVE THE CONTRACTOR FROM VERIFYING ALL CONDITIONS IN THE FILED.
- STORAGE OR SALE OF UNREGULATED REMOVED ITEMS ON THE SITE WILL NOT BE PERMITTED.
- UPON COMPLETION OF DEMOLITION WORK, REMOVE TOOLS, EQUIPMENT AND DEMOLISHED MATERIALS FROM THE SITE.
- LEAVE INTERIOR AREAS BROOM CLEAN.
- ALL MATERIALS REMOVED UNDER THIS DIVISION AND NOT SCHEDULED FOR REUSE OR REQUESTED BY THE OWNER, SHALL BE DISPOSED OF OFF SITE.
- DEMOLITION PLANS ARE BASED ON THE AVAILABLE INFORMATION AND FOR REFERENCE ONLY.

GENERAL

- 1. REQUIREMENTS SPECIFIED ON COVER SHEET, ALONG WITH ELECTRICAL SPECIFICATIONS AND ALL ITS SECTIONS, COMPRISE THE CONTRACT DOCUMENTS FOR THE ELECTRICAL CONTRACT. DRAWINGS AND ALL THEIR REVISIONS UP TO THE BID SUBMITTAL DATE BECOME A PART OF THE CONTRACT. ALONG WITH THESE SPECIFICATIONS AS THOUGH THEY WERE ONE, AND ANYTHING IMPLIED BY THE SPECIFICATIONS SHALL BE INTERPRETED AS ALSO IMPLIED BY THE DRAWINGS AND VICE VERSA. PROVIDE NECESSARY ITEMS FOR A COMPLETE INSTALLATION OF ALL ELECTRICALLY OPERATED EQUIPMENT LISTED IN THE SPECIFICATIONS OR SHOWN ON THE CONTRACT DRAWINGS.
2. THE ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING AND EQUIPMENT DRAWINGS AND SPECIFICATIONS ARE INCORPORATED INTO, AND BECOME A PART OF THIS DIVISION. THIS CONTRACTOR SHALL EXAMINE ALL SUCH DRAWINGS AND SPECIFICATIONS AND BE AWARE OF ALL THE PROVISIONS CONTAINED THEREIN. THE SUBMISSION OF HIS BID SHALL INDICATE SUCH KNOWLEDGE.
3. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC. THEY ARE INTENDED TO SHOW THE APPROXIMATE LOCATIONS OF EQUIPMENT AND CONDUIT. DIMENSIONS GIVEN ON THE PLANS, IN FIGURES, SHALL TAKE PRECEDENCE OVER ALL DIMENSIONS AND SHALL BE VERIFIED IN THE FIELD. THE ELECTRICAL CONTRACTOR SHALL LAYOUT ALL EQUIPMENT ROOMS TO MAKE SURE THE EQUIPMENT, AS PURCHASED, FITS IN THE ROOM OR SPACE SHOWN. EXACT LOCATION OF ALL EQUIPMENT SHALL BE VERIFIED IN THE FIELD AND ROUTING OF CONDUITS SHALL SUIT FIELD CONDITIONS.
4. UNTIL THE TIME OF INSTALLATION, THE ARCHITECT RESERVES THE RIGHT TO MAKE MINOR CHANGES IN THE LOCATION OF CONDUIT AND EQUIPMENT WITHOUT ADDITIONAL COST TO THE CONTRACT.
5. THE ELECTRICAL DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER. MATERIAL AND LABOR NECESSARY TO THE PROJECT SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LABOR AND MATERIALS NEITHER SHOWN NOR SPECIFIED, BUT OBVIOUSLY NECESSARY FOR THE COMPLETION AND PROPER FUNCTIONING OF THE SYSTEM. SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AT AN ADDITIONAL COST.
6. ARRANGE ALL EQUIPMENT SUBSTANTIALLY AS SHOWN ON THE DRAWINGS. MAKE DEVIATIONS ONLY WHEN NECESSARY TO AVOID INTERFERENCE. CHECK ALL EQUIPMENT SIZES AGAINST AVAILABLE SPACE PRIOR TO SHIPMENT TO AVOID INTERFERENCE.
7. EXAMINE THE WORK OF OTHER TRADES INsofar AS THEIR WORK COMES IN CONTACT WITH OR IS COVERED BY THIS WORK. IN NO CASE ATTACH, OR FINISH AGAINST ANY DEFECTIVE WORK OR INSTALL WORK IN A MANNER WHICH WILL PREVENT PROPER INSTALLATION OF THE WORK OF OTHER TRADES.
8. ELECTRICAL CONTRACTOR SHALL VERIFY WITH OTHER TRADES ALL ELECTRICAL CHARACTERISTICS OF EQUIPMENT REQUIRED FOR ELECTRICAL CONNECTIONS. CONTRACTOR SHALL VERIFY VOLTAGE, PHASE AND HORSEPOWER AND SHALL NOTIFY ENGINEER OF ANY DISCREPANCY PRIOR TO START OF WORK. ELECTRICAL CONTRACTOR SHALL PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION FOR ALL EQUIPMENT, UNLESS FURNISHED INTEGRAL WITH EQUIPMENT PACKAGE.
9. IT IS THE INTENT OF THESE DRAWINGS THAT THIS BE A COMPLETE ELECTRICAL JOB. ANY ERRORS OR OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BIDDING THE JOB.

VISIT TO THE SITE

- 1. THE CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING HIS WORK. THE SUBMISSION OF HIS PROPOSAL SHALL INDICATE SUCH KNOWLEDGE. NO ADDITIONAL PAYMENT SHALL BE MADE ON CLAIMS THAT ARISE FROM A LACK OF KNOWLEDGE OF THE EXISTING CONDITIONS.

CODE AND PERMITS

- 1. INSTALLATION SHALL BE IN FULL ACCORDANCE WITH ALL CODES, RULES AND REGULATIONS OF MUNICIPAL, CITY, COUNTY, STATE AND PUBLIC UTILITIES AND ALL OTHER AUTHORITIES HAVING JURISDICTION OVER THE PREMISES.
2. COMPLY WITH ANY SPECIFICATION REQUIREMENTS THAT ARE IN EXCESS BUT NOT IN CONFLICT WITH CODE REQUIREMENTS.
3. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS, PLAN REVIEWS AND CERTIFICATES OF INSPECTION IN CONNECTION WITH HIS WORK, REQUIRED BY THE FOREGOING AUTHORITIES. BEFORE FINAL PAYMENT OF THE CONTRACT IS ALLOWED, ALL CERTIFICATES SHALL BE DELIVERED TO THE ARCHITECT IN DUPLICATE.
4. ELECTRICAL MATERIAL AND EQUIPMENT SHALL BEAR THE UL LABEL EXCEPT WHERE UL DOES NOT LABEL SUCH TYPES OF MATERIAL AND EQUIPMENT.

SHOP DRAWINGS SUBMITTALS

- 1. THE ELECTRICAL CONTRACTOR SHALL SUBMIT FIVE (5) SETS OF SHOP DRAWINGS. THE SHOP DRAWINGS OF THE FOLLOWING EQUIPMENT USING THE INDICATED NUMBERING SYSTEM AND TITLES, SHALL BE SUBMITTED THROUGH THE ARCHITECT TO THE ENGINEER AND THEN RESUBMITTED FOR FINAL APPROVAL. IF NECESSARY, SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS:
A. WIRING DEVICES
B. PANELBOARDS AND SAFETY SWITCHES INCLUDING FAULT CURRENT STUDY BASED ON EQUIPMENT BEING SUPPLIED.
C. CONTRACTORS, TIME SWITCHES AND PHOTOCCELL
D. LIGHTING FIXTURES
E. SUPERVISORY ALARM SYSTEM
2. ALL SUBMITTED SHOP DRAWINGS (MANUFACTURERS' EQUIPMENT DESCRIPTIVE SHEETS OR VENDORS' PREPARED DRAWINGS) SHALL HAVE THE GENERAL CONTRACTORS OR SUBCONTRACTORS' STAMP OF APPROVAL INDICATING THAT THE ITEM SUBMITTED IS AS CALLED FOR ON THE PLANS AND SPECIFICATIONS, IS APPROVED BY THE GENERAL CONTRACTOR OR SUBCONTRACTOR, THE DATE OF APPROVAL AND INITIALED BY THE PERSON APPROVING THE SUBMITTAL, AND THE NAME OF THE COMPANY SUBMITTING SAID EQUIPMENT FOR APPROVAL.
3. SUBMIT BOUND BROCHURES COMPLETE WITH A TABLE OF CONTENTS. LOOSE OR STAPLED TOGETHER SHEETS ARE NOT ACCEPTABLE. ANY SUBMITTALS NOT IN BROCHURE FORM OR NOT AS SPECIFIED SHALL BE RETURNED AT THE CONTRACTORS EXPENSE FOR RESUBMITTAL.
4. ALL DESCRIPTIVE LITERATURE SHALL BE SUBMITTED IN A THREE (3) HOLE BROCHURE WITH A COVER IDENTIFYING THE FOLLOWING:
A. NAME OF THE JOB
B. LOCATION OF THE JOB, ADDRESS, CITY AND STATE.
C. NAME AND ADDRESS OF THE COMPANY SUBMITTING THE BROCHURES.
D. DATE OF THE SUBMITTAL.
5. EVERY EFFORT SHALL BE MADE, IN CHECKING THE SHOP DRAWINGS, TO DETECT AND CORRECT ALL ERRORS, OMISSIONS AND INACCURACIES. FAILURE TO DO THIS WILL NOT RELIEVE THE ELECTRICAL CONTRACTOR OF HIS RESPONSIBILITY FOR THE PROPER AND COMPLETE INSTALLATION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

RECORD DRAWINGS

- 1. SUBMIT TO THE ARCHITECT ONE SET OF REPRODUCIBLE (MYLARS) ELECTRICAL DRAWINGS SHOWING THE RECORD CONDITIONS.

STANDARDS AND SUBSTITUTIONS

- 1. WHEREVER THE WORDS "APPROVED BY," "APPROVED EQUAL," "AS DIRECTED" OR SIMILAR PHRASES ARE USED IN THE FOLLOWING SPECIFICATIONS, THEY SHALL BE UNDERSTOOD TO REFER TO THE OWNER AS THE APPROVING AGENCY. THE NAME OR MAKE OF ANY EQUIPMENT OR MATERIALS NAMED IN THIS SPECIFICATION (WHETHER OR NOT THE WORDS "OR APPROVED EQUAL" ARE USED) SHALL BE KNOWN AS THE "STANDARD."

- 2. THESE SPECIFICATIONS ESTABLISH QUALITY STANDARD OF MATERIALS AND EQUIPMENT TO BE PROVIDED. SPECIFIC ITEMS ARE IDENTIFIED BY MANUFACTURER, TRADE NAME OR CATALOG DESIGNATION. THE CONTRACTOR SHALL SUBMIT HIS BASE BID PRICE BASED UPON STANDARD SPECIFIED EQUIPMENT DESCRIBED HEREIN AND AS DETAILED ON DRAWINGS AND ASSOCIATED CONTRACT DOCUMENTS. THESE SPECIFICATIONS ARE NOT TO BE CONSIDERED PROPRIETARY. THE CONTRACTOR MAY SUBMIT INFORMATION ON MATERIALS AND EQUIPMENT ALTERNATIVES (OTHER THAN THOSE LISTED) FOR REVIEW BY THE ARCHITECT AND ENGINEER NO LATER THAN TEN (10) DAYS BEFORE BIDS ARE SUBMITTED. IN ADDITION, SAMPLES OF PROPOSED EQUIPMENT MAY BE REQUIRED TO BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO BIDDING. BIDS BEFORE BIDS ARE SUBMITTED, MANUFACTURERS OF PRODUCTS ACCEPTED BY THE ARCHITECT AND ENGINEER WILL BE LISTED IN AN ADDENDUM TO THE SPECIFICATIONS AS AN ACCEPTABLE SUBSTITUTION EQUIPMENT ACCEPTED AS DETAILED BELOW AND SHALL BE SHOWN AS A SEPARATE ADD OR DEDUCT PRICE TO BE ADDED INTO THE BASE BID PRICE BY THE ARCHITECT AND OWNER IF ACCEPTED.
3. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS AND EQUIPMENT OTHER THAN THOSE SPECIFIED OR APPROVED BY ADDENDUM, SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS TO THE ARCHITECT AT THE BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID, BE ACCOMPANIED WITH COMPLETE DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. FAILURE BY THIS CONTRACTOR TO SUBMIT THE REQUISITE DOCUMENTATION DETAILED ABOVE SHALL BE UNDERSTOOD BY THE ARCHITECT AND ENGINEER TO INDICATE THAT SUBSTITUTE EQUIPMENT WILL NOT BE PRESENTED BY THE CONTRACTOR FOR CONSIDERATION. SUCH SUBSTITUTIONS WILL NOT BE CONSIDERED AFTER THE BID OPENING DATE AND DELAY OF PROJECT WILL NOT BE PERMITTED FOR FURTHER INSPECTION AND EVALUATION AFTER THIS DATE.
4. WHERE SUCH SUBSTITUTIONS ALTER THE DESIGN OR SPACE REQUIREMENTS INDICATED ON THE DRAWINGS, INCLUDE ALL ITEMS OF COST FOR THE REVISED DESIGN AND CONSTRUCTION INCLUDING COST OF ALL ALIED TRADES INVOLVED.
5. ACCEPTANCE OR REJECTION OF THE PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO APPROVAL OF THE ARCHITECT AND ENGINEER. IF REQUESTED, THE CONTRACTOR SHALL SUBMIT (AT HIS COST) INSPECTION SAMPLES OF BOTH THE SPECIFIED AND PROPOSED SUBSTITUTE ITEMS.
6. IN ALL CASES WHERE SUBSTITUTIONS ARE PERMITTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF EVALUATING THE QUALITY OF THE SUBSTITUTIONS AND EQUIPMENT TO BE PROVIDED, INCLUDING ALL ARCHENGINEER FEES ASSOCIATED WITH CHANGE.

TESTING AND PLACING IN SERVICE

- 1. ANY MATERIAL OR EQUIPMENT FAILING A TEST SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
2. TESTS SHALL INCLUDE THE FOLLOWING:
A. MEASURE THE LOAD ON EACH PHASE OF THE MAIN SERVICE AND EACH PHASE OF EVERY FEEDER UNDER FULL LOAD CONDITIONS.
B. MEASURE THE NO-LOAD AND FULL-LOAD LOSS (PHASE TO PHASE, PHASE TO NEUTRAL AND PHASE TO GROUND FOR EACH PHASE OF EACH SERVICE, AND AT EACH PANELBOARD OR TRANSFORMER).
C. MEASURE THE GROUND RESISTANCE OF THE MAIN SERVICE GROUNDING ELECTRODE AND THE GROUND RESISTANCE OF EACH SEPARATELY DERIVED SYSTEMS GROUNDING ELECTRODE.
D. MAKE INSULATION RESISTANCE TESTS ON ALL DRY TYPE TRANSFORMERS AND MOTORS.
3. AFTER INSTALLING GROUNDING SYSTEM BUT BEFORE PERMANENT ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS.

INTERFERENCES

- 1. BEFORE THE INSTALLATION OF ANY ITEM BEGINS, THE ELECTRICAL CONTRACTOR SHALL CAREFULLY ASCERTAIN THAT IT DOES NOT INTERFERE WITH CLEARANCES FOR THE ERECTION OF FINISH BEAMS, COLUMNS, PLASTER, WALLS OR OTHER STRUCTURAL OR ARCHITECTURAL MEMBERS AS SHOWN ON THE ARCHITECTURAL DRAWINGS. IF ANY WORK IS INSTALLED AND THE ARCHITECTURAL DESIGN CANNOT BE FOLLOWED, THIS CONTRACTOR SHALL, AT HIS OWN EXPENSE, MAKE CHANGES IN HIS WORK AS DIRECTED BY THE ARCHITECT TO PERMIT THE COMPLETION OF THE ARCHITECTURAL WORK IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
2. IT SHALL BE THE DUTY OF THIS CONTRACTOR TO REPORT ANY INTERFERENCES BETWEEN HIS WORK AND THAT OF ANY OF THE OTHER CONTRACTORS AS SOON AS THEY ARE DISCOVERED. THE ARCHITECT SHALL DETERMINE WHICH EQUIPMENT WILL BE RELOCATED, REGARDLESS OF WHICH WAS INSTALLED FIRST. HIS DECISION WILL BE FINAL.

QUALITY ASSURANCE

- 1. ALL PRODUCTS SHALL BE NEW AND OF THE TYPE AND QUALITY SPECIFIED, WHERE MATERIALS, EQUIPMENT, APPARATUS OR OTHER PRODUCTS ARE SPECIFIED BY THE MANUFACTURER, BRAND NAME, TYPE OR CATALOG NUMBER. SUCH DESIGNATION SHALL ESTABLISH THE STANDARDS OF THE DESIRED QUALITY AND STYLE. IT IS THE INTENT OF THESE SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY OF MATERIALS AND EQUIPMENT INSTALLED.

NAMEPLATES

- 1. FURNISH AND MOUNT ON EACH PANELBOARD, SWITCHBOARD (INCLUDING BRANCH SWITCHES), LARGE JUNCTION BOX, SAFETY SWITCH, STARTER, REMOTE CONTROL PUSH BUTTON STATION, AND ALL SIMILAR CONTROLS, A NAMEPLATE DESCRIPTIVE OF THE EQUIPMENT OR EQUIPMENT CONTROLLED.
2. PROVIDE BLACK AND WHITE NAMEPLATES CONSTRUCTED FROM LAMINATED PHENOLIC WITH A WHITE CENTER CORE. LETTERS SHALL BE ENGRAVED IN THE PHENOLIC TO FORM WHITE LETTERS 3/8" HIGH. FASTEN THE NAMEPLATES WITH SCREWS AND AN ADHESIVE TYPE FASTENER.

MOUNTING ACCESSORIES

- 1. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL ANGLE IRON, CHANNEL IRON, RODS, SUPPORTS, HANGERS, CONCRETE OR PLYWOOD REQUIRED TO INSTALL, MOUNT AND SUPPORT ANY ELECTRICAL EQUIPMENT OR DEVICE CALLED FOR ON THE PLANS.
2. SUPPORTING MATERIAL SHALL BE COMPLETE WITH HANGERS, CONNECTORS, BOLTS, CLAMPS AND NECESSARY ACCESSORIES TO MAKE A COMPLETE INSTALLATION. SUPPORTING MATERIAL SHALL BE GALVANIZED, PAINTED OR OTHERWISE SUITABLY FINISHED. PRODUCTS BY BRINKLEY, STEEL CITY OR RACO WILL BE ACCEPTABLE.
3. ALL SURFACE MOUNTED EQUIPMENT ON BLOCK WALLS SHALL BE MOUNTED ON 3/4" PLYWOOD BACKBOARD. ALL FLOOR MOUNTED EQUIPMENT SHALL BE INSTALLED ON A 4" HIGH CONCRETE HOUSEKEEPING.

EXECUTION

- 1. THE ELECTRICAL WORK FOR CONSTRUCTION PROPOSED SHALL CONFORM TO ALL FEDERAL, (OSHA), STATE, ALL SPECIFIC SAFETY REQUIREMENTS AND THE REQUIREMENTS OF THE CURRENT EDITION OF THE NEC.
2. CHECK THE HVAC AND PLUMBING SPECIFICATIONS FOR ELECTRICAL REQUIREMENTS AND INCLUDE THE SAME IN THE CONTRACT COST.
3. EQUIPMENT CONNECTIONS, STARTERS, DISCONNECT SWITCHES, CONTROL TRANSFORMERS AND PUSHBUTTON STATIONS FOR THE EQUIPMENT FURNISHED BY THE OWNER OR UNDER A SEPARATE CONTRACT SHALL BE INSTALLED AND CONNECTED UNDER THIS DIVISION, AS INDICATED ON THE CONTRACT DRAWINGS.
4. ALL CUTTING, PATCHING, EXCAVATING, BACKFILLING AND CONCRETE WORK RELATED TO THIS CONTRACT WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. THIS CONTRACTOR SHALL ASSUME THE RESPONSIBILITY OF PROVIDING THE SLEEVES, CHASES AND OPENINGS NECESSARY FOR THE ELECTRICAL INSTALLATION AND FOR THEIR REPAIR IN AN ACCEPTABLE MANNER, AS DETERMINED BY THE ARCHITECT. ALL HOLES SHALL BE CORE-DRILLED, PROVIDE FIRE STOP IN ALL OPENINGS CREATED THROUGH FIRE-RATED WALLS, FLOORS OR CEILINGS.
5. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED ACCESS PANELS NECESSARY FOR HIS WORK. COORDINATE WITH ARCHITECT PRIOR TO INSTALLATION.

MATERIALS AND WORKMANSHIP

- 1. ALL WORK SHALL BE INSTALLED IN A PRACTICAL AND WORKMANLIKE MANNER, BY MECHANICS SKILLED IN THE SEVERAL TRADES NECESSARY.
2. ALL MATERIALS SHALL BE NEW AND FREE FROM DEFECTS AND SHALL BE THE BEST OF THEIR SEVERAL KINDS UNLESS SPECIFIED OR INDICATED ON THE DRAWINGS TO THE CONTRARY.
3. DURING EACH PHASE AND AT THE COMPLETION OF THE CONSTRUCTION, THIS CONTRACTOR SHALL REMOVE ALL DEBRIS AND EXCESS MATERIALS CAUSED BY HIS WORK. HE SHALL LEAVE THE AREA OF OPERATION BROOM CLEAN.
4. ALL ELECTRICAL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OR ETL LABEL.
5. THIS CONTRACTOR SHALL GUARANTEE HIS WORKMANSHIP AND MATERIALS (LAMPS EXCEPTED) FOR A PERIOD OF ONE YEAR FROM THE DATE OF BUILDING OPENING AND LEAVE HIS WORK IN PERFECT ORDER AT THE COMPLETION. SHOULD DEFECTS DEVELOP WITHIN THE GUARANTEE PERIOD, THE CONTRACTOR SHALL UPON NOTICE OF THE SAME, REMEDY THE DEFECTS AND HAVE ALL DAMAGES TO OTHER WORK OR FURNISHINGS CAUSED BY THE REPAIRS CORRECTED AT HIS EXPENSE TO THE CONDITION BEFORE SUCH DAMAGE.

SCOPE OF WORK

- 1. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, STORAGE, UNPACKING AND PLACEMENT, TO INCLUDE BUT NOT BE LIMITED TO, THE FOLLOWING ITEMS:
A. COMPLETE POWER AND LIGHTING DISTRIBUTION SYSTEM INCLUDING ALL PANELS AND FEEDERS.
B. COMPLETE BRANCH CIRCUIT WIRING SYSTEM.
C. COMPLETE POWER WIRING FOR ALL AIR CONDITIONING EQUIPMENT, PLUMBING SYSTEM, HEATING EQUIPMENT, VENTILATING AND EXHAUST EQUIPMENT.
D. LIGHTING FIXTURE INSTALLATION, INCLUDING ALL FLUORESCENT LAMPS.
E. COMPLETE TELEPHONE AND COMMUNICATION CONDUIT SYSTEM INCLUDING PULL BOXES, OUTLET BOXES, AND CONDUIT AS SPECIFIED, SHOWN ON THE DRAWINGS AND REQUIRED BY THE LOCAL TELEPHONE COMPANY AND/OR OWNER. FROM EACH OUTLET PROVIDE A 1" EMPTY EMT CONDUIT ROUTED INTO THE CEILING CAVITY OR TO THE CLOSEST TELECOMMUNICATIONS CLOSET.
F. TEMPORARY ELECTRICAL POWER AND LIGHTING AS REQUIRED FOR CONSTRUCTION.
G. TESTING OF ALL CABLES AND CIRCUIT WIRING AFTER INSTALLATION.
H. EXIT LIGHT SYSTEM.
I. WIRING DEVICES.
J. LIGHTING CONTROLS.
K. GROUNDING OF THE ELECTRICAL SYSTEM.
L. IDENTIFY RACEWAYS AND CABLES WITH COLOR BANDING AS FOLLOWS:
2. COLORS:
A. FIRE ALARM SYSTEM. RED
B. SECURITY SYSTEM. BLUE AND YELLOW.
C. TELECOMMUNICATION SYSTEM. GREEN AND YELLOW.

GROUNDING AND BONDING

- 1. GROUND ALL EQUIPMENT PER N.E.C.
2. ALL CONDUITS SHALL CONTAIN A CODE-SIZED GROUND WIRE SIZED PER N.E.C. IN ADDITION TO THE CONDUCTORS SHOWN ON THE PLANS. WHERE CIRCUIT CONDUCTORS ARE INCREASED IN SIZE FOR VOLTAGE DROP, THE GROUND WIRE SIZE SHALL BE INCREASED PROPORTIONATELY.
3. AFTER INSTALLING GROUNDING SYSTEM BUT BEFORE PERMANENT ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS.

WIRE AND CABLE

- 1. COLOR CODE CONDUCTORS (EXCEPT CONTROL AND INSTRUMENTATION CONDUCTORS) AS FOLLOWS:
208/120V SYSTEM
A. PHASE A BLACK
B. PHASE B RED
C. PHASE C BLUE
D. NEUTRAL WHITE
E. GROUND GREEN.
a. #12 AND #10 CONDUCTORS SHALL HAVE CONTINUOUS INSULATION COLOR, AS LISTED ABOVE.
b. COLOR CODE CONDUCTORS LARGER THAN ABOVE, WHICH DO NOT HAVE CONTINUOUS INSULATION COLOR BY APPLICATION OF AT LEAST TWO LAPS OF COLORED TAPE ON EACH CONDUCTOR AT ALL POINTS OF ACCESS INCLUDING JUNCTION BOXES. COLOR TAPE SHALL BE THE EQUAL OF 3M PRODUCTS SCOTCH #36.
c. CONDUCTORS SHALL BE SOFT ANNEALED COPPER INSULATED FOR 600 VOLTS UNLESS SPECIFICALLY INDICATED OTHERWISE. ALUMINUM AND NM (ROMEX) CONDUCTORS ARE NOT ALLOWED ON THIS PROJECT.

- 1. INSULATION TYPE SHALL BE TYPE THIN FOR WIRE SIZES #6 AWG AND LARGER AND THIN OR THINW FOR #10AWG AND SMALLER. THIN SHALL NOT BE USED IN WET OR DAMP LOCATIONS.
2. FLEXIBLE CORD SHALL BE HEAVY DUTY TYPE SO WITH AN EQUIPMENT GROUND CONDUCTOR IN ADDITION TO THE CURRENT CARRYING CONDUCTORS.
3. PROVIDE #12 CONDUCTORS, UNLESS OTHERWISE INDICATED.
A. CONTROL CONDUCTORS SHALL BE #14 MINIMUM (FOR NEC CLASS I) AND #16 FOR NEC CLASS II.
4. CONDUCTORS #6 AWG AND LARGER SHALL BE STRANDED.
5. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID.
6. INSTALL WIRING IN CONDUIT, CONCEALED WIRING IN WALLS OR ABOVE CEILINGS, OR EXPOSED IN UNFINISHED AREAS SHALL NOT BE SUBJECT TO PHYSICAL DAMAGE) MAY BE RUN IN MC OR AC CABLE.
7. CONNECT #10 AND SMALLER WIRES WITH CONSTANT PRESSURE EXPANDABLE SPRING TYPE CONNECTORS, "SCOTCHLOK" BY 3M OR B-CAP BY BUCHANAN.
8. CONNECT #8 AND LARGER WIRES WITH COMPRESSION CONNECTORS OR SPLICES AS MANUFACTURED BY BURNDY OR T&B.
9. INSULATE SPLICING CONNECTORS TO AT LEAST 200% OF THE WIRE INSULATION. USE PRE-STRETCHED TUBING CONNECTOR INSULATORS, 3M PST FOR #2 AND LARGER CONDUCTORS.

- 1. PULL CONDUCTORS USING RECOGNIZED METHODS AND EQUIPMENT LEAVING AT LEAST 6" WIRE AT ALL JUNCTION BOXES FOR CONNECTIONS.

- 1. CLEANOUT EACH CONDUIT SYSTEM BEFORE PULLING WIRE.
2. FORM AND TIE ALL WIRING IN PANELBOARDS.
3. THERE SHALL BE NO WIRENUT JOINTS OR SPLICES MADE INSIDE SWITCHBOARDS/PANELBOARDS.
4. ALL CUTTING, PATCHING, EXCAVATING, BACKFILLING AND CONCRETE WORK RELATED TO THIS CONTRACT WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. THIS CONTRACTOR SHALL ASSUME THE RESPONSIBILITY OF PROVIDING THE SLEEVES, CHASES AND OPENINGS NECESSARY FOR THE ELECTRICAL INSTALLATION AND FOR THEIR REPAIR IN AN ACCEPTABLE MANNER, AS DETERMINED BY THE ARCHITECT. ALL HOLES SHALL BE CORE-DRILLED, PROVIDE FIRE STOP IN ALL OPENINGS CREATED THROUGH FIRE-RATED WALLS, FLOORS OR CEILINGS.
5. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED ACCESS PANELS NECESSARY FOR HIS WORK. COORDINATE WITH ARCHITECT PRIOR TO INSTALLATION.

RACEWAYS

- 1. ALL WIRE SHALL BE RUN IN ACCORDANCE WITH CODE IN CORROSION RESISTANT, RIGID, THREADED, METAL, CONDUIT OR ELECTRICAL METALLIC TUBING (E.M.T.) UNLESS OTHERWISE SPECIFICALLY STATED HEREIN.
A. CONDUIT IN EXTERIOR WALLS, BELOW FLOOR SLAB, OR UNDERGROUND SHALL BE RIGID, THREADED, GALVANIZED, HEAVY WALL TYPE.
B. CARLON PVC TYPE 40 HEAVY WALL CONDUIT WITH GROUND WIRE MAY BE USED BELOW FLOOR SLAB OR UNDERGROUND IN LIEU OF RIGID, THREADED, GALVANIZED CONDUIT. PVC CONDUIT SHALL BE RUN IN OR ABOVE FLOOR SLAB. PVC CONDUIT SHALL TERMINATE BELOW FLOOR SLAB WITH RIGID, THREADED METAL CONDUIT ADAPTER. CONDUIT ABOVE SLAB SHALL BE METAL.
C. CONDUIT RUN EXPOSED TO THE WEATHER SHALL BE HEAVY WALL, METAL THREADED TYPE.
D. PROVIDE BRANCH CIRCUIT CONDUCTORS THAT ARE TYPE THIN OR THINW AS REQUIRED. MC CABLE CAN BE USED FOR LIGHT FIXTURE TO LIGHT FIXTURE.

- 2. CONDUIT SIZE SHALL BE 3/4" MINIMUM.
3. CONDUIT SHALL BE SECURELY FASTENED IN PLACE.
4. ALL CONDUIT SHALL BE CONCEALED IN WALLS, FLOOR AND CEILINGS WHEREVER POSSIBLE. EXPOSED CONDUIT IN FINISHED AREAS WILL NOT BE PERMITTED. EXPOSED CONDUIT WILL BE PERMITTED IN UNFINISHED AREAS WITH THE SPECIFIC APPROVAL OF THE ARCHITECT.
5. USE FLEXIBLE CABLE FOR THE CONNECTION TO RECESSED OR SEMI-RECESSED LIGHTING FIXTURES (Ø LENGTH MAXIMUM). USE LIQUID TIGHT METAL CONDUIT FOR ALL CONNECTIONS TO MOTORS AND OTHER EQUIPMENT SUBJECT TO VIBRATION AND IN AREAS SUBJECT TO MOISTURE.
6. USE WATER/TIGHT JOINTS WITH BURIED AND CONCRETE ENCASED CONDUIT. ALL BURIED CONDUITS OUTSIDE OF BUILDINGS SHALL HAVE A MINIMUM OF 24" OF COVER. CONDUITS BURIED IN EARTH SHALL BE PAINTED (WITH HEAVY ASPHALTUM PAINT).

- 7. SUPPORT RUNS OF CONDUIT AS DETAILED IN THE APPROPRIATE TABLE OF THE NATIONAL ELECTRICAL CODE (NEC).
8. INSTALL EXPOSED RUNS OF CONDUIT AND CONDUIT ABOVE LAY-IN CEILINGS PARALLEL OR PERPENDICULAR TO THE WALLS. STRUCTURAL MEMBERS OF INTERSECTIONS OF VERTICAL PLANES AND CEILINGS, PROVIDE RIGHT ANGLE TURNS USING FITTINGS OR SYMMETRICAL BENDS. SUPPORT CONDUITS WITHIN 1" OF ALL CHANGES IN DIRECTION.
9. IF A CONDUIT IS SUSPENDED, IT SHALL BE SUPPORTED ON TRAPEZE HANGERS WHICH USE "ALL-THREAD" RODS FROM THE STRUCTURAL STEEL. THE USE OF CEILING SUPPORT WIRE OR SIMILAR MATERIAL WILL NOT BE ACCEPTED.
10. INSTALL EMPTY CONDUIT FOR FUTURE USE AS INDICATED ON THE DRAWINGS. CONDUIT SHALL BE COMPLETE WITH EMT OR PULL ROPE, JUNCTION/OUTLET BOXES, TIE RINGS AND APPROPRIATE COVER PLATES.

- 11. PROVIDE PITCHPOCKETS WHERE CONDUITS PENETRATE THE ROOF.
12. THREAD LUBRICATION/SEALANT IS REQUIRED ON OUTDOOR AND UNDERGROUND THREADED METAL JOINTS.
13. INSTALL FIRE SEAL FITTINGS WHERE CONDUITS PENETRATE CONCRETE FLOOR SLABS OR MASONRY WALLS REQUIRED TO BE FIRE RATED.
14. HORIZONTAL PORTION OF CONDUIT EXPOSED ON THE ROOF AND FEEDING EQUIPMENT SHALL BE MORE THAN 5'-0" UNLESS THE WRITING APPROVAL FROM ARCHITECT OR ENGINEER IS OBTAINED.

PULL AND JUNCTION BOXES

- 1. INSTALL PULL AND JUNCTION BOXES WHERE SHOWN ON THE DRAWINGS, AND WHERE REQUIRED FOR CONDUIT IN DIRECTION OF THE CONDUITS, AND TO FACILITATE WIRE PULLING. FURNISH BOX SIZES IN ACCORDANCE WITH NEC UNLESS LARGER BOXES ARE INDICATED.
2. PROVIDE STEEL BOXES AND REMOVABLE COVERS OF CODE GAUGE, HOT ROLLED SHEET STEEL, HOT DIPPED GALVANIZED INSIDE AND OUTSIDE, FOR ABOVE GROUND WORK. FURNISH WEATHERPROOF BOXES WHEN INSTALLED ABOVE GROUND OUTSIDE.
3. PROVIDE CAST IRON BOXES, HOT DIPPED GALVANIZED INSIDE AND OUTSIDE, WHERE SHOWN ON THE DRAWINGS. FURNISH REMOVABLE COVERS WITH GASKETS AND STAINLESS STEEL, BRASS OR BRONZE SCREWS.
4. PROVIDE CONCRETE BOXES FOR UNDERGROUND WORK UNLESS OTHERWISE INDICATED ON THE DRAWINGS. FURNISH STEEL FRAMES AND COVERS WITH THE COVER ATTACHED TO THE FRAME WITH HEXAGON HEAD, BRASS OR BRONZE CAP SCREWS, 3/8" DIAMETER. PROVIDE A RUBBER GASKET FOR SEALING BETWEEN THE COVER AND THE FRAME. PAINT THE COVER WITH TWO COATS OF HEAVY ASPHALTUM.

OUTLET BOXES

- 1. USE SHEET STEEL BOXES, ZINC COATED OR GALVALUM, FOR CONCEALED INTERIOR WORK.
2. USE CAST BOXES, ZINC-CADMIUM FINISH MALLEABLE IRON, FOR EXPOSED INTERIOR WORK, AND EXPOSED OR CONCEALED WORK IN WET, DAMP OR EXTERIOR LOCATIONS.
3. WALL BOX SIZES (MINIMUM) SHALL BE 4" SQUARE x 2-1/2" DEEP WHERE WALL CONSTRUCTION PERMITS. WHERE WALL CONSTRUCTION DICTATES, THE WIDTH MAY BE REQUIRED TO 2-1/8" OR 1-1/2" UNDER SPECIAL CONDITIONS.
4. FIXTURE OUTLETS IN CEILINGS (MINIMUM) SHALL BE 4" OCTAGONAL x 1-1/2" DEEP (4-11/16" OCTAGONAL x 2-1/2" DEEP WHERE REQUIRED TO ACCOMMODATE LARGER CONDUIT OR LARGER NUMBER OF WIRES).
5. GANG BOXES SHALL BE ONE PIECE (MINIMUM), 2-1/8" DEEP.
6. PROVIDE CONCRETE-TIGHT FLOOR BOXES WITH ADJUSTABLE COVERS SET FLUSH AND LEVEL WITH THE FINISHED FLOOR, WITH OUTLETS AS INDICATED ON THE DRAWINGS. PROVIDE WIREMOLD #FB68 SERIES BOXES WITH LEVELING SCREWS FOR ABOVE GRADE APPLICATIONS, AND WIREMOLD #FB68-OG FOR ON-GRADE APPLICATIONS. FLUSH TYPE COVERS AND OPENINGS TO SERVE OUTLETS USED, FURNISH FLUSH CAPS FOR CLOSING OFF BOX WHEN NOT IN USE.
7. PROVIDE WIREMOLD EVOLUTION SERIES WALL BOX BEHIND ALL WALL MOUNTED FLAT SCREEN MONITORS, COORDINATE HEIGHT WITH ARCHITECT.
8. FLUSH MOUNT BOXES IN ALL FINISHED WALLS. INSTALL THE PLASTER RINGS IN DRYWALL PLASTERED WALLS AND RAISED COVERS AS REQUIRED IN WALLS WITH OTHER FINISHES SO THAT THE COVER PLATES FIT TIGHTLY AGAINST BOXES OR RINGS. 3/16" MAXIMUM GAPS ARE ALLOWED FOR NON-COMBUSTIBLE WALLS.
9. ADJUST LOCATION OF OUTLETS IN MASONRY OR TILE CONSTRUCTION TO OCCUR IN THE NEAREST JOINT TO THE HEIGHT SPECIFIED. HEIGHTS SHALL MEET A D.A. REQUIREMENTS.
10. SUPPORT ALL BOXES TO MAINTAIN PROPER ALIGNMENT AND RIGIDITY.
11. CLEAN BOXES OF ALL FOREIGN MATTER PRIOR TO THE INSTALLATION OR WIRING OF DEVICES.
12. MOUNTING HEIGHTS ON THE DRAWINGS ARE TO THE CENTERLINE OF THE BOX UNLESS OTHERWISE NOTED.

WIRING DEVICES

- 1. WIRING DEVICE COLOR SHALL BE WHITE, UNLESS OTHERWISE INDICATED.
2. OCCUPANCY SENSOR SWITCHES SHALL BE 120/277VOLT, DUAL TECHNOLOGY 0-10V DIMMING WALL SWITCH OCCUPANCY SENSORS, WATSTOPPER #DW-311.
3. DIMMER SWITCHES SHALL BE WIDE SLIDE 0-10V PRESET DIMMER WITH INTEGRATED POWER PACK EQUAL TO PASS & SEYMOUR WS4FB3P.
4. GENERAL SWITCHES SHALL BE SPECIFICATION GRADE AS MANUFACTURED BY PASS & SEYMOUR.

- 5. CEILING MOUNTED OCCUPANCY SENSORS SHALL BE LOW VOLTAGE DUAL TECHNOLOGY, WATSTOPPER #DW-300.
6. PROVIDE NEMA CONFIGURATION 0-20R DUPLEX 125 VOLT GROUNDING TYPE RECEPTACLES RATED FOR 20 AMPERES UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
7. RECEPTACLES SHALL BE SPECIFICATION GRADE AS MANUFACTURED BY PASS & SEYMOUR.
8. RECEPTACLES REQUIRING AMPERAGES, VOLTAGES OR CONFIGURATIONS DIFFERENT FROM THE DUPLEX CONVENIENCE RECEPTACLES ABOVE SHALL BE AS INDICATED ON THE DRAWINGS.
9. PROVIDE OTHER RECEPTACLES OF A QUALITY, MATERIAL AND WORKMANSHIP EQUAL TO THAT SPECIFIED FOR DUPLEX CONVENIENCE RECEPTACLES.
10. PROVIDE COVER OR DEVICE PLATES FOR OUTLET BOXES AS FOLLOWS UNLESS OTHERWISE NOTED:
A. FINISHED AREAS: STAINLESS STEEL.
B. UNFINISHED AREAS: ZINC COATED SHEET METAL, ALUMINUM, OR CAST METAL, AS APPROPRIATE FOR THE TYPE OF BOX.
C. EXTERIOR AREAS: COPPER FREE ALUMINUM WITH GRAY, POWDER EPOXY FINISH, GASKET, WEATHERPROOF, TELEPHONE, COMMUNICATION, AND SIGNAL OUTLET PLATES. SHALL MATCH THOSE USED FOR RECEPTACLES AND SWITCHES. ALL OUTLET AND/OR JUNCTION BOXES SHALL BE COMPLETE WITH A COVER PLATE BY THIS CONTRACTOR. WHERE DEVICES ARE GANGED, THEY SHALL BE INSTALLED UNDER A COMMON COVERPLATE.

- 11. LOCATE THE SWITCHES APPROXIMATELY 4'-0" ABOVE THE FINISHED FLOOR, ELEVATION OR NEAREST BLOCK COURSE (WITHIN A D.A. REQUIREMENTS), UNLESS OTHERWISE INDICATED. THE LONG DIMENSION OF THE SWITCHES SHALL BE VERTICAL.
12. LOCATE RECEPTACLES APPROXIMATELY 1'-6" ABOVE THE FINISHED FLOOR, ELEVATION OR NEAREST BLOCK COURSE (WITHIN A D.A. REQUIREMENTS), UNLESS NOTED OTHERWISE. THE LONG DIMENSION OF RECEPTACLES SHALL BE VERTICAL.

SAFETY SWITCHES

- 1. SAFETY SWITCHES SHALL BE THE ENCLOSED HEAVY-DUTY TYPE (TYPE HD) WITH QUICK-MAKE, QUICK-BREAK MECHANISM AND EXTERNAL PAD LOCKABLE OPERATING HANDLE.
2. SAFETY SWITCHES SHALL BE RATED FOR 200 OR 300 VOLTS AS APPLICABLE. THEY SHALL BE HORSEPOWER RATED WHEN USED IN MOTOR CIRCUITS.
3. SAFETY SWITCHES SHALL BE FUSIBLE OR NON-FUSIBLE, 2, 3, OR 4 POLE AS INDICATED ON THE DRAWINGS.
4. SAFETY SWITCHES SHALL BE SINGLE THROW UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
5. ENCLOSURES SHALL BE NEMA 1 INDOORS AND NEMA 3R OUTDOORS UNLESS OTHERWISE INDICATED ON DRAWINGS.
6. MANUFACTURER SHALL BE SQUARE D, SIEMENS, OR CUTLER-HAMMER. ALL SAFETY SWITCHES SHALL BE BY ONE MANUFACTURER.
7. MOUNT THE SAFETY SWITCHES SECURELY BETWEEN 3' & 6' LEVELS ABOVE THE FINISHED FLOOR.
8. SWITCHES ON BLOCK WALLS SHALL BE MOUNTED ON A 3/4" PLYWOOD BACKBOARD, WHERE LOCATED INDOORS.

DISTRIBUTION AND PANELBOARDS

- 1. PANELBOARDS SHALL BE FULLY RATED TO INTERRUPT SYMMETRICAL SHORT CIRCUIT AT THE TERMINALS.
2. PANELBOARDS SHALL BE LABELED WITH PHENOLIC NAMEPLATES INSCRIBED AS INDICATED ON THE DRAWINGS. PROVIDE LABELS AFFIXED TO PANELBOARDS AS REQUIRED BY NFPA 70E.
3. PANELBOARDS SHALL BE ENCLOSED DED DED FRONT SAFETY TYPE WITH FEATURES AND RATINGS AS SCHEDULED ON THE DRAWINGS.
4. MOLDED CASE CIRCUIT BREAKERS SHALL BE AS SCHEDULED ON THE DRAWINGS AND SPECIFIED IN THIS DIVISION.
5. ALL BUS BARS SHALL BE RECTANGULAR TIN PLATED ALUMINUM.
6. SPACE, WHERE SHOWN IN PANEL SCHEDULES, DESIGNATES SPACE FOR FUTURE PROTECTED DEVICES AND SHALL INCLUDE BUS AND SUPPORT.
7. INSTALL CABINETTS SO THAT CENTER OF THE TOP BREAKER DOES NOT EXCEED 6'-6" ABOVE THE FINISHED FLOOR.
8. ENTRIES ON DIRECTORY CARDS SHALL BE TYPED, COMPLETE AND ACCURATE.
9. ALL BOLTED CONNECTIONS SHALL BE TORQUED IN ACCORDANCE WITH MANUFACTURERS STANDARDS.
10. ELECTRICAL CONTRACTOR SHALL ARRANGE CIRCUITS AS NEAR AS POSSIBLE TO CIRCUIT NUMBERS ON THE DRAWINGS. AT COMPLETION OF JOB, ELECTRICAL CONTRACTOR SHALL TAKE CURRENT READING CHECKS OF RESPECTIVE PHASES. A MINIMUM OF CIRCUIT CONNECTIONS SHALL BE REARRANGED TO BALANCE, AS CLOSELY AS POSSIBLE, THE LOAD IN THE PANEL.
11. ALL BREAKERS SHALL BE BOLT-ON TYPE.
12. MANUFACTURER SHALL BE SQUARE D AS THE PREFERRED SWITCHGEAR.

LIGHTING FIXTURES

- 1. NEW LIGHTING FIXTURES SHALL BE AS LISTED IN THE LIGHTING FIXTURE SCHEDULE.
2. ALL LIGHTING FIXTURES SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR AS INDICATED ON THE LIGHTING FIXTURE SCHEDULE, INCLUDING LAMPS. LAMPS SHALL BE OF SAME MANUFACTURER FOR ALL TYPES.
3. ALL FIXTURES SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL AND SHALL BE INSTALLED ACCORDING TO MANUFACTURERS INSTRUCTIONS.
4. BALLASTS FOR LINEAR FLUORESCENT LAMPS SHALL BE AS LISTED IN THE LIGHTING FIXTURE SCHEDULE.
5. HIGH INTENSITY DISCHARGE BALLASTS SHALL BE CONSTANT WATTAGE TYPE.
6. THIS CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY SUPPORT MEDIA FOR ALL LIGHTING FIXTURES INCLUDING STRUCTURAL STEEL, ANGLE, RODS, ETC. IN GENERAL, FLUORESCENT AND HIGH INTENSITY DISCHARGE FIXTURES SHALL BE SUPPORTED IN A MANNER ACCEPTABLE TO THE LOCAL INSPECTION AUTHORITIES. ALL FIXTURES SHALL BE FIRMLY SUPPORTED FROM BEAMS OR JOISTS.
A. PROVIDE ALL NECESSARY BACKING, BLOCKING AND SUPPORTS FOR WALL MOUNTED FIXTURES.
B. FIXTURES SHALL NOT BE SUPPORTED FROM ROOF DECK.
7. ALL FIXTURES SHALL BE U.L. LISTED AND APPROVED FOR THE PURPOSE INTENDED.
8. RECESSED FIXTURES IN FIRE RATED CEILING OR SUPPLY AIR PLENUMS SHALL BE INSTALLED ACCORDING TO THE FIRE RATING OF THE CEILING. PROVIDE AIR-TIGHT GASKETS TO SEAL AROUND OPENINGS.
9. ALL ADJUSTABLE FIXTURES SHALL BE ADJUSTED DURING EVENING HOURS TO THE SATISFACTION OF THE ARCHITECT.

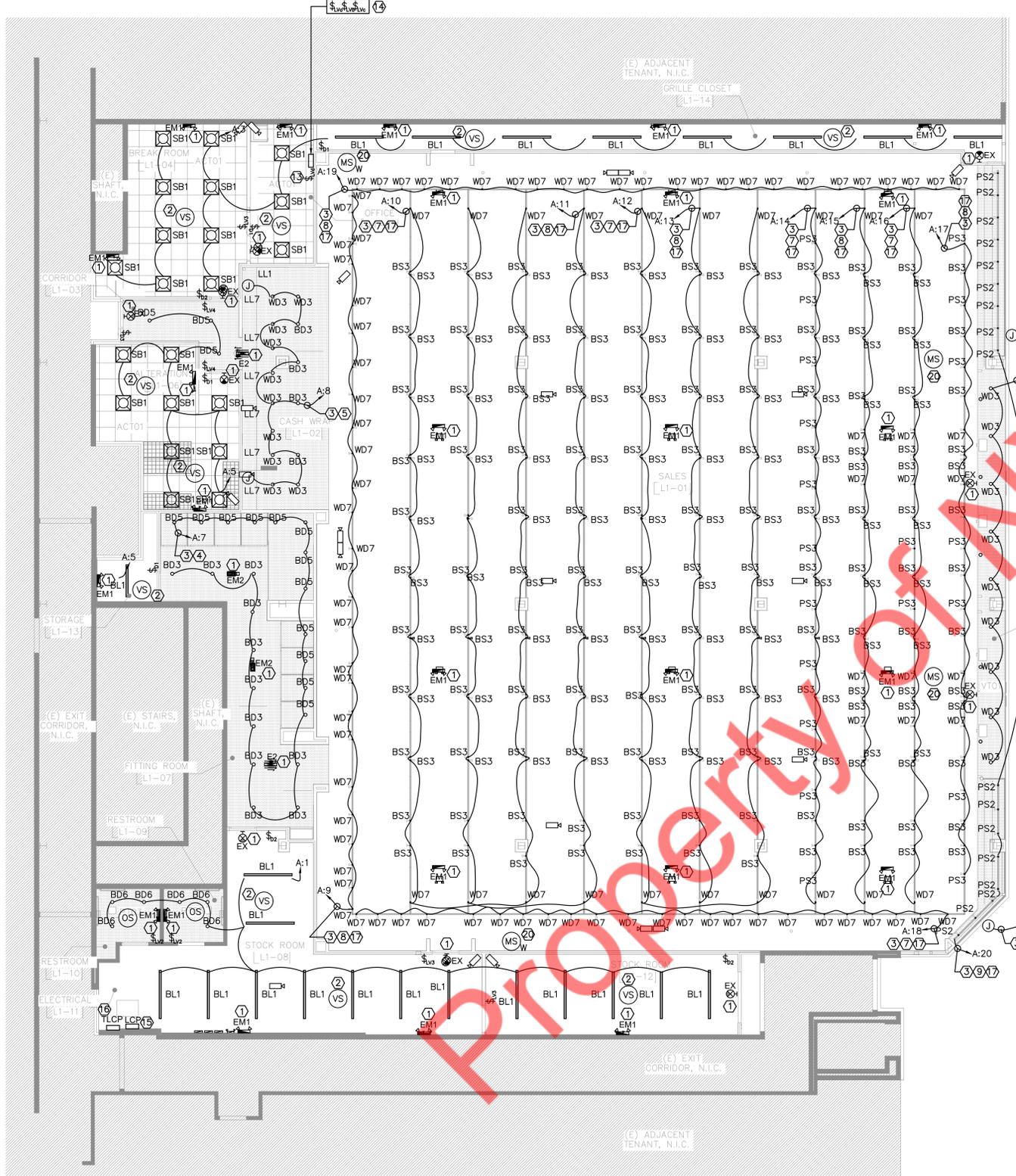
LANDLORD GENERAL NOTES
1. ETC TO MAKE A FIELD SURVEY OF THE EXISTING ELECTRICAL SERVICE TO ENSURE THAT THE TOTAL CONNECTED LOAD DOES NOT EXCEED THE ELECTRICAL SERVICE. ANY ALL MODIFICATIONS OR IMPROVEMENTS REQUIRED ARE SUBJECT TO LANDLORD'S PRIOR APPROVAL AND WILL BE COMPLETED BY TENANT/ TENANT'S GC, AT TENANT'S SOLE EXPENSE.
2. EMT ELECTRIC METALLIC TUBING SHALL BE USED IN ALL DESIRING WALLS, HOME RUNS, AND BETWEEN JOISTS AND PALL BOXES. MC CABLE MAY BE USED IN OTHER APPLICATIONS AS AUTHORIZED BY THE AUTHORITY HAVING JURISDICTION AND NOT DRILL WELDED SCREW, OR SHOOT INTO STRUCTURE. ALTERNATIVE METHODS OF ATTACHMENT ONLY, NOTWITHSTANDING DAMAGE TO LANDLORD'S BASE BUILDING STRUCTURE. TENANT SHALL PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS BY A STRUCTURAL ENGINEER WITH LEGALLY ACTIVE REGISTRATION AS INDICATED BY ALL JURISDICTIONAL REQUIREMENTS, FOR ALL STRUCTURAL MODIFICATIONS FOR LANDLORD RECORDS.
7 DAY, 24 HOUR TIME CLOCK IS REQUIRED TO CONTROL STOREFRONT ENTRY LIGHTS, SHOW WINDOW LIGHTS, SHOW WINDOW RECEPTACLES AND STOREFRONT SIGNAGE. ILLUMINATED STOREFRONT SIGNS MUST REMAIN LIT DURING ALL HOURS BUSINESS HOURS.
1. ALL INTERIORS SHALL BE CORE BORED ONLY. SAW CUTTING, JACK HAMMING, AND TRENCHING IS STRICTLY PROHIBITED. STRUCTURAL STEEL, WHEN EXPOSED ABOVE THE TENANT SPACE, WHEN ATTACHING TO LANDLORD'S STRUCTURE, DO NOT DRILL, WELD, SCREW, OR SHOOT INTO STRUCTURE. ALTERNATIVE METHODS OF ATTACHMENT ONLY, NOTWITHSTANDING DAMAGE TO LANDLORD'S BASE BUILDING STRUCTURE. TENANT SHALL PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS BY A STRUCTURAL ENGINEER WITH LEGALLY ACTIVE REGISTRATION AS INDICATED BY ALL JURISDICTIONAL REQUIREMENTS, FOR ALL STRUCTURAL MODIFICATIONS FOR LANDLORD RECORDS.
7. ETC SHALL VERIFY THAT WORK SHALL NOT CONFLICT WITH ANY EXISTING STRUCTURAL, UTILITY, OR OTHER UNDER-SLAB CONDUITS. (AN INSTRUCTIVE VERIFICATION MAY BE REQUIRED) ANY DAMAGE OR DAMAGE CAUSED BY TENANT'S WORK SHALL BE REPAIRED AND REIMBURSED AT TENANT'S EXPENSE.
8. ETC TO USE OF ENERGY STAR PRODUCTS AND/OR EQUIPMENT WHENEVER POSSIBLE DURING TENANT BUILD OUT, WHICH CAN REDUCE ENERGY CONSUMPTION.
9. NOTHING IS PERMITTED TO BE ATTACHED TO, SUSPENDED FROM, OR PENETRATE LANDLORD'S STRUCTURE, FLOOR DECK, OR ROOF DECK. YOU MAY ATTACH NON-DESTRUCTIVELY, TO OR SUSPEND FROM THE TOP CHORD OF THE JOIST OR THE STRUCTURAL STEEL, WHEN EXPOSED ABOVE THE TENANT SPACE, WHEN ATTACHING TO LANDLORD'S STRUCTURE, DO NOT DRILL, WELD, SCREW, OR SHOOT INTO STRUCTURE. ALTERNATIVE METHODS OF ATTACHMENT ONLY, NOTWITHSTANDING DAMAGE TO LANDLORD'S BASE BUILDING STRUCTURE. TENANT SHALL PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS BY A STRUCTURAL ENGINEER WITH LEGALLY ACTIVE REGISTRATION AS INDICATED BY ALL JURISDICTIONAL REQUIREMENTS, FOR ALL STRUCTURAL MODIFICATIONS FOR LANDLORD RECORDS.
10. ANY LANDLORD EQUIPMENT, COMPONENT, AND/OR SERVICE FEEDING OTHER TENANTS THAT IS EXISTING IN THE SPACE MUST REMAIN VISIBLE AND ACCESSIBLE TO THE LANDLORD. TENANT SHALL INSTALL ACCESS PANELS AS REQUIRED TO MAINTAIN ACCESS. ACCESS PANELS SHALL BE LABEL, TO PROVIDE 6" X 6" MINIMUM CLEARANCE WITH WALL OPERATING HANDLE.

LANDLORD GENERAL SECURITY CAMERA NOTES
1. SECURITY EQUIPMENT MUST BE INSTALLED WITHIN THE PREMISES. CAMERA AND/OR SECURITY EQUIPMENT ARE NOT PERMITTED ON THE EXTERIOR OF THE PREMISES UNLESS APPROVED BY WRITING BY LANDLORD. HOWEVER, IN CASES WHERE LANDLORD APPROVES EXTERIOR CAMERAS OR EQUIPMENT, THE CAMERAS OR EQUIPMENT SHOULD BE POSITIONED AS TO LIMIT VIEWING AREAS AND SHALL CAPTURE IMAGES OF THE TENANT SPACE ONLY AND SHALL NOT CAPTURE IMAGES OUTSIDE OF THE PREMISES. IN CASES WHERE A TENANT MAY HAVE AN APPROVED PATIO AREA, ALL CAMERAS OR EQUIPMENT SHALL BE INSTALLED AND OPERATED SO AS TO CAPTURE ONLY THE APPROVED PATIO AND NOT THE ADJACENT COMMON AREAS.
2. ALL EQUIPMENT, INSTALLATION METHODS AND LOCATIONS MUST BE APPROVED BY LANDLORD IN WRITING PRIOR TO INSTALLATION.
3. NO SIGNAL SHALL BE EMITTED OUTSIDE THE PREMISES.
4. ABSOLUTELY NO DISTRIBUTION, ELECTRONICALLY OR OTHERWISE, OF CAPTURED IMAGE OR VIDEO TO ANY THIRD PARTY OTHER THAN LANDLORD UPON REQUEST.
5. SECURITY CAMERAS, VISION PANELS, OR "BUMBLE" SHALL NOT BE VISIBLE TO PUBLIC VIEW IN THE DESIGN CONTROL ZONE OR ON PATIOS FROM THE COMMON AREA.

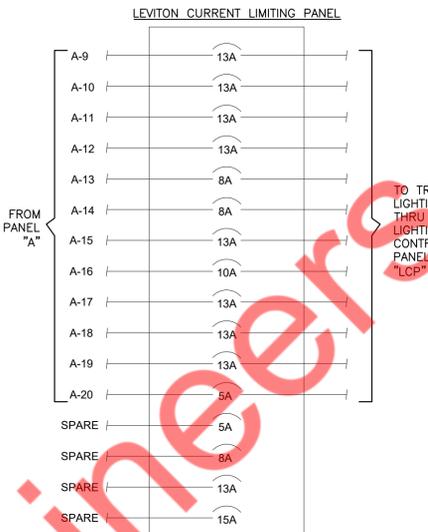


LIGHTING FIXTURE SCHEDULE:

TYPE	DESCRIPTION	MANUFACTURER	LUMINAIRE SPECIFICATION	LAMP SPECIFICATION	WATTAGES
BD3	BASE DL 60"	ITAB NLA TITAN L COB 3000 935 BBL WIDE FLOOD MATT 60 DEG. DIFFUSER GLOSS	LED 3500K	3850 LM	31W
BD5	BASE DL 60"	NORDIC TITAN L 3000 935 BBL WIDE FLOOD MATT 60 DEG WHITE, DIFFUSER GLOSS	LED 3500K	<varies>	24W
BD6	BASE DL 60"	NORDIC TITAN L 3000 935 BBL WIDE FLOOD MATT 60 DEG WHITE, DIFFUSER GLOSS	LED 3500K	3040 LM	24W
BL1	BASE LIGHT CEILING MOUNT	PHILIPS FSS440L850	LED 4000K	4000 LM	40W
BS3	TRACK LIGHT 10"+DIFFUSER	NORDIC TUBIX 4000 935 BBL SPOT 10 DEG WHITE DIFFUSER GLOSS	LED 3500K	3800 LM	24W
LL1	LINEAR LED STRIP LIGHT	LPA LIGHTING	3500K	LM	12W/FT
LL7	LINEAR LED STRIP LIGHT	LPA LIGHTING			12W/FT
PS2	TRACK LIGHT 25"	ITAB NLA TUBIX 3000 935 BBL MEDIUM 25 DEG. WHITE, CLEAR GLOSS	LED 3500K	3130 LM	24W
PS3	TRACK LIGHT 40"+DIFFUSER	NORDIC TUBIX 4000 935 BBL SPOT 40 DEG WHITE DIFFUSER GLOSS	LED 3500K	3800 LM	24W
SB1	LED DIRECT TROFFER LIGHT LUMINARIES	TOP DT-F-2-U-70-38-41K	LED 4100K	4200 LM	30W
WD3	ADJUSTABLE DL 40"+DIFFUSER	ITAB NLA MOON 4000 935 BBL FLOOD 40 DEG WHITE, DIFFUSER GLOSS	LED 3500K	<varies>	33W
WD7	TRACK LIGHT 40"+DIFFUSER	NORDIC TUBIX 4000 935 BBL SPOT 40 DEG WHITE DIFFUSER GLOSS	LED 3500K	3800 LM	35W
EM1	DUAL HEAD LED EMERGENCY LIGHT FIXTURE	TBD			5W
EM2	CONCEALED LED EMERGENCY LED FIXTURE	TBD			5W
X	LED EXIT SIGN, SINGLE FACE	TBD			5W
E2	LED EXIT SIGN, DOUBLE FACE	TBD			5W



ELECTRICAL LIGHTING PLAN
1/8" = 1'-0"



TRACK LIGHTING CURRENT LIMITER DETAIL
NTS

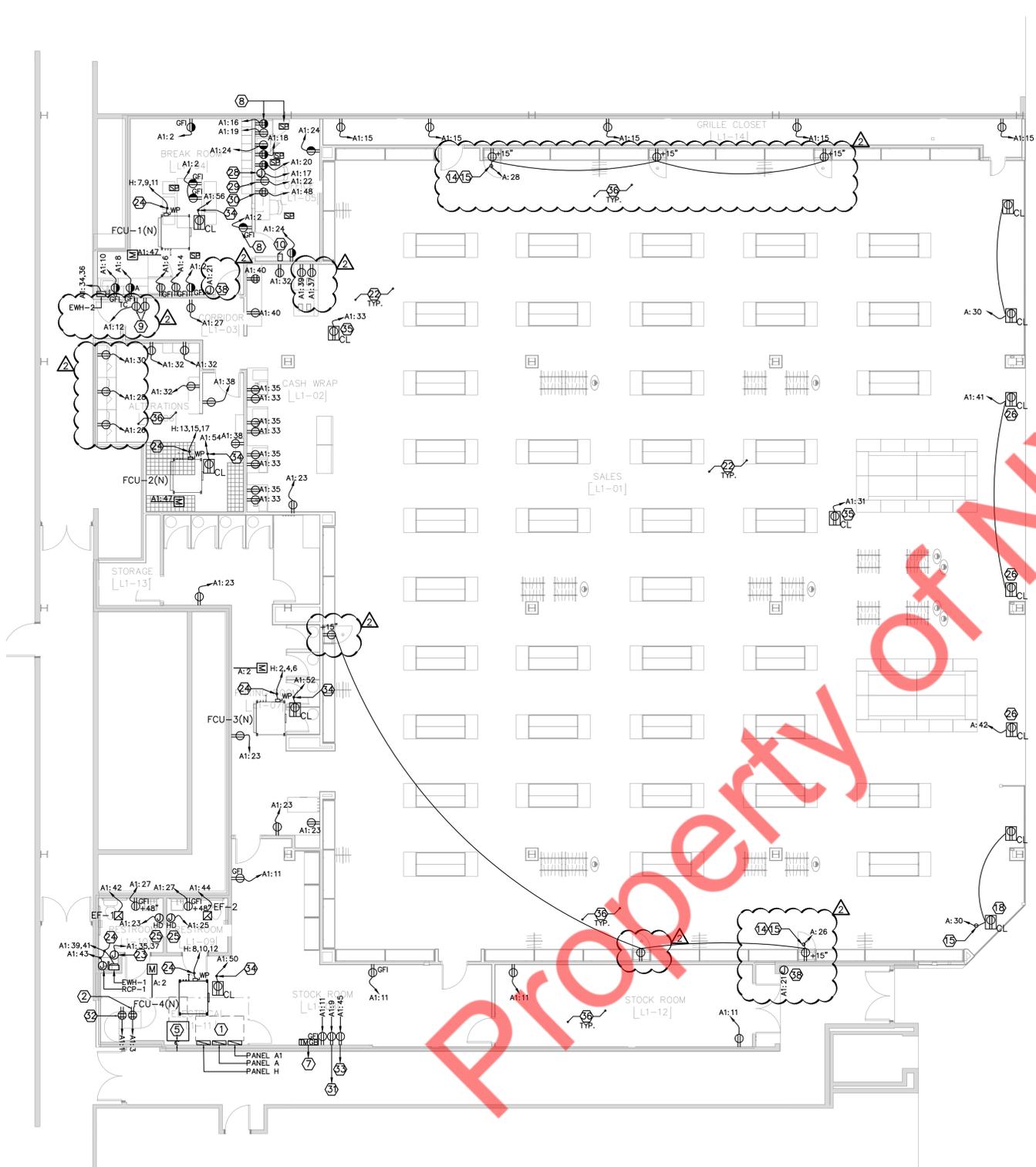
LIGHTING CONTROL DEVICES LIST	
Ⓛ ₂	LOW VOLTAGE AUTO ON SWITCH POD (SENSOR SWITCH, #SPODM)
Ⓛ ₃	LOW VOLTAGE MANUAL ON/3-WAY OPERATION SWITCH POD (SENSOR SWITCH, #SPODM)
Ⓛ ₄	LOW VOLTAGE AUTO ON/3-WAY OPERATION SWITCH POD (SENSOR SWITCH, #SPODM 3X)
Ⓛ ₁	LOW VOLTAGE MANUAL ON/O-10V DIMMING LED SWITCH POD (SENSOR SWITCH, #SPODM D SA)
Ⓛ ₂	LOW VOLTAGE MANUAL ON/O-10V DIMMING/3-WAY OPERATION LED SWITCH POD (SENSOR SWITCH, #SPODM D SA 3X)
Ⓛ ₃	LOW VOLTAGE AUTO ON/O-10V DIMMING/3-WAY OPERATION LED SWITCH POD (SENSOR SWITCH, #SPODM D 3X)
Ⓛ ₆	MOMENTARY LOW VOLTAGE WALL SWITCH, 6-BUTTON FOR LIGHTING CONTROL PANEL (HUBBELL, #CXSW-6-xx). PROVIDE LABEL FOR EACH BUTTON.
Ⓛ ₆	MOMENTARY LOW VOLTAGE WALL SWITCH, 4-BUTTON FOR LIGHTING CONTROL PANEL (HUBBELL, #CXSW-4-xx). PROVIDE LABEL FOR EACH BUTTON.
Ⓞ _S	LOW VOLTAGE OCCUPANCY SENSOR, DUAL TECHNOLOGY (SENSOR SWITCH, #CM PDT-9)
Ⓞ _V	LOW VOLTAGE VACANCY SENSOR, DUAL TECHNOLOGY (SENSOR SWITCH, #CM PDT-9)
LCP	LIGHTING CONTROL PANEL WITH INTEGRAL TIME CLOCK, 24-LATCHING RELAY AND 0-10V DIMMING CAPABILITY, 24 POLES (HUBBELL, CX-24-2-S-24-3L-M W/ TWO (2) CXDIMCONTRBD)
Ⓞ _S	MOTION DETECTOR - 360° CEILING MOUNTED
Ⓞ _S W	MOTION DETECTOR - WIDE RANGE

- LIGHTING CONTROL DEVICES GENERAL NOTES:**
- PROVIDE CONTROL CABLES BETWEEN SWITCHES, SENSOR AND POWER PACKS AS PER MANUFACTURER'S RECOMMENDATION.
 - PROVIDE CONTROL CABLES BETWEEN LOW VOLTAGE SWITCHES, AND LIGHTING CONTROL PANELS AS PER MANUFACTURER'S RECOMMENDATION.
 - PROVIDE CONTROL CABLES BETWEEN LOW VOLTAGE SWITCHES, AND LIGHTING CONTROL PANELS AS PER MANUFACTURER'S RECOMMENDATION.
 - PROVIDE ALL LOW VOLTAGE CONTROL WIRING AS REQUIRED FOR PROPER OPERATION OF ALL LIGHTING CONTROL DEVICES, SENSORS, ETC.
 - PROVIDE FACTORY ENGRAVING ON ALL WALL CONTROL DEVICES AND BUTTONS.
 - FACTORY COMMISSIONING AND STARTUP SHALL BE PROVIDED FOR ALL SYSTEM COMPONENTS (SENSOR, CONTROLS, LIGHTING CONTROL PANEL, ETC) BY MANUFACTURER AT ELECTRICAL CONTRACTOR'S EXPENSES.
 - TRAINING TO OWNER'S STAFF SHALL BE PROVIDED FOR ALL SYSTEM COMPONENTS (SENSOR, CONTROLS, LIGHTING CONTROL PANEL, ETC) BY MANUFACTURER AT ELECTRICAL CONTRACTOR'S EXPENSES.
 - POWER PACKS FOR LIGHTING SWITCHES/SENSORS NOT SHOWN ON DRAWING. PROVIDE QUANTITY AND TYPE OF POWER PACKS AS REQUIRED FOR PROPER OPERATION.
 - ROOM VACANCY SENSORS SHALL BE SET FOR MANUAL ON, AUTO OFF OPERATION. TIMEOUT AFTER 30 MINUTES.
 - ROOM OCCUPANCY SENSORS SHALL BE SET FOR AUTO ON, AUTO OFF OPERATION. TIMEOUT AFTER 30 MINUTES.

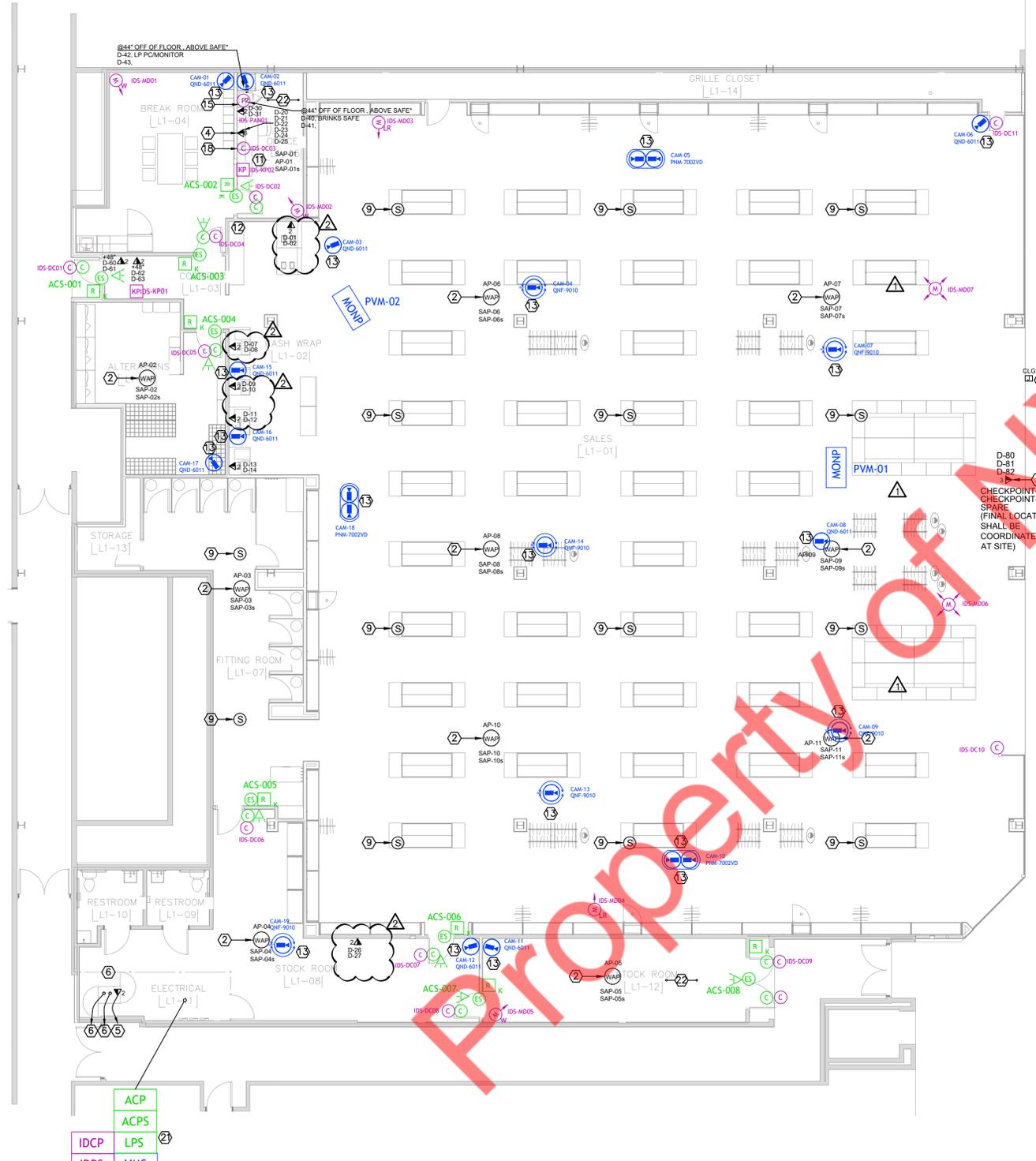
- LIGHTING GENERAL NOTES:**
- VERIFY ALL LUMINAIRE COLORS, TRIMS, LENGTHS, ETC. WITH THE ARCHITECT PRIOR TO PLACING FINAL PURCHASE ORDERS. SUBMISSION PF SHOP DRAWINGS WILL BE INTERPRETED AS HAVING BEEN COORDINATED WITH THE ARCHITECTURAL DRAWINGS.
 - PROVIDE ALL LENGTHS, FEEDS, ACCESSORIES, CONNECTORS, WIRING, POWER SUPPLIES, DRIVERS ETC. FOR A COMPLETE INSTALLATION. THE E.C. SHALL VERIFY THE COMPLETE BILL OF MATERIAL WITH MANUFACTURER'S REPRESENTATIVE AND ENSURE ALL EQUIPMENT ARE INCLUDED IN BID PRICE. COORDINATE INSTALLATION WITH ARCHITECTURAL DETAILS.
 - VERIFY FINAL LUMINAIRE LOCATIONS WITH OTHER CEILING MOUNTED EQUIPMENTS SUCH AS DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLANS.
 - VERIFY EXACT MOUNTING HEIGHT AND LOCATIONS OF ALL WALL MOUNTED LUMINAIRE WITH ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH-IN
 - ANY PROPOSED ALTERNATE LUMINAIRES SHALL BE APPROVED BY THE ARCHITECT PRIOR TO FINAL BID PRICING.
 - SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS, EQUIPMENT AND DEVICES OTHER THAN THOSE SPECIFIED AND LISTED, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS, TO THE ENGINEERS AT LEAST TEN (10) BUSINESS DAYS PRIOR TO BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID AND SHALL INCLUDE A COMPLETE SPECIFICATIONS CUTSHEET SUBMITTAL AS OUTLINED IN THE SPECIFICATIONS, COMPLETE WITH DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE WITH THE SUBSTITUTION SUBMITTAL AND ON THE BID FORM.
 - ALL FIXTURES INDICATED AS EMERGENCY SHALL BE PROVIDED WITH 90-MINUTE BATTERY PACK AND ALL FLORECENT FIXTURES INDICATED AS EMERGENCY SHALL BE PROVIDED WITH 1300LUMENS, 90MINUTE BATTERY PACK.
 - PROVIDE SHATTER-RESISTANT LAMPS OR PROVIDE CLEAR LENSES ON ALL FIXTURES LOCATED ABOVE ALL KITCHEN AREA.
 - VERIFY FINAL SELECTION OF LIGHT FIXTURES WITH ARCHITECT.

- ELECTRICAL LIGHTING PLAN KEYED WORK NOTES:**
- WIRE ALL EMERGENCY, EXIT LIGHT AND NIGHT LAMPS AHEAD OF SWITCHING FOR CONTINUOUS OPERATIONS. CONNECT IT TO THE ADJACENT LIGHTING CIRCUIT.
 - MOUNT VACANCY SENSOR/OCCUPANCY SENSOR AT SAME HEIGHT AS PENDANT LIGHT FIXTURE. TYPICAL NOTE FOR SENSORS INSTALLED IN AREAS WITH PENDANT LIGHT FIXTURES.
 - WIRE THRU LIGHTING CONTROL PANEL "LCP".
 - CIRCUIT SHALL BE CONTROLLED BY:
 - * TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - * BUTTONS #1&2 OF MOMENTARY LOW VOLTAGE SWITCH "Lvo" FOR DIMMING CONTROL.
 - * BUTTON #3 OF MOMENTARY LOW VOLTAGE SWITCH "Lvc" TO MANUALLY TURN ON/TURN OFF LIGHT DURING STORE HOURS.
 - CIRCUIT SHALL BE CONTROLLED BY:
 - * TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - * BUTTONS #4&5 OF MOMENTARY LOW VOLTAGE SWITCH "Lvo" FOR DIMMING CONTROL.
 - * BUTTON #6 OF MOMENTARY LOW VOLTAGE SWITCH "Lvc" TO MANUALLY TURN ON/TURN OFF LIGHT DURING STORE HOURS.
 - CIRCUIT SHALL BE CONTROLLED BY:
 - * TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - * BUTTON #7&8 OF MOMENTARY LOW VOLTAGE SWITCH "Lvo" FOR DIMMING CONTROL.
 - * BUTTON #9 OF MOMENTARY LOW VOLTAGE SWITCH "Lvc" TO MANUALLY TURN ON/TURN OFF LIGHT DURING STORE HOURS.
 - CIRCUIT SHALL BE CONTROLLED BY:
 - * TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - * BUTTON #10 OF MOMENTARY LOW VOLTAGE SWITCH "Lvc" TO MANUALLY TURN ON/TURN OFF LIGHT DURING STORE HOURS.
 - CIRCUIT SHALL BE CONTROLLED BY:
 - * TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - * BUTTON #11 OF MOMENTARY LOW VOLTAGE SWITCH "Lvc" TO MANUALLY TURN ON/TURN OFF LIGHT DURING STORE HOURS.
 - CIRCUIT SHALL BE CONTROLLED BY:
 - * TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - * BUTTON #12 OF MOMENTARY LOW VOLTAGE SWITCH "Lvc" TO MANUALLY TURN ON/TURN OFF LIGHT DURING STORE HOURS.
 - PROVIDE POWER CONNECTION FOR STOREFRONT SIGN. COORDINATE EXACT LOCATION WITH OWNER/SIGN'S VENDOR INSTALLER. PROVIDE PERMANENT HANDLE PADLOCK ATTACHMENT FOR CIRCUIT BREAKER.
 - NOT USED.
 - NOT USED.
 - LOW VOLTAGE SWITCH "d" SHALL BE USED AS MANUAL OVERRIDE SWITCH TO TURN ON LIGHT FIXTURES OF SALES AREA/FITTING AREA FOR 2-HRS AFTER NORMAL STORE HOURS. PROVIDE WIRES AND CONNECT TO LIGHTING CONTROL PANEL "LCP".
 - APPROXIMATE LOCATION FOR SWITCH BANK FOR SALES FLOOR LIGHTING. CONFIRM LOCATION WITH OWNER PRIOR TO ANY WORK.
 - LIGHTING CONTROL PANEL "LCP" WITH INTEGRAL TIME CLOCK, 24 LATCHING RELAYS AND 0-10V DIMMING CAPABILITY
 - * PROVIDE CONTROL WIRES FROM LIGHTING CONTROL PANEL TO MOMENTARY LOW VOLTAGE SWITCHES, REFER TO KEYNOTES #13 & #14.
 - * PROVIDE DIMMING WIRES TO RECESSED LIGHT FIXTURES IN SALES AREA AND FITTING AREA.
 - * CONNECT TO CIRCUIT #A-25.
 - * REFER TO DETAIL #1 IN SHEET #E5.03 FOR MORE INFORMATION.
 - TRACK LIMITING CURRENT PANEL (TLCP) WITH CIRCUIT BREAKERS (EQUAL TO #G-16-5-120V-1-16, LEVITON). REFER TO DETAIL #2 IN THIS SHEET FOR RATING OF CIRCUIT BREAKER.
 - WIRE THRU TRACK LIMITING CURRENT PANEL.
 - CONTRACTOR TO PROVIDE 120V BLUE INDICATOR LAMP (EQUAL TO #XB4BV6G, SQUARE D) TO INDICATE STATUS OF EACH GROUP OF LIGHT FIXTURES CONTROLLED BY LIGHTING CONTROL PANEL. MOUNT INDICATOR LAMPS ON PANEL ABOVE SWITCH BANK. PROVIDE LABEL FOR EACH INDICATOR LAMP. PROVIDE WIRES AND CONDUITS AND CONNECT EACH INDICATOR LAMP TO SAME LIGHTING CIRCUIT OF LIGHT FIXTURES INDICATED BY LAMP. REFER TO DETAIL #1 IN SHEET #E5.02.
 - NOT USED.
 - E.C. TO COORDINATE WITH LOW VOLTAGE VENDOR FOR EXACT LOCATION & WIRING FOR MOTION SENSOR.

- FLOOR POWER PLAN KEYED NOTES:**
1. LOCATION FOR NEW POWER PANEL.
 2. LOCATION OF IT RACK.
 3. NOT USED.
 4. NOT USED.
 5. NEW LOCATION FOR TRANSFORMER "T1". TRANSFORMER SHALL BE FLOOR MOUNTED.
 6. NOT USED.
 7. TELECOMMUNICATION MAIN GROUNDING BAR:
 - CONTRACTOR TO PROVIDE TELECOMMUNICATION GROUNDING BAR (EQUAL TO PANDUIT, #GB4B1028TP1-1).
 - CONTRACTOR TO PROVIDE LABEL AS PER TIA/EIA STANDARDS.
 - PROVIDE #6AWG GROUNDING WIRE IN 1" CONDUITS AND CONNECT TO GROUNDING BAR OF PANEL "A1".
 - GROUND ALL METAL COMPONENTS (RACK, CABLE TRAY, ... ETC) IN IT ROOM TO TELECOMMUNICATION GROUNDING BAR.
 8. TOP RECEPTACLE OF HALF SHADED RECEPTACLES SHALL BE CONTROLLED BY VACANCY SENSOR SHOWN ON LIGHTING PLAN TO AUTOMATICALLY TURN-OFF BOTTOM OUTLET WITHIN 20MIN OF ALL OCCUPANTS LEAVING SPACE. PROVIDE POWER PACK/SLAVE ACK FOR EACH CIRCUIT AND CONNECT POWER PACK/SLAVE PACK TO VACANCY SENSOR. RUN CIRCUIT FEEDING TOP RECEPTACLE OF HALF SHADED RECEPTACLE THRU POWER PACK. BOTTOM RECEPTACLE SHALL NOT BE CONTROLLED BY VACANCY SENSOR. TOP RECEPTACLE SHALL BE PERMANENTLY MARKED AS PER NEC 406.3 (E) AND PROVIDED IN GREEN COLOR. TYPICAL NOTE FOR HALF SHADED OUTLET.
 9. PROVIDE POWER CONNECTION/RECEPTACLE FOR EMPLOYEE TIME CLOCK, MOUNT AT 48" A.F.F.. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT WITH ARCHITECT/OWNER PRIOR TO ANY WORK AND MODIFY AS NEEDED.
 10. PROVIDE DELIVERY BUZZER SYSTEM. PROVIDE PUSH BUTTON AT DOOR (EQUAL TO #852, EDWARDS), BUZZER AT TOCK ROOM (EQUAL TO #340-4G5-24VAC, EDWARDS) AND ANOTHER BUZZER AT MANAGER OFFICE (EQUAL TO 340-4G5-24VAC, EDWARDS) AND STEP DOWN TRANSFORMER 120V-24V IN NEMA 1 ENCLOSURE (EQUAL TO #592, EDWARDS) COORDINATE LOCATION OF BUZZER WITH OWNER.
 11. NOT USED.
 12. NOT USED.
 12. NOT USED.
 13. NOT USED.
 14. CIRCUIT SHALL BE CONTROLLED BY:
 - TIME CLOCK IN LIGHTING CONTROL PANEL "LCP".
 - BUTTON "14" OF MOMENTARY LOW VOLTAGE SWITCH "LVc" TO MANUALLY TURN ON/TURN OFF DISPLAY CASE DURING STORE HOURS.
 15. WIRE THRU LIGHTING CONTROL PANEL "LCP".
 16. NOT USED.
 17. NOT USED.
 18. CONTRACTOR SHALL REVIEW ALL THE REFER TO ARCHITECTURAL DETAILS FOR ALL DEVICE.
 19. NOT USED.
 20. NOT USED.
 21. NOT USED.
 22. CONTRACTOR SHALL REVIEW ALL THE REFER TO ARCHITECTURAL DETAILS FOR ALL DEVICE INSTALLATIONS ON THE MILLWORK BEFORE ANY ROUGH INSTALLATIONS.
 23. PROVIDE POWER CONNECTION FOR HEAT TRACE'S CONTROLLER. COORDINATE EXACT LOCATION WITH PLUMBING CONTRACTOR.
 24. PROVIDE 2#10AWG, 1#10AWG "G" IN 3/4" CONDUIT.
 25. PROVIDE POWER CONNECTION/RECESSED JUNCTION BOX FOR HAND DRYER. COORDINATE EXACT LOCATION WITH ARCHITECT. PROVIDE PERMANENT HANDLE PADLOCK ATTACHMENT FOR CIRCUIT BREAKER. TYPICAL NOTE FOR JUNCTION BOX WITH PREFIX "HD".
 26. PROVIDE CEILING MOUNTED OUTLET FOR EAS SYSTEM. CONTRACTOR TO COORDINATE EXACT REQUIREMENT FOR EAS WITH SYSTEM'S VENDOR/INSTALLER PRIOR TO ANY WORK/ROUGH-IN AND MODIFY AS NEEDED.
 27. NOT USED.
 28. PROVIDE JUNCTION BOX ABOVE CEILING FOR CONNECTION WITH SECURITY POWER PANELS. COORDINATE EXACT LOCATION IN FILED PRIOR TO ROUGH-IN. PROVIDE HARDWIRE TO SECURITY PANELS.
 29. PROVIDE RECEPTACLE FOR INTRUSION TRANSFORMER. MOUNT OUTLET ON WALL TIGHT TO CEILING (BELOWCEILING). COORDINATE EXACT LOCATION IN FIELD PRIOR TO ROUGH-IN. COORDINATE REQUIREMENT WITH SECURITY SYSTEM'S VENDOR.
 30. PROVIDE RECEPTACLE MOUNTED ON WALL ABOVE SAFE FOR HAWKEYE MONITORS. MOUNT AT 44" A.F.F. TO CENTER OF RECEPTACLE.
 31. PROVIDE RECEPTACLE FOR ACCESS CONTROL SYSTEM. COORDINATE EXACT LOCATION IN FIELD PRIOR TO ANY WORK, COORDINATE WITH SECURITY SYSTEM VENDOR.
 32. MOUNT OUTLET ABOVE RACK. COORDINATE LOCATION AND MOUNTING HEIGHT OF OUTLET FOR IT-A/V RACK WITH OWNER/SYSTEM'S VENDOR PRIOR TO ANY WORK.
 33. OUTLET FOR INTRUSION DETECTION CONTROL PANEL.
 34. PROVIDE DISCONNECT SWITCH/RECEPTACLE FOR CONDENSATE PUMP. COORDINATE EXACT LOCATION WITH PLUMBING CONTRACTOR.
 35. CEILING OUTLET FOR SECURITY MONITOR. COORDINATE EXACT LOCATION WITH OWNERS/SCRUTINY VENDOR.
 36. OUTLET SHALL BE MOUNTED @15" A.F.F. U.O.N. TYPICAL NOTE.
 37. PROVIDE RECEPTACLE FOR SECURITY MONITOR. COORDINATE EXACT MOUNTING HEIGHT & LOCATION WITH OWNER/SCRUTINY VENDOR. RECEPTACLE SHALL BE PENNANT FROM CEILING WITH JUNCTION BOX & THREADED ROD FOR MONITOR AT SALES FLOOR.
 38. PROVIDE JUNCTION BOX FOR DOOR BELL. PROVIDE NECESSARY WIRING, BREAKER AND BRANCH CIRCUIT AS REQUIRED.



COORDINATE EXACT LOCATION OF ALL SECURITY DEVICES, SPEAKER, CAMERA, ACCESS CONTROL DEVICES AND INTRUSION DETECTION WITH RESPECTIVE VENDOR



- ### ELECTRICAL LOW VOLTAGE PLAN KEY NOTES
- PROVIDE DATA OUTLET ON CEILING FOR EAS SYSTEM, COORDINATE WITH OWNERS/VENDOR EXACT LOCATION PRIOR TO ANY WORK/ROUGH-IN. PROVIDE ONE (1) CAT6, PLENUM RATED CABLE FROM DATA OUTLET TO NETWORK SWITCH IN IT RACK. PROVIDE ONE (1) CAT6, PLENUM RATED CABLE FROM DATA OUTLET TO DVR IN MANAGER'S OFFICE.
 - PROVIDE JUNCTION BOX WITH 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS FOR EACH WIRELESS ACCESS POINT. PROVIDE TWO (2) CAT6, PLENUM RATED CABLES IT RACK. WHERE WAP IS INSTALLED IN AREAS WITH OPEN CEILING, CONTRACTOR TO MOUNT JUNCTION BOX AT SAME HEIGHT AS PENDANT LIGHT FIXTURE. COORDINATE EXACT LOCATION WITH OWNER/IT CONTRACTOR. TYPICAL NOTE FOR "WAP".
 - NOT USED.
 - MOUNT OUTLET ON WALL ABOVE SAFE FOR HAWKEYE MONITORS. MOUNT AT 44" A.F.F. TO CENTER OF OUTLET.
 - PROVIDE SIX (6) DATA OUTLETS (SECURITY, CCTV, MUSIC, VIDEO, REMOTE DEVICES FOR IT RACK & PHONE), MOUNT OUTLET ABOVE IT RACK.
 - LOCATION FOR IT/AV RACK.
 - CONTRACTOR TO EXTEND EXISTING TELEPHONE CONDUIT (FULL SIZE) FROM LANDLORD'S MAIN TELEPHONE BOARD - VERIFY LOCATION OF STUB-UP INSIDE TENANT'S SPACE IN FIELD - TO LOCATION OF IT RACK. TERMINATE CONDUIT ABOVE IT RACK (@84" A.F.F.). CONTRACTOR IS RESPONSIBLE TO PROVIDE NEW TELEPHONE SERVICE FROM LANDLORD'S MAIN TELEPHONE BOARD FOR TENANT'S SPACE. COORDINATE WITH OWNER, LANDLORD & LOCAL UTILITY COMPANY. PROVIDE FIBER OPTIC CABLES IF AVAILABLE (PREFERRED), CONTRACTOR TO TERMINATE FIBER OPTIC CABLES INSIDE AT BOTH ENDS AS PER TIA/EIA STANDARDS.
 - PROVIDE EIGHT (8) 4" SLEEVES UP THROUGH CEILING TO CEILING SPACE FOR DATA CABLES. SEAL OPENING WITH FIRE STOPPING MATERIALS AFTER CABLE INSTALLATION. SLEEVES SHALL 6" IN LENGTH, 3" BELOW CEILING AND 3" ABOVE CEILING.
 - CEILING MOUNTED SPEAKER, 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. WHERE SPEAKER IS INSTALLED AT OPEN CEILING SPACE, CONTRACTOR TO MOUNT JUNCTION BOX AT SAME HEIGHT AS PENDANT LIGHT FIXTURE. REFER TO TECHNOLOGY SHOP DRAWINGS FOR MORE INFORMATION. TYPICAL NOTE FOR ALL SPEAKER.
 - WALL MOUNTED SPEAKER. PROVIDE RECESSED JUNCTION BOX AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. REFER TO TECHNOLOGY SHOP DRAWINGS FOR MORE INFORMATION. TYPICAL NOTE FOR ALL SPEAKER.
 - PROVIDE RECESSED 1-GANG J-BOX MOUNTED @48" A.F.F. FOR AUDIO CONTROLS. PROVIDE 1" CONDUIT WITH PULL STRING TO AV RACK. REFER TO TECHNOLOGY SHOP DRAWINGS FOR MORE INFORMATION.
 - MICROPHONE. PROVIDE RECESSED BACK BOX, COVER PLATE AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. LOCATE BACKBOX BELOW COUNTER TOP BUT ABOVE TOP SHELF. BACKBOX TO BE LOCATED INSIDE OF CABINET AT 24" A.F.F.. VERIFY EXACT LOCATION AND COORDINATE INSTALLATION WITH WITH COUNTER TOP GROMMET. REFER TO TECHNOLOGY SHOP DRAWINGS FOR MORE INFORMATION.
 - SECURITY CAMERA. PROVIDE JUNCTION BOX AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. CONFIRM LOCATION AND MOUNTING HEIGHT WITH SECURITY SYSTEM'S VENDOR. REFER TO SECURITY SYSTEM SHOP DRAWINGS FOR MORE INFORMATION. TYPICAL NOTE FOR ALL SECURITY CAMERA.
 - SECURITY MONITOR. PROVIDE JUNCTION BOX, 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS. CONFIRM LOCATION AND MOUNTING HEIGHT WITH SECURITY SYSTEM'S VENDOR. REFER TO SECURITY SYSTEM SHOP DRAWINGS FOR MORE INFORMATION. TYPICAL NOTE FOR ALL SECURITY MONITOR.
 - PROVIDE A V5751 WIREMOLD EXTENSION BOX ONTO RECESSED SINGLE GANG MUD RING WITH SINGLE GANG BLANK COVER MOUNTED BELOW DESK FOR PANIC BUTTON. PROVIDE 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS.
 - PROVIDE J-BOX WITH COVER PLATE CENTERED ON SOTIE FOR SOUNDER. PROVIDE 1/2" CONDUIT WITH PULL STRING TO EAS CONTROLLER.
 - NOT USED.
 - SAFE'S CONTACT. REFER TO DETAIL IN THIS SHEET FOR MORE INFORMATION.
 - NOT USED.
 - ALL OUTLET SHALL BE MOUNTED @15" A.F.F. U.O.N. TYPICAL NOTE.
 - E.C TO COORDINATE WITH RESPECTIVE VENDOR FOR EXACT PANEL LOCATION OF ACP, LPS, VMS AND IDCP.

- ### LOW VOLTAGE SYSTEMS GENERAL NOTES
- ALL LOW VOLTAGE WORK SHALL MEET ALL FEDERAL, STATE AND LOCAL CODES.
 - INDICATION HERE OF TEL/COM, SECURITY AND ACCESS CONTROL EQUIPMENT IS FOR COORDINATION PURPOSES ONLY. COORDINATE ACTUAL LOCATIONS, QUANTITIES AND ADDITIONAL REQUIREMENTS WITH RESPECTIVE VENDORS.
 - GENERAL CONTRACTOR/ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING & INSTALLING NEW MAIN TELEPHONE SERVICE FOR SPACE (FIBER OPTIC CABLE IS PREFERRED). CONTRACTOR TO COORDINATE WITH LANDLORD & LOCAL TELEPHONE COMPANY.
 - PROVIDE BACK BOX AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS FOR EACH TELEPHONE/DATA OUTLET.
 - WHERE DATA OUTLETS ARE LOCATED IN SPACES WITH GYPSUM BOARD CEILING, CONTRACTOR TO EXTEND DATA CONDUIT TILL SPACES WITH SUSPENDED CEILING TILES AND TERMINATE CONDUIT AT ACCESSIBLE LOCATION.
 - CONTRACTOR TO PROVIDE CAT6 PLENUM RATED CABLES (QUANTITY EQUAL TO NUMBER OF JACKS) FROM EACH DATA OUTLETS TILL THE LOCATION OF IT RACK. LEAVE AT LEAST 20' EXTRA LENGTH AT BOTH ENDS FOR FINAL TERMINATION.
 - ALL DATA CABLES SHALL BE TERMINATED AT POINT OF USE BY ELECTRICAL CONTRACTOR.
 - ALL DATA CABLES SHALL BE TERMINATED AT IT RACK IN CAT6 PATCH PANELS BY ELECTRICAL CONTRACTOR.
 - ALL DATA CABLES SHALL BE TERMINATED AT BOTH ENDS AND TESTED PER EIA/TIA BY ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO HIRE TELECOMMUNICATION CONTRACTOR TO PERFORM THE JOB AT ELECTRICAL CONTRACTOR'S EXPENSES. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO REPLACE ANY WIRING THAT DOES NOT PASS ALL REQUIRED TESTING.
 - DATA CABLES SHALL BE INSTALLED IN CONDUITS WHENEVER RUN CONCEALED IN WALLS, UNDER SLAB OR ABOVE GYPSUM BOARD CEILING. DATA CABLES SHALL BE PLENUM RATED WHENEVER RUN ABOVE SUSPENDED CEILING TILES IN PLENUM RATED SPACE.
 - CONTRACTOR TO PROVIDE J-HOOKS FOR PLENUM RATED DATA/TELEPHONE CABLES INSTALLED ABOVE SUSPENDED CEILING. J-HOOKS SHALL BE ATTACHED TO BUILDING STRUCTURE WITH INTERVAL NOT TO EXCEED 48" CENTER TO CENTER.
 - ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE LABELS FOR ALL DATA CONDUITS AT BOTH ENDS.
 - ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE LABELS FOR ALL DATA CABLES AT BOTH ENDS AS PER TIA/EIA STANDARDS.
 - NO MORE THAN TWO (2) 90° BENDS IN ONE RUN FOR TELEPHONE & DATA SYSTEM. IF CONDUIT RUN REQUIRES MORE THAN TWO (2) 90° BENDS, PROVIDE A PULL BOX AFTER EACH SET OF TWO (2) 90° BENDS.
 - LONG SWEEP ELBOWS SHALL BE USED FOR TELEPHONE AND DATA RACEWAYS.
 - MINIMUM SIZE OF CONDUIT FOR TELEPHONE/DATA SYSTEM SHALL BE 1", UNLESS NOTED OTHERWISE.
 - ALL EMPTY CONDUITS SHALL HAVE A PULL STRING WITH A MINIMUM 10' OF SLACK ON BOTH END.
 - PROVIDE BACK BOX AND 1" CONDUIT TILL CEILING SPACE WITH, PULL STRING, ONE 90° ELBOW AND PLASTIC BUSHING AT BOTH ENDS FROM EACH SECURITY DEVICE (SECURITY CAMERA, KEYPAD, MOTION SENSOR, CARD READER,....ETC).
 - ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE LABELS FOR ALL SECURITY CONDUITS AT BOTH ENDS.
 - SECURITY DEVICES SHALL BE PROVIDED AND INSTALLED BY OTHERS (SECURITY VENDOR).
 - SECURITY CABLES SHALL BE SUPPLIED & INSTALLED BY OTHERS (SECURITY VENDOR).
 - CONTRACTOR TO REFER TO SECURITY SYSTEM SHOP DRAWINGS FOR MORE INFORMATION.
 - PROVIDE BACK BOX AND 1" CONDUIT TILL CEILING SPACE WITH PULL STRING, ONE 90° ELBOW AND
 - ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE LABELS FOR ALL SOUND MUSIC SYSTEMS CONDUITS AT BOTH ENDS.
 - SOUND MUSIC SYSTEMS DEVICES SHALL BE PROVIDED AND INSTALLED BY OTHERS (SOUND MUSIC SYSTEMS VENDOR).
 - SOUND MUSIC SYSTEMS CABLES SHALL BE SUPPLIED AND INSTALLED BY OTHERS (SOUND MUSIC SYSTEMS VENDOR).
 - CONTRACTOR TO REFER TO SOUND SYSTEM SHOP DRAWINGS FOR MORE INFORMATION. PLASTIC BUSHING AT BOTH ENDS FROM EACH SPEAKER.

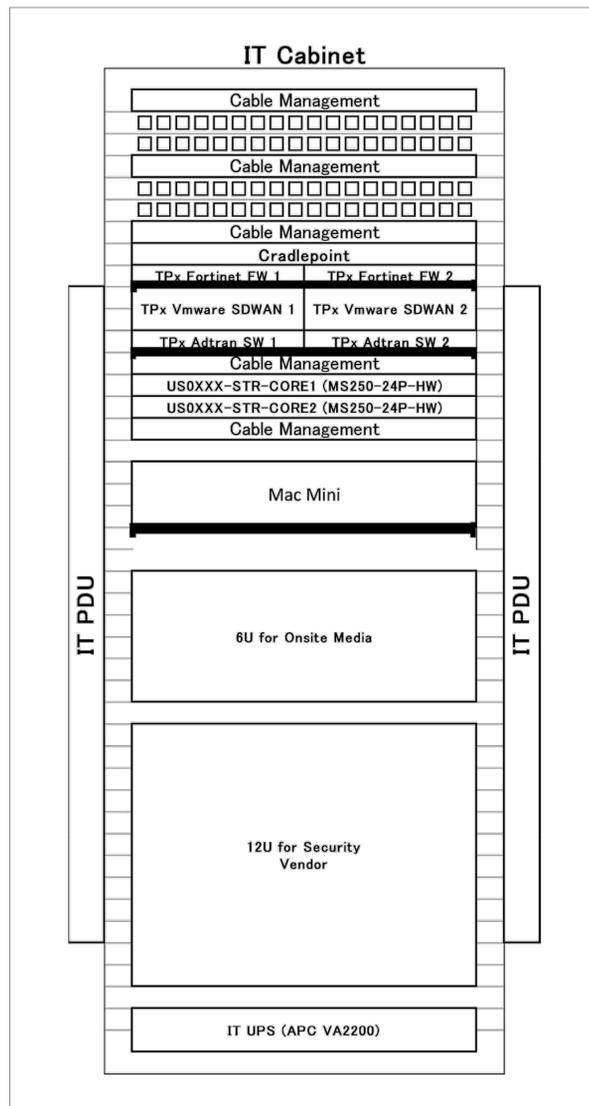
VIDEO MANAGEMENT SYSTEM SYMB		ACCESS CONTROL SYMBOLS		INTRUSION DETECTION SYMBOLS	
SYMB	DESCRIPTION	SYMB	DESCRIPTION	SYMB	DESCRIPTION
VMS	VIDEO MANAGEMENT SYSTEM HEAD END	ACP	ACCESS CONTROL PANEL	IDCP	INTRUSION DETECTION CONTROL PANEL
VUPS	VIDEO MANAGEMENT SYSTEM UPS-RACK	ACPS	ACCESS CONTROL POWER SUPPLY	IDPS	INTRUSION DETECTION POWER SUPPLY
VSSR	VIDEO MANAGEMENT SYSTEM SERVER - RACK	LPS	LOCK POWER SUPPLY	CELL	CELLULAR DIALER
VARC	VIDEO MANAGEMENT SYSTEM ARCHIVER	ECB	EMERGENCY CALLBOX	POC	POINT OF CONNECTION
VYMF	VIDEO MANAGEMENT SYSTEM -FAIL-OVER	R	CREDENTIAL READER	PRN	PRINTER
VSTO	VIDEO MANAGEMENT SYSTEM STORAGE	R _K	CREDENTIAL READER-KEYPAD	GW	GATEWAY
NVR	NETWORK VIDEO RECORDER	R _P	CREDENTIAL READER-PINPAD	M _L	MOTION DETECTOR - LONG RANGE
DVR	DIGITAL VIDEO RECORDER	MP	MOUNTING PEDESTAL	M _W	MOTION DETECTOR - WIDE RANGE
NVE	NETWORK VIDEO ENCODER	RM	READER MODULE ENCLOSURE	M _C	MOTION DETECTOR - 360° CEILING MOUNTED
SCS	SINGLE CHANNEL ENCODER	C	DOOR CONTACT		
MCE	MULTI CHANNEL ENCODER	EL	ELECTRIC LOCK - GENERIC		
MON	PUBLIC VIEW MONITOR	ES	ELECTRIC STRIKE		
POE-I	POWER OVER ETHERNET INJECTOR	TH	TRANSFER HINGE - ELECTRIC		
POE	NETWORK SWITCH - POE	REX	REX - MOTION DETECTOR		
CS	NETWORK CORE SWITCH	DR	DOOR RELEASE BUTTON		
VCL	VIDEO MANAGEMENT SYSTEM CLIENT	E-LS	EMERGENCY LOCK RELEASE STATION		
MON	MONITOR	P-LS	EMERGENCY LOCK RELEASE PULLSTATION		
KBC	KEYBOARD CONTROLLER	CB	CRASH BAR		
PTZ-C	PTZ CONTROLLER	CD	CHEXIT DEVICE		
C	CAMERA	PB	PANIC BAR		
DC	DOME CAMERA	PP	PUSHPLATE		
M-W	CAMERA MOUNT - WALL	CR	CONTROL RELAY		
M-I	CAMERA MOUNT - INTERIOR CORNER	KAC	FIRE ALARM RELAY RELEASE ACCESS CONTROL (BY OTHERS)		
M-E	CAMERA MOUNT - EXTERIOR CORNER	P	PANIC BUTTON		
M-P	CAMERA MOUNT - PENDANT	KS	KEYSWITCH		
M-Pole	CAMERA MOUNT - POLE	GC	GATE CONTROLLER		
M-Parapet	CAMERA MOUNT - ROOF/PARAPET	KA	KEYPAD - ALPHANUMERIC		
		AO	AUTO OPERATOR		
		DH	DOOR HOLDER		
		ZEM	ZONE EXPANSION MODULE		

CAMERA ABBREVIATIONS	
SYMB	DESCRIPTION
B	BULLET
COV	COVERT
IP	INTERNET PROTOCOL
IR	INFRARED
MXP	MEGA-PIXEL X-RESOLUTION EG. 5MP
NV	NIGHT VISION
PTZ	PAN/TILT/ZOOM
TH	THERMAL
VR	VANDAL RESISTANT
90°	90 DEGREES
180°	180 DEGREES
270°	270 DEGREES
360°	360 DEGREES

MULTI LENS CAMERAS	
	2 LENS MULTI DIRECTIONAL
	180° FIXED CAMERA
	270° FIXED CAMERA
	360° FIXED CAMERA
	360° FIXED CAMERA w/PTZ
	PTZ CAMERA

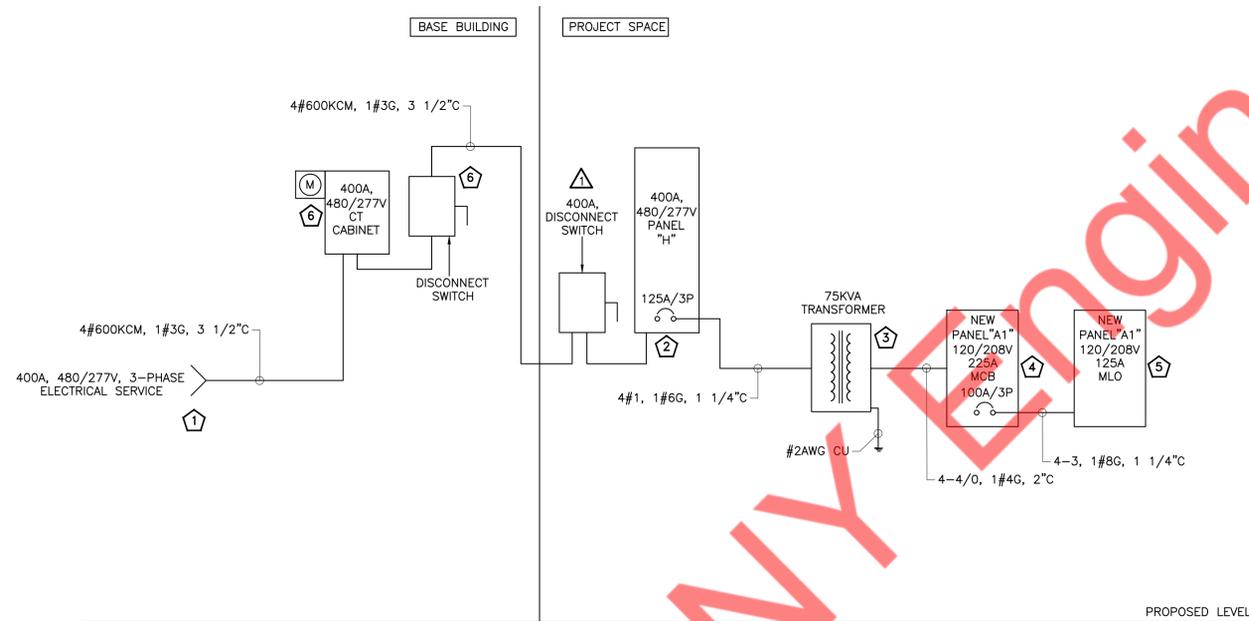
ELECTRICAL SYMBOLS	
SYMB	DESCRIPTION
	DATA JACK
	DATATELCO JACK

ELECTRICAL LOW VOLTAGE PLAN | 1
1/8" = 1'-0"



PATCH PANEL # 1			
PATCH PANEL PORT	ID	LOCATION	PURPOSE
1	D-01	Cash Wrap	POS 1
2	D-02	Cash Wrap	Spare
3	D-03	Cash Wrap	POS 2
4	D-04	Cash Wrap	Spare
5	D-05	Cash Wrap	Temp POS
6	D-06	Cash Wrap	Spare
7	D-07	Cash Wrap	Self Checkout 1
8	D-08	Cash Wrap	Spare
9	D-09	Cash Wrap	Self Checkout 2
10	D-10	Cash Wrap	Spare
11	D-11	Cash Wrap	Self Checkout 3
12	D-12	Cash Wrap	Spare
13	D-13	Cash Wrap	Self Checkout 4
14	D-14	Cash Wrap	Spare
15	D-20	Manager Room	Store Cloud Laptop MO
16	D-21	Manager Room	Printer A
17	D-22	Manager Room	Printer B
18	D-23	Manager Room	Spare
19	D-24	Manager Room	Sato A
20	D-25	Manager Room	Spare
21	D-26	Stock Room	Printer C
22	D-27	Stock Room	Spare
23	D-30	Manager Room	Phone
24	D-31	Manager Room	Spare
25	D-40	Manager Room	Brink Safe
26	D-41	Manager Room	Spare
27	D-42	Manager Room	LP PC/Monitor
28	D-43	Manager Room	Spare
29	D-60	Employee Entrance	Time Clock 1
30	D-61	Employee Entrance	Spare
31	D-62	Employee Entrance	Time Clock 2
32	D-63	Employee Entrance	Spare
33	D-80	Entrance	Checkpoint 1
34	D-81	Entrance	Checkpoint 2
35	D-82	Entrance	Spare
36	SAP-01	Manager Room	Store AP1
37	SAP-01s	Manager Room	Spare
38	SAP-02	Alteration Room	Store AP2
39	SAP-02s	Alteration Room	Spare
40	SAP-03	Fitting Room	Store AP3
41	SAP-03s	Fitting Room	Spare
42	SAP-04	Stock Room	Store AP4
43	SAP-04s	Stock Room	Spare
44	SAP-05	Stock Room	Store AP5
45	SAP-05s	Stock Room	Spare
46	SAP-06	Sales floor	Store AP6
47	SAP-06s	Sales floor	Spare
48			
PATCH PANEL # 2			
PATCH PANEL PORT	ID	LOCATION	PURPOSE
1	SAP-07	Sales floor	Store AP7
2	SAP-07s	Sales floor	Spare
3	SAP-08	Sales floor	Store AP8
4	SAP-08s	Sales floor	Spare
5	SAP-09	Sales floor	Store AP9
6	SAP-09s	Sales floor	Spare
7	SAP-10	Sales floor	Store AP10
8	SAP-10s	Sales floor	Spare
9	SAP-11	Sales floor	Store AP11
10	SAP-11s	Sales floor	Spare
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23	D-98	POTS	Burglar Alarm POTS
24	D-99	POTS	Fire Alarm POTS

Property of SONY Engineers



RISER DIAGRAM GENERAL NOTES:

1. RISER DIAGRAM IS FOR REFERENCE PURPOSES ONLY. E.C. SHALL VERIFY EXACT POWER DISTRIBUTION IN FIELD AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.
2. E.C. SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION IN FIELD COORDINATION WITH OWNER/ARCHITECT.
3. ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (Isc) RATING WITH UTILITY COMPANY AND AHJ PRIOR TO COMMENCING ANY WORK.
4. E.C. TO VERIFY SCOPE OF WORK WITH LANDLORD/OWNER PRIOR TO BID.

NOTES:

ELECTRICAL SERVICE TO PROJECT SPACE SHALL PROVIDED BY LANDLORD, INCLUDING J-BOX, SERVICE DISCONNECT, METER WITH REQUIRED CT CABINET, SERVICE FEEDERS, CONDUIT, PANELS WITH FULLY LOADED BREAKERS PER PANEL SCHEDULE, DISCONNECT AND TRANSFORMER.

ELECTRICAL RISER KEYED WORK NOTES:

1. NEW 400 AMPS, 480/277V, 3-PH, 4-WIRE ELECTRICAL SERVICE FOR THE SPACE SHALL PROVIDED BY LANDLORD. E.C. SHALL COORDINATE WITH THE LANDLORD FOR EXACT POINT OF SUPPLY. BASE BID ACCORDINGLY.
2. NEW 400 AMPS, 480/277V, 3-PH, 4-WIRE ELECTRICAL PANEL "H" SHALL PROVIDED BY LANDLORD FOR PROJECT SPACE. E.C. SHALL COORDINATE WITH THE LANDLORD/OWNER FOR EXACT LOCATION OF HOUSE PANEL "H". BASE BID ACCORDINGLY.
3. NEW 75KVA ELECTRICAL TRANSFORMER WITH PRIMARY 480/277V AND SECONDARY 120/208V SHALL PROVIDED BY LANDLORD FOR PROJECT SPACE. E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
4. NEW 225 AMPS, 120/208V, 3-PH, 4-WIRE ELECTRICAL PANEL "A1" SHALL PROVIDED BY LANDLORD FOR PROJECT SPACE. E.C. SHALL COORDINATE WITH THE LANDLORD/OWNER FOR EXACT LOCATION OF HOUSE PANEL "A1". BASE BID ACCORDINGLY.
5. NEW 125 AMPS MLO, 120/208V, 3-PH, 4-WIRE ELECTRICAL PANEL "A" SHALL PROVIDED BY LANDLORD FOR PROJECT SPACE. E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
6. 400 AMPS, 480/277V, 3-PH ELECTRICAL METER BASE WITH CT CABINET & DISCONNECT SWITCH SHALL PROVIDED BY LANDLORD FOR PROJECT SPACE. E.C. TO COORDINATE WITH OWNER/UTILITY COMPANY FOR SERVICE METER AND PROVIDE METER IN METER EXISTING METER SOCKET.

GENERAL NOTES:

- ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE SHORT CIRCUIT STUDY, COORDINATION STUDY AND ARC FLASH LABEL FOR ALL PANEL BOARDS PRIOR OF PURCHASING OR SUBMITTAL.
- AIC RATING OF PANEL BOARDS IS SHOWN FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE TO VERIFY AIC RATING OF EACH PANEL BOARDS VIA SHORT CIRCUIT STUDY.
- ELECTRICAL CONTRACTOR IS RESPONSIBLE TO REPLACE ANY DEVICES/EQUIPMENT AS REQUIRED BY SHORT CIRCUIT STUDY AND COORDINATION STUDY REPORTS.
- ELECTRICAL CONTRACTOR IS RESPONSIBLE TO BALANCE ALL PHASES WITHIN 10% USING ACTUAL LOADS.
- ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE CIRCUIT DIRECTORY FOR EACH PANEL BOARD IN PROTECTIVE PLASTIC SLEEVE.

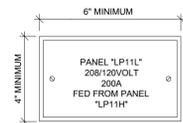
ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE SHORT CIRCUIT STUDY, COORDINATION STUDY AND ARC FLASH LABELS FOR ALL PANEL BOARDS PRIOR OF PURCHASING OR SUBMITTAL.

PANEL: H (NEW)										MOUNTING:		SURFACE			
480Y/277		VOLTS,		3		PHASE,		4		WIRE					
MAIN CB		400A		MLO:		NA		BUS:		400A					
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1			M	22.96		36.79				13.83	H			2	
3	125/3P	75 KVA TRANSFORMER	M	22.96	4#1, #6G, 1 1/4" C		36.79		3#6, #10G, 3/4" C	13.83	H	FCU-3(N)	60/3P	4	
5			M	22.96				36.79		13.83	H			6	
7			H	13.83		27.65			3#6, #10G, 3/4" C	13.83	H	FCU-4(N)	60/3P	8	
9	60/3P	FCU-1(N)	H	13.83	3#6, #10G, 3/4" C		27.65			13.83	H			10	
11			H	13.83				27.65		13.83	H			12	
13			H	13.83		13.83								14	
15	60/3P	FCU-2(N)	H	13.83	3#6, #10G, 3/4" C			13.83				SPARE	60/3P	16	
17			H	13.83					13.83					18	
19		SPACE				0.00								20	
21		SPACE					0.00					SPARE	60/3P	22	
23		SPACE						0.00						24	
25		SPACE				0.00						SPARE	20	26	
27		SPACE					0.00					SPARE	20	28	
29		SPACE						0.00				SPARE	20	30	
TOTAL CONNECTED LOAD (KVA)						78.26	78.26	78.26							

PANEL: A1 (NEW)										MOUNTING:		SURFACE			
208Y/120		VOLTS,		3		PHASE,		4		WIRE					
MAIN CB		225A		MLO:		NA		BUS:		225A					
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1	20	IT/AV RACK EQUIPMENT	R	1.70	2#12, #12G, 3/4" C	2.24			2#12, #12G, 3/4" C	0.54	R	RECEPTACLE- BREAK ROOM	20	2	
3	20	IT/AV RACK EQUIPMENT	R	1.70	2#12, #12G, 3/4" C		2.95		2#12, #12G, 3/4" C	1.25	R	REFRIGERATOR @ BREAKROOM	20	4	
5	20	SPARE						1.25	2#12, #12G, 3/4" C	1.25	R	REFRIGERATOR @ BREAKROOM	20	6	
7	20	SPARE				0.72			2#12, #12G, 3/4" C	0.72	R	RECEPTACLE- COUNTER TOP @ BREAKROOM	20	8	
9	20	SECURITY ACCESS CONTROL	R	1.00	2#12, #12G, 3/4" C		2.20		2#12, #12G, 3/4" C	1.20	R	RECEPTACLE- COUNTER TOP @ BREAKROOM	20	10	
11	20	RECEPTACLE-UTILITY ROOM	R	0.54	2#12, #12G, 3/4" C			1.04	2#12, #12G, 3/4" C	0.50	L	EMPLOYEE TIME CLOCK @ CORRIDOR	20	12	
13	20	SPARE				0.00						SPARE	20	14	
15	20	RECEPTACLE- STOCK ROOM	R	1.08	2#12, #12G, 3/4" C		1.44		2#12, #12G, 3/4" C	0.36	R	RECEPTACLE- OFFICE	20	16	
17	20	SECURITY PANEL	R	1.00	2#12, #12G, 3/4" C			1.36	2#12, #12G, 3/4" C	0.36	R	RECEPTACLE- OFFICE	20	18	
19	20	RECEPTACLE- SANTO @ OFFICE	R	1.00	2#12, #12G, 3/4" C	1.36			2#12, #12G, 3/4" C	0.36	R	RECEPTACLE- OFFICE	20	20	
21	20	DOOR BELL	R	0.50	2#12, #12G, 3/4" C		1.00		2#12, #12G, 3/4" C	0.50	R	SECURITY SYSTEM	20	22	
23	20	HAND DRYER	O	1.80	2#12, #12G, 3/4" C			2.52	2#12, #12G, 3/4" C	0.72	R	RECEPTACLE- OFFICE	20	24	
25	20	HAND DRYER	O	1.80	2#12, #12G, 3/4" C	2.16			2#12, #12G, 3/4" C	0.36	R	RECEPTACLE- ALTERATION ROOM	20	26	
27	20	RECEPTACLE- BATHROOM	R	0.36	2#12, #12G, 3/4" C		0.72		2#12, #12G, 3/4" C	0.36	R	RECEPTACLE- ALTERATION ROOM	20	28	
29	20	SPARE						0.36	2#12, #12G, 3/4" C	0.36	R	RECEPTACLE- ALTERATION ROOM	20	30	
31	20	SECURITY MONITOR	R	0.36	2#12, #12G, 3/4" C	1.26			2#12, #12G, 3/4" C	0.90	E	RECEPTACLE- ALTERATION ROOM	20	32	
33	20	SECURITY MONITOR	R	0.36	2#12, #12G, 3/4" C		2.44		2#10, #10G, 3/4" C	2.08	O	ELCTRICAL WATER HEATER (EWH-2)	30/2P	34	
35	15/2P	HEAT TRACE	H	0.25	2#12, #12G, 3/4" C			2.33		2.08	O			36	
37			H	0.25		1.15			2#12, #12G, 3/4" C	0.90	R	RECEPTACLE- ALTERATION ROOM	20	38	
39	20/2P	ELCTRICAL WATER HEATER (EWH-1)	O	1.25	2#12, #12G, 3/4" C		1.25					SPARE	20	40	
41			O	1.25				1.61	2#12, #12G, 3/4" C	0.36	M	EF-1	20	42	
43	20	HWCP-1	M	1.40	2#12, #12G, 3/4" C	1.76			2#12, #12G, 3/4" C	0.36	M	EF-2	20	44	
45	20	INTRUSION DETECTION CONTROL PANEL	R	0.36	2#12, #12G, 3/4" C		0.36					SPARE	20	46	
47	20	MOTORIZED DAMPER	M	0.50	2#12, #12G, 3/4" C			0.86	2#12, #12G, 3/4" C	0.36	M	HAWKEY MONITOR @ MANAGER OFFICE	20	48	
49	20	SPARE				1.20			2#12, #12G, 3/4" C	1.20	M	CONDENSATE PUMPS	20	50	
51	20	SPARE					1.20		2#12, #12G, 3/4" C	1.20	M	CONDENSATE PUMPS	20	52	
53	20	SPARE						1.20	2#12, #12G, 3/4" C	1.20	M	CONDENSATE PUMPS	20	54	
55			O	10.02		11.22			2#12, #12G, 3/4" C	1.20	M	CONDENSATE PUMPS	20	56	
57	100A/3P	PANEL A	O	10.02	4-3, 1#8G, 1 1/4" C		10.02					SPARE	20	58	
59			O	10.02				10.02				SPARE	20	60	
TOTAL CONNECTED LOAD (KVA)						23.07	23.58	22.55							

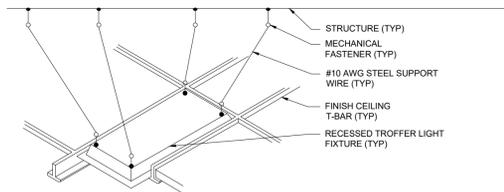
PANEL: A (NEW)										MOUNTING:		SURFACE			
208Y/120		VOLTS,		3		PHASE,		4		WIRE					
MCB		NA		MLO:		125A		BUS:		125A					
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
						A	B	C							
1	20	LIGHTING-STOCK ROOM & REST ROOM	L	0.55	2#12, #12G, 3/4" C	1.75			2#12, #12G, 3/4" C	1.20	R	MOTORIZED DAMPER	20	2	
3	20	LIGHTING- CLOSET,BREAK ROOM, OFFICE	L	0.60	2#12, #12G, 3/4" C		1.14		2#12, #12G, 3/4" C	0.54	R	RECEPTACLE @ CLOSET	20	4	
5	20	LIGHTING-ALTERATIONS & CORRIDOR	L	0.40	2#12, #12G, 3/4" C			0.90	2#12, #12G, 3/4" C	0.50	R	MOTORIZED DAMPER	20	6	
7	20	LIGHTING-FITTING ROOM	L	0.65	2#12, #12G, 3/4" C	1.65			2#12, #12G, 3/4" C	1.00	L	LIGHTING-CASH AREA	20	8	
9	20	TRACK LIGHT-SALES AREA	L	0.65	2#12, #12G, 3/4" C		1.71		2#12, #12G, 3/4" C	1.06	L	TRACK LIGHT-SALES AREA	20	10	
11	20	TRACK LIGHT-SALES AREA	L	1.06	2#12, #12G, 3/4" C			2.12	2#12, #12G, 3/4" C	1.06	L	TRACK LIGHT-SALES AREA	20	12	
13	20	TRACK LIGHT-SALES AREA	L	0.55	2#12, #12G, 3/4" C	1.35			2#12, #12G, 3/4" C	0.80	L	TRACK LIGHT-SALES AREA	20	14	
15	20	TRACK LIGHT-SALES AREA	L	0.65	2#12, #12G, 3/4" C		1.30		2#12, #12G, 3/4" C	0.65	L	TRACK LIGHT-SALES AREA	20	16	
17	20	TRACK LIGHT-SALES AREA	L	0.58	2#12, #12G, 3/4" C			1.18	2#12, #12G, 3/4" C	0.60	L	TRACK LIGHT-SALES AREA	20	18	
19	20	TRACK LIGHT-SALES AREA	L	0.59	2#12, #12G, 3/4" C	1.01			2#12, #12G, 3/4" C	0.42	L	TRACK LIGHT-SHOW WINDOW	20	20	
21	20	STOREFRONT SIGN	L	1.00	2#12, #12G, 3/4" C		2.00		2#12, #12G, 3/4" C	1.00	L	STOREFRONT SIGN	20	22	
23	20	RECEPTACLE-FITTING ROOM	R	0.75	2#12, #12G, 3/4" C			0.75				SPARE	20	24	
25	20	LIGHTING CONROL PANEL	L	1.00	2#12, #12G, 3/4" C	1.72			2#12, #12G, 3/4" C	0.72	L	WALL DISPLAY CASE	20	26	
27	20	RECEPTACLE-CORRIDOR	R	0.72	2#12, #12G, 3/4" C		2.16		2#12, #12G, 3/4" C	1.44	L	WALL DISPLAY CASE	20	28	
29	20	DOOR BUZZER	R	0.20	2#12, #12G, 3/4" C			1.40	2#12, #12G, 3/4" C	1.20	R	RECPY-SHOW WINDOW	20	30	
31	20	RECEPTACLE-STAOCKRRM #2	R	0.54	2#12, #12G, 3/4" C	1.14			2#12, #12G, 3/4" C	0.60	R	RECEPTACLE @ CASHWRAP	20	32	
33	20	RECEPTACLE- POS @ CASHWRAP	R	0.72	2#12, #12G, 3/4" C		1.02		2#12, #12G, 3/4" C	0.30	L	LIGHTING-DOWNLIGHT @ STOREFRONT	20	34	
35	20	RECEPTACLE- POS @ CASHWRAP	R	0.72	2#12, #12G, 3/4" C			1.72	2#12, #12G, 3/4" C	1.00	L	EXTERIOR LIGHT BOX	20	36	
37	20	RECEPTACLE- POS @ CASHWRAP	R	0.72	2#12, #12G, 3/4" C	1.40						SPARE	20	38	
39	20	RECEPTACLE- POS @ CASHWRAP	R	0.72	2#12, #12G, 3/4" C		1.32		2#12, #12G, 3/4" C	0.60	R	RECEPTACLE @ CASHWRAP	20	40	
41	20	RECEPTACLE- EAS SYSTEM @ ENTRY	R	1.00	2#12, #12G, 3/4" C			2.00	2#12, #12G, 3/4" C	1.00	R	RECEPTACLE- EAS SYSTEM @ ENTRY	20	42	
TOTAL CONNECTED LOAD (KVA)						10.02	10.65	10.07							



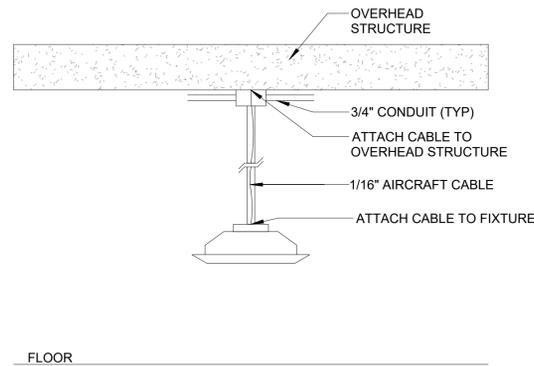


- NOTES:
- NAMEPLATES SHALL BE FASTENED BY MACHINE SCREWS. ADHESIVE WILL NOT BE ALLOWED.
 - NAMEPLATES SHALL BE PROVIDED FOR ALL EQUIPMENT INCLUDED, BUT NOT LIMITED TO, PANEL BOARDS, SWITCHBOARDS, MOTOR CONTROL CENTERS, STARTERS, DISCONNECT SWITCHES, TRANSFORMERS, ETC.
 - COLOR:
 - NORMAL POWER SYSTEM: WHITE TEXT ON BLACK BACKGROUND.
 - OPTIONAL STANDBY POWER SYSTEM: WHITE TEXT ON ORANGE BACKGROUND.
 - FIRE ALARM SYSTEM: WHITE TEXT ON RED BACKGROUND.

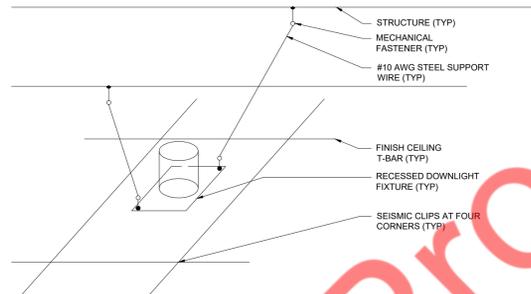
1 TYPICAL ENGRAVED NAMEPLATE
E5.01 N.T.S.



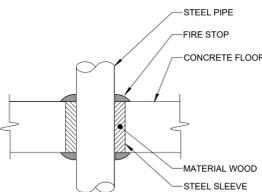
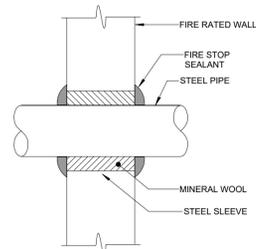
2 TYPICAL RECESSED TROFFER LIGHT SUPPORT DETAIL
E5.01 N.T.S.



3 PENDANT FIXTURE DETAIL
E5.01 N.T.S.

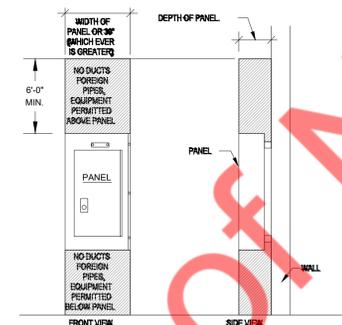


4 TYPICAL RECESSED DOWN LIGHT SUPPORT DETAIL
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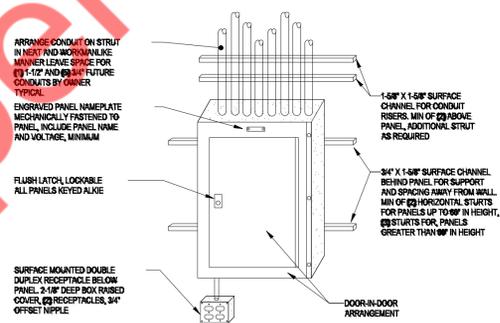
- NOTES:
- 4\"/>

5 CONDUIT/SLEEVE WALL & FLOOR PENETRATION DETAILS
E5.01 N.T.S.

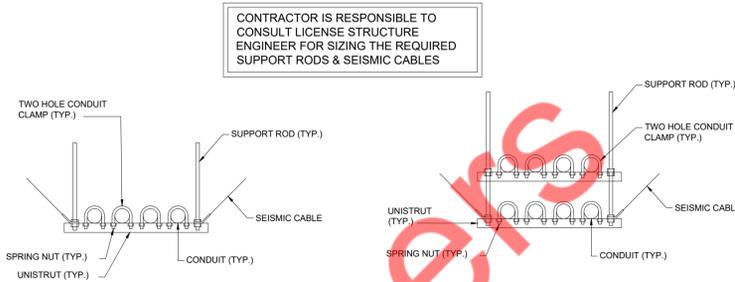


- NOTES:
- TYPICAL FOR SWITCHBOARDS, PANELBOARDS AND MOTOR CONTROL CENTERS.
 - SEE N.E.C. ART. 110.28.C.F

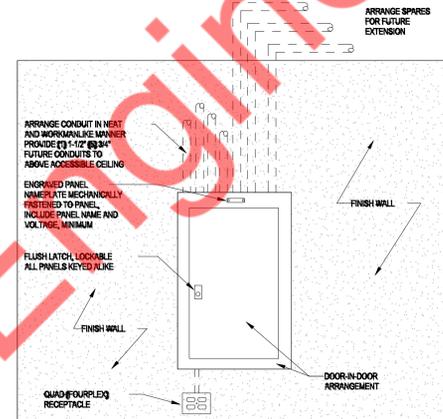
6 DEDICATED ELECTRICAL EQUIPMENT SPACE DETAIL
E5.01 N.T.S.



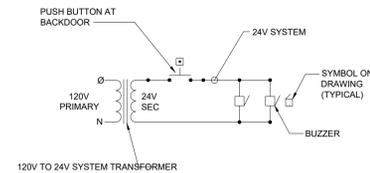
7 SURFACE MOUNT PANEL BOARD DETAIL
E5.01 N.T.S.



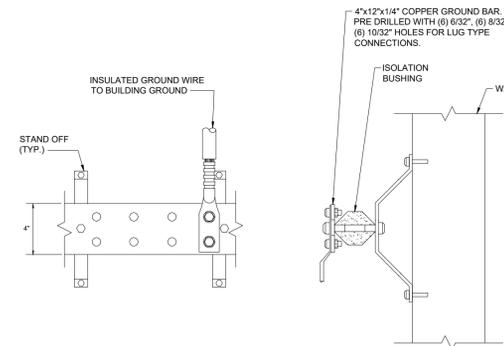
8 INSTALLATION CONDUITS DETAIL (TYPICAL)
E5.01 N.T.S.



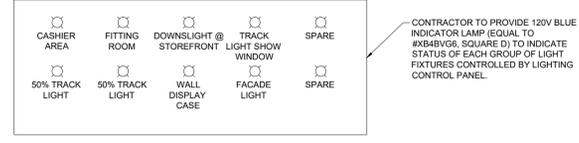
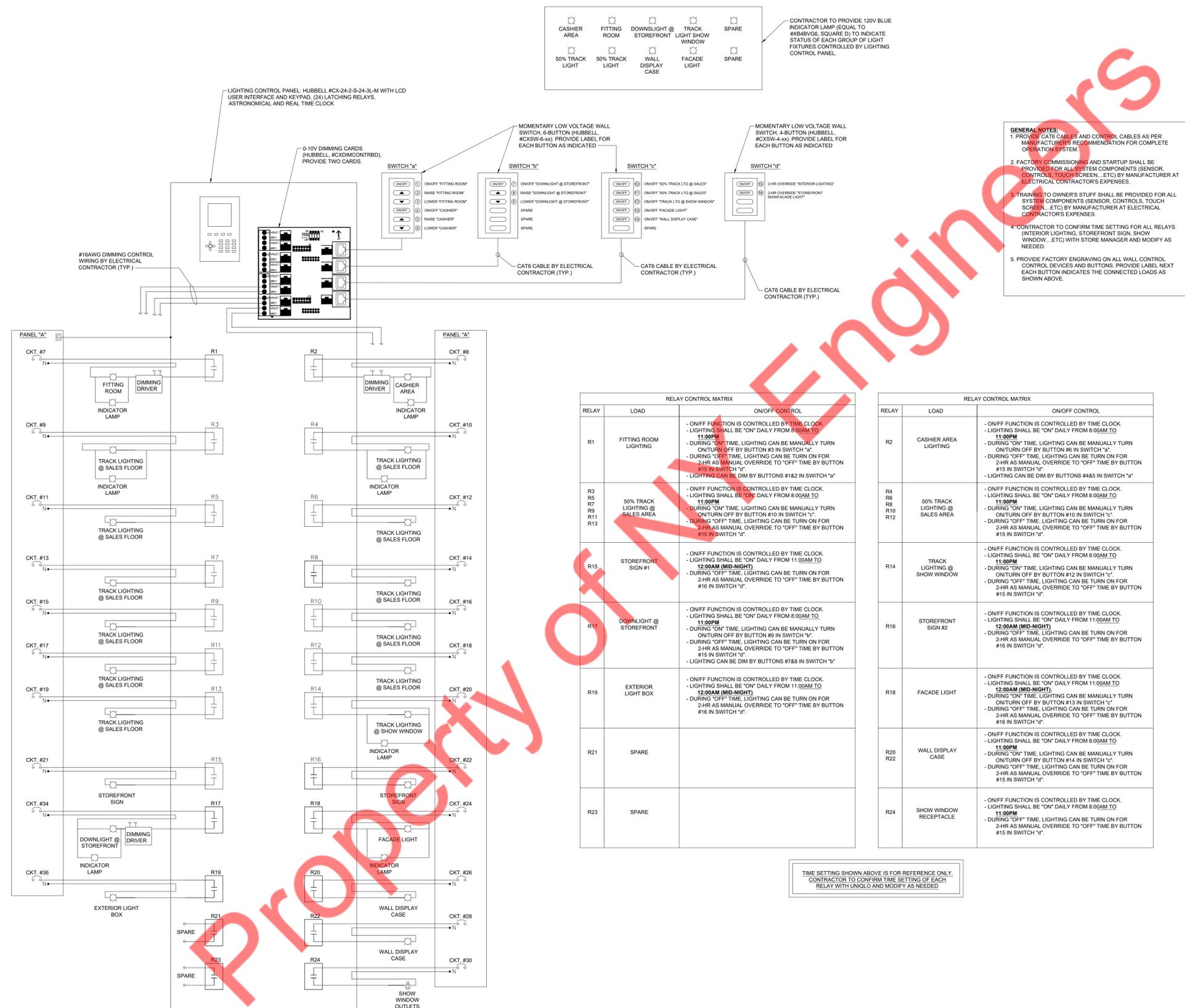
9 FLUSH MOUNT PNL BOARD DETAIL
N.T.S.



10 SERVICE BELL WIRING DIAGRAM
N.T.S.



11 GROUNDING BAR INSTALLATION DETAIL
N.T.S.



- GENERAL NOTES:**
1. PROVIDE CAT6 CABLES AND CONTROL CABLES AS PER MANUFACTURER'S RECOMMENDATION FOR COMPLETE OPERATION SYSTEM.
 2. FACTORY COMMISSIONING AND STARTUP SHALL BE PROVIDED FOR ALL SYSTEM COMPONENTS (SENSOR, CONTROLS, TOUCHSCREEN...ETC) BY MANUFACTURER AT ELECTRICAL CONTRACTOR'S EXPENSES.
 3. TRAINING TO OWNERS STAFF SHALL BE PROVIDED FOR ALL SYSTEM COMPONENTS (SENSOR, CONTROLS, TOUCH SCREEN...ETC) BY MANUFACTURER AT ELECTRICAL CONTRACTOR'S EXPENSES.
 4. CONTRACTOR TO CONFIRM TIME SETTING FOR ALL RELAYS (INTERIOR LIGHTING, STOREFRONT SIGN, SHOW WINDOW...ETC) WITH STORE MANAGER AND MODIFY AS NEEDED.
 5. PROVIDE FACTORY ENGRAVING ON ALL WALL CONTROL DEVICES AND BUTTONS. PROVIDE LABEL NEXT EACH BUTTON INDICATES THE CONNECTED LOADS AS SHOWN ABOVE.

RELAY CONTROL MATRIX		
RELAY	LOAD	ON/OFF CONTROL
R1	FITTING ROOM LIGHTING	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #3 IN SWITCH "a". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d". - LIGHTING CAN BE DIM BY BUTTONS #1&2 IN SWITCH "a"
R3 R5 R7 R9 R11 R13	50% TRACK LIGHTING @ SALES AREA	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #10 IN SWITCH "c". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d".
R15	STOREFRONT SIGN #1	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 11:00AM TO 12:00AM (MID-NIGHT). - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #16 IN SWITCH "d".
R17	DOWNSLIGHT @ STOREFRONT	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 11:00AM TO 12:00AM (MID-NIGHT). - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #9 IN SWITCH "b". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d". - LIGHTING CAN BE DIM BY BUTTONS #7&8 IN SWITCH "b"
R19	EXTERIOR LIGHT BOX	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 11:00AM TO 12:00AM (MID-NIGHT). - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #16 IN SWITCH "d".
R21	SPARE	
R23	SPARE	

RELAY CONTROL MATRIX		
RELAY	LOAD	ON/OFF CONTROL
R2	CASHIER AREA LIGHTING	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #6 IN SWITCH "a". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d". - LIGHTING CAN BE DIM BY BUTTONS #4&5 IN SWITCH "a"
R4 R6 R8 R10 R12	50% TRACK LIGHTING @ SALES AREA	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #10 IN SWITCH "c". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d".
R14	TRACK LIGHTING @ SHOW WINDOW	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #12 IN SWITCH "c". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d".
R16	STOREFRONT SIGN #2	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 11:00AM TO 12:00AM (MID-NIGHT). - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #16 IN SWITCH "d".
R18	FACADE LIGHT	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 11:00AM TO 12:00AM (MID-NIGHT). - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #13 IN SWITCH "c". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d".
R20 R22	WALL DISPLAY CASE	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "ON" TIME, LIGHTING CAN BE MANUALLY TURN ON/TURN OFF BY BUTTON #14 IN SWITCH "c". - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d".
R24	SHOW WINDOW RECEPTACLE	- ON/OFF FUNCTION IS CONTROLLED BY TIME CLOCK. - LIGHTING SHALL BE "ON" DAILY FROM 8:00AM TO 11:00PM. - DURING "OFF" TIME, LIGHTING CAN BE TURN ON FOR 2-HR AS MANUAL OVERRIDE TO "OFF" TIME BY BUTTON #15 IN SWITCH "d".

TIME SETTING SHOWN ABOVE IS FOR REFERENCE ONLY. CONTRACTOR TO CONFIRM TIME SETTING OF EACH RELAY WITH UNIGLO AND MODIFY AS NEEDED.

PLUMBING SYMBOLS LIST

— SAN —	SANITARY SEWER (ABOVE GROUND)
— SAN —	SANITARY SEWER (BELOW GROUND)
— EX.SAN —	EXISTING SANITARY SEWER
----	VENT PIPING
----	HOT WATER PIPING
----	HOT WATER RETURN PIPING
----	COLD WATER PIPING
—○—	P-TRAP
—○—	PIPE UP
—○—	PIPE DROP
—○—	CLEANOUT
—○—	PLUGGED OUTLET/CLEANOUT
☒	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
N.I.S	NOT IN SCOPE
BFP/RPZ	BACK FLOW PREVENTER
VTR	VENT THROUGH ROOF
ET-1	EXPANSION TANK
WH	WATER HEATER
HWCP-1	HOT WATER CIRCULATION PUMP
S-1	DROP-IN SINK
EW-1	DRINKING FOUNTAIN

PLUMBING DRAWING LIST

P0.01	PLUMBING SPECIFICATION, LEGENDS & GENERAL NOTES
P1.01	PLUMBING SANITARY PLAN
P1.02	PLUMBING WATER PLAN
P2.01	PLUMBING DETAILS
P3.01	PLUMBING RISERS & SCHEDULES

APPLICABLE CODES

- A. 2015 INTERNATIONAL BUILDING CODE.
- B. 2015 INTERNATIONAL MECHANICAL CODE.
- C. 2020 MASSACHUSETTS ENERGY CODE.
- D. 248 CMR UNIFORM STATE PLUMBING CODE
- E. 2023 NATIONAL ELECTRIC CODE

BUILDING DEPARTMENT PLUMBING NOTES

- ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT WATER DISTRIBUTION PIPING SYSTEMS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 248 CMR UNIFORM STATE PLUMBING CODE
- INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 248 CMR 10.05 AND 10.06
- PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER 248 CMR 10.05, SECTION 8.
- TRENCHING, EXCAVATION AND BACKFILL AS PER 248 CMR 10.05, SECTION 5.
- RODENT PROOFING AS PER PER 248 CMR 10.05, SECTION 8.
- MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF PER 248 CMR 10.06
- EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF PER 248 CMR 10.07
- 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 PER 248 CMR 10.08
- DRAINAGE PIPE CLEANOUTS AS PER 248 CMR 10.08
- VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS PER 248 CMR 10.11
- WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS PER 248 CMR 10.14
- THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS PER 248 CMR 10.15

PLUMBING SPECIFICATIONS:

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS.

1.01 SCOPE

- A. 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.
- B. 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.
- C. OBTAIN 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.
- D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.

- E. 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.

- F. IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE THE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.

- G. 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.

- H. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.

- I. 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.

- J. 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.

- K. 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.

- L. PLUMBING IS NOT PERMITTED IN ANY DEMISING PARTITIONS. FURR OUT THE WALL AS NECESSARY.

- M. EXHAUST AND PLUMBING VENTS SHALL BE LOCATED A MINIMUM OF 10'-0" AWAY FROM ANY OUTSIDE AIR INTAKE, AND 5'-0" FROM ANY DEMISING WALL VERTICAL PLAN.

- N. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.

- O. ALL FLOOR PENETRATIONS MUST BE CORE BORED, SLEEVED, GROUTED, SEALED AND MADE WATERPROOF. SLEEVES MUST EXTEND A MINIMUM OF 4" AFF.

- P. INSTALL A WATERPROOF MEMBRANE IN ALL WET AREAS OF THE SPACE. USE A 30 MIL POLYETHYLENE CLEAVAGE MEMBRANE (EQUAL TO NOBLESEAL TS) INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND ANSI A08. MEMBRANE MUST BE EXTENDED UP THE WALL A MINIMUM OF 6" OR EQUAL TO THE HEIGHT OF THE FLOOR BASE.

1.02 SUBMITTALS

- A. 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
- MIXING VALVES
- WATER HEATER & ACCESSORIES.
- SCHEDULED PLUMBING EQUIPMENT

- B. 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 A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA. 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

- A. 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.

- B. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.

1.05 DEFINITIONS

- A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.

- B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.

- C. PROVIDE: TO FURNISH AND INSTALL.

- D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

- E. REFER TO THE UNIFORM PLUMBING CODE FOR ADDITIONAL DEFINITIONS.

1.06 DRAWINGS

- A. 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.

- B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.

- C. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.

- D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.

- E. 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.

- F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

1.07 PRODUCTS

- A. 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.
- 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.

- B. DOMESTIC WATER PIPING:

- ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.
- FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.
- JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
- THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
- COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
- ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH 2020 MASSACHUSETTS ENERGY CONSERVATION CODE SECTION C403.11.3 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS		NOMINAL PIPE OR TUBE SIZE (INCHES)	
FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY BTU-IN./ (H·FT ² ·°F)	< 1 1/2	1 1/2 < 4
105-140	0.21-0.28	1.0	1.0 1.5 1.5 1.5
40-60	0.21-0.27	75	0.5 0.5 1.0 1.0 1.0

- 7. WATER DISTRIBUTION SYSTEM AS PER 2020 MASSACHUSETTS ENERGY CONSERVATION CODE C404.7, HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:

- THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE.
- THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F (40°C).

8. AS PER 2020 MASSACHUSETTS ENERGY CONSERVATION CODE 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 WITHIN 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.

- 9. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER 2020 MASSACHUSETTS ENERGY CONSERVATION CODE SECTION C404.5.1. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE C404.5.1.

NOMINAL PIPE SIZE (INCHES)	MAXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAV	OTHER FIXTURES
1/2"	2'	43'
3/4"	0.5'	20'
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.

C. 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.

- UNLESS OTHERWISE INDICATED OR REQUIRED BY AUTHORITIES HAVING JURISDICTION, THE FOLLOWING SHALL BE PROVIDED WITH SEISMIC RESTRAINTS AS REQUIRED BY THE BOCA NATIONAL BUILDING CODE, SECTION 1610.6.4: ALL EQUIPMENT AND MACHINERY, ALL NEW PIPING 2-1/2" AND LARGER (1-1/4" AND LARGER INBOLLER/MECHANICAL ROOMS) WITH HANGERS GREATER THAN 12" IN LENGTH FROM THE TOP OF PIPE TO THE STRUCTURE.

- 6. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

D. 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 FLUSHMETER-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.

E. SLEEVES AND ESCUTCHEONS:

- SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS ON GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GAGE GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USE THERMAFIBER SAFING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.

- PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GAGE STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.

F. DRAINAGE ACCESSORIES

- 1. GENERAL:

- a. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.

- b. SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.

- g. 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.

H. 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.

- I. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- J. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- K. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.
- L. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
- M. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.
- N. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.
- O. 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.
- P. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.
- Q. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.
- R. 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.
- S. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- T. INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.
- U. PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHMETER VALVES AND QUICK-CLOSING VALVES.
- V. MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.

2.01 GENERAL

- A. ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
- B. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- C. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- D. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- E. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- F. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- G. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.
- H. COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
- I. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
- J. PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.
- K. THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.
- L. WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.

2.02 ABOVE GRADE

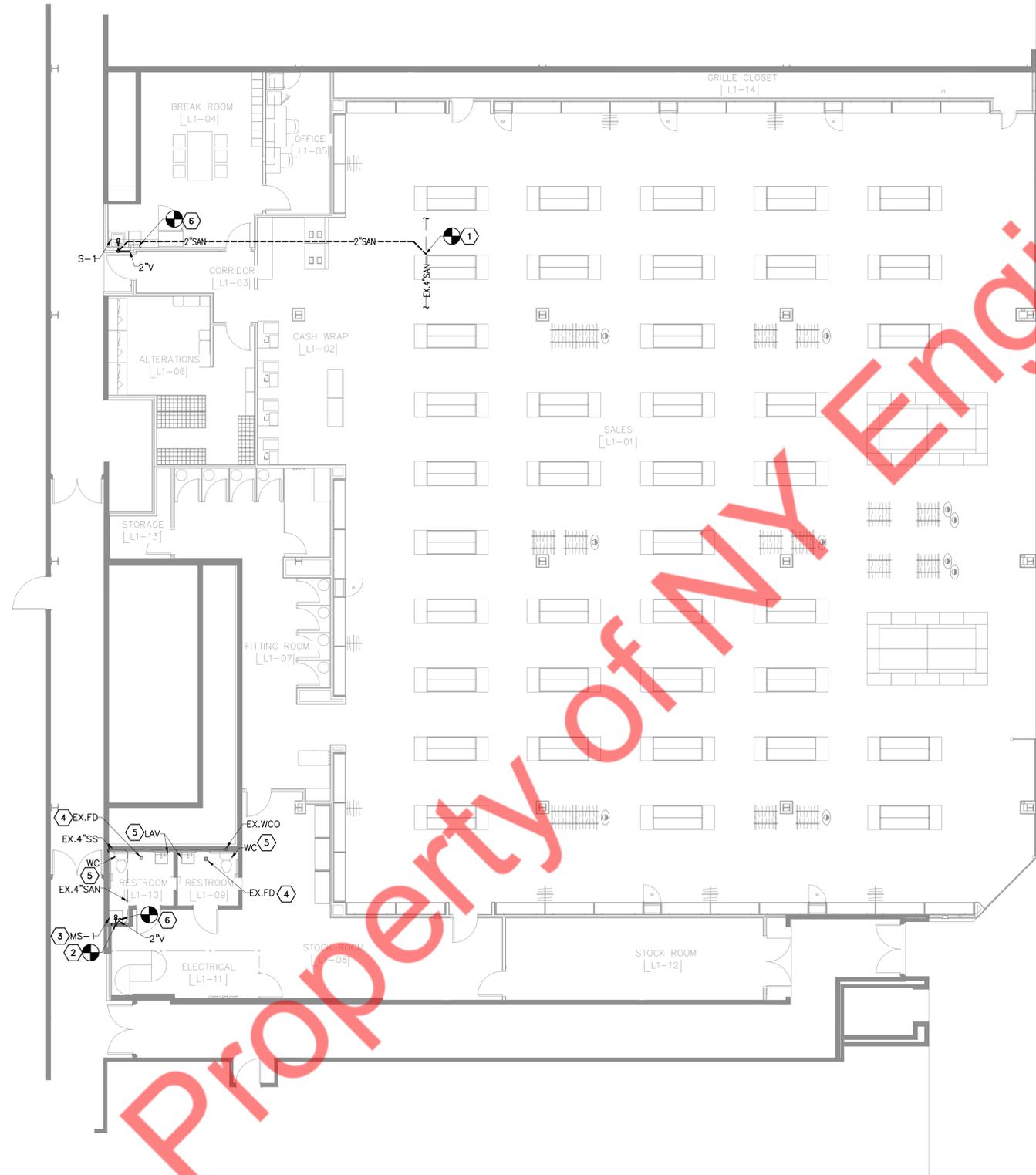
- A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVICES INTENDED PURPOSES.
- B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.
- C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

2.03 INSULATION

- COVER ALL HOT WATER AND HOT WATER RECIRCULATION PIPE WITH 1" THICK FOR PIPE SIZE UP TO 1 1/2" AND 1 1/2" THICK FOR PIPE SIZE 1 1/2" AND GREATER WITH MANVILLE MICRO-LOK AP-2 PLUS FIBERGLASS INSULATION. COVER ALL COLD WATER PIPE WITH 1/2" THICK FOR PIPE SIZE UP TO 1 1/2" AND 1" THICK FOR PIPE SIZE 1 1/2" AND GREATER WITH 1" MANVILLE MICRO-LOK AP-2 PLUS FIBERGLASS INSULATION. FITTINGS AND VALVES SHALL BE INSULATED WITH MANVILLE ZESTON 2000 PVC INSULAT-ED FITTING COVERS. INSTALL ALL INSULATION AS PER MANUFACTURER'S RECOMMENDATIONS. ALL INSULATION MATERIAL SHALL COMPLY WITH THE MASSACHUSETTS BUILDING CODE REQUIREMENT OF A FLAME SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DEVELOPED RATING NOT TO EXCEED 50. ALL PIPE INSULATION SHALL COMPLY WITH 2020 MASSACHUSETTS ENERGY CONSERVATION CODE

3. TESTING

- A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.
- B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
- C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.
- D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
- E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THE CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.
- F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR

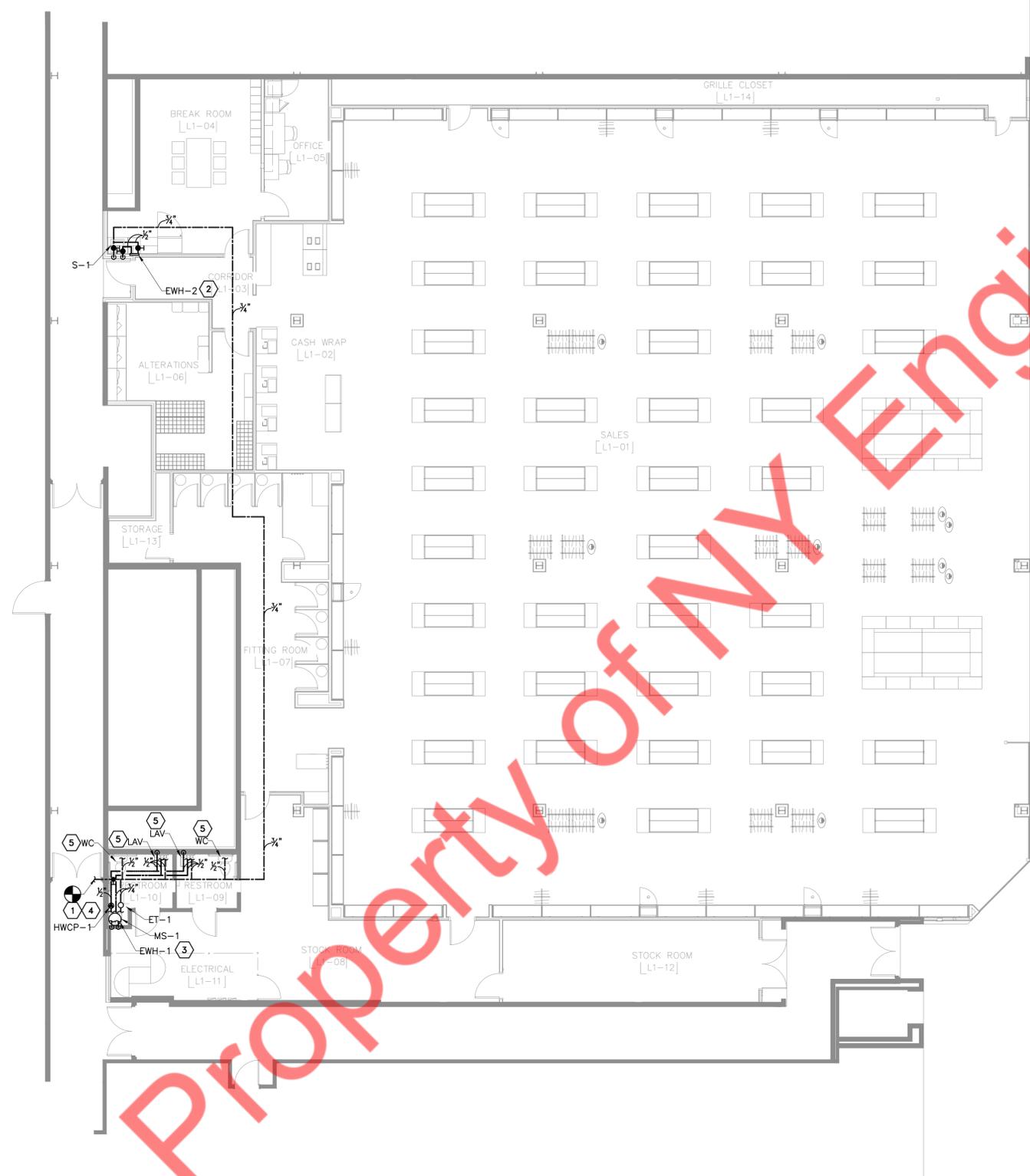


- GENERAL NOTES:**
1. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
 2. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
 3. PROVIDE TRAP PRIMER FOR FLOOR DRAIN AS PER LOCAL JURISDICTION.
 4. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.

- SANITARY PIPING KEYED NOTES:**
1. CONNECT NEW 2" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE. CONTRACTOR TO FIELD VERIFY SIZE, LOCATION AND INVERT LEVEL OF EXISTING SANITARY LINE.
 2. CONNECT NEW 3" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE. CONTRACTOR TO FIELD VERIFY SIZE, LOCATION AND INVERT LEVEL OF EXISTING SANITARY LINE.
 3. ROUTE WATER HEATER T&P TO MOP SINK.
 4. EXISTING PLUMBING FIXTURE WITH ASSOCIATED ACCESSORIES AND FITTINGS TO REMAIN. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING, REPLACE IF REQUIRED.
 5. RESTROOM PLUMBING FIXTURE TO BE REPLACED IN KIND WITH NEW PLUMBING FIXTURE AT SAME LOCATION. RECONNECT EXISTING SANITARY PIPING FROM EXISTING PLUMBING TO NEW PLUMBING FIXTURE. CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING PIPING, REPLACE IF REQUIRED.
 6. CONNECT NEW 2" VENT LINE TO EXISTING VENT LINE IN SPACE. CONTRACTOR TO FIELD VERIFY THE EXACT SIZE AND LOCATION OF THE EXISTING VENT LINE.

NOTE:
 PLUMBING SUPPLY AND SANITARY TO KITCHENETTE BY LANDLORD, TENANT PROVIDES PLUMBING FIXTURES, WATER HEATER AND ACCESSORIES.

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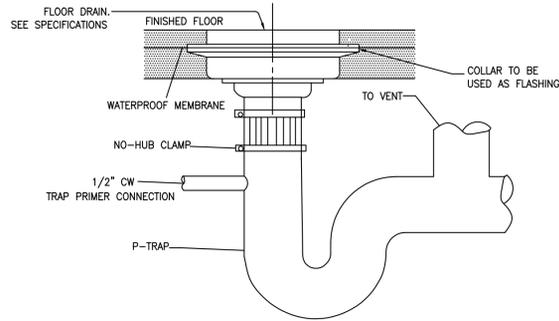


- GENERAL NOTES:**
1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER 2020 MASSACHUSETTS ENERGY CONSERVATION CODE (REFER SHEET P0.01)
 2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
 3. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
 4. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
 5. ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
 6. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.

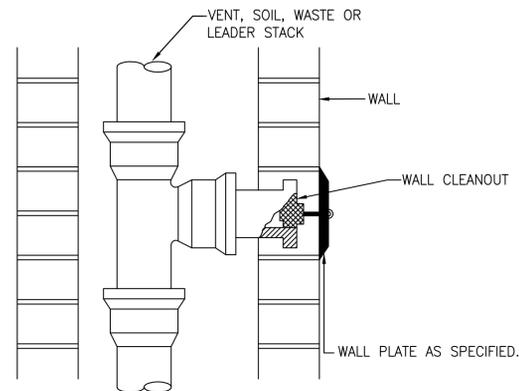
- WATER PIPING KEYED NOTES:**
1. ROUTE NEW 1" CW PIPING WITH SHUT OFF VALVE AND TIE-INTO THE EXISTING 1" CW LINE.
 2. PROVIDE NEW ELECTRIC TANKLESS WATER HEATER.
 3. PROVIDE NEW ELECTRIC STORAGE WATER HEATER.
 4. CONTRACTOR TO FIELD VERIFY WATER METER AND BACKFLOW PREVENTER REQUIREMENT, PROVIDE NEW IF NOT EXISTING.
 5. EXISTING RESTROOM PLUMBING FIXTURE TO BE REPLACED IN KIND WITH NEW FIXTURE AT SAME LOCATION. RECONNECT EXISTING CW/HW PIPING TO NEW CW/HW PIPING. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EXISTING PIPING, REPLACE IF REQUIRED.

NOTE:
 PLUMBING SUPPLY AND SANITARY TO KITCHENETTE BY LANDLORD. TENANT PROVIDES PLUMBING FIXTURES, WATER HEATER AND ACCESSORIES.

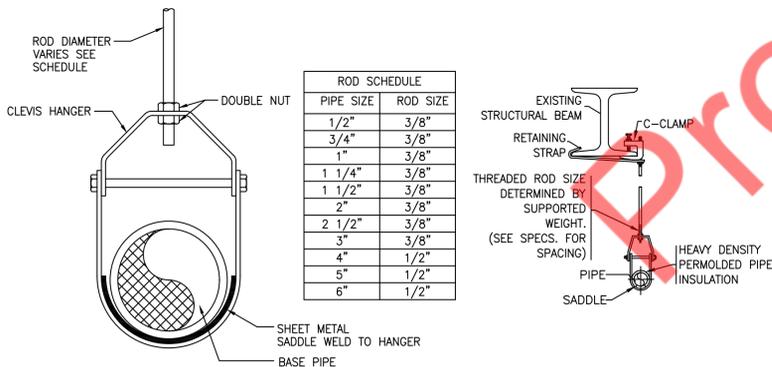
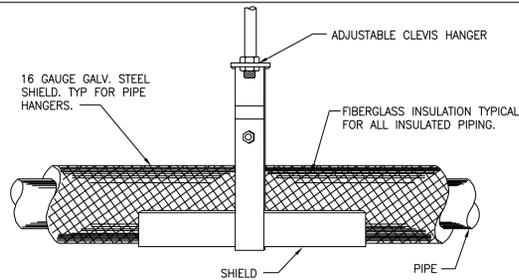
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1 FLOOR DRAIN DETAILS
P2.01 N.T.S

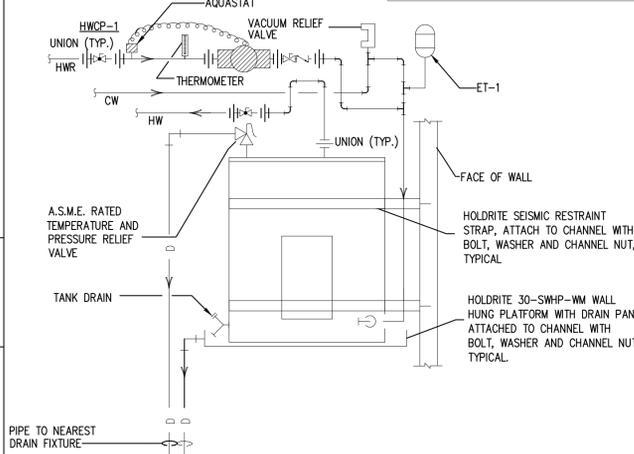


4 WALL CLEANOUT DETAIL
P2.01 N.T.S



5 HANGER DETAIL
P2.01 N.T.S

WATER HEATER SCHEDULE: (WH-1)
MAKE- A.O. SMITH, MODEL-DEL-10
TYPE- ELECTRIC TANK TYPE
TANK CAPACITY-10 GALLON
RECOVERY CAPACITY-11 GPH @ 90°F,
DIMENSIONS- 18.25"H X 18"D
POWER REQUIREMENT-208V/1 ϕ /2.5 KW
PROVIDE EXPANSION TANK(ET-1)- AMTROL
ST-5 OR EQUIVALENT.
PROVIDE RECIRCULATION PUMP(RCP-1)-
BELL & GOSSETT
PL-30-B OR EQUIVALENT.
POWER REQUIREMENT:120V/1 ϕ /60HZ



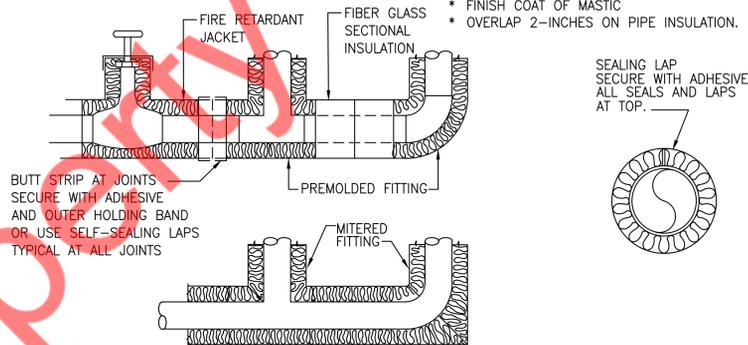
2 ELECTRIC WATER HEATER DETAIL
P2.01 N.T.S

CONCEALED VALVES AND FITTINGS

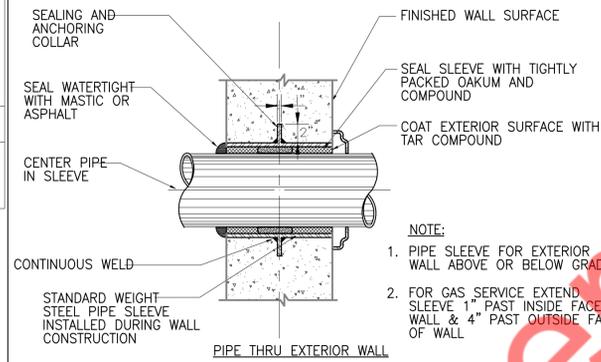
- * WRAP WITH 1-INCH THICK, 1-POUND DENSITY TO REQUIRED PIPE INSULATION THICKNESS
- * SECURE WITH WIRE OR TAPE.
- * VAPOR SEAL COLD WATER, CHILLED WATER AND STORM WATER PIPING.

CONCEALED VALVES AND FITTINGS

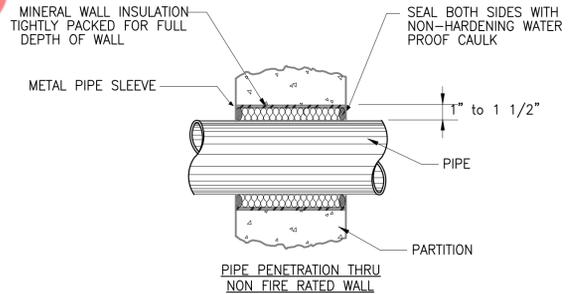
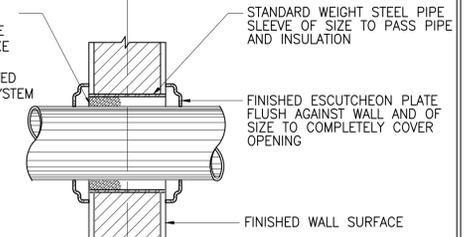
- * PREMOLDED FIBER GLASS OR RADIAL MITERED PIPE INSULATION
- * SKIM COAT OF INSULATION CEMENT
- * COAT OF MASTIC
- * WRAP WITH FIBER GLASS REINFORCING CLOTH.
- * FINISH COAT OF MASTIC
- * OVERLAP 2-INCHES ON PIPE INSULATION.



6 INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS
P2.01 N.T.S



- NOTE:
1. PIPE SLEEVE FOR EXTERIOR WALL ABOVE OR BELOW GRADE
 2. FOR GAS SERVICE EXTEND SLEEVE 1" PAST INSIDE FACE OF WALL & 4" PAST OUTSIDE FACE OF WALL



3 PIPE SLEEVE THRU WALL SECTION
P2.01 N.T.S

CHRONOMITE Electric Tankless Water Heaters

INSTANT-FLOW® C-MICRO - LOW ACTIVATION

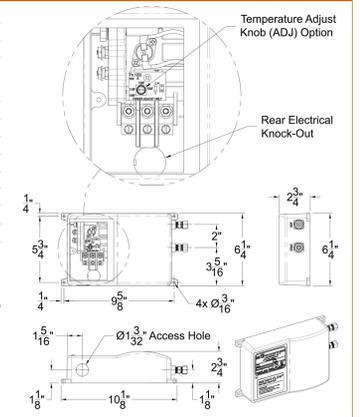
TECHNICAL DIMENSIONS

INSTANT-FLOW® C-MICRO - LOW ACTIVATION

- Dimensions: 6-1/4" (H) x 9-5/8" x 2-3/4"
Weight: 5 lbs.
Materials: Rugged cast aluminum housing
Celcon plastic element assembly with nichrome coils
Housing Color: White
Minimum Operating Flow Rate: 0.2 GPM
Minimum Operating Pressure: 25 PSI
Maximum Operating Pressure: 80 PSI
Maximum Pressure: 150 PSI
Maximum Water Temperature: 160°F
Maximum Ambient Operating Temperature: 140°F
Listing: UL, IAPMO, UPC, ADA, ETL

GENERAL NOTES:

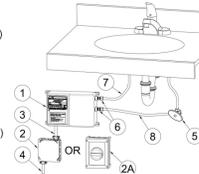
- * The microprocessor adjusts the heater's power for variations in flow rates, inlet water temperature and pressure to assure the selected factory preset water temperature.
- * 240V models when operated at 220V will have approximately a 15% wattage decrease.
- * 120V models when operated 110V will have approximately a 15% wattage decrease.
- * Instant-Flow C-Micro is ideal for sensor/hands-free faucets with the 104°F (40°C) factory preset setting temperature; no mixing valve needed
- * Factory setting of 110°F or above require cold water mixing at the hand wash faucet.
- * Microprocessor limits temperature increase according to the pre-selected temperature.



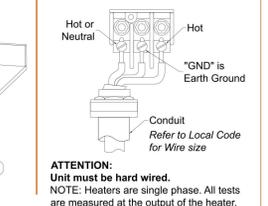
Notes:

1. Heater to be installed below the level of all hot water outlets serviced by the Heater.
2. Diagram shown with standard 3/8" Compression Fitting. Optional 1/2" NPT Male water connections available.

- 1 Instant-Flow Micro Heater
- 2 Electrical Junction Supply Box (Optional)
- 2A 2095-1 Disconnect Switch (Optional)
- 3 Electrical Supply Conduit
- 4 Electrical Supply Wire
- 5 Dual Outlet Stop, 3/8" Comp. Outlet Connections
- 6 3/8" Comp. x 1/4" NPT Fittings (supplied)
- 7 3/8" Hot Water Outlet
- 8 3/8" Cold Water Inlet



WIRING CONNECTION



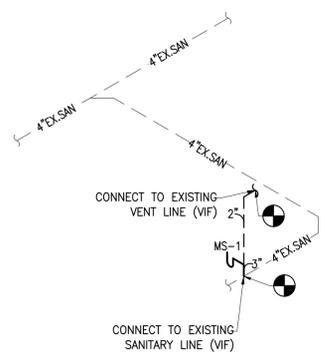
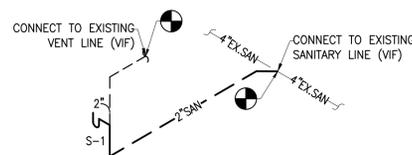
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SELECTION SUMMARY MANUFACTURING

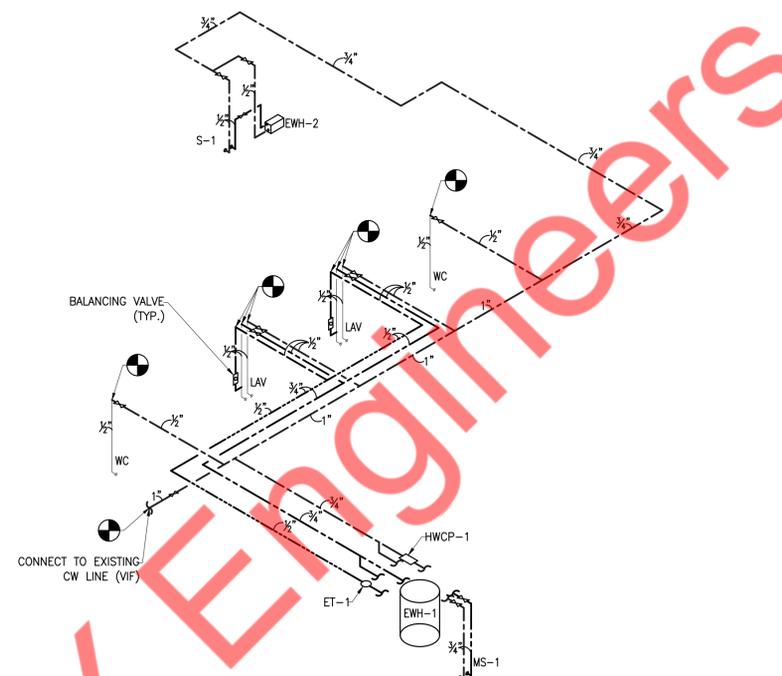
Company _____
Model Number & Options _____ Quantity _____
Contact _____ Title _____
Signature (Approval for Manufacturing) _____ Date _____

CHRONOMITE LABORATORIES, INC.
PH. 800-447-4962
626-937-4270
FAX 626-937-4279
www.chronomite.com

7 POINT OF USE WATER HEATER DETAIL
P2.01 N.T.S



SANITARY AND VENT RISER DIAGRAM
NTS



WATER SUPPLY RISER DIAGRAM
NTS

PLUMBING FIXTURE SCHEDULE

LEGEND	PLUMBING FIXTURE	CONNECTION SIZE - INCHES						REMARKS
		TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
WC	WATER CLOSET	-	4"	2"	1/2"	-	-	FLUSH TANK
LAV	LAVATORY	1 1/2"	1 1/2"	1 1/2"	1/2"	1/2"	PROVIDE	P-TRAP
S-1	DROP-IN SINK	2"	2"	1 1/2"	1/2"	1/2"	PROVIDE	P-TRAP
MS-1	MOP SINK	2"	3"	2"	3/4"	3/4"	PROVIDE	P-TRAP
EX.FD	FLOOR DRAIN	2"	3"	2"	-	-	-	EXISTING TO REMAIN

NOTE:

- CONTRACTOR TO COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL PLUMBING FIXTURES SPECIFICATIONS AND MOUNTING HEIGHT INSTALLATION.
- PLUMBING SUPPLY AND SANITARY TO KITCHENETTE BY LANDLORD, TENANT PROVIDES PLUMBING FIXTURES, WATER HEATER AND ACCESSORIES. ⚠

PUMP SCHEDULE

TAG	DESCRIPTION	TYPE	CAPACITY		ELECTRICAL DATA			SELECTION BASED ON		REMARKS/OPTIONS	
			GPM	HEAD (FT.)	HP	V	PH	HZ	MANUFACTURER		MODEL NUMBER
HWCP-1	HOT WATER RECIRC. PUMP	IN-LINE	2.0	9	1/12	120	1	60	BELL & GOSSETT	PL-30-B	NOTE 1,2

OPTIONS (ALL RCP UNITS)

- AQUA-STAT & NIGHT TIMER
- FLANGED PUMP
- BALANCING VALVE & CHECK VALVE
- MAINTENANCE BALL VALVES ON BOTH SIDES OF PUMP

NOTES:

- SET AQUA-STAT WITH SET POINT 10 DEGREES BELOW SYSTEM SUPPLY TEMP.
- INSTALL RECIRCULATION PUMP PER MANUFACTURERS REQUIREMENTS.

ELECTRIC STORAGE WATER HEATER

TAG No.	LOCATION	RECOVERY GPH @90°F RISE	VOLUME (GALLONS)	TEMPERATURE		ELECTRICAL			MANUFACTURER MODEL#	WEIGHT (LBS)	SIZE HxD (IN)
				IN °F	OUT °F	VOLTS	PHASE	KW			
EWH-1	ABOVE MOP SINK	11	10	50	140	208	1	2.5	AO SMITH-DEL-10	54	18.2x18

ELECTRIC POINT OF USE WATER HEATER SCHEDULE

HEATER TAG	NO. OF ELEMENTS	LOCATION	MAX. INPUT (kW)	STORAGE CAPACITY (GAL)	RECOVERY CAPACITY @57°F RISE	TYPE	ELECTRICAL CHARACTERISTICS CONTROL	NO. OF HEATERS	EFFICIENCY (%)	MANUFACTURER & MODEL NO.	REMARKS
EWH-2	1	DROP-IN SINK	4.16	0	0.5	ELECTRIC	208V/1Ø/60Hz	1	97	CHRONOMITE MODEL-CM-20L/208	-DIMENSIONS: 9-5/8"Wx5-3/4"Hx2-3/4"D WALL MOUNTED

MIXING VALVE SCHEDULE

TAG	DESCRIPTION	MAXIMUM GPM	MINIMUM GPM	PRESSURE LOSS	SELECTION BASED ON		REMARKS/OPTIONS
					MANUFACTURER	MODEL NUMBER	
MV-1	THERMOSTATIC MIXING VALVE	3.5	.25	5	LEONARD	270-LF	NOTE 1, A

OPTIONS (ALL UNITS)

- LEAD FREE NSF APPROVED
- PROVIDE T-STAT ON TEMPERED LINE

ADDITIONAL OPTIONS (UNITS AS NOTED)

A: ASSE 1070 APPROVED, SET @ 110° F. 1/2" INLETS/ 1/2" OUTLET, MOUNT BELOW FIXTURE

NOTES:

- INSTALL MIXING VALVE PER MANUFACTURERS REQUIREMENTS. PROVIDE ALL PIPING AND VALVES PER O&M MANUAL.

EXPANSION TANK

UNIT	NUMBER	MANUFACTURER & MODEL NUMBER	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRESSURE RATING (PSI)	DIMENSIONS		OPERATING WEIGHT (LBS)	NOTES
							DIAMETER (INCH)	HEIGHT (INCH)		
ET-1	1	AMTROL	ST-5	2	0.9	150	8	12.5	25	1

GENERAL NOTES:

- SET THE TANK PRESSURE TO EQUAL THE SYSTEM OPERATING PRESSURE. TANK MUST BE DRAINED BEFORE ADJUSTING SET PRESSURE.
- INSTALL PER MANUFACTURER'S RECOMMENDATIONS ON INCOMING COLD WATER LINE.