

DIVISION 26 – ELECTRICAL SPECIFICATIONS

26 00 50 – BASIC ELECTRICAL REQUIREMENTS

GENERAL

ALL WORK SHALL BE IN ACCORDANCE WITH ALL LOCAL CODES AND JURISDICTIONS.

THIS CONTRACTOR SHALL FURNISH ALL THE LABOR AND MATERIAL NECESSARY TO INSTALL A COMPLETE ELECTRICAL SYSTEM FOR THE BUILDING. THE SYSTEM SHALL INCLUDE ALL ITEMS OF WORK AS OUTLINED IN THESE SPECIFICATIONS AND ON THE DRAWINGS.

WHERE APPLICABLE, ALL FIXTURES, EQUIPMENT AND MATERIALS SHALL BE LISTED BY UNDERWRITER'S LABORATORIES, INC. OR A NATIONALLY RECOGNIZED TESTING ORGANIZATION.

ALL WIRING SHALL BE IN CONDUIT AND ALL BOXES SHALL BE INSTALLED IN ACCESSIBLE LOCATIONS. NO SPLICES SHALL BE MADE TO ANY SERVICE IN INACCESSIBLE LOCATIONS.

THIS CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS ON SITE TO ASSURE ADEQUATE CLEARANCES AND ACCESS TO DEVICES PER NATIONAL AND LOCAL CODE.

THE DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO CONVEY THE SCOPE OF THE WORK AND TO INDICATE THE GENERAL ARRANGEMENTS AND LOCATIONS OF EQUIPMENT, OUTLETS, ETC. AND THE APPROXIMATE SIZE OF EQUIPMENT.

SIMILAR PRODUCTS SHALL BE ALL OF THE SAME MANUFACTURERS AND STYLE. THERE IS NO EXCEPTION TO THIS UNLESS PRIOR APPROVAL HAS BEEN GRANTED FROM THE DESIGN TEAM.

THIS CONTRACTOR SHALL GUARANTEE ALL OF THE APPARATUS, MATERIALS, EQUIPMENT FURNISHED, AND LABOR INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE. UNLESS A LONGER PERIOD IS SPECIFIED, SHOULD ANY DEFECTS ARISE AS THE RESULT OF DEFECTIVE WORKMANSHIP OR MATERIAL WITHIN THE GUARANTEE PERIOD SET FORTH, THIS CONTRACTOR SHALL MAKE THE NECESSARY CORRECTION AT HIS OWN EXPENSE.

THE ARCHITECT AND GENERAL CONTRACTOR, BEFORE PROCEEDING WITH ANY WORK, SHALL REVIEW THESE PLANS FOR COORDINATION WITH ARCHITECTURAL AND STRUCTURAL ELEMENTS AND MAKE THIS CONTRACTOR AWARE OF ANY COLOR SELECTION CONCERNS OR CONFLICTS PRIOR TO ORDERING AND INSTALLATION.

TEMPORARY ELECTRICAL POWER AND LIGHTING FOR CONSTRUCTION
TEMPORARY POWER AND LIGHTING NECESSARY FOR THE CONSTRUCTION PROCESS IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

TEMPORARY LIGHTING WILL BE PROVIDED FOR GENERAL ILLUMINATION ONLY. SPECIFIC TASK BASED LIGHTING IS NOT INCLUDED.

TEMPORARY POWER WILL BE PROVIDED IN THE FORM OF A TEMPORARY POWER PANEL (OR PANELS) PROVIDING INDIVIDUAL 110V GFCI PROTECTED CIRCUITS FOR GENERAL USE. SPECIFIC TASK BASED POWER IS NOT INCLUDED.

IF THERE IS NO READILY AVAILABLE TEMPORARY POWER SOURCE ON THE PROJECT SITE FROM THE UTILITY, THIS CONTRACTOR SHALL NOT BE RESPONSIBLE FOR PROVIDING A TEMPORARY POWER SOURCE, SUCH AS A GENERATOR. IT SHALL BE UP TO THE CONSTRUCTION MANAGER OR GENERAL CONTRACTOR TO PROVIDE AND FUEL ANY TEMPORARY GENERATORS AND COORDINATE FINAL ELECTRICAL HOOKUPS WITH THE ELECTRICAL CONTRACTOR DURING CONSTRUCTION.

AS-BUILT DRAWINGS

THIS CONTRACTOR SHALL PROVIDE (AT THE CONCLUSION OF THE PROJECT) ONE CLEAN, NEAT AND LEGIBLE, ELECTRONIC "AS-BUILT" SET OF DRAWINGS TO THE OWNER. THESE DRAWINGS SHALL SHOW THE ROUTING OF FEEDER CONDUITS 2" AND LARGER, AND EQUIPMENT DRAWN IN AT LOCATIONS DIFFERING FROM PLANS. ALL CIRCUITS SHALL BE LABELED AND SHALL CONFORM TO LABELED PANEL BREAKERS.

ALL ELECTRICAL PANELS AND ELECTRICAL INSTALLED EQUIPMENT ALONG WITH ANY UPDATED LOCATIONS SHALL BE SHOWN ON THE "AS-BUILT" DRAWINGS.

TESTING OF SYSTEMS

THIS CONTRACTOR SHALL, BEFORE CONCEALED, TEST ALL SYSTEMS INSTALLED UNDER THIS CONTRACT AS CALLED FOR IN THESE SPECIFICATIONS AND AS REQUIRED BY LOCAL CODES. TESTS SHALL BE MADE IN THE PRESENCE OF THE ENGINEER, LOCAL AUTHORITIES OR THEIR DULY AUTHORIZED REPRESENTATIVE. ANY DEFECTS DISCOVERED IN TESTING SHALL BE CORRECTED AND THE TESTS REPEATED UNTIL ALL DEFECTS ARE ELIMINATED.

26 05 19 – ELECTRICAL POWER CONDUCTORS AND CABLES

GENERAL

INSTALLATION SHALL MEET NECA STANDARD OF INSTALLATION (NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION).

INSTALLATION SHALL BE TESTED TO NETA ATS - ACCEPTANCE TESTING SPECIFICATIONS FOR ELECTRICAL POWER DISTRIBUTION EQUIPMENT AND SYSTEMS (INTERNATIONAL ELECTRICAL TESTING ASSOCIATION).

MINIMUM SIZE WIRING FOR POWER APPLICATIONS SHALL BE 12 AWG.

PROVIDE MINIMUM 10 AWG WIRING FOR 20 AMPERE, 120V BRANCH CIRCUIT HOME RUNS LONGER THAN 75 FEET.

ALL WIRE AND CABLE FOR BRANCH POWER, LIGHTING, CONTROL AND SIGNAL CIRCUITS SHALL HAVE COPPER CONDUCTORS AND SHALL BE INSULATED TO 600 VOLTS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

ALL WIRE SHALL BE STRANDED TYPE.

ALL STANDARD BUILDING WIRING SHALL BE THWN-2/THHN.

IN-LINE SPLICES AND TAPS FOR CONDUCTOR SIZES #8 AWG AND SMALLER, SHALL USE VINYL INSULATED SPRING CONNECTORS. CONNECTORS FOR CONDUCTORS SIZES #6 AND LARGER SHALL BE COMPRESSION LUG TYPES.

COLOR CODE CONDUCTORS AS FOLLOWS:

- 120/240V, 1PH, 3W: PHASE A – BLACK; PHASE B – RED; NEUTRAL – WHITE; GROUND – GREEN.

ALL CABLE FOR FEEDERS SHALL BE CONTINUOUS FROM ORIGIN TO TERMINATION. SPLICES IN BRANCH CIRCUIT WIRES SHALL BE MADE ONLY IN ACCESSIBLE JUNCTION BOXES. KEEP CONDUCTOR SPLICES TO A MINIMUM.

ALL POWER FEEDER CABLE SHALL BE PULLED WITH THE USE OF APPROVED PULLING COMPOUND OR POWDER. PULL ALL CONDUCTORS INTO RACEWAY AT THE SAME TIME.

NEATLY ARRANGE, AND LABEL ALL WIRING INSIDE ALL CABINETS, PANELBOARDS, BOXES, AND OTHER ENCLOSURES.

MAKE SPLICES, TAPS, AND TERMINATIONS TO CARRY FULL AMPACITY OF CONDUCTORS WITH NO PERCEPTIBLE TEMPERATURE RISE.

IDENTIFY AND COLOR CODE WIRE AND CABLE UNDER PROVISIONS OF SPECIFICATION SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS. IDENTIFY EACH CONDUCTOR WITH ITS CIRCUIT NUMBER OR OTHER DESIGNATION INDICATED.

DO NOT INSTALL MULTI-WIRE BRANCH CIRCUITS. NO SHARING OF NEUTRAL SHALL BE PERMITTED.

26 05 26 – GROUNDING AND BONDING

GENERAL

ALL EQUIPMENT, LIGHTING, DEVICES, AND METALLIC CONDUIT SYSTEMS SHALL BE GROUNDED AND BONDED PER NEC 250.

GROUNDING SHALL MEET (OR EXCEED AS REQUIRED TO MEET THESE SPECIFICATIONS) ALL THE REQUIREMENTS OF THE NEC, NFPA AND APPLICABLE STANDARDS OF IEEE.

PROVIDE GROUNDING AND BONDING AT UTILITY'S METERING EQUIPMENT AND TRANSFORMERS PER UTILITY REQUIREMENTS.

GROUNDING ROD ELECTRODES

ROD ELECTRODES SHALL BE 5/8" COPPER-CLAD STEEL 8 FEET (MINIMUM) LENGTH. INCREASE NUMBER AND/OR LENGTHS OF GROUND ROD ELECTRODES AS REQUIRED TO MEET AND ACHIEVE SPECIFIED RESISTANCE. MAINTAIN SEPARATION OF AT LEAST 8 FEET, BUT NOT MORE THAN 20 FEET BETWEEN GROUND ROD ELECTRODES.

MECHANICAL CONNECTORS

ALL GROUNDING CONNECTORS SHALL BE IN ACCORDANCE WITH UL467 AND BE UL LISTED FOR USE WITH EQUIPMENT CONNECTED. GROUNDING SYSTEM CONNECTORS SHALL BE FABRICATED OF COPPER AND SHALL BE PROPERLY APPLIED FOR THEIR INTENDED USE. ALL CONNECTORS AND DEVICES SHALL BE COMPATIBLE WITH THE SURFACES BEING BONDED AND SHALL NOT CAUSE GALVANIC CORROSION BY CONTACT WITH ADJACENT DISSIMILAR MATERIALS.

CONNECTORS:

- LUGS SHALL BE EQUAL TO BURNDY QOA SERIES.
- GROUNDING AND BONDING BUSHINGS SHALL BE MALLEABLE IRON.
- PIPING CLAMPS SHALL BE EQUAL TO BURNDY GAR-TC SERIES WITH A TWO-HOLE COMPRESSION TERMINAL.
- GROUNDING SCREW AND PIGTAIL SHALL BE RACO #983.
- BUILDING STRUCTURAL STEEL: THOMPSON #701 SERIES HEAVY DUTY BRONZE "C" CLAMP WITH TWO-BOLT VISE-GRIP CABLE CLAMP OR EQUAL.
- MECHANICAL LUGS OR WIRE TERMINALS SHALL BE USED TO BOND EQUIPMENT.

GROUNDING ELECTRODES

PROVIDE EXOTHERMIC WELDED CONNECTIONS AT ALL LOCATIONS THAT WILL BECOME INACCESSIBLE FOLLOWING CONSTRUCTION. THIS INCLUDES IN-GRADE CONNECTIONS.

ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

ALL GROUNDING CONDUCTORS SHALL BE INSULATED TYPE THWN COPPER, UNLESS NOTED TO BE BARE.

A GREEN GROUNDING CONDUCTOR SHALL BE INSTALLED THROUGHOUT THE ENTIRE NEW OR MODIFIED PORTION OF THE ELECTRICAL DISTRIBUTION SYSTEM.

INSPECT GROUNDING AND BONDING SYSTEM CONDUCTORS AND CONNECTIONS FOR TIGHTNESS AND PROPER INSTALLATION.

GROUNDING SYSTEM TESTING

GROUNDING RESISTANCE MEASURED BETWEEN GROUND AND THE MAIN ELECTRICAL SERVICE SHALL NOT EXCEED 5 OHMS.

WHERE GROUND ELECTRODE SYSTEM BEING MEASURED CONSISTS OF TWO OR MORE GROUND ROD ELECTRODES THEN THE RESISTANCE SPECIFIED ABOVE SHALL BE THE MAXIMUM RESISTANCE WITH TWO OR MORE RODS CONNECTED TOGETHER BUT NOT CONNECTED TO THE GROUNDING ELECTRODE CONDUCTOR.

FIELD QUALITY CONTROL

USE SUITABLE TEST INSTRUMENT WITH CURRENT CERTIFICATE OF CALIBRATION TO MEASURE RESISTANCE TO GROUND OF SYSTEM. PERFORM TESTING IN ACCORDANCE WITH TEST INSTRUMENT MANUFACTURER'S RECOMMENDATIONS USING THE FALL-OF-POTENTIAL METHOD.

26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

GENERAL

INSTALLATION SHALL MEET NECA STANDARD OF INSTALLATION (NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION).

PRODUCTS SHALL BE GALVANIZED STEEL AND CORROSION RESISTANT.

THE SUPPORT SYSTEMS SHALL BE SELECTED TO CARRY THE LOADS OF EQUIPMENT AND CONDUIT AND ALL WIRE CONTAINED WITHIN.

ANCHORS, FASTENERS AND SUPPORTS
CONCRETE STRUCTURAL ELEMENTS: USE EXPANSION ANCHORS, POWER ACTUATED ANCHORS AND PRESET INSERTS.

STEEL STRUCTURAL ELEMENTS: USE BEAM CLAMPS AND WELDED FASTENERS.

CONCRETE SURFACES: USE SELF-DRILLING ANCHORS AND EXPANSION ANCHORS.

FOR HOLLOW MASONRY, PLASTER, AND GYPSUM BOARD PARTITIONS: USE TOGGLE BOLTS AND HOLLOW WALL FASTENERS.

- SOLID MASONRY WALLS: USE EXPANSION ANCHORS AND PRESET INSERTS
- SHEET METAL: USE SHEET METAL SCREWS.
- WOOD ELEMENTS: USE WOOD SCREWS.

DO NOT EXCEED 25 LBS PER HANGER AND A MINIMUM SPACING OF 2'-0" ON CENTER WHEN ATTACHING ANCHORS AND FASTENERS TO METAL ROOF DECKING.

EXTERIOR ROOFTOP PATHWAYS SHALL BE SUPPORTED ABOVE ROOFING MEMBRANE UTILIZING RUBBER TYPE SUPPORT BASES WITH 12 GA. GALVANIZED CHANNEL SUPPORTS (COOPER B-LINE DURA-BLOCK OR EQUIVALENT). ADJUST HEIGHT AS NECESSARY FOR COMPLIANCE WITH NEC.

FORMED STEEL CHANNEL SHALL BE GALVANIZED STEEL.

INSTALLATION

INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND UTILITY COMPANY REGULATIONS.

PROVIDE ANCHORS, FASTENERS AND SUPPORTS IN ACCORDANCE WITH NECA "STANDARD OF INSTALLATION".

DO NOT FASTEN SUPPORTS TO PIPES, DUCTS, MECHANICAL EQUIPMENT, OR CONDUIT.

DO NOT USE SPRING STEEL CLIPS AND CLAMPS.

DO NOT USE POWDER-ACTUATED ANCHORS.

DO NOT DRILL OR CUT STRUCTURAL MEMBERS.

FABRICATE SUPPORTS FROM STRUCTURAL STEEL OR FORMED STEEL MEMBERS OR STEEL CHANNEL. RIGIDLY WELD MEMBERS OR USE HEXAGON-HEAD BOLTS TO PRESENT NEAT APPEARANCE WITH ADEQUATE STRENGTH AND RIGIDITY. USE SPRING LOCK WASHERS UNDER ALL NUTS.

BEAM CLAMPS FOR STRUCTURAL STEEL SHALL BE DOUBLE-SIDED.

WHERE APPLICABLE, INSTALL SURFACE-MOUNTED CABINETS AND PANELBOARDS WITH MINIMUM OF FOUR ANCHORS.

USE STEEL CHANNEL SUPPORTS TO STAND CABINETS AND PANELBOARDS ONE INCH (1") OFF WALL IN ALL WET AND DAMP LOCATIONS.
USE SHEET METAL CHANNEL TO BRIDGE STUDS ABOVE AND BELOW CABINETS AND PANELBOARDS RECESSED IN HOLLOW PARTITIONS.

ALL CONDUCTORS LOWER THAN 50 VOLTS MAY BE FLOWN IN CADDY STYLE J-HOOKS WHERE ACCEPTABLE TO DESIGN TEAM. COORDINATE WITH DESIGN TEAM PRIOR TO INSTALLATION.

26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

GENERAL

INSTALLATION SHALL MEET NECA STANDARD OF INSTALLATION (NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION).

CONDUIT REQUIREMENTS

ALL POWER CONDUCTORS SHALL BE ROUTED IN EMT ABOVE GRADE, OR IN SCHEDULE 40 PVC IN SLAB ON GRADE AND TRANSITION UP USING RGS CONDUIT. CONDUITS INSTALLED ON ROOFTOPS SHALL BE IMC. CONDUITS INSTALLED UNDER VEHICLE TRAFFIC OR ROADWAYS SHALL BE RMC.

USE EMT CONDUIT FOR ALL DRY/INTERIOR APPLICATIONS.

USE IMT OR RGS CONDUIT FOR ALL WET/EXTERIOR APPLICATIONS.

PROVIDE LIQUID-TIGHT FLEXIBLE CONNECTIONS TO EXTERIOR MECHANICAL EQUIPMENT.

ALL CONDUIT FITTINGS FOR EXTERIOR APPLICATIONS SHALL BE COMPRESSION TYPE.

ABOVE GRADE APPLICATIONS, CONDUITS SHALL BE MINIMUM OF 1/2" FOR POWER AND A MINIMUM OF 3/4" FOR LOW VOLTAGE WIRING.

CONDUITS OVER 2" IN SIZE SHALL HAVE A GROUNDING BUSHING.

FLEXIBLE "WHIPS" SHALL BE USED FOR DEVICE CONNECTIONS SO THAT MAXIMUM LENGTH OF FLEXIBLE CONNECTION IS NOT GREATER THAN 6'.

CONDUIT INSTALLATION

PROVIDE SUITABLE PULL STRING IN EACH EMPTY CONDUIT EXCEPT SLEEVES AND NIPPLES.

GROUND AND BOND ALL CONDUITS.

EXPOSED CONDUIT AND CONDUIT CONCEALED IN CEILING SPACE SHALL BE ROUTED IN LINES PARALLEL TO BUILDING CONSTRUCTION.

DO NOT INSTALL MORE THAN THREE 90 DEGREE BENDS BETWEEN PANELBOARDS, ENCLOSURES, JUNCTION BOXES, OR PULL BOXES.

CONDUIT AND CONDUCTOR SIZING SHALL BE COORDINATED TO LIMIT CONDUCTOR FILL TO LESS THAN 40%, MAINTAIN CONDUCTOR AMPERE CAPACITY AS REQUIRED BY THE NATIONAL ELECTRICAL CODE.

SUPPORT CONDUIT RACEWAY SYSTEMS IN ACCORDANCE WITH REQUIREMENTS AS SET FORTH IN THE NATIONAL ELECTRIC CODE. CONDUIT SHALL NOT BE ATTACHED TO CEILING SUPPORT WIRES.

PROVIDE SUITABLE FITTINGS TO ACCOMMODATE EXPANSION AND DEFLECTION WHERE CONDUIT CROSSES CONTROL AND EXPANSION JOINTS.

AVOID MOISTURE TRAPS; PROVIDE JUNCTION BOX WITH DRAIN FITTING AT LOW POINTS IN CONDUIT SYSTEM.

GROUND AND BOND ALL CONDUITS PER ARTICLE 250 IN NEC.

PROVIDE NYLON INSULATED BUSHINGS ON ALL CONDUITS AND SLEEVES SERVING LOW VOLTAGE WIRING PRIOR TO PULLING WIRE UNLESS OTHERWISE NOTED.

BOX REQUIREMENTS

IN STUD WALLS: FOR SINGLE OR DOUBLE OUTLET, USE 4" SQUARE BY 1-1/2" DEEP BOX. BOXES TO BE PROVIDED WITH RAISED COVERS OF DEPTH AS REQUIRED FOR THICKNESS OF WALL MATERIALS. BACK-TO-BACK OR THROUGH-WALL TYPE BOXES SHALL NOT BE USED. BOXES SHALL BE STAGGERED ON OPPOSITE SIDES OF SOUND AND FIRE RATED WALLS.

IN MASONRY AND POURED CONCRETE WALLS: USE 3-3/4" HIGH BY 2-1/2" AND/OR 3-1/2" DEEP MASONRY BOXES.

FOR EXTERIOR AND WET LOCATIONS: USE "NEMA 3R" RATED BOXES (BELL).

SURFACE MOUNTED WALL OUTLETS: USE 4 "SQUARE BY 1-1/2" DEEP BOX WITH RAISED COVER IN ROUGH AREAS; WIREMOLD BOX IN FINISHED AREAS.

SUSPENDED CEILINGS: USE OCTAGON BOXES, DEPTH AS REQUIRED FOR APPLICATION; SECURELY FASTENED TO STRUCTURE.

PROVIDE JUNCTION BOXES WHERE NEEDED BY CODE AND AT ALL LOCATIONS SHOWN ON PLANS.

BOX CONSTRUCTION SHALL BE GALVANIZED STAMPED STEEL. BOXES SHALL BE RECESSED UNLESS STATED OTHERWISE.

CONTROL PANELS, J-BOXES AND OTHER EQUIPMENT SHALL BE PROVIDED WITH NEMA RATED ENCLOSURES SUITABLE FOR THE AREA WHERE THEY ARE INSTALLED.

BOX INSTALLATION
INSTALL BOXES IN ACCORDANCE WITH NECA "STANDARD OF INSTALLATION."

INSTALL ELECTRICAL BOXES IN LOCATIONS AS SHOWN ON THE DRAWINGS AND AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS AND COMPLIANCE WITH REGULATORY REQUIREMENTS.

SET WALL MOUNTED BOXES AT ELEVATIONS TO ACCOMMODATE MOUNTING HEIGHTS AS INDICATED.

ELECTRICAL BOXES ARE SHOWN ON THE DRAWINGS IN APPROXIMATE LOCATIONS UNLESS DIMENSIONED.

ORIENT BOXES TO ACCOMMODATE WIRING DEVICE ORIENTATION.

MAINTAIN HEADROOM AND PRESENT NEAT MECHANICAL APPEARANCE.

INSTALL PULL BOXES AND JUNCTION BOXES ABOVE ACCESSIBLE CEILINGS AND IN UNFINISHED AREAS ONLY.

JUNCTION BOXES SHALL NOT BE INSTALLED OVER FOUR FOOT (4') ABOVE ACCESSIBLE CEILINGS.

INACCESSIBLE CEILING AREAS: INSTALL OUTLET AND JUNCTION BOXES NO MORE THAN SIX INCHES (6") FROM CEILING ACCESS PANEL OR FROM REMOVABLE RECESSED LUMINAIRE.

FIRE-STOP BOXES TO PRESERVE FIRE RESISTANCE RATING OF PARTITIONS AND OTHER ELEMENTS. BOXES MAY BE INSTALLED WITHIN A MINIMUM OF 24-INCH SEPARATION WITH WRITTEN APPROVAL PRIOR TO INSTALLATION.

COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF OUTLETS MOUNTED ABOVE COUNTERS, BENCHES, AND BACK SPLASHES.

LOCATE OUTLET BOXES TO ALLOW LUMINAIRES POSITIONED AS SHOWN ON THE DRAWINGS. IF LIGHT FIXTURE LOCATIONS CONFLICT WITH CEILING PLANS, THE ELECTRICAL CONTRACTOR SHALL DOCUMENT DISCREPANCIES AND SEND TO THE DESIGN TEAM FOR CLARIFICATION.

ALIGN ADJACENT WALL MOUNTED OUTLET BOXES FOR SWITCHES, THERMOSTATS, AND SIMILAR DEVICES.

USE FLUSH MOUNTING OUTLET BOXES IN FINISHED AREAS.

LOCATE FLUSH MOUNTING BOX IN MASONRY WALL TO REQUIRE CUTTING OF MASONRY UNIT CORNER ONLY.

COORDINATE MASONRY CUTTING TO ACHIEVE NEAT OPENING.

DO NOT INSTALL FLUSH MOUNT BOXES BACK-TO-BACK IN WALL. PROVIDE MINIMUM SIX-INCH (6") SEPARATION.

DO NOT FASTEN BOXES TO CEILING SUPPORT WIRES.

SUPPORT BOXES INDEPENDENTLY OF CONDUIT.

USE GANG BOX WHERE MORE THAN ONE DEVICE IS MOUNTED TOGETHER.



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26 05 53 – IDENTIFICATION OF ELECTRICAL SYSTEMS

GENERAL
A NAMEPLATE AT THE SERVICE ENTRANCE SHALL BE PROVIDED THAT INDICATES THE ELECTRICAL SERVICE VOLTAGE, AMPERAGE AND THE CALCULATED AVAILABLE FAULT CURRENT IN AMPS ALONG WITH THE DATE OF THE CALCULATION.

PANELBOARDS AND DISCONNECTS SHALL HAVE AN ENGRAVED THREE-LAYER LAMINATED PLASTIC NAMEPLATE WITH WHITE LETTERS ON BLACK BACKGROUND.

FOR HARDWIRED EQUIPMENT THAT HAS THE UPSTREAM CIRCUIT BREAKER AS THE PRIMARY FORM OF DISCONNECTING MEANS, THERE SHALL BE A NAMEPLATE AT EACH ASSOCIATED EQUIPMENT THAT INDICATES THE PANEL, CIRCUITING INFORMATION AND LOCATION OF THE UPSTREAM CIRCUIT BREAKER.

WIRE MARKERS:
FEEDER CONDUCTORS SHALL BE TAPED TO INDICATE PHASE.

APPLY DESIGNATION LABELS OF ENGRAVED PLASTIC LAMINATE FOR PUSHBUTTONS, PILOT LIGHTS, ALARMS/SIGNAL COMPONENTS, AND SIMILAR ITEMS, EXCEPT WHERE LABELING IS SPECIFIED ELSEWHERE.

PANEL IDENTIFICATION:
INSTALL ENGRAVED THREE-LAYER LAMINATED PLASTIC NAMEPLATE ON ALL SWITCHBOARDS, PANELBOARDS, AND CONTROL PANELS.

INSTALL ARC FLASH WARNING LABELS ON ALL SWITCHBOARDS, DISTRIBUTION PANELBOARDS, BRANCH PANELBOARDS, AND CONTROL PANELS.

INSTALL LABEL AT THE SERVICE ENTRANCE THAT CONTAINS THE CALCULATED FAULT CURRENT IN AMPS, THE SYSTEM VOLTAGE AT THE BUS, AND THE DATE THE CALCULATION WAS PERFORMED TO SATISFY THE REQUIREMENTS OF ARTICLE 408.6.

ALL PANELBOARDS SHALL BE PROVIDED WITH TYPED PANEL SCHEDULES UPON COMPLETION OF THE PROJECT. HANDWRITTEN MARKING SHALL NOT BE ACCEPTABLE.

26 24 16 – PANELBOARDS

GENERAL
LIGHTING AND APPLIANCE BRANCH PANELBOARDS AND LOAD CENTERS SHALL BE FACTORY ASSEMBLED, DEAD-FRONT, METAL ENCLOSED WITH ALUMINUM BUSSING AND SOLIDLY BONDED ALUMINUM EQUIPMENT GROUND BAR, AND U.L. LISTED.

MANUFACTURER SHALL BE SCHNEIDER ELECTRIC (SQUARE D) OR APPROVED EQUAL BY OWNER/ARCHITECT.

PROVISIONS FOR ADDITIONAL CIRCUIT BREAKERS SHALL BE SUCH THAT FIELD ADDITION TO CONNECTORS OR MOUNTING HARDWARE WILL NOT BE REQUIRED TO ADD CIRCUIT BREAKERS.

PANEL FRONTS SHALL INCLUDE DOORS AND HAVE FLUSH, STAINLESS STEEL, CYLINDER TUMBLER-TYPE LOCKS WITH CATCHES AND SPRING-LOADED DOOR PULLS AND BE KEYPED ALIKE.

REFER TO PANEL SCHEDULES ON DRAWINGS FOR RATINGS AND ADDITIONAL INFORMATION.

FACTORY ASSEMBLED 100% RATED SOLID NEUTRAL BUS WITH A FULL CAPACITY BONDING STRAP FOR SERVICE ENTRANCE APPLICATIONS.

MOLDED CASE CIRCUIT BREAKERS: NEMA AB 1, PLUG-ON TYPE THERMAL MAGNETIC TRIP CIRCUIT BREAKERS WITH COMMON TRIP HANDLE FOR ALL POLES, LISTED AS TYPE #SWD FOR LIGHTING CIRCUITS, CLASS A GROUND FAULT INTERRUPTER CIRCUIT BREAKERS WHERE REQUIRED BY NEC CODE, IN ALL WET AREAS AND ALSO WHERE SCHEDULED. PROVIDE ARC FAULT CIRCUIT BREAKERS IN ALL DWELLING UNITS AS REQUIRED BY NEC CODE.

DO NOT USE TANDEM CIRCUIT BREAKERS. HANDLE TIES TO MAKE MULTIPLE POLE BREAKERS ARE NOT PERMITTED.

PROVIDE PADLOCK HASP STYLE CIRCUIT BREAKERS FOR EQUIPMENT WITH HARDWIRED CONNECTIONS AS NECESSARY. PROPERLY LABEL THE CIRCUIT AND PANEL SERVING EQUIPMENT ON DEVICE TO DE-ENERGIZE POWER IN ACCORDANCE WITH NEC ARTICLE 422.

ENCLOSURE: GENERAL PURPOSE, FLUSH OR SURFACE AS INDICATED, PROVIDE WITH LOCK ON DOOR, PROVIDE STANDARD GRAY ENAMEL FINISH.

INSTALLATION
INSTALL PANELBOARDS IN ACCORDANCE WITH NEMA PB 1.1 AND THE NECA "STANDARD OF INSTALLATION.

PROVIDE TYPED CIRCUIT DIRECTORY FOR EACH BRANCH PANELBOARD. USE ACTUAL ROOM NUMBERS AND NOT PLAN ROOM NUMBERS. COORDINATE WITH OWNER. REVISE DIRECTORY TO REFLECT CIRCUITING CHANGES REQUIRED TO BALANCE PHASE LOADS.

PROVIDE ENGRAVED PLASTIC NAMEPLATES UNDER THE PROVISIONS OF SPECIFICATION SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS.

PROVIDE SPARE CONDUITS OUT OF EACH RECESSED PANELBOARD TO AN ACCESSIBLE LOCATION ABOVE CEILING AND TO THE FLOOR BELOW. MINIMUM SPARE CONDUITS: THREE EMPTY ONE-INCH (1") AT EACH RECESSED PANEL LOCATION. IDENTIFY EACH AS 'SPARE'.

GROUND AND BOND THE PANELBOARD ENCLOSURE.

ANY FIELD MODIFICATIONS AND ASSOCIATED MEANS AND METHODS SHALL BE APPROVED BY THE AUTHORITY HAVING JURISDICTION AND EQUIPMENT MANUFACTURER. ANY COSTS ASSOCIATED SHALL BE INCLUDED IN THE BID.

PERFORM INSPECTIONS LISTED IN NETA ATS.

MEASURE STEADY STATE LOAD CURRENTS AT EACH PANELBOARD FEEDER; REARRANGE CIRCUITS IN THE PANELBOARD TO BALANCE THE PHASE LOADS TO WITHIN 10% OF EACH OTHER. MAINTAIN PROPER PHASING FOR MULTI-WIRE BRANCH CIRCUITS.

26 27 01 – UTILITY SERVICE ENTRANCE

GENERAL
COORDINATE ALL WORK AND ITEMS PROVIDED WITH THE LOCAL UTILITY.

ALL FEES BY THE UTILITY SHALL BE BILLED DIRECTLY TO THE OWNER.

METERING CABINETS SHALL BE SIZED AND CONFORM TO LOCAL UTILITY COMPANY REQUIREMENTS WITH PROVISIONS FOR LOCKING AND SEALING.

COORDINATE FINAL PAD REQUIREMENTS WITH LOCAL UTILITY COMPANY.

INSTALLATION
ARRANGE WITH UTILITY COMPANY TO OBTAIN TEMPORARY AND PERMANENT ELECTRIC SERVICES TO THE PROJECT.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR FILLING OUT THE UTILITY ELECTRIC SERVICE APPLICATION FOR PERMANENT POWER.

26 27 26 – WIRING DEVICES

GENERAL
RECEPTACLES SHALL BE COMMERCIAL HARD USE SPEC GRADE WITH RATING TO MATCH CIRCUIT.

PROVIDE GFCI OR OTHER CONFIGURATIONS AS STATED ON PLANS OR REQUIRED BY CODE.

REFER TO THE "ELECTRICAL DEVICES LISTING SCHEDULE" FOR ADDITIONAL DEVICE REQUIREMENTS (MAKE/MODEL, ETC.).

DEVICE AND COVERPLATE COLORS SHALL BE SELECTED BY THE OWNER/ARCHITECT DURING CONSTRUCTION.

TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED AS REQUIRED BY NEC 450 AND WHERE INDICATED ON THE DRAWINGS.

GFCI TYPE RECEPTACLES SHALL BE PROVIDED WITHIN 6 FEET TO THE EDGE OF A SINK AND WHERE SPECIFICALLY REQUIRED BY THE NEC.

EXTERIOR DUPLEX RECEPTACLES SHALL BE GFCI, TAMPER-RESISTANT TYPE AND WEATHER-RESISTANT. EACH EXTERIOR DUPLEX SHALL UTILIZE A WEATHERPROOF WHILE IN-USE COVER AND BE SIMILAR TO INTERMATIC #WP1010HMXD (HORIZONTAL POSITION).

INSTALLATION
INSTALL ALL DEVICES IN ACCORDANCE WITH NECA "STANDARD OF INSTALLATION" AND ADAAG REQUIREMENTS.

ALL DEVICES SHALL HAVE A GROUND WIRE (RACEWAY SHALL NOT BE USED AS GROUND PATH).

INSTALL RECEPTACLES WITH GROUNDING POLE ON TOP.

PROVIDE EXTENSION RINGS AS NEEDED TO BRING OUTLET AND SWITCH BOXES FLUSH WITH FINISHED SURFACE.

VERIFY THAT EACH RECEPTACLE DEVICE IS ENERGIZED AND TEST EACH RECEPTACLE FOR PROPER POLARITY.

USE JUMBO SIZE PLATES FOR OUTLETS INSTALLED IN MASONRY WALLS.

INSTALL CONVENIENCE RECEPTACLE 18 INCHES (18") ON CENTER ABOVE FINISHED FLOOR.

INSTALL CONVENIENCE RECEPTACLE SIX INCHES (6") ON CENTER ABOVE COUNTER.

INSTALL LIGHT SWITCHES 46 INCHES (46") ON CENTER ABOVE FINISHED FLOOR.

FEEDING RECEPTACLES DOWNSTREAM OF GFCI RECEPTACLES FOR PROTECTION IN LIEU OF PROVIDING MULTIPLE GFCI RECEPTACLES IS NOT ALLOWED UNLESS THERE IS A USB TYPE RECEPTACLE PRESENT NEEDING GFCI PROTECTION PER THE NEC.

26 28 16 – ENCLOSED SWITCHES AND MOTOR STARTERS

GENERAL
ALL EQUIPMENT WITH AMPACITY OVER 20A OR SINGLE PHASE SHALL BE GENERAL-DUTY TYPE.

WHERE INSTALLED IN WET LOCATIONS, PROVIDE DISCONNECTS WITH A NEMA 3R ENCLOSURE.

MANUFACTURER SHALL BE SCHNEIDER ELECTRIC (SQUARE D) OR APPROVED EQUAL BY OWNER/ARCHITECT.

PROVIDE MOTOR RATED SWITCHES WITH GREEN PILOT LIGHT AND THERMAL OVERLOADS FOR SINGLE OR THREE PHASE LOADS 30 AMPS OR LESS.

PROVIDE FUSED DISCONNECT SWITCHES AS NECESSARY WHEN EQUIPMENT AIC RATINGS ARE NOT ACCEPTABLE TO HANDLE INCOMING FAULT CURRENT.

INSTALLATION
INSTALL IN ACCORDANCE WITH NECA "STANDARD OF INSTALLATION".

INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

INSTALL PLUMB AND PROVIDE IN ACCORDANCE WITH SPECIFICATION SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS.

HEIGHT TO BE FIVE FOOT (5') TO OPERATING HANDLE.

INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES SHALL NOT BE INSTALLED UNTIL EQUIPMENT IS READY TO BE ENERGIZED.

PROVIDE ENGRAVED PLASTIC NAMEPLATES UNDER THE PROVISIONS OF SPECIFICATION SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS.

26 51 00 – INTERIOR LIGHTING

GENERAL
REFER TO LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION AND COLOR TEMPERATURE REQUIREMENTS.

DRIVERS SHALL BE UNDERWRITERS LABORATORIES (UL) LISTED.

DRIVERS SHALL BE SUITABLE FOR DAMP LOCATIONS.

DRIVERS SHALL OPERATE FROM -20 TO 60 DEG C.

DRIVERS SHALL BE ACCESSIBLE FROM BELOW CEILING THROUGH LUMINAIRE OPENING.

DRIVERS FOR LIGHT FIXTURES INSTALLED IN AN EXTERIOR LOCATION OR IN A LOCATION THAT IS OPEN TO THE ELEMENTS SHALL BE RATED FOR COLD WEATHER USE.

EMERGENCY DRIVERS SHALL BE MOUNTED INTEGRAL OR ADJACENT TO LUMINAIRE OR WHERE SHOWN ON DRAWINGS.

EMERGENCY DRIVERS SHALL BE SELF-CONTAINED, WITH AUTOMATIC TRANSFER TO BATTERY SUPPLY ON LOSS OF NORMAL POWER, UL 924 LISTED.

INSTALLATION
ALL FIXTURES SHALL BE INSTALLED SO THEY HAVE REPLACEABLE COMPONENTS ACCESSIBLE.

POSITION EXIT SIGN DIRECTIONAL ARROWS AS INDICATED.

BOND PRODUCTS AND METAL ACCESSORIES TO THE BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.

INSTALL RECESSED LUMINAIRES TO PERMIT REMOVAL FROM BELOW.

INSTALL WALL MOUNTED LUMINAIRES, EMERGENCY LIGHTING UNITS AND EXIT SIGNS AT HEIGHT AS SCHEDULED OR ON THE PLANS. IF HEIGHTS ARE NOT SHOWN OR INDICATED, THE CONTRACTOR SHALL NOTIFY THE DESIGN TEAM IMMEDIATELY FOR A RESOLUTION.

INSTALL ACCESSORIES FURNISHED WITH EACH LUMINAIRE.

CONNECT ALL EMERGENCY LIGHTING UNITS, EXIT SIGNS AND LIGHT FIXTURES DESIGNATED FOR EMERGENCY USE WITH NEAREST UNSWITCHED HOT CONDUCTOR FROM THE NEAREST ELECTRICAL POWER CIRCUIT IF NOT CLEARLY INDICATED ON THE PLANS.

FIXTURE WHIPS UTILIZING THHN/THWN-2 WIRE IN FLEXIBLE METAL CONDUIT SHALL BE USED TO CONNECT ALL LUMINAIRES, EMERGENCY LIGHTS, AND EXIT SIGNS. MINIMUM WIRE SIZE FOR ALL FIXTURE WHIPS SHALL BE 14 AWG.

MAKE WIRING CONNECTIONS TO BRANCH CIRCUIT USING BUILDING WIRE WITH INSULATION SUITABLE FOR TEMPERATURE CONDITIONS WITHIN LUMINAIRE.

BOND PRODUCTS AND METAL ACCESSORIES TO THE BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.

EXPOSED GRID CEILINGS: SUPPORT SURFACE MOUNTED LUMINAIRES ON GRID CEILING DIRECTLY FROM BUILDING STRUCTURE. PROVIDE AUXILIARY MEMBERS SPANNING CEILING GRID MEMBERS TO SUPPORT SURFACE MOUNTED LUMINAIRES.

26 56 10 – EXTERIOR LIGHTING

GENERAL
REFER TO SITE LIGHT POLE BASE DETAIL FOR CONCRETE POLE BASE DEPTH SPECIFICS AND WIRING INFORMATION.

CONCRETE POLE BASES SHALL HAVE MINIMUM 2'-6" EXPOSED ABOVE GRADE WHEN NOT PROTECTED BY A CURB. VERIFY HEIGHT OF EXPOSED ABOVE-GRADE BASE WITH SITE CIVIL AND DESIGN TEAM FOR FINAL LOCATIONS AND REQUIREMENTS.

TOP OF BASE IS TO HAVE BEVELED CANTED EDGE.

THE ANCHOR BASE SHALL BE FABRICATED FROM STRUCTURAL QUALITY HOT ROLLED CARBON STEEL PLATE THAT MEETS OR EXCEEDS A MINIMUM YIELD STRENGTH OF 36,000 PSI. THE ANCHOR BASE TELESCOPES THE POLE SHAFT AND SHALL BE CIRCUMFERENTIALLY WELDED TOP AND BOTTOM.

ANCHOR BOLTS SHALL BE FABRICATED FROM COMMERCIAL QUALITY HOT ROLLED CARBON STEEL BAR THAT MEETS OR EXCEEDS A MINIMUM YIELD STRENGTH OF 55,000 PSI. FOUR PROPERLY SIZED ANCHOR BOLTS, EACH WITH TWO REGULAR HEX NUTS AND WASHERS, SHALL BE FURNISHED AND SHIPPED WITH ALL POLES UNLESS OTHERWISE SPECIFIED. ANCHOR BOLTS SHALL HAVE THE THREADED END GALVANIZED A MINIMUM OF EIGHT INCHES (8") IN ACCORDANCE WITH ASTM A-153.

THE STANDARD FINISH SHALL BE A POLYESTER THERMOSETTING POWDER COATING. VERIFY WITH DESIGN TEAM FINAL COLOR PRIOR TO ORDERING.

PROVIDE AN OVAL REINFORCED GASKETED HANDHOLE, HAVING A NOMINAL 4" X 6-1/2" INSIDE OPENING, LOCATED 1'-6" ABOVE BASE AND A GROUNDING PROVISION SHALL BE LOCATED INSIDE THE HANDHOLE RING.

ALL POLES OVER 12' TALL SHALL HAVE AN INTERNAL VIBRATION DAMPENERS. DAMPENERS SHALL INCLUDE A RUBBERIZED COATING TO PREVENT EXCESSIVE METAL-ON-METAL NOISE DURING HIGH WIND EVENTS.

POLES SHALL BE DESIGNED FOR LUMINAIRE SIZE AND SUITABLE FOR 100 MPH WIND WITH GUST TO 130 MPH.

INSTALLATION
PROVIDE CONCRETE BASES FOR LIGHTING POLES AT LOCATIONS INDICATED.

INSTALL POLES PLUMB AND PROVIDE DOUBLE NUTS TO ADJUST PLUMB. GROUT AROUND EACH BASE.

BOND LUMINAIRES METAL ACCESSORIES AND METAL POLES TO BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.

PROVIDE SUPPLEMENTARY GROUNDING ELECTRODE AT EACH POLE IF NECESSARY.

RE-LAMP ALL LUMINAIRES THAT HAVE FAILED HEADS OR DRIVERS UP TO SIX MONTHS AFTER THE SUBSTANTIAL COMPLETION DATE.



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HYPER ENERGY BAR

2060 NW LOWENSTEIN DR., LEE'S SUMMIT, MO 64081

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Project No.	595
Sheet Content:	ELECTRICAL SPECIFICATIONS
Sheet No.	E-0.2

ELECTRICAL CONNECTION KITCHEN SCHEDULE							
NO.	DESCRIPTION	VOLTS	PHASE	AMPS	WATTS (VA)	CONNECTION TYPE	NOTES
7	UC REFRIGERATOR	120	1	3	360	RECEPT (5-20R)	INSTALL FOR FUTURE EQUIPMENT. PROVIDE GFCI BREAKER.
11A	ICE MACHINE	120	1	6.2	744	DIRECT (J-BOX)	POWERED VIA REMOTE CONDENSER ON ROOF. VERIFY LOCATIONS OF EQUIPMENT CONNECTIONS AND J-BOXES WITH FINAL MFR SHOP DRAWINGS. PROVIDE ALL REQD COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM.
11B	ICE MACHINE CONDENSER	240	1	18.5	4440	NON-FUSED DISCONNECT	PROVIDE NEMA 3R WEATHERPROOF DISCONNECT. MOUNT ON STRUT EXTENDED FROM ROOF CURB IF NECESSARY.
12A	WALK-IN COOLER LIGHTS	120	1	1	120	DIRECT (J-BOX)	VERIFY LOCATIONS OF EQUIPMENT CONNECTIONS AND J-BOXES WITH FINAL MFR SHOP DRAWINGS. PROVIDE ALL REQD COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM.
12B	DOOR HEAT TRACE & ALARM	120	1	12	1440	DIRECT (J-BOX)	VERIFY LOCATIONS OF EQUIPMENT CONNECTIONS AND J-BOXES WITH FINAL MFR SHOP DRAWINGS. PROVIDE ALL REQD COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM.
12C	WALK-IN COOLER EVAP. COIL	120	1	1.8	216	DIRECT (J-BOX)	POWERED VIA REMOTE CONDENSER ON ROOF. VERIFY LOCATIONS OF EQUIPMENT CONNECTIONS AND J-BOXES WITH FINAL MFR SHOP DRAWINGS. PROVIDE ALL REQD COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM.
12D	REMOTE COOLER CONDENSER	240	1	7.4	1776	NON-FUSED DISCONNECT	PROVIDE NEMA 3R WEATHERPROOF DISCONNECT. MOUNT ON STRUT EXTENDED FROM ROOF CURB IF NECESSARY.
16	P.O.S. SYSTEM - MONITOR	120	1	0.5	60	RECEPT (5-20R)	
17	ESPRESSO STEAMER	220	1	21	4620	RECEPT (L6-30R)	PROVIDE GFCI BREAKER.
18	ESPRESSO MACHINE	220	1	21	4620	RECEPT (L6-30R)	PROVIDE GFCI BREAKER.
23	P.O.S. SYSTEM - PRINTER	120	1	2.5	300	RECEPT (5-20R)	
24	INSECT TRAPPER	120	1	1.5	180	RECEPT (5-20R)	
25	FROZEN DRINK MACHINE (FUTURE)	-	-	-	-	DIRECT (J-BOX)	PROVIDE J-BOX WHERE INDICATED WITH PULLSTRING BACK TO ELECTRICAL PANEL FOR FUTURE FROZEN DRINK MACHINE.
37	MICROWAVE	120	1	10	1200	RECEPT (5-20R)	PROVIDE GFCI BREAKER.
42	WATER HEATER	240	1	37.5	9000	DIRECT (J-BOX)	COORDINATE FINAL EQUIPMENT SIZE WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION. PROVIDE ADEQUATELY SIZED WIRE, CONDUIT AND HANDLE-LOCK TYPE BREAKER TO ACCOMMODATE EQUIPMENT.
44	R.O. SYSTEM	120	1	5	600	RECEPT (5-20R)	
45	WATER SOFTNER	120	1	2.4	288	RECEPT (5-20R)	

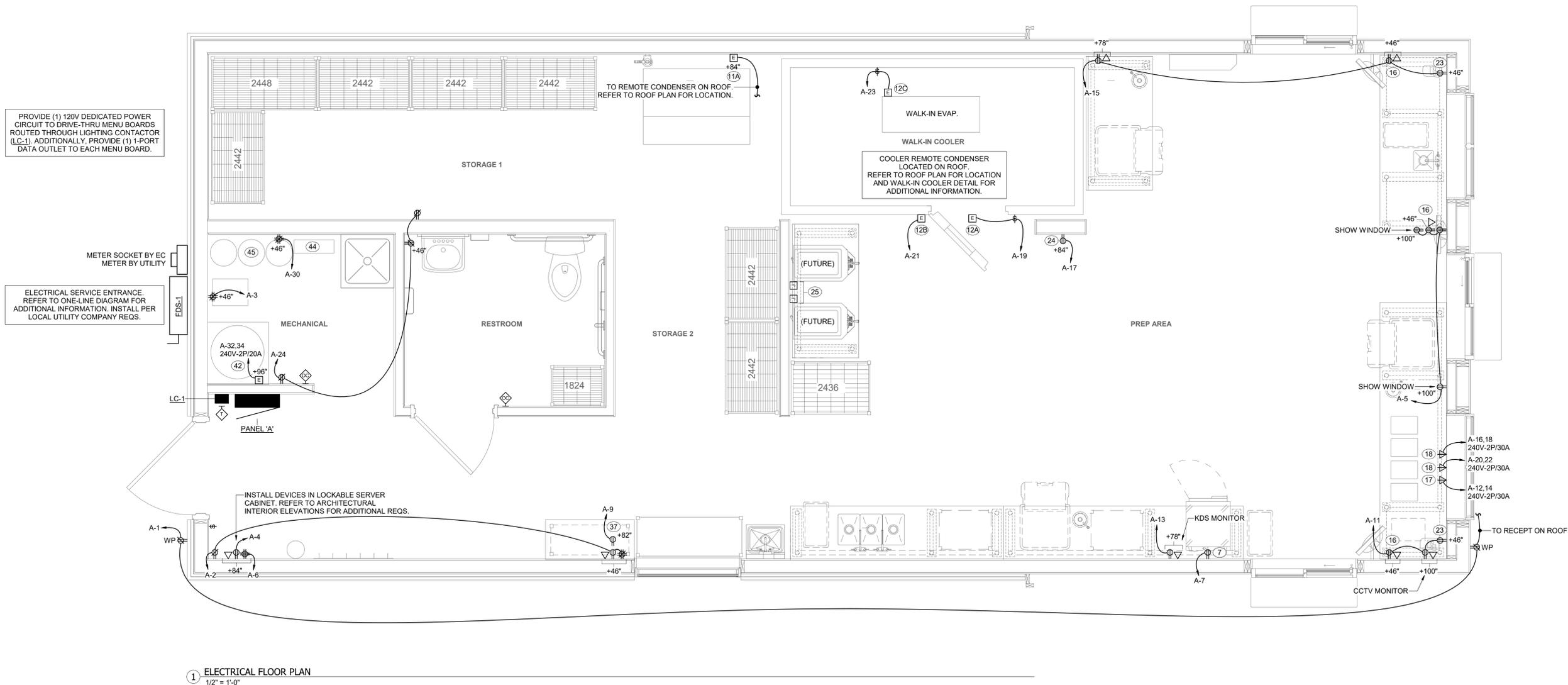
ELECTRICAL PLAN SYMBOLS LIST	
DISTRIBUTION	
	METER SOCKET
	SURFACE-MOUNT PANEL
EQUIPMENT WIRING	
	DISCONNECT
	WEATHERPROOF DISCONNECT
WIRING DEVICES	
	DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE - GFCI TYPE
	DUPLEX GFCI/WP RECEPTACLE W/ IN-USE COVER
	QUADRUPLEX RECEPTACLE - GFCI TYPE
	SPECIAL 240V RECEPTACLE - REFER TO DRAWINGS
	JUNCTION BOX
	ELECTRICAL CONNECTION
COMMUNICATIONS DEVICES	
	DATA OUTLET IN WALL W/ # OF JACKS
MISCELLANEOUS	
	WEATHERPROOF

- GENERAL ELECTRICAL NOTES:**
- ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY GROUNDING FOR THE BUILDING AS REQUIRED BY NFPA 70 ARTICLE 250.
 - ALL HEIGHTS INDICATED ARE TO CENTER OF BOX. GENERAL-USE CONVENIENCE RECEPTACLES SHALL BE MOUNTED AT 18" ABOVE FINISH FLOOR. COORDINATE ALL WALL DEVICES WITH FINAL CASEWORK ELEVATIONS, KITCHEN EQUIPMENT AND OTHER TRADES.
 - SURFACE RACEWAY SHALL NOT BE USED IN ANY FINISHED AREAS WITHOUT PRIOR APPROVAL FROM THE DESIGN TEAM.
 - ALL RECEPTACLES LOCATED WITHIN A WET LOCATION, FOOD PREP AREA OR 6 FEET OF THE EDGE OF A SINK SHALL BE GFCI OR PROTECTED BY GFCI RATED CIRCUIT BREAKER.
 - ALL RECEPTACLE CIRCUITS SHALL HAVE DEDICATED NEUTRALS.
 - DEVICES SHALL BE INSTALLED SUCH THAT NO TWO DEVICES ON OPPOSITE SIDES OF SAME WALL ARE WITHIN 6" OF EACH OTHER.
 - MAINTAIN SERVICE CLEARANCE AROUND ALL ELECTRICAL AND MECHANICAL EQUIPMENT. CONFIRM FINAL MECHANICAL EQUIPMENT LOCATIONS DURING CONSTRUCTION.
 - PROVIDE CONDUIT SLEEVES WITH INSULATED BUSHINGS SERVING ALL LOW VOLTAGE CABLING. DO NOT EXCEED 40% FILL.
 - LOW VOLTAGE CABLING (E.G., FIRE ALARM, TECHNOLOGY, ETC.) SHALL BE ROUTED EXPOSED ABOVE ACCESSIBLE CEILING ONLY AND SUPPORTED BY J-HOOKS OR BRIDAL RINGS.
 - THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH ADAAG (AMERICANS WITH DISABILITIES ACT ACCESSIBILITIES GUIDELINES) AND ANSI 117.1.
 - WIRELESS ACCESS POINTS (WAP) AND SECURITY CAMERAS SHALL BE OWNER FURNISHED AND OWNER INSTALLED. ELECTRICAL CONTRACTOR SHALL PROVIDE ROUGH-IN. COORDINATE FINAL REQS DURING CONSTRUCTION WITH OWNER'S REP.**



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1 ELECTRICAL FLOOR PLAN
1/2" = 1'-0"

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Project No.	595
Sheet Content:	ELECTRICAL FLOOR PLAN
Sheet No.	E-1.1

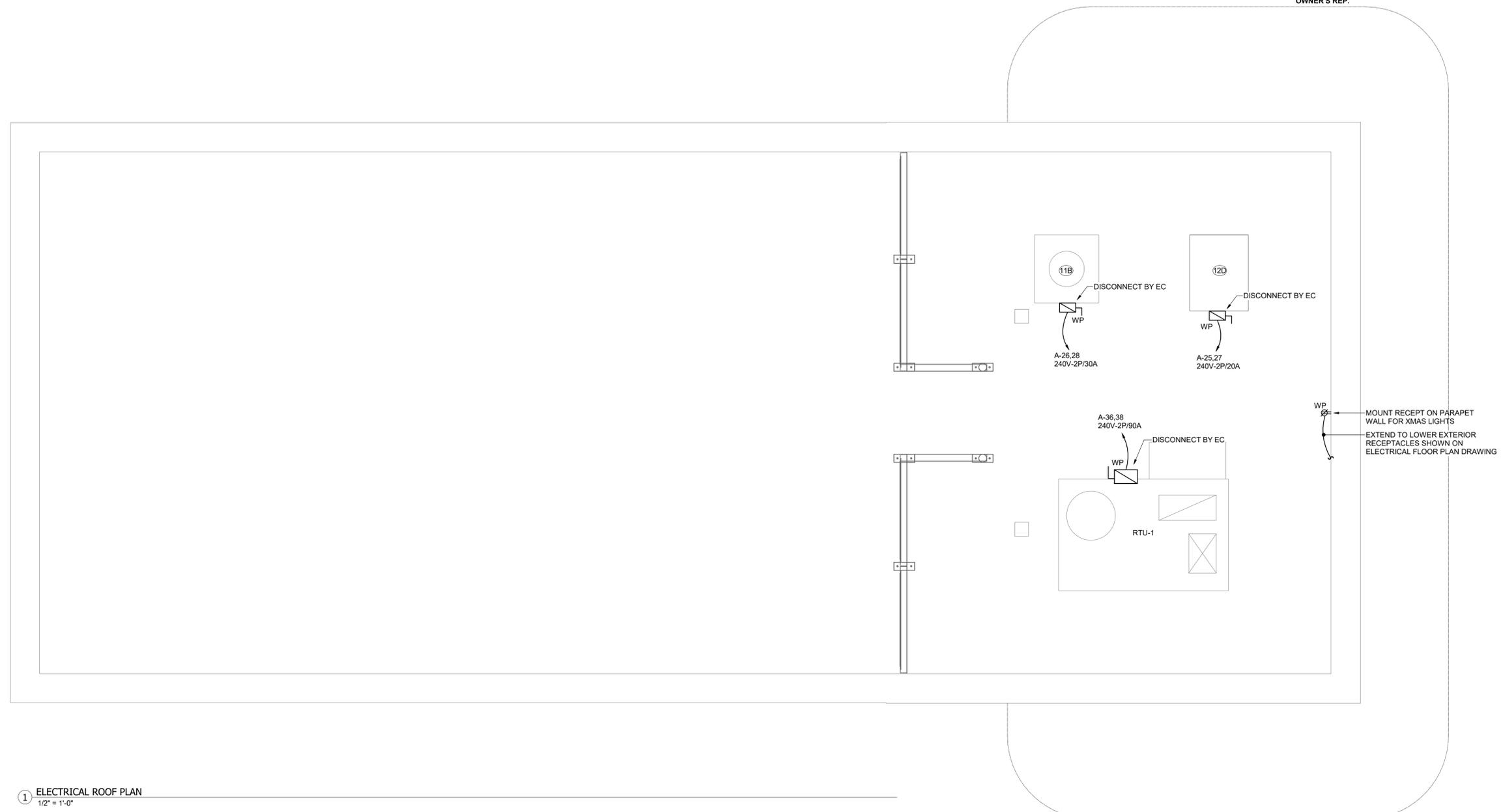
GENERAL ELECTRICAL NOTES:

- A. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY GROUNDING FOR THE BUILDING AS REQUIRED BY NFPA 70 ARTICLE 250.
- B. ALL HEIGHTS INDICATED ARE TO CENTER OF BOX. GENERAL-USE CONVENIENCE RECEPTACLES SHALL BE MOUNTED AT 18" ABOVE FINISH FLOOR. COORDINATE ALL WALL DEVICES WITH FINAL CASEWORK ELEVATIONS, KITCHEN EQUIPMENT AND OTHER TRADES.
- C. SURFACE RACEWAY SHALL NOT BE USED IN ANY FINISHED AREAS WITHOUT PRIOR APPROVAL FROM THE DESIGN TEAM.
- D. ALL RECEPTACLES LOCATED WITHIN A WET LOCATION, FOOD PREP AREA OR 6 FEET OF THE EDGE OF A SINK SHALL BE GFCI OR PROTECTED BY GFCI RATED CIRCUIT BREAKER.
- E. ALL RECEPTACLE CIRCUITS SHALL HAVE DEDICATED NEUTRALS.
- F. DEVICES SHALL BE INSTALLED SUCH THAT NO TWO DEVICES ON OPPOSITE SIDES OF SAME WALL ARE WITHIN 6" OF EACH OTHER.
- G. MAINTAIN SERVICE CLEARANCE AROUND ALL ELECTRICAL AND MECHANICAL EQUIPMENT. CONFIRM FINAL MECHANICAL EQUIPMENT LOCATIONS DURING CONSTRUCTION.
- H. PROVIDE CONDUIT SLEEVES WITH INSULATED BUSHINGS SERVING ALL LOW VOLTAGE CABLING. DO NOT EXCEED 40% FILL.
- I. LOW VOLTAGE CABLING (E.G., FIRE ALARM, TECHNOLOGY, ETC.) SHALL BE ROUTED EXPOSED ABOVE ACCESSIBLE CEILINGS ONLY AND SUPPORTED BY J-HOOKS OR BRIDAL RINGS.
- J. THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH ADAAG (AMERICANS WITH DISABILITIES ACT ACCESSIBILITIES GUIDELINES) AND ANSI 117.1.
- K. **WIRELESS ACCESS POINTS (WAP) AND SECURITY CAMERAS SHALL BE OWNER FURNISHED AND OWNER INSTALLED. ELECTRICAL CONTRACTOR SHALL PROVIDE ROUGH-IN. COORDINATE FINAL REQS DURING CONSTRUCTION WITH OWNER'S REP.**



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1 ELECTRICAL ROOF PLAN
1/2" = 1'-0"

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Project No.	595
Sheet Content:	ELECTRICAL ROOF PLAN
Sheet No.	E-1.2

LUM. TYP.	QUANTITY
ER	1
L1	5
L2	12
L2E	5
L3	1
L4	1
X1	1

REFLECTED CEILING PLAN SYMBOLS LIST

LIGHTING SWITCHES & SENSORS

- ⌚ SINGLE POLE SWITCH
- ⌚₃ 3-WAY SWITCH
- ⌚_T TIMER SWITCH
- ⌚_{OC} OCCUPANCY SENSOR SWITCH

LUMINAIRES

- ☐ 2x2' RECESSED TROFFER
- RECESSED DOWNLIGHT

NOTE: HALF SHADING INDICATES EMERGENCY

EXIT & EMERGENCY

- ⊕ SINGLE FACE EXIT SIGN (WALL MOUNT)
- ⊕ 2-HEAD EMERGENCY BATTERY FIXTURE

COMMUNICATIONS DEVICES

- ⊕ WIRELESS ACCESS POINT (WAP)
- ⊕ WALL SPEAKER

SECURITY DEVICES

- ⊕ SECURITY CAMERA

MISCELLANEOUS

- NL NIGHT LIGHT - ALWAYS ON

- GENERAL REFLECTED CEILING PLAN NOTES:**
- A. COORDINATE ALL WALL DEVICES WITH FINAL CASEWORK ELEVATIONS, ARCHITECTURAL DETAILS AND OTHER TRADES.
 - B. SURFACE RACEWAY SHALL NOT BE USED IN ANY FINISHED AREAS WITHOUT PRIOR APPROVAL FROM THE DESIGN TEAM.
 - C. DEVICES SHALL BE INSTALLED SUCH THAT NO TWO DEVICES ON OPPOSITE SIDES OF SAME WALL ARE WITHIN 6" OF EACH OTHER.
 - D. OCCUPANCY SENSORS SHALL BE LOCATED PER MANUFACTURER'S RECOMMENDATIONS.
 - E. EACH AREA OF CONTROL SHALL HAVE A DEDICATED POWER PACK OR ROOM CONTROLLER WITH ALL DEVICES SHOWN ON PLANS OPERATING TOGETHER.
 - F. ALL LIGHTING FIXTURES SHALL BE INSTALLED IN SUCH WAY THAT DRIVERS ARE ACCESSIBLE WITHOUT CUTTING OF CEILING.
 - G. THE ELECTRICAL CONTRACTOR SHALL EXTEND AN "UNSWITCHED" HOT CONDUCTOR FROM THE NEAREST NORMAL LIGHTING CIRCUIT TO ALL HALF SHADE LIGHTING FIXTURES. UL924 LISTED DEVICES AND EXIT SIGNS REQUIRED FOR EMERGENCY EGRESS OPERATION.
 - H. REFER TO ARCHITECTURAL ELEVATIONS AND REFLECTED CEILING PLANS FOR SPECIFIC DEVICE ROUGH-IN AND PLACEMENT REQS. ANY DEVIATIONS SHALL BE REVIEWED AND APPROVED BY THE DESIGN TEAM PRIOR TO ROUGH-IN.
 - I. THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH ADAAG (AMERICANS WITH DISABILITIES ACT ACCESSIBILITIES GUIDELINES) AND ANSI 117.1.
 - J. **WIRELESS ACCESS POINTS (WAP) AND SECURITY CAMERAS SHALL BE OWNER FURNISHED AND OWNER INSTALLED. LIGHTING FIXTURES SHALL BE OWNER FURNISHED AND CONTRACTOR INSTALLED. CONTRACTOR SHALL PROVIDE ALL ROUGH-INS AND COORDINATE FINAL REQUIREMENTS DURING CONSTRUCTION WITH OWNER'S REP.**



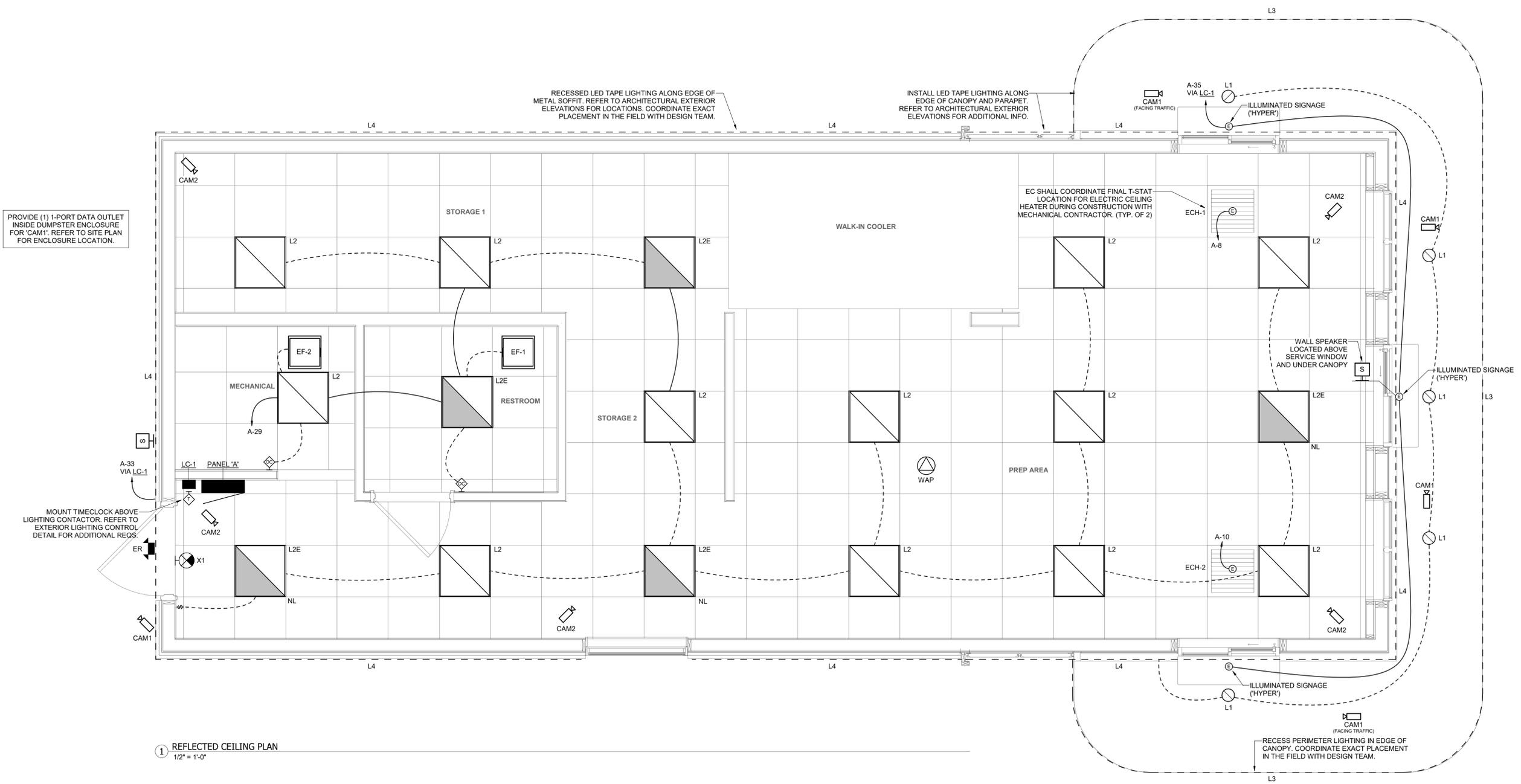
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1 REFLECTED CEILING PLAN
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Project No. **595**
Sheet Content:
REFLECTED CEILING PLAN
Sheet No.
E-2.1

CONDUIT AND WIRE FEEDER SCHEDULE - ALUMINUM						
CONDUCTORS (THWN-2)	CONDUIT			PARALLEL SETS		
	PHASE	NEUTRAL	GROUND			
(A400/N)	(2) 250 MCM	250 MCM	-	2-1/2"	2-1/2"	2
(A400/3)	(2) 250 MCM	250 MCM	#1 AWG	2-1/2"	2-1/2"	2

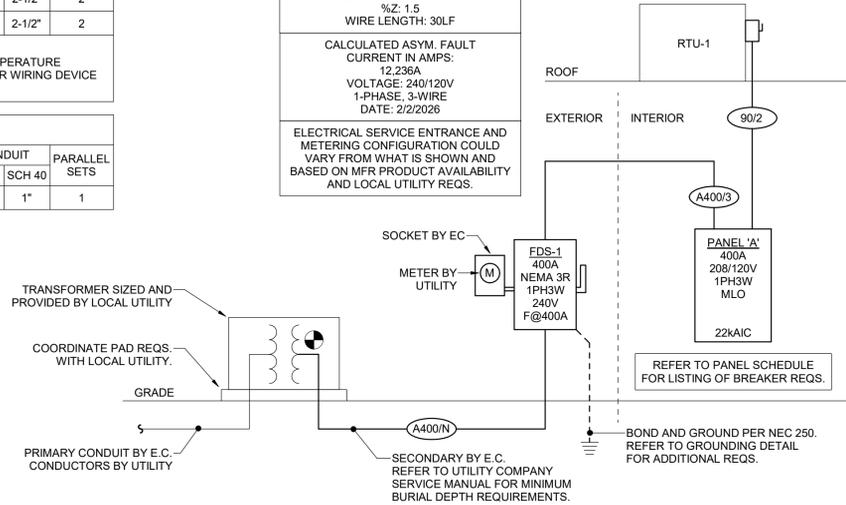
NOTE:
AMPACITIES BASED OFF NEC TABLE 310.16 WITH TEMPERATURE RATINGS AT 75 DEGREE. DO NOT USE THIS TABLE FOR WIRING DEVICE CIRCUITS OR MECHANICAL EQUIPMENT FEEDERS.

CONDUIT AND WIRE FEEDER SCHEDULE - COPPER						
CONDUCTORS (THWN-2)	CONDUIT			PARALLEL SETS		
	PHASE	NEUTRAL	GROUND			
(90/2)	(2) #3 AWG	-	#8 AWG	1"	1"	1

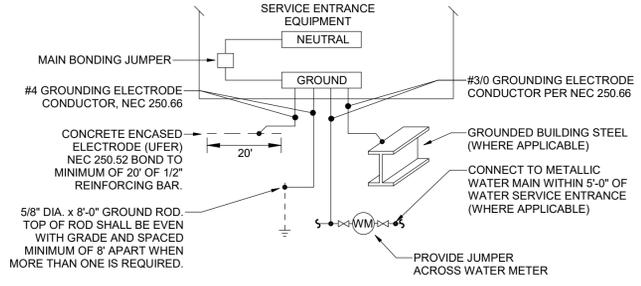
CALCULATED FAULT CURRENT ASSUMPTIONS:
 INFINITE PRIMARY SOURCE
 50KVA UTILITY XFMR
 %Z: 1.5
 WIRE LENGTH: 30LF

CALCULATED ASYM. FAULT CURRENT IN AMPS:
 12,236A
 VOLTAGE: 240/120V
 1-PHASE, 3-WIRE
 DATE: 2/2/2026

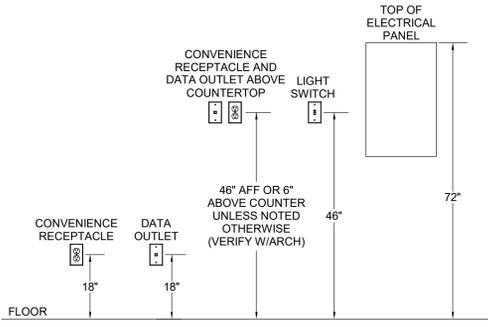
ELECTRICAL SERVICE ENTRANCE AND METERING CONFIGURATION COULD VARY FROM WHAT IS SHOWN AND BASED ON MFR PRODUCT AVAILABILITY AND LOCAL UTILITY REQS.



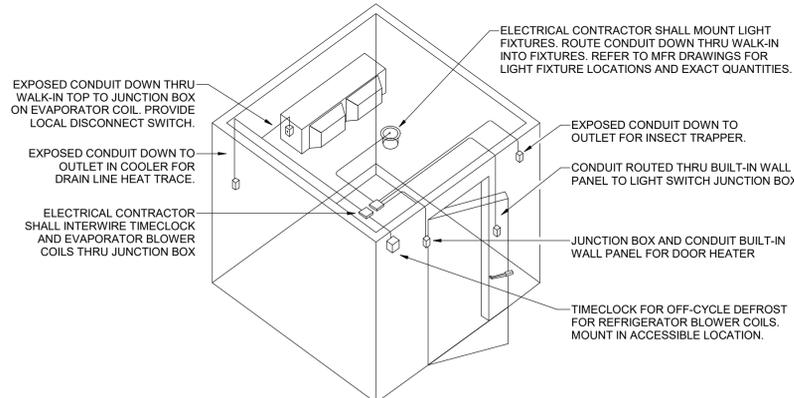
1 ELECTRICAL ONE-LINE DIAGRAM
NO SCALE



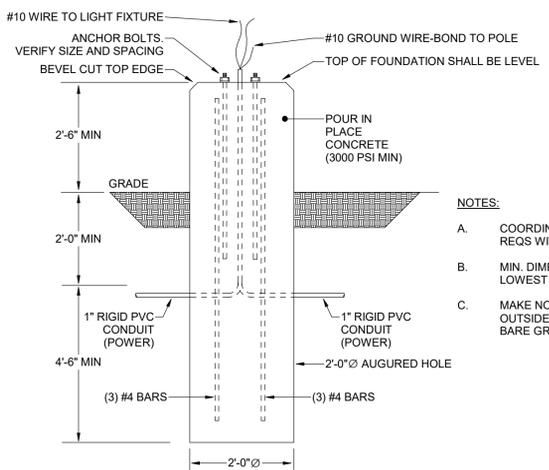
2 SERVICE ENTRANCE GROUNDING DETAIL
NO SCALE



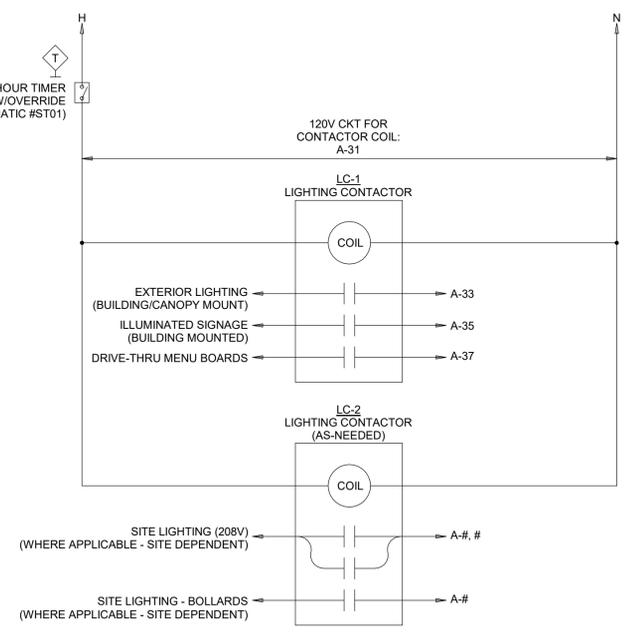
3 TYPICAL DEVICE ELEVATION DETAIL
NO SCALE



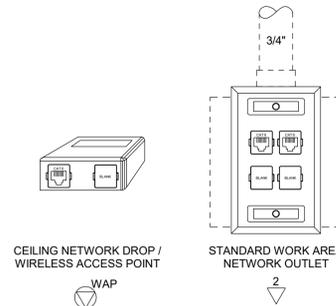
4 TYPICAL ELECTRICAL COOLER CONNECTION DETAIL
NO SCALE



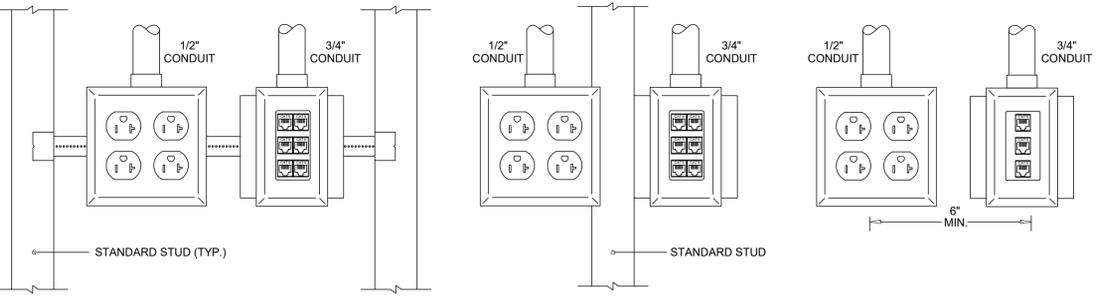
5 TYPICAL SITE LIGHT POLE FOUNDATION MOUNTING DETAIL (WHERE APPLICABLE - SITE DEPENDENT)
NO SCALE



6 TYPICAL EXTERIOR LIGHTING CONTROL DETAIL
NO SCALE



7 TELECOM DEVICE DETAIL
NO SCALE



8 TYPICAL RECEPTACLE AND DATA MOUNTING DETAIL
NO SCALE

LOW VOLTAGE CABLING CONDUIT FILL TABLE	
TRADE SIZE	MAX # OF WIRES
1/2"	2
3/4"	3
1"	5
1-1/4"	10
1-1/2"	13
2"	22
2-1/2"	39
3"	59
3-1/2"	77
4"	98



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Project No. 595
 Sheet Content:
ELECTRICAL DETAILS
 Sheet No.
E-5.1

LUMINAIRE SCHEDULE									
LUM. TYP.	MFR	CATALOG NO.	LAMP DATA	LUMENS	WATTS	VOLTAGE	DESCRIPTION	MOUNTING	COMMENTS
ER	BARRON	2RL1-WP-BL	LED	160	2	6	EXTERIOR REMOTE TWO-HEAD EMERGENCY LIGHT, BLACK, UL924 LISTED.	WALL	BY OWNER
L1	SATCO	S11875	4000K/80CRI	900	12	120	6-INCH ROUND RECESSED DOWNLIGHT, EDGE-LIT, DIMMABLE, FIELD SWITCHABLE CCT SET TO 4000K, WET LOCATION LISTED, BLACK FINISH, REMOTE DRIVER.	RECESSED	BY OWNER
L2	LITHONIA	CPX-2X2-AL07-80CRI-SWW7-SWL-MVOLT	4000K/80CRI	4,557	33	120	2x2' RECESSED BACK-LIT FLAT PANEL. (HIGH SETTING)	RECESSED	BY OWNER
L2E	LITHONIA	CPX-2X2-AL07-80CRI-SWW7-SWL-MVOLT-E10WLCP	4000K/80CRI	4,557	33	120	SAME AS PREVIOUS EXCEPT PROVIDE WITH INTEGRAL EMERGENCY BATTERY BACKUP.	RECESSED	BY OWNER
L3	NOVA	DUAL-BEND NEON SERIES	RGBW	250/FT	3W/FT	24	FLEXIBLE SILICONE DIMMABLE LED TAPE LIGHT. MOUNT DRIVERS IN ACCESSIBLE LOCATIONS. REFER TO PLANS FOR LENGTHS.	RECESSED	BY OWNER
L4	NOVA	DESIGN SERIES: NF-CH-4517	3000K/80CRI	250/FT	3W/FT	24	DIMMABLE LED TAPE LIGHT W/LENSED ALUMINUM SLIM EXTRUSION. MOUNT DRIVERS IN ACCESSIBLE LOCATIONS. REFER TO PLANS FOR LENGTHS.	RECESSED	BY OWNER
X1	BARRON	VEX-U-BP-WB-WH-R6	LED	NA	4	120	SINGLE FACE EXIT SIGN, THERMOPLASTIC HOUSING. REMOTE CAPACITY, WHITE W/RED LETTERS. BATTERY BACKUP WITH 2-HOUR MINIMUM RUN-TIME. UL924 LISTED.	WALL	BY OWNER

BRANCH PANEL 'A'													
Location: BACK OF HOUSE Supply From: FDS-1 Mounting: SURFACE Enclosure: NEMA 1						Volts: 120/240 Single Phases: 1 Wires: 3 SCCR Rating: 22,000				Mains Type: MLO Mains Rating: 400 A MCB Rating: NONE SPD: NONE			
Notes:													
CKT	Circuit Description	Type	Trip	Poles	A		B		Poles	Trip	Type	Circuit Description	CKT
A-1	RECEPTS - EXTERIOR/ROOF			20 A	1	540	1740		1	20 A		RECEPTS - GENERAL USE	A-2
A-3	RECEPT - IRRIGATION			20 A	1			360	180	1	20 A	RECEPT - DATA	A-4
A-5	RECEPTS - POS SYSTEM (#16)(#23)	G		20 A	1	720	360			1	20 A	RECEPT - DATA	A-6
A-7	RECEPT - UC REFRIG. (#7)	G		20 A	1			1200	1500	1	20 A	H ECH-1 (CEILING HEATER)	A-8
A-9	RECEPT - MICROWAVE	G		20 A	1	1200	1500			1	20 A	H ECH-2 (CEILING HEATER)	A-10
A-11	RECEPTS - POS SYSTEM (#16)(#23)	G		20 A	1			660	2310	2	30 A	G RECEPT - ESPRESSO (#17)	A-12
A-13	RECEPT - KDS MONITOR	G		20 A	1	220	2310						A-14
A-15	RECEPTS - POS SYSTEM (#16)(#23)	G		20 A	1			660	2310			G RECEPT - ESPRESSO (#18)	A-16
A-17	RECEPT - INSECT TRAPPER (#24)	G		20 A	1	500	2310			2	30 A	G RECEPT - ESPRESSO (#18)	A-18
A-19	COOLER LTGS (#12A)			20 A	1			100	2310				A-20
A-21	COOLER HEAT TRACE & ALARM (#12B)			20 A	1	800	2310			2	30 A	G RECEPT - ESPRESSO (#18)	A-22
A-23	COOLER EVAP. COIL (#12C)			20 A	1			250	540	1	20 A	RECEPTS - GENERAL USE	A-24
A-25	COOLER REMOTE COND. (#12D)			20 A	2	1320	1320			2	30 A	ICEMAKER CONDENSER (#11A/11B)	A-26
A-27								1320	1320				A-28
A-29	LIGHTING - INTERIOR/EF-1/EF-2			20 A	1	474	360			1	20 A	RECEPT - RO & WTR SFNR (#44/45)	A-30
A-31	LTG CONTACTOR COIL (LC-1)			20 A	1			50	1250				A-32
A-33	LIGHTING - EXTERIOR	T		20 A	1	260	1250			2	20 A	H WATER HEATER (#42)	A-34
A-35	LIGHTING - EXTERIOR SIGNAGE	T		20 A	1			750	6750				A-36
A-37	DRIVE-THRU MENU BOARDS	T		20 A	1	500	6750			2	90 A	RTU-1	A-38
A-39	SPACE	--	--	1				--	--	1	--	SPACE	A-40
A-41	SPACE	--	--	1				--	--	1	--	SPACE	A-42
A-43	SPACE	--	--	1				--	--	1	--	SPACE	A-44
A-45	SPACE	--	--	1				--	--	1	--	SPACE	A-46
A-47	SPACE	--	--	1				--	--	1	--	SPACE	A-48
A-49	SPACE	--	--	1				--	--	1	--	SPACE	A-50
A-51	SPACE	--	--	1				--	--	1	--	SPACE	A-52
A-53	SPACE	--	--	1				--	--	1	--	SPACE	A-54
					Total Load:	26744 VA	23820 VA						
					Total Amps:	223 A	199 A						
Type Legend: N=NORMAL G=GFI M=MOTORIZED E=EXISTING T=THRU LIGHTING CONTRACTOR H=HANDLE LOCK													
Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals									
HVAC	18880 VA	100.00%	18880 VA										
Heating	3000 VA	100.00%	3000 VA	Total Conn. Load:	50.6 kVA								
Lighting - General	534 VA	125.00%	668 VA	Total Est. Demand:	44.8 kVA								
Receptacles	5640 VA	100.00%	5640 VA	Total Conn. Current:	211 A								
Lighting - Exterior	950 VA	125.00%	1188 VA	Total Est. Demand Current:	187 A								
Equipment	4100 VA	100.00%	4100 VA										
Kitchen Equipment - Non-Dwelling Unit	17460 VA	65.00%	11349 VA										

ELECTRICAL DEVICES LISTING SCHEDULE	
DEVICE SYMBOL	DESCRIPTION
(E) (E) (CEILING) (WALL)	4x4 JUNCTION BOX; 2x4 HANDY BOX; EQUIPMENT CONNECTIONS.
⊕ ⊕	DUPLEX RECEPTACLE, 125 VOLT, 20 AMP, 3-WIRE GROUNDING TYPE, COMMERCIAL HARD USE SPEC GRADE. LEGRAND #5362XXX. [HUBBELL #HBL5362XX]
⊕ ⊕	DUPLEX RECEPTACLE, 125 VOLT, 20 AMP, 3-WIRE GROUNDING TYPE, GROUND FAULT INTERRUPTER W/SELF-TEST. LEGRAND #2097XXX. [HUBBELL #GFRST20XX]
⊕ ⊕	QUAD RECEPTACLE, CONSIST OF TWO DUPLEX RECEPTACLES, DOUBLE GANG BOX, PLASTER RING AND FACEPLATE.
⊕ ⊕	DUPLEX RECEPTACLE, 125 VOLT, 20 AMP, 3-WIRE GROUNDING TYPE, GROUND FAULT INTERRUPTER W/SELF-TEST. LEGRAND #2097XXX. [HUBBELL #GFRST20XX]
⊕ ⊕	QUAD RECEPTACLE, CONSIST OF TWO DUPLEX RECEPTACLES, DOUBLE GANG BOX, PLASTER RING AND FACEPLATE.
∇	RECEPTACLE, TWIST-LOCKING TYPE, 250 VOLT, 20 AMP, 2 POLE, 3-WIRE GROUNDING TYPE, NEMA L6-20R, BLACK. LEGRAND #L620R
∇	RECEPTACLE, TWIST-LOCKING TYPE, 250 VOLT, 30 AMP, 2 POLE, 3-WIRE GROUNDING TYPE, NEMA L6-30R, BLACK. LEGRAND #L630R
⊕ WP	DUPLEX RECEPTACLE, 125 VOLT, 20 AMP, 3-WIRE GROUNDING TYPE, GROUND FAULT INTERRUPTER W/SELF-TEST, TAMPER-RESISTANT, WEATHER-RESISTANT, LEGRAND #2097TRWRXXX. PROVIDE WEATHERPROOF WHILE IN-USE EXTRA DUTY COVER INTERMATIC #WP1010HMXD (HORIZ). [HUBBELL #GFTWRST20XX, #MX4380S (HORIZ)]
⊕	DISCONNECTING MEANS FOR SERVICE EQUIPMENT (IE. NON-FUSED DISCONNECT, FUSED DISCONNECT, MOTOR STARTER W/RED PILOT LIGHT).
⊕	24-HR, 7-DAY, 24HR, PROGRAMMABLE ELECTRONIC TIMER SWITCH, MANUAL OVERRIDE, BATTERY BACKUP, SINGLE CIRCUIT CONFIGURATION, 15 AMP RATED, AUTOMATIC DAYLIGHT SAVING TIME ADJUSTMENT, 120/277VAC, INTERMATIC #ST01.
NOTES:	
1. EQUAL DEVICES BY HUBBELL. HUBBELL CATALOG NUMBERS ARE IN [BRACKETS]	
2. ALL RECEPTACLES SHALL BE MOUNTED AT 18" ABOVE FINISH FLOOR UNLESS OTHERWISE NOTED.	
3. ALL LIGHT SWITCHES SHALL BE MOUNTED AT 46" ABOVE FINISH FLOOR UNLESS OTHERWISE NOTED.	



Date: 02-02-2026	
Designed by:	AH
Drawn by:	AH
Checked by:	AH

ISSUED FOR BID:	
02-02-2026	
Revisions:	
1	
2	
3	
4	
5	
6	
7	

HYPER ENERGY BAR

2060 NW LOWENSTEIN DR., LEE'S SUMMIT, MO 64081

Heart of America
energy bar

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Project No. 595
Sheet Content:
ELECTRICAL SCHEDULES
Sheet No.
E-6.1

DIVISION 22 – PLUMBING SPECIFICATIONS

22 00 50 – BASIC PLUMBING REQUIREMENTS

GENERAL
ALL WORK SHALL BE IN ACCORDANCE WITH ALL LOCAL CODES AND JURISDICTIONS.

THIS CONTRACTOR SHALL FURNISH ALL THE LABOR AND MATERIAL NECESSARY TO INSTALL A COMPLETE MECHANICAL SYSTEM FOR THE BUILDING. THE SYSTEM SHALL INCLUDE ALL ITEMS OF WORK AS OUTLINED IN THESE SPECIFICATIONS AND ON THE DRAWINGS.

THIS CONTRACTOR IS TO BE SOLELY ANSWERABLE FOR AND SHALL PROMPTLY MAKE GOOD ALL DAMAGE, INJURY OR DELAY TO OTHER CONTRACTORS, TO NEIGHBORING PREMISES OR TO PERSONS OR PROPERTY OF THE PUBLIC BY THEMSELVES, BY THEIR EMPLOYEES OR THROUGH ANY OPERATION UNDER THEIR CHARGE, WHETHER IN THE CONTRACT OR EXTRA WORK.

NO ATTEMPT HAS BEEN MADE TO REPRODUCE IN THESE SPECIFICATIONS ANY OF THE RULES OR REGULATIONS CONTAINED IN CITY, STATE OR FEDERAL ORDINANCES AND CODES PERTAINING TO THE WORK COVERED BY THESE SPECIFICATIONS THAT THE CONTRACTOR BE THOROUGHLY FAMILIAR WITH ALL SUCH ORDINANCES AND CODES.

INSTALL WORK IN LOCATIONS SHOWN ON THE DRAWINGS UNLESS PREVENTED BY PROJECT CONDITIONS.

WHERE SPACE FOR MECHANICAL AND ELECTRICAL LINES AND PIPING IS LIMITED, IT IS IMPERATIVE THAT ALL SUCH TRADES COORDINATE THEIR WORK SO AS TO ENSURE CONCEALMENT IN SPACE PROVIDED. WHERE CONFLICT EXISTS, THE OWNER/ARCHITECT SHALL DECIDE PRIORITY OF SPACE.

THIS CONTRACTOR SHALL GUARANTEE ALL OF THE APPARATUS, MATERIALS, EQUIPMENT FURNISHED AND LABOR INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE, UNLESS A LONGER PERIOD IS SPECIFIED. SHOULD ANY DEFECTS ARISE AS THE RESULT OF DEFECTIVE WORKMANSHIP OR MATERIAL WITHIN THE GUARANTEE PERIOD SET FORTH, THIS CONTRACTOR SHALL MAKE THE NECESSARY CORRECTION AT THEIR OWN EXPENSE.

THIS CONTRACTOR SHALL DO ALL CUTTING AND PATCHING NECESSARY FOR THE INSTALLATION OF THEIR WORK IN ALL NEW BUILDINGS UNLESS OTHERWISE NOTED.

ALL UNDERGROUND UTILITIES, PIPING, ETC SHALL BE LOCATED EXACTLY BEFORE DIGGING. THIS CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ALL DAMAGES CAUSED BY FAILURE TO DO SO. ANY BACKFILL SHALL BE TAMPED AND COMPACTED TO PREVENT FUTURE SETTLING. ALL EXCESS DIRT SHALL BE CLEARED FROM THE AREA AND DISPOSED OF AS DIRECTED BY THE OWNER.

THIS CONTRACTOR SHALL ARRANGE FOR OPENINGS IN THE BUILDING AS REQUIRED FOR THE INSTALLATION OF EQUIPMENT FURNISHED UNDER THIS CONTRACT. WHERE SEWERS MUST BE EXTENDED OR CHANGED, PATCHING WITH CONCRETE WILL BE DONE IN THE BUILDING. PATCHING SHALL BE AT BOTH THE TOP AND BOTTOM OF SLEEVES WHERE ABOVE GRADE.

THIS CONTRACTOR SHALL UPON COMPLETION OF HIS WORK, REMOVE ALL RUBBISH AND DEBRIS RESULTING FROM THEIR OPERATION AND SHALL REMOVE IT FROM SITE AT THEIR OWN EXPENSE. ALL EQUIPMENT SHALL BE CLEANED AND THE PREMISES LEFT IN FIRST CLASS CONDITION. THIS CONTRACTOR SHALL MAINTAIN THE WORK AREA EACH DAY TO PREVENT HAZARDOUS ACCUMULATION OF WASTE FROM THEIR WORK.

THIS CONTRACTOR SHALL THOROUGHLY CLEAN ALL RUST, GREASE, PLASTER, CEMENT, ETC., FROM ALL EQUIPMENT AND PIPING FURNISHED AND INSTALLED BY THEM AS REQUIRED TO LEAVE SURFACES SUITABLE FOR FINISH PAINTING.

THIS CONTRACTOR SHALL KEEP ALL PIPES, TRAPS, WASTE LINES, DUCTS, ETC., PLUGGED, DRAINED OR OTHERWISE PROTECTED DURING CONSTRUCTION. ALL ITEMS OF MECHANICAL EQUIPMENT SHALL BE SUITABLY PROTECTED AND UPON COMPLETION OF PROJECT SHALL BE EQUAL TO NEW CONDITION.

ANY FEES BY THE UTILITY COMPANY ARE TO BE BILLED DIRECTLY TO THE OWNER.

THIS CONTRACTOR IS REQUIRED TO ASSIST THE OWNER IN THE PREPARATION OF ALL UTILITY COMPANY REBATE FORMS THAT DEAL WITH EQUIPMENT FURNISHED AND/OR INSTALLED AS A PART OF THIS CONTRACTOR.

THIS CONTRACTOR SHALL PROVIDE, AT THE CONCLUSION OF THE PROJECT, ONE CLEAN, NON-TORN, NEAT, AND LEGIBLE "AS-BUILT" SET OF DRAWINGS TO THE OWNER. THESE DRAWINGS SHALL SHOW THE ROUTING OF PIPES, DUCTWORK AND EQUIPMENT DRAWN IN AT SCALED LOCATIONS. ALL DIMENSIONS INDICATED SHALL BE REFERENCED TO A COLUMN LINE.

THIS CONTRACTOR SHALL SUBMIT TO THE OWNER/ARCHITECT/CG FOR REVIEW ONE (1) ELECTRONIC COPY OF A COMPLETE LIST OF MATERIALS AND EQUIPMENT THEY PROPOSE TO FURNISH. THE LIST SHALL CONTAIN COMPLETE INFORMATION AS TO THE MAKE OF EQUIPMENT, TYPE, SIZE, CAPACITIES, DIMENSIONS AND ILLUSTRATION. ONE OF THE RETURNED COPIES SHALL BE KEPT ON THE JOB AT ALL TIMES.

ALL WORK SHALL BE PERFORMED BY WELL-QUALIFIED AND LICENSED MECHANICS WITH A THOROUGH KNOWLEDGE OF THE VARIOUS SYSTEMS INVOLVED IN THIS BUILDING. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO SEE THAT THEIR MECHANICS ARE FAMILIAR WITH ALL THE VARIOUS CODES AND TESTS APPLICABLE TO THIS WORK.

THIS CONTRACTOR SHALL BE REQUIRED TO FURNISH AND INSTALL ALL SUCH ITEMS NORMALLY INCLUDED ON SYSTEMS OF THIS TYPE, WHICH, WHILE NOT MENTIONED DIRECTLY HEREIN OR ON THE DRAWINGS ARE OBVIOUSLY ESSENTIAL TO THE INSTALLATION AND OPERATION OF THE SYSTEM AND WHICH ARE NORMALLY FURNISHED ON QUALITY INSTALLATION OF THIS TYPE. THE DRAWINGS AND SPECIFICATIONS CANNOT DEAL INDIVIDUALLY WITH THE MANY MINUTE ITEMS THAT MAY BE REQUIRED BY THE NATURE OF THE SYSTEMS.

IF THERE IS A DISCREPANCY BETWEEN THE DRAWINGS AND THE SPECIFICATIONS OR WITHIN EITHER DOCUMENT, THE MORE STRINGENT REQUIREMENT SHALL BE ESTIMATED AND PROVIDED.

THIS CONTRACTOR SHALL TEST ALL SYSTEMS INSTALLED UNDER THIS CONTRACT AS CALLED FOR IN THESE SPECIFICATIONS AND AS REQUIRED BY LOCAL CODES. ANY DEFECTS DISCOVERED IN TESTING SHALL BE CORRECTED AND THE TESTS REPEATED UNTIL ALL DEFECTS ARE ELIMINATED.

22 05 19 – METERS AND GAUGES FOR PLUMBING PIPING

GENERAL
WETTED SURFACES OF BRASS AND BRONZE COMPONENTS SHALL CONTAIN <0.25% WEIGHTED AVERAGE LEAD CONTENT (LEAD FREE) AS DEFINED BY NSF/ANSI STANDARDS 61 AND 372.

STEM TYPE THERMOMETERS
THERMOMETER: ASTM E1, BLUE ORGANIC-FILLED GLASS TUBE, LENS FRONT TUBE, CAST ALUMINUM CASE WITH ENAMEL FINISH.
SIZE: SIX INCH (6") SCALE WHERE LESS THAN SIX FOOT (6') ABOVE FLOOR, NINE INCH (9") SCALE WHERE HIGHER THAN SIX INCH (6") ABOVE FLOOR.
WINDOW: POLYESTER/GLASS MIXTURE OR ACRYLIC.
STEM: ALUMINUM, 3/4 INCH NPT, 3-1/2 INCH
ACCURACY: TWO PERCENT.
CALIBRATION: DEGREE F.
SOCKET: BRASS SEPARABLE SOCKETS FOR THERMOMETER STEM WITH OR WITHOUT EXTENSIONS AS REQUIRED.
TEST PLUG: BRASS 1/4 INCH FITTING AND CAP FOR RECEIVING 1/8 INCH OUTSIDE DIAMETER PRESSURE OR TEMPERATURE PROBE WITH NEOPRENE CORE FOR TEMPERATURES UP TO 200 DEG F.

STATIC PRESSURE GAUGES
DIAL GAUGES: DIAL 3-1/2 INCH DIAMETER IN METAL CASE, DIAPHRAGM ACTUATED, BLACK FIGURES ON WHITE BACKGROUND, FRONT RE-CALIBRATION ADJUSTMENT, AND 2% OF FULL-SCALE ACCURACY.

INCLINED MANOMETER: PLASTIC WITH RED LIQUID ON WHITE BACKGROUND WITH BLACK FIGURES, FRONT RE-CALIBRATION ADJUSTMENT, 3% OF FULL-SCALE ACCURACY.

ACCESSORIES: STATIC PRESSURE TIPS WITH COMPRESSION FITTINGS FOR BULKHEAD MOUNTING, 1/4 INCH DIAMETER TUBING.

INSTALLATION
INSTALL ONE PRESSURE GAUGE PER PUMP WITH TAPS BEFORE STRAINERS AND ON SUCTION AND DISCHARGE OF PUMP; PIPE TO GAUGE.

INSTALL PRESSURE GAUGES WITH PULSATION DAMPERS. PROVIDE BALL VALVE TO ISOLATE EACH GAUGE. EXTEND NIPPLES AND SIPHONS TO ALLOW CLEARANCE FROM INSULATION.

INSTALL THERMOMETERS IN PIPING SYSTEMS IN SOCKETS IN SHORT COUPLINGS. ENLARGE PIPES SMALLER THAN 2-1/2 INCH FOR INSTALLATION OF THERMOMETER SOCKETS. ENSURE SOCKETS ALLOW CLEARANCE FROM INSULATION.

INSTALL GAUGES AND THERMOMETERS IN LOCATIONS WHERE THEY ARE EASILY READ FROM NORMAL OPERATING LEVEL. INSTALL VERTICAL TO 45 DEGREES OFF VERTICAL AND CLEAN WINDOWS AND LENSES, AND CALIBRATE TO ZERO.

LOCATE TEST PLUGS ADJACENT THERMOMETERS AND THERMOMETER SOCKETS ADJACENT TO PRESSURE GAUGES AND PRESSURE GAUGE TAPS.

22 05 29 – HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

GENERAL
CONFORM TO APPLICABLE CODE FOR SUPPORT OF PIPING.

PIPE HANGERS AND SUPPORTS
PLUMBING PIPING - DRAIN, WASTE AND VENT:
CONFORM TO ASME B31.9; ASTM F708
HANGERS FOR PIPE SIZES 1/2 INCH TO 1-1/2 INCH: CARBON STEEL ADJUSTABLE SWIVEL, SPLIT RING.
HANGERS FOR PIPE SIZES 2 INCHES AND OVER: CARBON STEEL, ADJUSTABLE, CLEVIS.
MULTIPLE OR TRAPEZE HANGERS: STEEL CHANNELS WITH WELDED SPACERS AND HANGER RODS.
WALL SUPPORT FOR PIPE SIZES TO 3 INCHES: CAST IRON BRACKET.
WALL SUPPORT FOR PIPE SIZES 4 INCHES AND OVER: WELDED STEEL BRACKET AND WROUGHT STEEL CLAMP.
VERTICAL SUPPORT: STEEL RISER CLAMP.
FLOOR SUPPORT: CAST IRON ADJUSTABLE PIPE SADDLE, LOCK NUT, NIPPLE, FLOOR FLANGE, AND CONCRETE PIER OR STEEL SUPPORT.
COPPER PIPE SUPPORT: CARBON STEEL RING, ADJUSTABLE, AND COPPER PLATED.

PROVIDE ZINC COATED HANGERS AND SUPPORTS FOR ALL NON AIR CONDITIONED AREAS.

PLUMBING PIPING - WATER:
CONFORM TO ASME B31.9; ASTM F708.
HANGERS FOR PIPE SIZES 1/2 INCH TO 1-1/2 INCHES: CARBON STEEL ADJUSTABLE SWIVEL, SPLIT RING. ANVIL INTERNATIONAL FIGURE 104.
HANGERS FOR COLD PIPE SIZES 2 INCH AND OVER: CARBON STEEL, ADJUSTABLE, CLEVIS.
HANGERS FOR HOT PIPE SIZES 2 INCH TO 4 INCH: CARBON STEEL, ADJUSTABLE, CLEVIS.
MULTIPLE OR TRAPEZE HANGERS: STEEL CHANNELS WITH WELDED SPACERS AND HANGER RODS.
WALL SUPPORT FOR PIPE SIZES TO 3 INCHES: CAST IRON BRACKET.
VERTICAL SUPPORT: STEEL RISER CLAMP.
FLOOR SUPPORT FOR COLD PIPE: CAST IRON ADJUSTABLE PIPE SADDLE, LOCK NUT, NIPPLE, FLOOR FLANGE, AND CONCRETE PIER OR STEEL SUPPORT.
COPPER PIPE SUPPORT: CARBON STEEL RING, ADJUSTABLE, AND COPPER PLATED.

PROVIDE ZINC COATED HANGERS AND SUPPORTS FOR ALL NON AIR CONDITIONED AREAS.

PROVIDE ZINC COATED (HOT DIPPED GALVANIZED) HANGERS AND SUPPORTS FOR ALL EXTERIOR APPLICATIONS.

HANGER RODS: MILD STEEL THREADED BOTH ENDS, THREADED ONE END OR CONTINUOUS THREADED.

FLASHING
METAL FLASHING: 26 GAUGE GALVANIZED STEEL.

METAL COUNTER FLASHING: 22 GAUGE GALVANIZED STEEL.

FLEXIBLE FLASHING: 47 MIL THICK SHEET BUTYL COMPATIBLE WITH ROOFING.

CAPS: STEEL, 22 GAUGE MINIMUM; 16 GAUGE AT FIRE RESISTANT ELEMENTS.

SLEEVES FOR PIPES THROUGH NON-FIRE RATED BEAMS, WALLS, FOOTINGS, AND POTENTIALLY WET FLOORS SHALL BE SCHEDULE 40 STEEL PIPE OR 18 GAUGE GALVANIZED STEEL.

STUFFING AND FIRESTOPPING INSULATION: FIBERGLASS TYPE, NON-COMBUSTIBLE PER UL TESTED ASSEMBLY TYPE.

INSTALLATION
INSTALL HANGERS TO PROVIDE MINIMUM 1/2 INCH SPACE BETWEEN FINISHED COVERING AND ADJACENT WORK.

PLACE HANGERS WITHIN 12 INCHES OF EACH HORIZONTAL ELBOW.

SUPPORT HORIZONTAL CAST IRON PIPE ADJACENT TO EACH HUB WITH 5 FOOT MAXIMUM SPACING BETWEEN HANGERS.

WHERE SEVERAL PIPES CAN BE INSTALLED IN PARALLEL AND AT SAME ELEVATION, PROVIDE MULTIPLE OR TRAPEZE HANGERS. SUPPORT RISER PIPING INDEPENDENTLY OF CONNECTED HORIZONTAL PIPING.

PROVIDE COPPER PLATED HANGERS AND SUPPORTS FOR COPPER PIPING.

PROVIDE TEMPLATES, ANCHOR BOLTS AND ACCESSORIES FOR MOUNTING AND ANCHORING EQUIPMENT. CONSTRUCT SUPPORTS (AS-NEEDED) OF STEEL MEMBERS. BRACE AND FASTEN WITH FLANGES BOLTED TO STRUCTURE.

PROVIDE FLEXIBLE FLASHING AND METAL COUNTER FLASHING WHERE PIPING AND DUCTWORK PENETRATE WEATHER OR WATERPROOFED WALLS, FLOORS, AND ROOFS.

FLASH VENT AND SOIL PIPES PROJECTING THREE INCH (3") MINIMUM ABOVE FINISHED ROOF SURFACE WITH 24" X 24" SHEET SIZE. TURN FLANGES BACK INTO WALL AND CAULK, METAL COUNTERFLASH, AND SEAL FOR PIPES THROUGH OUTSIDE WALLS.

FLASH FLOOR DRAINS IN FLOORS WITH TOPPING OVER FINISHED AREAS WITH WATERPROOF MEMBRANE TEN INCH (10") CLEAR ON SIDES WITH MINIMUM 36" X 36" SHEET SIZE. FASTEN FLASHING TO DRAIN CLAMP DEVICE.

SEAL FLOOR, SHOWER, AND MOP SINK DRAINS WATERTIGHT TO ADJACENT MATERIALS.

SET SLEEVES IN POSITION IN FORMWORK. PROVIDE REINFORCING AROUND SLEEVES AND SIZE SLEEVES LARGE ENOUGH TO ALLOW FOR MOVEMENT DUE TO EXPANSION AND CONTRACTION. PROVIDE FOR CONTINUOUS INSULATION WRAPPING.

EXTEND SLEEVES THROUGH FLOOR ONE INCH ABOVE FINISHED FLOOR LEVEL. CAULK SLEEVES.

PROVIDE CLOSE FITTING METAL COLLAR OR ESCUTCHEON COVERS AT BOTH SIDES OF PENETRATION. INSTALL CHROME PLATED STEEL ESCUTCHEONS AT FINISHED SURFACES AND WITHIN CABINETS.

HANGER SCHEDULE:

HANGER ROD PIPE SIZE	MAX. HANGER SPACING FEET	DIAMETER INCHES
1/2 to 1-1/4	6.5	3/8
1-1/2 to 2	10.0	3/8
2-1/2 to 3	10.0	1/2
4 to 6	10.0	5/8
PVC (all sizes)	6.0	3/8
C.I. Bell & Spigot (or No-Hub) and at Joints	5.0	5/8

22 05 53 – IDENTIFICATION FOR PLUMBING AND EQUIPMENT

GENERAL
LAMINATED THREE-LAYER PLASTIC WITH ENGRAVED BLACK LETTERS ON LIGHT CONTRASTING BACKGROUND COLOR.

TAGS
PLASTIC TAGS: LAMINATED THREE-LAYER PLASTIC WITH ENGRAVED BLACK LETTERS ON LIGHT CONTRASTING BACKGROUND COLOR. TAG SIZE MINIMUM 1-1/2 INCH DIAMETER.

METAL TAGS: BRASS WITH STAMPED LETTERS; TAG SIZE MINIMUM 1-1/2 INCH DIAMETER WITH SMOOTH EDGES.

INFORMATION TAGS: CLEAR PLASTIC WITH PRINTED "DANGER," "CAUTION" OR "WARNING" AND MESSAGE; SIZE 3-1/4" X 5-5/8" WITH GROMMET AND SELF-LOCKING NYLON TIES.

PIPE MARKERS
COLOR AND LETTERING: CONFORM TO ASME A13.1.

PLASTIC UNDERGROUND PIPE MARKERS: BRIGHT COLORED CONTINUOUSLY PRINTED PLASTIC RIBBON TAPE, MINIMUM 6" W X 4" MIL THICK, MANUFACTURED FOR DIRECT BURIAL SERVICE.

PLASTIC TAPE PIPE MARKERS: FLEXIBLE, VINYL FILM TAPE WITH PRESSURE SENSITIVE ADHESIVE BACKING AND PRINTED MARKINGS INDICATING FLOW DIRECTION ARROW AND IDENTIFICATION OF FLUID BEING CONVEYED.

LABELS
DESCRIPTION: LAMINATED MYLAR, SIZE 1.9" X 0.75" ADHESIVE BACKED WITH PRINTED IDENTIFICATION.

INSTALLATION
INSTALL IDENTIFYING DEVICES AFTER COMPLETION OF COVERINGS AND PAINTING.

PROVIDE PLASTIC NAMEPLATES WITH CORROSIVE-RESISTANT MECHANICAL FASTENERS OR ADHESIVE.

TAGS SHALL UTILIZE CORROSION RESISTANT CHAIN. NUMBER TAGS CONSECUTIVELY BY LOCATION.

INSTALL UNDERGROUND PLASTIC PIPE MARKERS SIX INCH (6") TO EIGHT INCH (8") BELOW FINISHED GRADE, DIRECTLY ABOVE BURIED PIPE.

IDENTIFY PIPING, CONCEALED OR EXPOSED. IDENTIFY SERVICE, FLOW DIRECTION, AND PRESSURE. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING. LOCATE IDENTIFICATION NOT TO EXCEED 20 FOOT ON STRAIGHT RUNS INCLUDING RISERS AND DROPS, ADJACENT TO EACH VALVE AND TEE. AT EACH SIDE OF PENETRATION OF STRUCTURE OR ENCLOSURE AND AT EACH OBSTRUCTION, IDENTIFY ON BOTH SIDES OF ANY WALL.

22 07 19 – DOMESTIC PLUMBING INSULATION

GENERAL
MAINTAIN AMBIENT CONDITIONS REQUIRED BY MANUFACTURERS OF EACH PRODUCT.

MAINTAIN TEMPERATURE BEFORE, DURING, AND AFTER INSTALLATION FOR MINIMUM OF 24 HOURS.

FIBERGLASS
INSULATION: ASTM C547 RIGID MOLDED, NONCOMBUSTIBLE.
"K" VALUE: ASTM C635, 0.23 AT 75 DEG F.
MINIMUM SERVICE TEMPERATURE: 0 DEG F.
MAXIMUM SERVICE TEMPERATURE: 800 DEG F.
MAXIMUM MOISTURE ABSORPTION: <5% BY WEIGHT.
VAPOR BARRIER JACKET: ASTM C1136, WHITE KRAFT PAPER WITH FIBERGLASS YARN, BONDED TO ALUMINIZED FILM.
MOISTURE VAPOR TRANSMISSION: ASTM E96, 0.02 PERM INCHES.
SECURE WITH SELF-SEALING LONGITUDINAL LAPS AND BUTT STRIPS.
SURFACE BURNING: ASTM E84; FLAME SPREAD-25, SMOKE DEVELOPED-50
VOC CONTENT: ASTM D5116; 0.15 G/L

JACKETS
PVC PLASTIC JACKET: ASTM C921, UV RESISTANT, ONE PIECE MOLDED TYPE FITTING COVERS AND SHEET MATERIAL, OFF WHITE COLOR.
MINIMUM SERVICE TEMPERATURE: 0 DEG F.
MAXIMUM SERVICE TEMPERATURE: 150 DEG F.
MOISTURE VAPOR TRANSMISSION: ASTM E96, 0.002 PERM INCHES.
MAXIMUM FLAME SPREAD: ASTM E84; 25
MAXIMUM SMOKE DEVELOPED: ASTM E84; 50
THICKNESS: 20 MIL.
CONNECTIONS: BRUSH ON WELDING ADHESIVE.
COVERING ADHESIVE MASTIC: COMPATIBLE WITH INSULATION.

INSTALLATION
VERIFY THAT PIPING IS CLEAN AND DRY WITH FOREIGN MATERIAL REMOVED AND HAS BEEN TESTED BEFORE APPLYING INSULATION MATERIALS.

INSTALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

EXPOSED PIPING: LOCATE INSULATION AND COVER SEAMS IN LEAST VISIBLE LOCATIONS.

INSULATED DUAL TEMPERATURE PIPES OR COLD PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE:
PROVIDE VAPOR BARRIER JACKETS, FACTORY APPLIED OR FIELD APPLIED
INSULATE FITTINGS, JOINTS AND VALVES WITH MOLDED INSULATION OF LIKE MATERIAL AND THICKNESS AS ADJACENT PIPE.
PROVIDE PVC FITTING COVERS.
CONTINUE INSULATION THROUGH WALLS (UNLESS IN FIREWALL SLEEVES), PIPE HANGERS AND OTHER PIPE PENETRATIONS.
INSULATE ENTIRE SYSTEM INCLUDING FITTINGS, VALVES, UNIONS, FLANGES, STRAINERS, FLEXIBLE CONNECTIONS, PUMP BODIES, AND EXPANSION JOINTS.
VAPOR SEAL INSULATION ENDS EVERY 20 FEET.

INSULATED PIPES CONVEYING FLUIDS ABOVE AMBIENT TEMPERATURE:
PROVIDE STANDARD JACKETS WITH VAPOR BARRIER, FACTORY APPLIED.
INSULATE FITTINGS, JOINTS AND VALVES WITH INSULATION OF LIKE MATERIAL AND THICKNESS AS ADJOINING PIPE.
PROVIDE PVC FITTING COVERS.
CONTINUE INSULATION THROUGH WALLS (UNLESS IN FIREWALL SLEEVES) PIPE HANGERS AND OTHER PIPE PENETRATIONS.

SHIELDS: GALVANIZED SADDLE WITH FLARED EDGES BETWEEN PIPE HANGERS OR PIPE HANGER ROLLS AND INSERTS.

INSULATION SHALL BE CONTINUOUS AT ALL HANGERS. HANGERS SHALL NOT BE IN DIRECT CONTACT WITH PIPE.

INSULATION ON PIPING SERVED BY HEAT TRACE SHALL BE SIZED LARGE ENOUGH TO ENCLOSE THE PIPE AND THE HEAT WIRE.

SUBSTITUTED INSULATION MATERIALS SHALL PROVIDE THERMAL RESISTANCE WITHIN 10% AT NORMAL CONDITIONS, AS MATERIALS INDICATE.

FIBERGLASS INSULATION SCHEDULE:

PIPING SYSTEMS	PIPE SIZE	THICKNESS
Domestic Hot Water and Re-Circulation	Less than 1.5"	1"
Domestic Hot Water and Re-Circulation	1.5" and Larger	1.5"
Plumbing Vents within 10' of Exterior	All	1"
Domestic Cold Water	All	1"
Condensate Drain from Cooling Coil	All	1"
PVC Piping Installed in a Return Air Plenums (including Mechanical Rooms)	All	1.5"

PIPE JACKET SCHEDULE:

PIPE LOCATION	JACKET MATERIAL
Piping in Mechanical/Electrical/Storage Room within 10' of floor (excluding racked piping)	PVC

MECHANICAL SHEET INDEX	
SHEET NUMBER	SHEET NAME
M-0.1	MECHANICAL SPECIFICATIONS
M-0.2	MECHANICAL SPECIFICATIONS
M-0.3	MECHANICAL SPECIFICATIONS
M-1.1	MECHANICAL FLOOR PLAN
M-1.2	MECHANICAL ROOF PLAN
M-6.1	MECHANICAL SCHEDULES
P-1.0	PLUMBING UNDERFLOOR PLAN
P-1.1	PLUMBING FLOOR PLAN
P-5.1	PLUMBING DETAILS
P-6.1	PLUMBING SCHEDULES



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Drawn by:	AH
Checked by:	AH

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Project No.	595
Sheet Content:	MECHANICAL SPECIFICATIONS
Sheet No.	M-0.1

22 11 16 – DOMESTIC PLUMBING PIPING

GENERAL
PERFORM WORK IN ACCORDANCE WITH ALL LOCAL AND STATE ADOPTED PLUMBING CODE.

VALVES: MANUFACTURER'S NAME AND PRESSURE RATING MARKED ON VALVE BODY.

IDENTIFY PIPE WITH MARKING INCLUDING SIZE, MATERIAL CLASSIFICATION, SPECIFICATION, POTABLE WATER CERTIFICATION AND WATER PRESSURE RATING.

ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE AND BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE CAST IRON SOIL PIPE AND FITTINGS HANDBOOK.

CONFORM TO APPLICABLE CODE FOR INSTALLATION OF BACK FLOW PREVENTION DEVICES AND PROVIDE CERTIFICATE OF COMPLIANCE FROM AUTHORITY HAVING JURISDICTION INDICATING APPROVAL OF INSTALLATION OF BACK FLOW PREVENTION DEVICES.

WETTED SURFACES OF BRASS AND BRONZE COMPONENTS SHALL CONTAIN <0.25% WEIGHTED AVERAGE LEAD CONTENT (LEAD FREE) AS DEFINED BY NSF/ANSI STANDARDS 61 AND 372.

PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY TEMPORARY COVERS, COMPLETING SECTIONS OF THE WORK AND ISOLATING PARTS OF COMPLETED SYSTEM.

DO NOT INSTALL UNDERGROUND PIPING WHEN BEDDING IS WET OR FROZEN.

SANITARY SEWER PIPING (BELOW GRADE)
PVC PIPE, SCHEDULE 40, ASTM D2865 PIPE.

JOINTS: ASTM D2865 SOLVENT WELD WITH ASTM D2564 SOLVENT CEMENT.

SANITARY SEWER PIPING (ABOVE GRADE)
PVC PIPE, SCHEDULE 40, ASTM D2865 PIPE.

JOINTS: ASTM D2865 SOLVENT WELD WITH ASTM D2564 SOLVENT CEMENT.

INSULATE PIPING PER SPECIFICATIONS IN A FREE RETURN PLENUM.

WATER PIPING (ABOVE GRADE)
CROSS-LINKED POLYETHYLENE (PEX) (2" AND SMALLER); ASTM F876, SDR 9 POLYETHYLENE PEX-A OR PEX-B TUBING.

RATING: CONTINUOUS OPERATION BY THE PLASTIC PIPE INSTITUTE (PPI) AT THE FOLLOWING CONDITIONS: 180 PSI @ 73.4 DEG F, 100 PSI @ 180 DEG F, 80 PSI @ 200 DEG F. MINIMUM BEND RADIUS FOR COLD BENDING OF THE PIPE SHALL NOT BE GREATER THAN 6 TIMES THE OUTSIDE DIAMETER OF THE PIPE. PROVIDE BEND SUPPORTS SUPPLIED BY THE TUBING MANUFACTURER FOR ALL BENDS WITH A RADIUS TIGHTER THAN THIS REQUIREMENT.

PLENUM RATING: PIPE SHALL NOT EXCEED A MAXIMUM FLAME SPREAD/SMOKE EMISSION RATING OF 25/50 IN COMPLIANCE ASTM E84. PROVIDE METAL SHIELDS CLIPPED TO BOTTOM SIDE OF PIPING OR FULLY INSULATE PIPING AS NECESSARY TO MEET THIS REQUIREMENT.

FITTINGS: ASTM F2080 OR ASTM F1960 COLD-EXPANSION, COMPRESSION SLEEVE FITTINGS. PROVIDE SPECIFIC FITTING TYPES AS REQUIRED TO MAINTAIN WARRANTY OF PIPING MANUFACTURER.

MANUFACTURER SHALL PROVIDE COMPONENTS OF THE PEX TUBING SYSTEM INCLUDING ALL PLASTIC PIPING, FITTINGS, MANIFOLDS, SUPPORTS, AND ANY OTHER ANCILLARY ITEMS REQUIRED FOR A COMPLETE INSTALLATION.

WARRANTY
PLASTIC PIPING SHALL BE WARRANTED FOR 25 YEARS (NON-PRORATED).

MANIFOLDS, HEADERS, THERMOSTATS, ACTUATORS, AND OTHER ANCILLARY COMPONENTS SHALL BE WARRANTED FOR 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION.

BALL VALVES
UP TO AND INCLUDING 2-1/2 INCHES: BRONZE ONE PIECE FULL PORT BODY, CHROME PLATED BALL, TEFLON SEATS AND STUFFING BOX RING, LEVER HANDLE THREADED ENDS.

SPRING LOADED CHECK VALVES
UP TO 2 INCHES: SPRING LOADED, SILENT WATER CHECK VALVE, BRONZE BODY AND TRIM. STAINLESS STEEL SPRING, THREADED ENDS, 300 PSI W.O.G. RENEWABLE PARTS.

OVER 2 INCHES: SPRING LOADED GLOBE TYPE, SILENT CHECK VALVE, IRON BODY, BRONZE TRIM. STAINLESS STEEL SPRING, 250 PSI ASA FLANGED, 250 PSI W.O.G. RENEWABLE PARTS.

RELIEF VALVES
PRESSURE RELIEF: BRONZE BODY, TEFLON SEAT, STEEL STEM AND SPRINGS, AUTOMATIC, DIRECT PRESSURE ACTUATED CAPACITIES ASME CERTIFIED AND LABELED.

STRAINERS
SIZE 2 INCHES AND UNDER: SCREWED BRASS BODY FOR 175 PSIG WORKING PRESSURE, "Y" PATTERN WITH 1/32 INCH STAINLESS STEEL PERFORATED SCREEN.

SIZE 2-1/2" TO 4 INCHES: FLANGED IRON BODY FOR 175 PSIG WORKING PRESSURE, "Y" PATTERN WITH 3/64 INCH STAINLESS STEEL PERFORATED SCREEN.

CALIBRATED BALANCE VALVES
UP TO 3 INCHES: LEAD FREE BRASS, TEMPERATURE AND PRESSURE TEST PLUG ON INLET AND OUTLET, MEMORY STOP.

DRAIN BALL VALVES
DRAIN TWO-PIECE FULL PORT BODY CHROME PLATED BALL AND STEM.

TEFLON SEATS AND STUFFING, BOX RING, LEVER HANDLE, DRAIN CAP AND SEAL, [SOLDER] [THREADED] ENDS.

PIPE ACCESSORIES
ALL FITTINGS SHALL BE OF THE SAME MATERIAL AS THE PIPE. MATERIAL JOINING THE FITTING TO THE PIPE SHALL BE FREE FROM CRACKS AND SHALL ADHERE TIGHTLY TO EACH JOINING SURFACE.

ALL FITTINGS SHALL BE CAPPED WITH A PLUG OF THE SAME MATERIAL AS THE PIPE, AND GASKETED WITH THE SAME GASKET MATERIAL AS THE PIPE JOINT OR BE OF MATERIAL APPROVED BY THE ENGINEER. THE PLUG SHALL BE ABLE TO WITHSTAND ALL TEST PRESSURES INVOLVED WITHOUT LEAKAGE.

INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

PROVIDE NON-CONDUCTING DIELECTRIC CONNECTIONS WHEREVER JOINTING DISSIMILAR METALS.

ROUTE PIPING IN ORDERLY MANNER AND MAINTAIN GRADIENT. ROUTE PARALLEL AND PERPENDICULAR TO WALLS. GROUP PIPING WHENEVER PRACTICAL AT COMMON ELEVATIONS.

INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT.

PROVIDE ACCESS WHERE VALVES AND FITTINGS ARE NOT EXPOSED. COORDINATE SIZE AND LOCATION OF ACCESS DOORS.

PROVIDE SUPPORT FOR UTILITY METERS IN ACCORDANCE WITH REQUIREMENTS OF UTILITY COMPANIES.

INSTALL BELL AND SPIGOT PIPE WITH BELL END UPSTREAM.

INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL, NOT INVERTED.

SLEEVE PIPES PASSING THROUGH PARTITIONS, WALLS AND FLOORS.

CLEAN OUT ALL SANITARY SEWERS TO REMOVE ANY DEBRIS PRIOR TO SUBSTANTIAL COMPLETION.

WHERE STATIC WATER PRESSURE IN THE WATER SUPPLY PIPING EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE PRECEDED BY A STRAINER SHALL BE INSTALLED AND THE STATIC PRESSURE REDUCED TO 80 PSI OR LESS. PRESSURE REGULATOR(S) EQUAL TO OR EXCEEDING 1-1/2 INCHES SHALL NOT REQUIRE A STRAINER.

INSTALL UNIONS DOWNSTREAM OF VALVES AND AT EQUIPMENT OR APPARATUS CONNECTIONS.

INSTALL BRASS MALE ADAPTERS EACH SIDE OF VALVES IN COPPER PIPED SYSTEM. SOLDER ADAPTERS TO PIPE.

22 11 19 – DOMESTIC PLUMBING SPECIALTIES

GENERAL
WETTED SURFACES OF BRASS AND BRONZE COMPONENTS SHALL CONTAIN <0.25% WEIGHTED AVERAGE LEAD CONTENT (LEAD FREE) AS DEFINED BY NSF/ANSI STANDARDS 61 AND 372.

REFER TO 'PLUMBING FIXTURE SCHEDULE' FOR ADDITIONAL REQUIREMENTS.

CLEAN OUTS INSTALLED IN 'ON-GRADE' FLOORS SHALL BE LACQUERED CAST IRON BODIES WITH INTEGRAL ANCHOR FLANGE. NEOPRENE "O" RING SECONDARY TEST SEAL AND ADJUSTABLE COMBINED ACCESS COVER AND PLUG WITH GASKET SEAL. NICKEL-BRONZE SCORRIATED COVER IN SERVICE AREA AND ROUND WITH DEPRESSED COVER TO ACCEPT FLOOR FINISH IN FINISHED FLOOR AREAS.

CLEAN OUTS INSTALLED IN INTERIOR WALL AREAS SHALL BE LACQUERED CAST IRON BODY AND ROUND EPOXY COATED GASKET COVER AND ROUND STAINLESS STEEL ACCESS COVER SECURED WITH MACHINE SCREW.

CLEANOUT SIZE SHALL BE EQUAL TO PIPE SIZE UP TO 4 INCHES.

BACKFLOW PREVENTERS (RPZ, 2" AND SMALLER)
REDUCED PRESSURE ZONE ASSEMBLY CONSISTING OF TWO INDEPENDENT CHECK VALVES WITH A PRESSURE MONITORED CHAMBER IN BETWEEN. THE CHAMBER CONTAINS A DIFFERENTIAL PRESSURE RELIEF VALVE THAT RELIEVES EXCESS PRESSURE PREVENTING BACK FLOW OR BACK SIPHONAGE. SHALL CONTAIN STAINLESS STEEL SPRINGS, SILICONE DISCS AND HAVE 3 ACCESS PORTS. ONE FOR EACH CHECK VALVE AND ONE FOR THE RELIEF VALVE ASSEMBLY. A SINGLE ACCESS PORT IS NOT ACCEPTABLE. STRAINER SHALL BE A "Y-TYPE" LEAD FREE STRAINER. QUARTER TURN BALL VALVES SHALL BE USED FOR SHUT-OFF PURPOSES.

AIR GAP FITTING SHALL BE PROVIDED BY BFP MANUFACTURER.

BEVERAGE DISPENSING BACKFLOW PREVENTERS (COFFEE MAKERS, ETC)
3/8" DUAL CHECK DEVICE WITH ATMOSPHERIC VENT PORT DESIGNED TO PROTECT THE DOMESTIC WATER SUPPLY FROM DIRECT CONNECTION BEVERAGE MACHINES. MANUFACTURER PROVIDED WYE STRAINER. VENT PORT OPENS TO ATMOSPHERE IN THE EVENT OF SECOND CHECK VALVE FAILURE. SHALL CONSIST OF #316 STAINLESS STEEL BODY, FDA APPROVED RUBBER INTERNAL COMPONENTS, AND NSF APPROVED ACETAL PLASTIC STRAINER. STAINLESS STEEL BALL VALVE SHALL BE USED FOR SHUT-OFF PURPOSES. SHALL HAVE THE CAPABILITY TO BE INSTALLED HORIZONTALLY OR VERTICALLY SO THAT STRAINER AND VALVE ARE ACCESSIBLE FOR SERVICE AND MAINTENANCE. DEVICE SHALL NOT BE INSTALLED WITHIN A WALL CAVITY. CONNECT A VENT DISCHARGE LINE TO THE VENT OUTLET AND ROUTE TO NEARBY FLOOR DRAIN OR FLOOR SINK.

INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

EXTEND CLEAN OUT TO FINISHED FLOOR OR WALL SURFACE. LUBRICATE THREADED CLEAN OUT PLUGS WITH MIXTURE OF GRAPHITE AND LINSEED OIL. ENSURE CLEARANCE AT CLEAN OUT FOR RODDING OF DRAINAGE SYSTEM. COORDINATE ALL CLEANOUT LOCATIONS WITH THE ARCHITECT AND OWNER.

FURNISH AND INSTALL CLEANOUTS AT LOCATIONS AS SPECIFIED AND REQUIRED BY LOCAL PLUMBING CODE.

PIPE RELIEF FROM BACKFLOW PREVENTER TO NEAREST DRAIN.

INSTALL APPROVED POTABLE WATER PROTECTION DEVICES ON PLUMBING LINES WHERE CONTAMINATION OF DOMESTIC WATER MAY OCCUR; ON JANITOR ROOMS, PREMISE ISOLATION, IRRIGATION SYSTEMS, FLUSH VALVES, INTERIOR HOSE BIBBS AND EXTERIOR WALL HYDRANTS.

INSTALL AIR GAP FITTINGS AT ALL EQUIPMENT DRAINS WHEN EQUIPMENT IS CONNECTED TO DOMESTIC WATER.

COORDINATE ALL FLOOR DRAIN LOCATIONS WITH ASSOCIATED EQUIPMENT.

INSTALL BACK WATER VALVES WHERE REQUIRED BY LOCAL CODES.

DIVISION 23 – HVAC SPECIFICATIONS

23 00 50 – BASIC HVAC REQUIREMENTS

GENERAL
ALL WORK SHALL BE IN ACCORDANCE WITH ALL LOCAL CODES AND JURISDICTIONS.

THIS CONTRACTOR SHALL FURNISH ALL THE LABOR AND MATERIAL NECESSARY TO INSTALL A COMPLETE MECHANICAL SYSTEM FOR THE BUILDING. THE SYSTEM SHALL INCLUDE ALL ITEMS OF WORK AS OUTLINED IN THESE SPECIFICATIONS AND ON THE DRAWINGS.

THIS CONTRACTOR IS TO BE SOLELY ANSWERABLE FOR AND SHALL PROMPTLY MAKE GOOD ALL DAMAGE, INJURY OR DELAY TO OTHER CONTRACTORS, TO NEIGHBORING PREMISES OR TO PERSONS OR PROPERTY OF THE PUBLIC BY THEMSELVES, BY THEIR EMPLOYEES OR THROUGH ANY OPERATION UNDER THEIR CHARGE, WHETHER IN THE CONTRACT OR EXTRA WORK.

NO ATTEMPT HAS BEEN MADE TO REPRODUCE IN THESE SPECIFICATIONS ANY OF THE RULES OR REGULATIONS CONTAINED IN CITY, STATE OR FEDERAL ORDINANCES AND CODES PERTAINING TO THE WORK COVERED BY THESE SPECIFICATIONS THAT THE CONTRACTOR BE THOROUGHLY FAMILIAR WITH ALL SUCH ORDINANCES AND CODES.

INSTALL WORK IN LOCATIONS SHOWN ON THE DRAWINGS UNLESS PREVENTED BY PROJECT CONDITIONS.

WHERE SPACE FOR MECHANICAL AND ELECTRICAL LINES AND PIPING IS LIMITED, IT IS IMPERATIVE THAT ALL SUCH TRADES COORDINATE THEIR WORK SO AS TO ENSURE CONCEALMENT IN SPACE PROVIDED. WHERE CONFLICT EXISTS, THE OWNER/ARCHITECT SHALL DECIDE PRIORITY OF SPACE.

THIS CONTRACTOR SHALL GUARANTEE ALL OF THE APPARATUS, MATERIALS, EQUIPMENT FURNISHED AND LABOR INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE, UNLESS A LONGER PERIOD IS SPECIFIED. SHOULD ANY DEFECTS ARISE AS THE RESULT OF DEFECTIVE WORKMANSHIP OR MATERIAL WITHIN THE GUARANTEE PERIOD SET FORTH, THIS CONTRACTOR SHALL MAKE THE NECESSARY CORRECTION AT THEIR OWN EXPENSE.

THIS CONTRACTOR SHALL DO ALL CUTTING AND PATCHING NECESSARY FOR THE INSTALLATION OF THEIR WORK IN ALL NEW BUILDINGS UNLESS OTHERWISE NOTED.

THIS CONTRACTOR SHALL ARRANGE FOR OPENINGS IN THE BUILDING AS REQUIRED FOR THE INSTALLATION OF EQUIPMENT FURNISHED UNDER THIS CONTRACT. WHERE DUCTWORK AND PIPING MUST BE EXTENDED OR CHANGED, PATCHING WITH CONCRETE WILL BE DONE IN THE BUILDING. PATCHING SHALL BE AT BOTH THE TOP AND BOTTOM OF SLEEVES WHERE ABOVE GRADE.

THIS CONTRACTOR SHALL UPON COMPLETION OF HIS WORK, REMOVE ALL RUBBISH AND DEBRIS RESULTING FROM THEIR OPERATION AND SHALL REMOVE IT FROM SITE AT THEIR OWN EXPENSE. ALL EQUIPMENT SHALL BE CLEANED AND THE PREMISES LEFT IN FIRST CLASS CONDITION. THIS CONTRACTOR SHALL MAINTAIN THE WORK AREA EACH DAY TO PREVENT HAZARDOUS ACCUMULATION OF WASTE FROM THEIR WORK.

THIS CONTRACTOR SHALL THOROUGHLY CLEAN ALL RUST, GREASE, PLASTER, CEMENT, ETC., FROM ALL EQUIPMENT AND PIPING FURNISHED AND INSTALLED BY THEM AS REQUIRED TO LEAVE SURFACES SUITABLE FOR FINISH PAINTING.

ALL ITEMS OF MECHANICAL EQUIPMENT SHALL BE SUITABLY PROTECTED AND UPON COMPLETION OF PROJECT SHALL BE EQUAL TO NEW CONDITION.

ANY FEES BY THE UTILITY COMPANY ARE TO BE BILLED DIRECTLY TO THE OWNER.

THIS CONTRACTOR IS REQUIRED TO ASSIST THE OWNER IN THE PREPARATION OF ALL UTILITY COMPANY REBATE FORMS THAT DEAL WITH EQUIPMENT FURNISHED AND/OR INSTALLED AS A PART OF THIS CONTRACTOR.

THIS CONTRACTOR SHALL PROVIDE, AT THE CONCLUSION OF THE PROJECT, ONE CLEAN, NON-TORN, NEAT, AND LEGIBLE "AS-BUILT" SET OF DRAWINGS TO THE OWNER. THESE DRAWINGS SHALL SHOW THE ROUTING OF PIPES, DUCTWORK AND EQUIPMENT DRAWN IN AT SCALED LOCATIONS. ALL DIMENSIONS INDICATED SHALL BE REFERENCED TO A COLUMN LINE.

THIS CONTRACTOR SHALL SUBMIT TO THE OWNER/ARCHITECT/GC FOR REVIEW ONE (1) ELECTRONIC COPY OF A COMPLETE LIST OF MATERIALS AND EQUIPMENT THEY PROPOSE TO FURNISH. THE LIST SHALL CONTAIN COMPLETE INFORMATION AS TO THE MAKE OF EQUIPMENT, TYPE, SIZE, CAPACITIES, DIMENSIONS AND ILLUSTRATION. ONE OF THE RETURNED COPIES SHALL BE KEPT ON THE JOB AT ALL TIMES.

ALL WORK SHALL BE PERFORMED BY WELL-QUALIFIED AND LICENSED MECHANICS WITH A THOROUGH KNOWLEDGE OF THE VARIOUS SYSTEMS INVOLVED IN THIS BUILDING. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO SEE THAT THEIR MECHANICS ARE FAMILIAR WITH ALL THE VARIOUS CODES AND TESTS APPLICABLE TO THIS WORK.

THIS CONTRACTOR SHALL BE REQUIRED TO FURNISH AND INSTALL ALL SUCH ITEMS NORMALLY INCLUDED ON SYSTEMS OF THIS TYPE, WHICH, WHILE NOT MENTIONED DIRECTLY HEREIN OR ON THE DRAWINGS ARE OBVIOUSLY ESSENTIAL TO THE INSTALLATION AND OPERATION OF THE SYSTEM AND WHICH ARE NORMALLY FURNISHED ON QUALITY INSTALLATION OF THIS TYPE. THE DRAWINGS AND SPECIFICATIONS CANNOT DEAL INDIVIDUALLY WITH THE MANY MINUTE ITEMS THAT MAY BE REQUIRED BY THE NATURE OF THE SYSTEMS.

IF THERE IS A DISCREPANCY BETWEEN THE DRAWINGS AND THE SPECIFICATIONS OR WITHIN EITHER DOCUMENT, THE MORE STRINGENT REQUIREMENT SHALL BE ESTIMATED AND PROVIDED.

THIS CONTRACTOR SHALL TEST ALL SYSTEMS INSTALLED UNDER THIS CONTRACT AS CALLED FOR IN THESE SPECIFICATIONS AND AS REQUIRED BY LOCAL CODES. ANY DEFECTS DISCOVERED IN TESTING SHALL BE CORRECTED AND THE TESTS REPEATED UNTIL ALL DEFECTS ARE ELIMINATED.

23 05 29 – HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

GENERAL
CONFORM TO APPLICABLE CODE FOR SUPPORT OF PIPING.

PIPE HANGERS AND SUPPORTS

HVAC PIPING - REFRIGERANT:
CONFORM TO ASME B31.5 OR ASTM F708.
HANGERS FOR PIPE SIZES 1/2" TO 1-1/2": CARBON STEEL ADJUSTABLE SWIVEL, SPLIT RING.
MULTIPLE OR TRAPEZE HANGERS: STEEL CHANNELS WITH WELDED SPACERS AND HANGER RODS.
WALL SUPPORT FOR PIPE SIZES TO 3": CAST IRON HOOK.
WALL SUPPORT FOR PIPE SIZES 4" AND OVER: WELDED STEEL BRACKET AND WROUGHT STEEL CLAMP.
VERTICAL SUPPORT: STEEL RISER CLAMP.
FLOOR SUPPORT: CAST IRON ADJUSTABLE PIPE SADDLE, LOCK NUT, NIPPLE, FLOOR FLANGE, AND CONCRETE PIER OR STEEL SUPPORT.
COPPER PIPE SUPPORT: CARBON STEEL RING, ADJUSTABLE, COPPER PLATED.
EXTERIOR SUPPORT: ZINC COATED UNISTRUT.
PROVIDE ZINC COATED (HOT DIPPED GALVANIZED) HANGERS AND SUPPORTS FOR ALL EXTERIOR APPLICATIONS.

HANGER RODS: MILD STEEL THREADED BOTH ENDS, THREADED ONE END OR CONTINUOUS THREADED.

FLASHING
METAL FLASHING: 26 GAUGE GALVANIZED STEEL.

METAL COUNTER FLASHING: 22 GAUGE GALVANIZED STEEL.

FLEXIBLE FLASHING: 47 MIL THICK SHEET BUTYL COMPATIBLE WITH ROOFING.

CAPS: STEEL, 22 GAUGE MINIMUM; 16 GAUGE AT FIRE RESISTANT ELEMENTS.

SLEEVES FOR PIPES THROUGH NON-FIRE RATED BEAMS, WALLS, FOOTINGS, AND POTENTIALLY WET FLOORS SHALL BE SCHEDULE 40 STEEL PIPE OR 18 GAUGE GALVANIZED STEEL.

INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

INSTALL HANGERS TO PROVIDE MINIMUM 1/2 INCH SPACE BETWEEN FINISHED COVERING AND ADJACENT WORK.

PLACE HANGERS WITHIN 12 INCHES OF EACH HORIZONTAL ELBOW.

WHERE SEVERAL PIPES CAN BE INSTALLED IN PARALLEL AND AT SAME ELEVATION, PROVIDE MULTIPLE OR TRAPEZE HANGERS.

PROVIDE COPPER PLATED HANGERS AND SUPPORTS FOR COPPER PIPING.

PROVIDE FLEXIBLE FLASHING AND METAL COUNTER FLASHING WHERE PIPING AND DUCTWORK PENETRATE WEATHER OR WATERPROOFED WALLS, FLOORS, AND ROOFS.

SET SLEEVES IN POSITION IN FORMWORK. PROVIDE REINFORCING AROUND SLEEVES AND SIZE SLEEVES LARGE ENOUGH TO ALLOW FOR MOVEMENT DUE TO EXPANSION AND CONTRACTION. PROVIDE FOR CONTINUOUS INSULATION WRAPPING.

EXTEND SLEEVES THROUGH FLOOR ONE INCH (1") ABOVE FINISHED FLOOR LEVEL. CAULK SLEEVES.

PROVIDE CLOSE FITTING METAL COLLAR OR ESCUTCHEON COVERS AT BOTH SIDES OF PENETRATION. INSTALL CHROME PLATED STEEL ESCUTCHEONS AT FINISHED SURFACES AND WITHIN CABINETS.

23 07 19 – HVAC PIPING INSULATION

GENERAL
MAINTAIN AMBIENT CONDITIONS REQUIRED BY MANUFACTURERS OF EACH PRODUCT.

MAINTAIN TEMPERATURE BEFORE, DURING, AND AFTER INSTALLATION FOR MINIMUM OF 24 HOURS.

FLEXIBLE ELASTOMERIC CELLULAR INSULATION
INSULATION: ASTM C534 FLEXIBLE CELLULAR ELASTOMERIC MOLDED FOAM
"K" VALUE: ASTM C177 OR C518: 0.27 AT 75 DEG F.
MINIMUM SERVICE TEMPERATURE: -40 DEG F.
MAXIMUM SERVICE TEMPERATURE: 220 DEG F.
MAXIMUM MOISTURE ABSORPTION: ASTM D1056, 5.0% BY WEIGHT GAIN
MAXIMUM WATER VAPOR PERMEABILITY: ASTM E96, 0.05 PERM-IN
MAXIMUM FLAME SPREAD: ASTM E84, 25
MAXIMUM SMOKE DEVELOPED: ASTM E84, 50

PIPING JACKETS
PVC PLASTIC JACKET: ASTM C921, UV RESISTANT ONE PIECE MOLDED TYPE FITTING COVERS AND SHEET MATERIAL, OFF WHITE COLOR.
MINIMUM SERVICE TEMPERATURE: -40 DEG F.
MAXIMUM SERVICE TEMPERATURE: 150 DEG F.
MOISTURE VAPOR TRANSMISSION: ASTM E96, 0.002 PERM INCHES.
MAXIMUM FLAME SPREAD: ASTM E84, 25
MAXIMUM SMOKE DEVELOPED: ASTM E84, 50
THICKNESS: 20 MIL FOR INDOOR APPLICATIONS, 30 MIL FOR OUTDOOR APPLICATIONS
CONNECTIONS: BRUSH ON WELDING ADHESIVE.
COMPATIBLE WITH INSULATION.

INSULATION PIPE SHIELDS
SHIELD: 180-DEGREE PIPE INSULATION SHIELD TO EVENLY DISPERSE THE WEIGHT OF THE PIPING SYSTEM. EDGES SHALL BE FLARED TO PREVENT INSULATION PUNCTURES.
MATERIAL: G60 GALVANIZED STEEL, 20 GAUGE (18 GAUGE ON SADDLES LARGER THAN 8" OD)
LENGTH: INSULATION OD OF 8" AND SMALLER: 12" LENGTH, INSULATION OD OF 10" AND LARGER: 18" LENGTH

INSTALLATION
INSTALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

INSULATED DUAL TEMPERATURE PIPES OR COLD PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE:
PROVIDE VAPOR BARRIER JACKETS, FACTORY APPLIED OR FIELD APPLIED.
INSULATE FITTINGS, JOINTS AND VALVES WITH MOLDED INSULATION OF LIKE MATERIAL AND A THICKNESS AS ADJACENT PIPE.
PVC FITTING COVERS MAY BE USED.
CONTINUE INSULATION THROUGH WALLS (UNLESS IN FIREWALL SLEEVES), PIPE HANGERS AND OTHER PIPE PENETRATIONS.
INSULATE ENTIRE SYSTEM INCLUDING FITTINGS, VALVES, UNIONS, FLANGES, STRAINERS, FLEXIBLE CONNECTIONS, AND EXPANSION JOINTS.

PROVIDE INSULATION SHIELDS AT EVERY HANGER LOCATION. INSULATION SHALL BE CONTINUOUS AT ALL HANGERS.

INSULATION INSERTS SHALL BE USED TO PREVENT DIRECT CONTACT BETWEEN PIPE AND HANGER.

INSULATION SHALL BE CONTINUOUS THROUGH ALL WALL, ROOF AND CURB PENETRATIONS.

FLEXIBLE ELASTOMERIC FOAM INSULATION SCHEDULE:

PIPING SYSTEM	THICKNESS
REFRIGERANT SUCTION LINES	1"
REFRIGERANT LIQUID LINES	N/A

NOTE: PRE-INSULATED REFRIGERANT PIPING FROM THE MANUFACTURER SHALL BE APPROVED FOR USE.

PIPE JACKET SCHEDULE:

PIPE LOCATION	JACKET MATERIAL
EXTERIOR ROOF PIPING	PVC

NOTE: JACKETING SHALL COVER THE ENTIRE PIPING SYSTEM INCLUDING, BUT NOT LIMITED TO THE PIPE, JOINTS, FITTINGS AND TEES.



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23 23 00 – REFRIGERANT PIPING

GENERAL
PROTECT PIPING AND SPECIALTIES FROM ENTRY OF CONTAMINATING MATERIAL BY LEAVING END CAPS AND PLUGS IN PLACE UNTIL INSTALLATION.

PIPING
COPPER TUBING: ASTM B280, TYPE #ACR HARD DRAWN OR ANNEALED.

FITTINGS: ASME B16.22 WROUGHT COPPER.

JOINTS: BRAZE, AWS A5.8 BCUP SILVER/PHOSPHORUS/COPPER ALLOY WITH MELTING RANGE OF 1190 TO 1480 DEG F.

INSTALLATION
ROUTE PIPING IN ORDERLY MANNER WITH PLUMBING PARALLEL TO BUILDING STRUCTURE AND MAINTAIN GRADIENT.

GROUP PIPING WHENEVER PRACTICAL AT COMMON ELEVATIONS AND LOCATIONS. SLOPE PIPING 1% IN DIRECTION OF OIL RETURN.

ARRANGE PIPING TO RETURN OIL TO COMPRESSOR. PROVIDE TRAPS AND LOOPS IN PIPING AND PROVIDE DOUBLE RISERS AS REQUIRED. SLOPE HORIZONTAL PIPING 0.40% IN DIRECTION OF FLOW. PIPE SIZE TO BE PROVIDED BY UNIT MANUFACTURER.

FLOOD PIPING SYSTEM WITH NITROGEN WHEN BRAZING. FOLLOW ASHRAE 15 PROCEDURES FOR CHARGING AND PURGING OF SYSTEMS AND FOR DISPOSAL OF REFRIGERANT.

INSULATE PIPING AND EQUIPMENT.

TEST REFRIGERATION SYSTEM IN ACCORDANCE WITH ASME B31.5.

EVACUATE SYSTEM TO 27 INCHES VACUUM AND HOLD AT THAT LEVEL FOR 1 HOUR PRIOR TO CHARGING SYSTEM WITH REFRIGERANT. TEST TO NO LEAKAGE AND FULLY CHARGE COMPLETED SYSTEM WITH REFRIGERANT AFTER TESTING.

23 31 00 – HVAC DUCTS AND CASING

GENERAL
PERFORM WORK IN ACCORDANCE WITH SMACNA - HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.

CONSTRUCT DUCTWORK TO NFPA 90A STANDARDS. DO NOT INSTALL DUCT SEALANTS WHEN TEMPERATURES ARE LESS THAN THOSE RECOMMENDED BY SEALANT MANUFACTURERS.

GALVANIZED STEEL DUCTS: ASTM A924 AND ASTM A653 GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, HAVING G60 ZINC COATING IN CONFORMANCE WITH ASTM A90.

STEEL DUCTS: ASTM A366, A569, AND A568.

FASTENERS: RIVETS, BOLTS OR SHEET METAL SCREWS.

DUCT SEALANT: WATER BASED, NON HARDENING, HIGH VELOCITY/HIGH PRESSURE DUCT SEALANT INTENDED FOR INDOOR AND OUTDOOR HVAC DUCTS. PRESSURE RATING SHALL BE 10" WATER COLUMN MINIMUM AND A SERVICE TEMPERATURE RANGE OF -20 TO 200F.

HANGER ROD: ASTM A36; STEEL, GALVANIZED; THREADED BOTH ENDS, THREADED ONE END.

DUCTWORK FABRICATION
FABRICATE AND SUPPORT DUCTWORK IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, AND AS INDICATED. PROVIDE DUCT MATERIAL, GAUGES, REINFORCING AND SEALING FOR OPERATING PRESSURES INDICATED.

INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15 DEGREE DIVERGENCE WHEREVER POSSIBLE; MAXIMUM 30 DEGREE DIVERGENCE UPSTREAM OF EQUIPMENT AND 45 DEGREE CONVERGENCE DOWNSTREAM.

CONSTRUCT T'S, BENDS, AND ELBOWS WITH RADIUS OF NOT LESS THAN 1-1/2 TIMES WIDTH OF DUCT ON CENTERLINE. WHERE NOT POSSIBLE AND WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE AIRFOIL TURNING VANES. WHERE ACOUSTICAL LINING IS INDICATED, PROVIDE TURNING VANES OF PERFORATED METAL WITH FIBERGLASS INSULATION.

PROVIDE STANDARD 45 DEGREE LATERAL WYE TAKEOFFS OR 90 DEGREE CONICAL TEE TAKEOFFS.

ALL EXPOSED DUCTWORK SHALL BE FABRICATED USING PAINT GRIP GALVANIZED SHEET METAL.

INSTALLATION
INSTALL AND SEAL DUCTS IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE AND PER MANUFACTURER'S INSTRUCTIONS.

SEALANT SHALL BE NON-HARDENING AND WATER RESISTANT. SEALANT SHALL BE CAPABLE OF BEING APPLIED WITH A BRUSH AND SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. EACH SEAM OR PENETRATION SHALL BE DRESSED AFTER APPLICATION OF SEALANT FOR NEAT APPEARANCE.

DUCTWORK SHALL BE INSTALLED FOLLOWING ESSENTIALLY LINES INDICATED ON THE DRAWINGS. INSTALL OFFSETS, AND ANGLES. TRANSITIONS MAY BE REQUIRED TO AVOID INTERFERENCE WITH OTHER WORK AND EXISTING CONDITIONS. MAINTAIN FULL CAPACITY OF DUCTWORK.

DUCT SIZES ARE NET OUTSIDE DIMENSIONS. MAINTAIN OUTSIDE SIZES FOR LINED DUCTS. DO NOT INCREASE DUCT DIMENSIONS.

USE CRIMP JOINTS WITH OR WITHOUT BEAD FOR JOINING ROUND DUCT SIZES EIGHT INCH (8") AND SMALLER WITH CRIMP IN DIRECTION OF AIRFLOW.

CONNECT TERMINAL UNITS TO SUPPLY DUCTS DIRECTLY WITH RIGID DUCT. DO NOT USE FLEXIBLE DUCT.

23 34 23 – HVAC POWER VENTILATORS

GENERAL
PROVIDE ALL INSTALLATION, MAINTENANCE AND WARRANTY INFORMATION FROM THE MANUFACTURER.

REFER TO SCHEDULE ON DRAWINGS FOR MANUFACTURER, MODEL NUMBERS AND ADDITIONAL INFORMATION.

PROVIDE TERMINAL LUGS TO MATCH BRANCH CIRCUIT CONDUCTOR QUANTITIES, SIZES AND MATERIALS INDICATED.

PROVIDE CORD AND PLUG IN HOUSING FOR THERMAL OVERLOAD PROTECTED MOTOR.

MOLDED WHITE PLASTIC OR ALUMINUM GRILLE WITH BAKED WHITE ENAMEL FINISH.

INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

DO NOT OPERATE FANS UNTIL DUCTWORK IS CLEAN, FILTERS ARE IN PLACE, AND BEARINGS ARE LUBRICATED.

SUPPORT CEILING FANS FROM STRUCTURE AS REQUIRED.

FANS SHALL BE TIED IN WITH LOCAL LIGHTING CIRCUIT AND SHALL BE POWERED 'ON' WHEN LIGHTS ARE 'ON'.

23 37 00 – AIR OUTLETS AND INLETS

GENERAL
PROVIDE ALL INSTALLATION, MAINTENANCE AND WARRANTY INFORMATION FROM THE MANUFACTURER.

REFER TO SCHEDULE ON DRAWINGS FOR MANUFACTURER, MODEL NUMBERS AND ADDITIONAL INFORMATION.

INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

CHECK LOCATION OF OUTLETS AND INLETS AND MAKE NECESSARY ADJUSTMENTS IN POSITION AND TYPE TO CONFORM TO ARCHITECTURAL FEATURES, SYMMETRY, AND LIGHTING ARRANGEMENT.

PROVIDE BALANCING DAMPERS ON DUCT TAKE-OFF TO DIFFUSERS, GRILLES AND REGISTERS, DESPITE WHETHER DAMPERS ARE SPECIFIED AS PART OF THE DIFFUSER OR GRILLE AND REGISTER ASSEMBLY.

INSTALL DIFFUSERS TO DUCTWORK WITH AIRTIGHT CONNECTION.

23 81 01 – TERMINAL HEAT TRANSFER, CONVECTION HEATING, AND COOLING UNITS

GENERAL
PROVIDE ALL INSTALLATION, MAINTENANCE AND WARRANTY INFORMATION FROM THE MANUFACTURER.

REFER TO SCHEDULE ON DRAWINGS FOR MANUFACTURER, MODEL NUMBERS AND ADDITIONAL INFORMATION.

18 GAUGE GALVANIZED STEEL CABINET WITH POLYESTER POWDER COAT WHITE FINISH.

OUTLET GRILLE SHALL HAVE ADJUSTABLE LOUVERS WITH PROTECTIVE MESH SCREEN.

DIRECT DRIVE FAN PROPELLER TYPE STATICALLY AND DYNAMICALLY BALANCED WITH PERMANENTLY LUBRICATED BEARINGS.

BLOW THROUGH, TOTALLY ENCLOSED, THERMALLY PROTECTED MOTOR.

MOUNTING SHALL BE FACTORY ASSEMBLED WALL OR CEILING HANGER. REFER TO DRAWINGS.

PROVIDE WITH WALL MOUNTED THERMOSTAT FOR CONTROL.

PROVIDE WITH MANUFACTURER'S INTEGRAL DISCONNECT SWITCH.

INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

INSTALL EQUIPMENT EXPOSED TO FINISHED AREAS AFTER WALLS AND CEILINGS ARE FINISHED AND PAINTED. AVOID DAMAGE.

SUPPORT FROM BUILDING STRUCTURE WITH PIPE HANGERS ANCHORED TO BUILDING AS REQUIRED.

23 74 00 – SMALL PACKAGED ROOFTOP UNITS

GENERAL
PROVIDE ALL INSTALLATION, MAINTENANCE AND WARRANTY INFORMATION FROM THE MANUFACTURER.

UNITS SHALL BE TESTED AND CERTIFIED TO ANSI Z21.47/JUL 1995.

UNITS SHALL EXCEED OR BE WITHIN 5% OF THE SCHEDULED RATINGS (EER/SEER/IEER) PER AHRI 210/240 (3-5 TON) OR AHRI 340/360 (6 TON AND LARGER). ALL UNITS SHALL BE CERTIFIED AND RATED BY AHRI.

FABRICATE AND LABEL REFRIGERATION SYSTEM TO COMPLY WITH ASHRAE 15.

UNIT SHALL BE TEST RUN AT THE FACTORY. THIS TEST INCLUDES PRESSURE TESTING OF THE FANS, THE HEATING AND COOLING OPERATION, THE HOT GAS RE-HEAT OPERATION, AND CONTROL SYSTEM. ALL COILS AND PIPING SHALL BE LEAK TESTED. UNIT PERFORMANCE SHALL MEET OR EXCEED THE REQUIREMENTS SHOWN ON THE SCHEDULE.

THE RTU MUST BE DELIVERED TO THE JOB SITE FACTORY ASSEMBLED AND TESTED WITH ALL INTERNAL WIRING AND READY FOR INSTALLATION.

THE RTU MUST BE FULLY CHARGED WITH REFRIGERANT AND OIL BY THE MANUFACTURER OR A MANUFACTURER TRAINED AND AUTHORIZED SERVICE ORGANIZATION.

CONTRACTOR SHALL PROVIDE A FULL PARTS AND LABOR WARRANTY FOR ONE YEAR FROM START-UP OR 18 MONTHS FROM SHIPMENT, WHICHEVER OCCURS FIRST. PROVIDE A FIVE YEAR EXTENDED WARRANTY FOR COMPRESSORS (PARTS ONLY).

PROVIDE TWO SETS OF FILTERS. ONE SET SHALL SHIP WITHIN THE UNIT. THE SECOND SET SHALL BE SENT WITHIN ORIGINAL PACKAGING AND USED AT SUBSTANTIAL COMPLETION.

PROVIDE AN EXTRA SET OF FAN BELTS AND SHIP WITHIN UNIT CABINET.

CABINET SHALL BE GALVANIZED STEEL WITH FACTORY FINISH CERTIFIED TO A MINIMUM 500-HOUR SALT SPRAY TEST PER ASTM-B117.

RTU SHALL CONTAIN 1/2" FIBERGLASS INSULATION WITH FOIL FACING, HINGED ACCESS PANELS WITH 1/4 TURN LATCHES ON THE FAN, EVAPORATOR, ECONOMIZER AND FILTER SECTIONS. BASE RAIL SHALL BE STRUCTURAL GALVANIZED STEEL WITH RIGGING HOLES AND A DOUBLE SLOPED NON-CORROSIVE POLYMER OR STAINLESS STEEL CONDENSATE PAN.

COMPRESSORS SHALL BE FULLY HERMETIC DIRECT-DRIVE SCROLL COMPRESSORS. COMPRESSORS SHALL BE FACTORY MOUNTED ON RUBBER GROMMETS AND BE INTERNALLY PROTECTED FROM HIGH DISCHARGE TEMPERATURE CONDITIONS. PROVIDE CRANKCASE HEATERS FOR COLD WEATHER OPERATION AND START-UP.

EVAPORATOR COIL SHALL BE A MULTI-ROW COIL AND CONTAIN COPPER TUBES WITH MECHANICALLY BONDED ALUMINUM FINS. COIL SHALL BE FACTORY LEAK TESTED, EVACUATED AND CHARGED WITH REFRIGERANT. ALL JOINTS SHALL BE SOLDERED OR BRAZED.

CONDENSER COIL SHALL CONTAIN COPPER TUBES WITH MECHANICALLY BONDED ALUMINUM FINS. COIL SHALL BE FACTORY LEAK TESTED, EVACUATED AND CHARGED WITH REFRIGERANT. ALL JOINTS SHALL BE SOLDERED OR BRAZED.

EVAPORATOR FAN ASSEMBLY SHALL BE DOUBLE INLET FORWARD CURVED WHEEL, DIRECT DRIVE, STATICALLY AND DYNAMICALLY BALANCED FOR ENTIRE RPM RANGE WITH PERMANENTLY LUBRICATED BEARINGS.

CONDENSER FAN ASSEMBLY SHALL BE DIRECT DRIVE PROPELLER TYPE WITH PERMANENTLY LUBRICATED BEARINGS.

CONDENSER FAN BLADES SHALL BE ALUMINUM AND RIVETED TO A STEEL SHAFT. COMPOSITE BLADES ARE ACCEPTABLE.

THE ELECTRIC HEATING COIL MODULE SHALL BE LOCATED DOWNSTREAM OF THE SUPPLY AIR FAN IN THE HEATING SECTION OF THE ROOFTOP UNIT. HEATING ELEMENTS SHALL BE CONSTRUCTED OF A LOW WATT DENSITY, NICKEL - CHROMIUM ALLOY RESISTANCE WIRE WITH CERAMIC BUSHINGS.

ELECTRIC HEATING COIL MODULE SHALL HAVE AN AUTOMATIC RESET AND HIGH TEMPERATURE LIMIT SAFETY PROTECTION.

HEATING COIL POWER SUPPLY SHALL BE FACTORY WIRED INTO THE RTU'S MAIN POWER BLOCK OR DISCONNECT SWITCH.

ECONOMIZER SHALL BE FULLY MODULATING (0-100%) WITH PREWIRED ACTUATORS. MINIMUM DAMPER SETTING SHALL BE FIELD ADJUSTABLE. DAMPERS SHALL BE LOW LEAK DAMPERS. CLASS 1 PER AMCA 511 (MAXIMUM LEAKAGE OF 4CFM/SQ.FT @ 1" STATIC). INTAKE SHALL HAVE A WEATHER HOOD AND BIRD SCREEN. GRAVITY CONTROLLED RELIEF DAMPER TO ALLEVIATE HIGH BUILDING PRESSURE DURING ECONOMIZER OPERATION.

RTU FILTER SECTION SHALL BE A 2" SLIDE-IN FILTER FRAME ACCESSED VIA A HINGED ACCESS PANEL UTILIZING MERV 8 PLEATED THROWAWAY FILTERS.

GALVANIZED STEEL ROOF CURB WITH FACTORY WOOD NAILER WITH MINIMUM 1" RIGID INSULATION.

PROVIDE ALL NECESSARY MICROPROCESSOR CONTROL COMPONENTS TO PROPERLY PERFORM THE FEATURES REQUIRED IN THIS SPECIFICATION.

REFER TO SCHEDULE ON DRAWINGS FOR MANUFACTURER, MODEL NUMBER AND ADDITIONAL INFORMATION.



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Project No. 595
Sheet Content:
MECHANICAL SPECIFICATIONS
Sheet No.
M-0.3

MECHANICAL & PLUMBING SYMBOLS LIST

HVAC

- ☒ SUPPLY DIFFUSER
- ☒ RETURN AIR GRILLE
- ===== FLEX DUCT
- 18x12 DUCT SIZE: HORIZONTAL WIDTH x VERTICAL HEIGHT (NET OUTSIDE SHEET METAL DIMENSION)
- VOLUME CONTROL DAMPER
- ☐ GRILLE/DIFFUSER TAG WITH TYPE NUMBER AND CFM
S = SUPPLY, R = RETURN, E = EXHAUST
- ⊖ THERMOSTAT

PLUMBING

- DOMESTIC COLD WATER - CW
- DOMESTIC HOT WATER - HW
- DOMESTIC HOT WATER CIRCULATING - HWC
- SS SANITARY SEWER
- GSS GREASE SANITARY SEWER
- v VENT
- CD CONDENSATE DRAIN LINE
- RL REFRIGERANT LIQUID
- RS REFRIGERANT SUCTION
- FOO FLOOR CLEANOUT

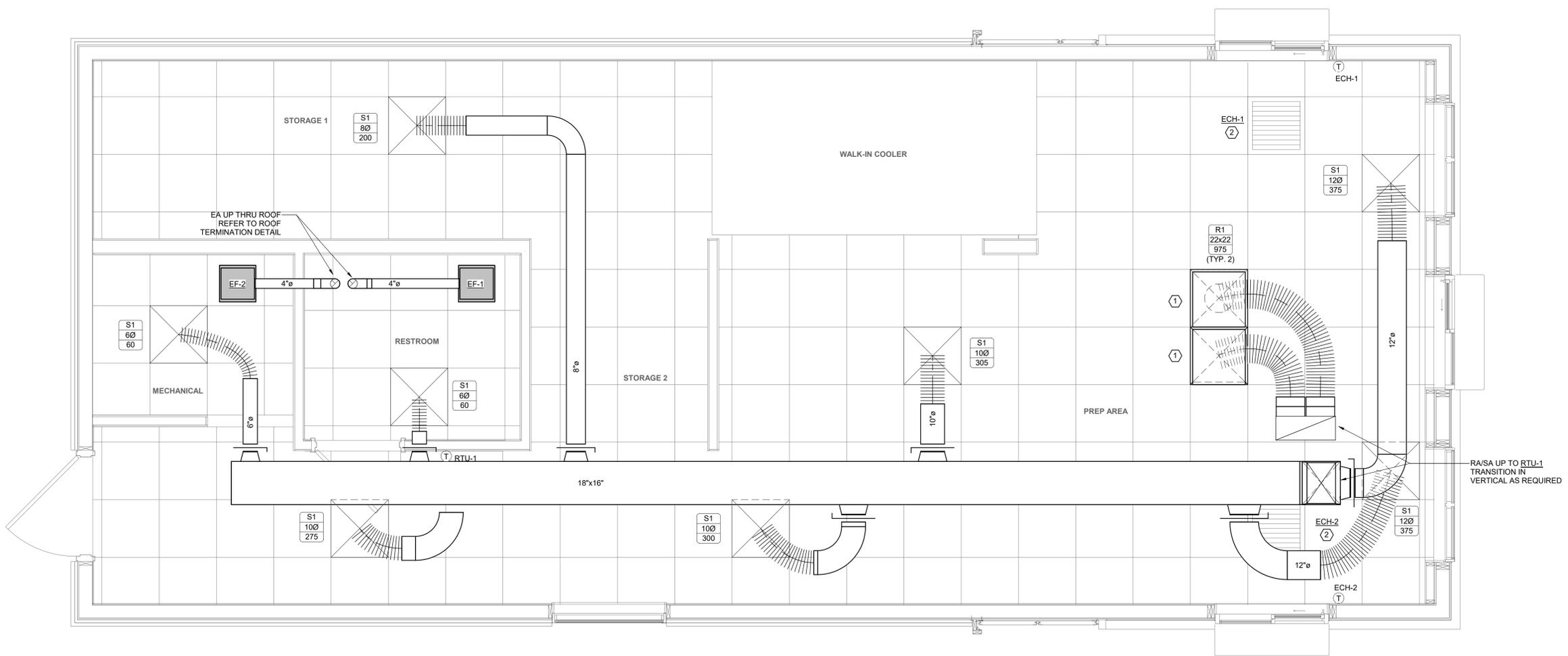
- GENERAL MECHANICAL NOTES:**
- A. ALL MECHANICAL EQUIPMENT SHALL BEAR THE U.L. LABEL.
 - B. ALL EQUIPMENT IS TO BE STARTED UP AND RUN IN SHOP BEFORE BUILDING SHIPMENT.
 - C. HVAC EQUIPMENT SHALL BE TESTED IN ACCORDANCE WITH ALL LOCAL AND ADOPTED STATE MECHANICAL CODES.
 - D. HVAC DUCTING MATERIAL IS TO BE GALVANIZED METAL OR INSULATED FLEX DUCT WITH A FLAME SPREAD INDEX NOT TO EXCEED 25 AND A SMOKE DEVELOPED INDEX OF NOT OVER 50.
 - E. ALL SUPPLY DIFFUSERS SHALL HAVE MANUAL BALANCING DAMPERS.
 - F. FLEX DUCTING TO BE 6'-0" LONG MAX. FLEX SIZE TO BE SAME AS DIFFUSER / GRILLE UNLESS NOTED OTHERWISE.
 - G. FLEXIBLE DUCTS AND CONNECTORS SHALL CONFORM TO THE REQUIREMENTS OF U.L. 181 AND BE LABELED AS 'CLASS 0' OR 'CLASS 1' FLEXIBLE AIR DUCT.
 - H. ALL DUCTWORK JOINTS AND SEAMS SHALL BE SECURELY FASTENED AND MADE SUBSTANTIALLY AIRTIGHT WITH DUCT MASTIC OR TAPE.
 - I. ALL DUCTWORK SHALL BE INSULATED WITH A MINIMUM OF 2" THICK, 3/4 POUND DENSITY FOIL FACED FIBERGLASS INSULATION, OR 1" THICK, 1-1/2 POUND DENSITY LINER, HAVING A FLAMESPREAD RATING OF NOT OVER 25, A SMOKE DEVELOPED RATING NOT OVER 50.
 - J. METAL DUCTWORK SHALL BE SECURELY SUPPORTED, HUNG OR SUSPENDED BY METAL STRAPS AND HANGERS.
 - K. THERMOSTAT SHALL BE CAPABLE OF BEING SET FROM 56°F TO 85°F AND SHALL BE CAPABLE OF OPERATING THE SYSTEM HEATING AND COOLING IN SEQUENCE. MOUNT AT 60° AFF.

- KEYNOTES:** (#)
1. PROVIDE LINED RETURN BOOT ON RETURN GRILLE.
 2. MOUNT ELECTRIC CEILING HEATER IN CEILING GRID PER MANUFACTURER'S INSTRUCTIONS.



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1 MECHANICAL FLOOR PLAN
1/2" = 1'-0"

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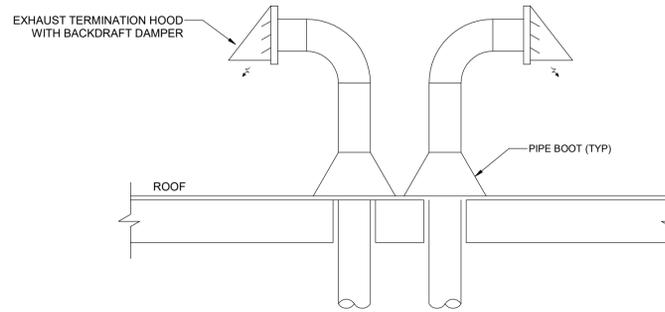
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Sheet Content:	MECHANICAL FLOOR PLAN
Sheet No.	M-1.1

GENERAL MECHANICAL NOTES:

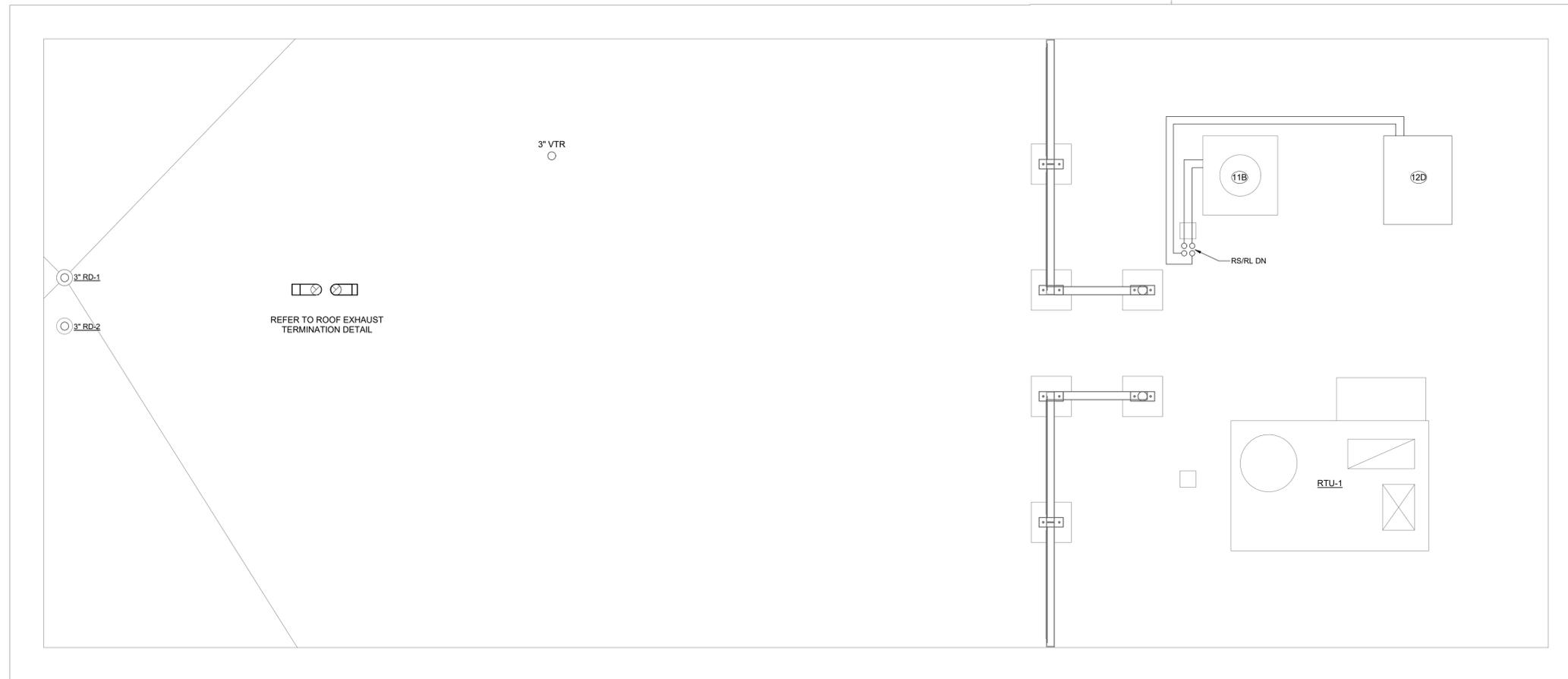
- A. ALL MECHANICAL EQUIPMENT SHALL BEAR THE U.L. LABEL.
- B. ALL EQUIPMENT IS TO BE STARTED UP AND RUN IN SHOP BEFORE BUILDING SHIPMENT.
- C. HVAC EQUIPMENT SHALL BE TESTED IN ACCORDANCE WITH ALL LOCAL AND ADOPTED STATE MECHANICAL CODES.
- D. CONTRACTOR SHALL FURNISH AND INSTALL DUCTS, DIFFUSERS, EQUIPMENT, AND CONTROLS FOR THE COMPLETE H.V.A.C. SYSTEM AS SHOWN OR NOTED ON PLANS.
- E. MECHANICAL CONTRACTOR SHALL COORDINATE EQUIPMENT LOCATIONS WITH ROOF OPENINGS AND OTHER TRADES.
- F. MOUNT RTU ON PREFAB CURB MATCHED TO ROOF SLOPE. RTU SHALL BE MOUNTED BEHIND SCREEN WALL.



NOTES:

- A. DO NOT TERMINATE EXHAUST HOODS ON NORTH FACE.

② ROOF EXHAUST TERMINATION DETAIL
NO SCALE



① MECHANICAL ROOF PLAN
1/2" = 1'-0"



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Project No.	595
Sheet Content:	MECHANICAL ROOF PLAN
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DIFFUSERS AND GRILLES SCHEDULE										
TAG	MFR	MODEL	TYPE	STYLE	MATERIAL	NECK SIZE	FACE SIZE	FINISH	BORDER TYPE	NOTES
S1	PRICE	ASCD	SUPPLY	ADJUSTABLE PATTERN CONTROL	ALUMINUM	SEE DWGS	24"X24"	WHITE	LAY-IN	1,2
R1	PRICE	80FF	RETURN	EGGCRATE WITH REMOVABLE CORE	ALUMINUM	22"X22"	24"X24"	WHITE	LAY-IN	1

- NOTES:
1. STANDARD WHITE FINISH.
2. FACTORY INSULATED R-6 BACKPAN.

EXHAUST FAN SCHEDULE									
TAG	MFR	MODEL	TYPE	AIRFLOW (CFM)	ESP (IN WC)	POWER (W)	DRIVE TYPE	MAX. SONES	VOLTS/PHASE/HZ
EF-1	GREENHECK	SP-A110-QD	CEILING	80	0.25	18.5	DIRECT DRIVE	1.5	120/1/60
EF-2	GREENHECK	SP-A110-QD	CEILING	80	0.25	18.5	DIRECT DRIVE	1.5	120/1/60

- NOTES:
1. OTHER APPROVED MANUFACTURERS: BROAN, COOK OR APPROVED EQUAL.
2. INTERLOCK FAN WITH LIGHTS TO ENERGIZE FAN WHEN LIGHTS ARE ON. PROVIDE WITH INTEGRAL BACKDRAFT DAMPER, LOCAL SPEED CONTROLLER AND CLG. MOUNT HARDWARE.

ELECTRIC CABINET UNIT HEATER						
TAG	MFR	MODEL	TYPE	AIRFLOW (CFM)	ELECTRICAL	
					FLA	VOLTS/PHASE/HZ
ECH-1	MARKEL	3380	CEILING	175	19.2	120/1/60
ECH-2	MARKEL	3380	CEILING	175	19.2	120/1/60

- NOTES:
1. OTHER APPROVED MANUFACTURERS: INDEECO, REZNOR OR APPROVED EQUAL.
2. PROVIDE WITH UNIT WITH WALL MOUNTED ADJUSTABLE THERMOSTAT.
3. PROVIDE WITH T-BAR LAY-IN CEILING MOUNT KIT AND ANY OTHER ACCESSORIES REQUIRED FOR MOUNTING.

ROOFTOP UNIT SCHEDULE													
TAG	MFR	MODEL	FAN				COOLING			HEATING		ELECTRICAL	
			SA AIRFLOW (CFM)	OA (CFM)	ESP (IN WC)	MOTOR (HP)	CAPACITY (MBH)	MIN. SEER	CAPACITY (KW)	STAGES	FLA	MOCP	VOLTS/PHASE/HZ
RTU-1	CARRIER	50FC-C06A2A3-0A0A0	1950	150	0.75	1	60	14	13.1	2	82	90	208/1/60

- NOTES:
1. PROVIDE WITH LOW AMBIENT COOLING TO ALLOW COOLING TO 0° OUTDOOR TEMPERATURE.
2. COOLING EAT OF 80FDB/67FWB AND WINTER 68F EAT/ 90F LAT.
3. PROVIDE HAIL GUARDS ON CONDENSER COIL.
4. PROVIDE ELECTRICAL CONVENIENCE OUTLET.
5. PROVIDE LOW LEAK ECONOMIZER AND HOOD WITH OUTDOOR AIR DRY BULB SENSOR.
6. PROVIDE PACKAGED FACTORY CONTROLS WITH LOCAL THERMOSTAT.
7. PROVIDE SINGLE POINT POWER.
8. DISCONNECT BY ELECTRICAL CONTRACTOR.

OUTSIDE AIR VENTILATION CALCULATION								
TAG	AREA SERVED	AREA (SF)	NUMBER OF PEOPLE	OA CFM PER PERSON	OA CFM PER SF	ZONE EFFECTIVENESS	OA CFM REQUIRED	OA CFM DESIGNED
RTU-1	ALL INTERIOR	585	6	5	0.12	1	100	140

- NOTES:
1. ALL CALCULATIONS PERFORMED IN ACCORDANCE WITH 2024 IMC CHAPTER 4.



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Sheet Content:	MECHANICAL SCHEDULES
Sheet No.	M-6.1

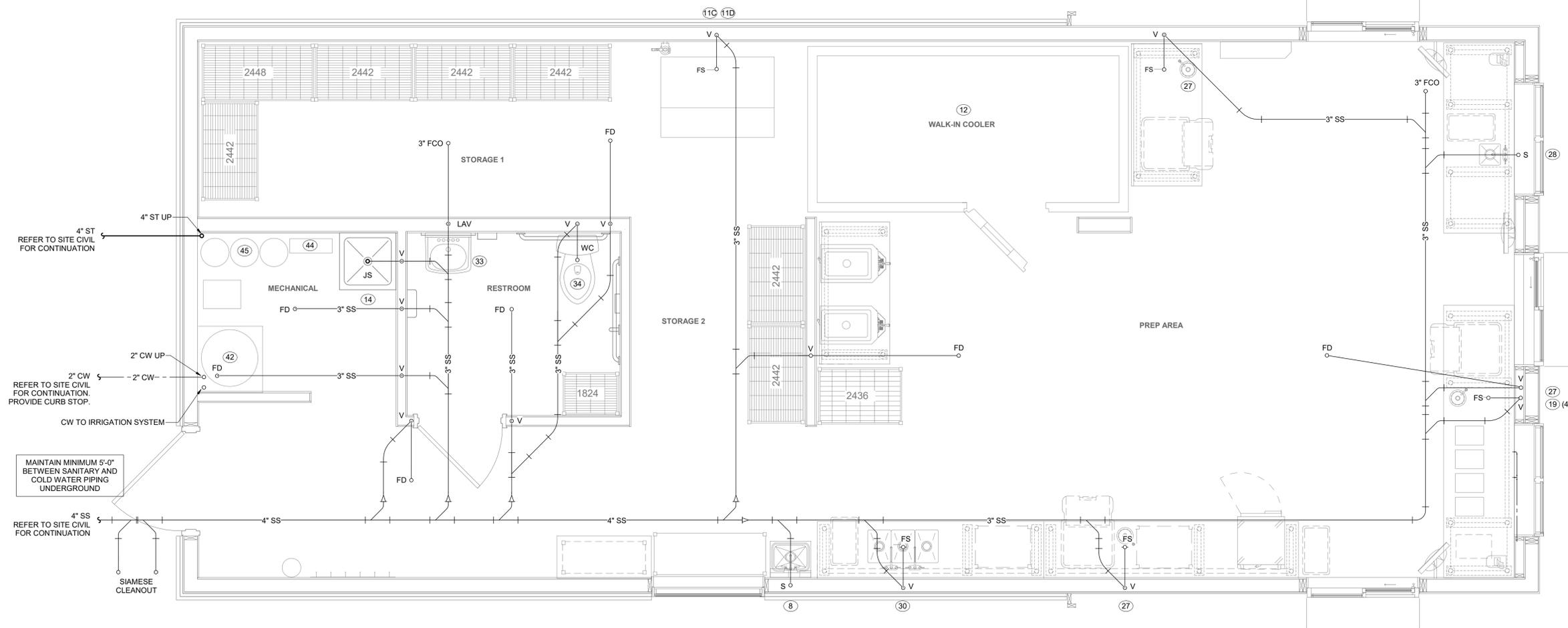
GENERAL PLUMBING NOTES:

- A. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL EQUIPMENT, PERMITS, LICENSES AND FEES NECESSARY TO INSTALL A COMPLETE WATER SUPPLY, WASTE, VENT, SYSTEM SUPPLY AND RETURN SYSTEM AS INDICATED AND NECESSARY TO OPERATE THE FOOD SERVICE EQUIPMENT.
- B. REFER TO FOODSERVICE EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL EQUIPMENT INFORMATION.
- C. ALL WATER PIPING IN UNHEATED SPACES SHALL BE INSULATED WITH URETHANE FOAM INSULATION FOR FREEZE PROTECTION (R6 MIN.) UNLESS ALTERNATE FREEZE PROTECTION METHOD IS APPROVED BY OWNER/ARCHITECT. ALL HOT AND COLD WATER LOCATED IN WALLS SHALL BE INSULATED WITH 1" URETHANE FOAM INSULATION FOR FREEZE PROTECTION (R4 MIN.) UNLESS ALTERNATE FREEZE PROTECTION METHOD IS APPROVED BY OWNER/ARCHITECT. ALL HOT WATER PIPING IN THE BUILDING SHALL BE INSULATED WITH 1" URETHANE FOAM (R4 MIN.) PER IEEC TABLE C403.10.
- D. CONTRACTOR SHALL COORDINATE AND VERIFY EXACT PLACEMENT OF NEW EQUIPMENT/FIXTURES PRIOR TO INSTALLATION AND MAKE FINAL CONNECTIONS FROM THE ROUGH-IN LOCATIONS TO THE CONNECTION POINTS ON THE FOODSERVICE EQUIPMENT.
- E. MAINTAIN SERVICE CLEARANCE AROUND ALL MECHANICAL EQUIPMENT AND ABOVE ELECTRICAL EQUIPMENT. DO NOT ROUTE PIPING IN CLEARANCE SPACES.
- F. COORDINATE PIPING LAYOUT AND ELEVATIONS WITH FOOTINGS, FLOW LINES, LOCAL PLUMBING CODE AND THE SPECIFICATIONS.
- G. VERIFY ALL SITE CONDITIONS PRIOR TO START OF WORK.
- H. COORDINATE ALL PLUMBING, PIPING ROUTING AND FLOOR DRAIN LOCATIONS WITH EQUIPMENT/BUILDING STRUCTURE AND OTHER TRADES PRIOR TO INSTALLATION TO ALLOW FOR PROPER CLEARANCES AND FLOW REQUIREMENTS.
- I. COORDINATE ALL VENTS THROUGH ROOF WITH DESIGN TEAM AND MAINTAIN 10FT REQUIRED DISTANCE FROM MECHANICAL EQUIPMENT INTAKES. OFFSET PIPING AS NECESSARY.



Date:	02-02-2026
Designed by:	AH
Drawn by:	AH
Checked by:	AH

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Revisions:	
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1 PLUMBING UNDERFLOOR PLAN
1/2" = 1'-0"

HYPER ENERGY BAR
 2060 NW LOWENSTEIN DR., LEE'S SUMMIT, MO 64081

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Project No.	595
Sheet Content:	PLUMBING UNDERFLOOR PLAN
Sheet No.	P-1.0

PLUMBING CONNECTION KITCHEN SCHEDULE										
NO.	DESCRIPTION	QTY	COLD WATER	HOT WATER	AFF	DIRECT	INDIRECT	FURNISHED BY	INSTALLED BY	NOTES
8	HAND SINK	1	1/2"	1/2"	12"	X		FSEC	PC	
11A	ICE MACHINE	1	1/2"		84"		X	FSEC	PC	FILTERED WATER WITH REDUCED PRESSURE BACKFLOW ASSEMBLY.
11B	ICE MACHINE CONDENSER	1						FSEC	PC	MFR SHALL SIZE REFRIGERANT PIPING BETWEEN ICE MACHINE AND REMOTE CONDENSER.
11C	ICE BIN	1					X	FSEC	PC	
11D	WATER FILTER	1	3/4"		84"			FSEC	PC	INTERCONNECT TO ICE MAKER.
12C	WALK-IN COOLER EVAP. COIL	1	1/2"		12"		X	FSEC	PC	
12D	WALK-IN COOLER CONDENSER	1	1/2"		12"			FSEC	PC	
14	MOP SINK (JS-1)	1	1/2"	1/2"	36"	X		PC	PC	
17	ESPRESSO STEAMER	1	1/2"		21"			OWNER	PC	SUPPLIED WITH R.O. WATER.
18	ESPRESSO MACHINE	2	1/2"		21"			OWNER	PC	
19	ESPRESSO DROP-IN	4			21"		X	OWNER	PC	SUPPLIED WITH R.O. WATER.
27	DIPWELL	3		1/2"	12"		X	FSEC	PC	
28	HAND SINK	1	1/2"	1/2"	12"		X	FSEC	PC	MODULAR WASTE DRAIN VALVE WITH PULL HANDLE.
30	3-COMPARTMENT SINK	1	(2) 1/2"	(2) 1/2"	12"		X	FSEC	PC	INDIRECT DRAINS TO FS; PROVIDE MODULAR WASTE DRAIN VALVE WITH PULL HANDLE ON EACH SINK DRAIN.
33	LAVATORY (L-1)	1	1/2"	1/2"	14"	X		PC	PC	
34	WATER CLOSET (WC-1)	1	1/2"				X	PC	PC	
42	WATER HEATER (EWH-1)	1	3/4"	3/4"	76"		X	PC	PC	CONFIRM FINAL INSTALLATION MOUNTING HEIGHT AND LOCATION WITH OWNER AND OTHER TRADES DURING CONSTRUCTION.
44	R.O. SYSTEM	1	1/2" & 3/8"				X	OWNER	PC	
45	WATER SOFTNER	1	1/2"				X	OWNER	PC	

- NOTES:
- CONTRACTOR SHALL FURNISH ALL SHUT-OFF VALVES, PRESSURE REDUCING VALVES, PRESSURE/TEMPERATURE RELIEF VALVES, SYPHON BREAKERS, TAIL PIECES, "P" TRAPS, INDIRECT WASTES, CONTINUOUS WASTES, AND ANY OTHER FITTINGS NOT FURNISHED AS PART OF THE FOOD SERVICE EQUIPMENT SCOPE, BUT REQUIRED FOR PROPER INSTALLATION AND OPERATION OF EQUIPMENT OR BY APPLICABLE STATE AND LOCAL CODES.
 - REFER TO FOODSERVICE EQUIPMENT CONSULTANT DRAWINGS AND COORDINATE ALL CONNECTIONS, SIZES, LOCATIONS WITH APPROVED KITCHEN EQUIPMENT CUTSHEETS.
 - PROVIDE QUARTER TURN VALVE STOP AT EACH WATER TERMINATION AT WALL.

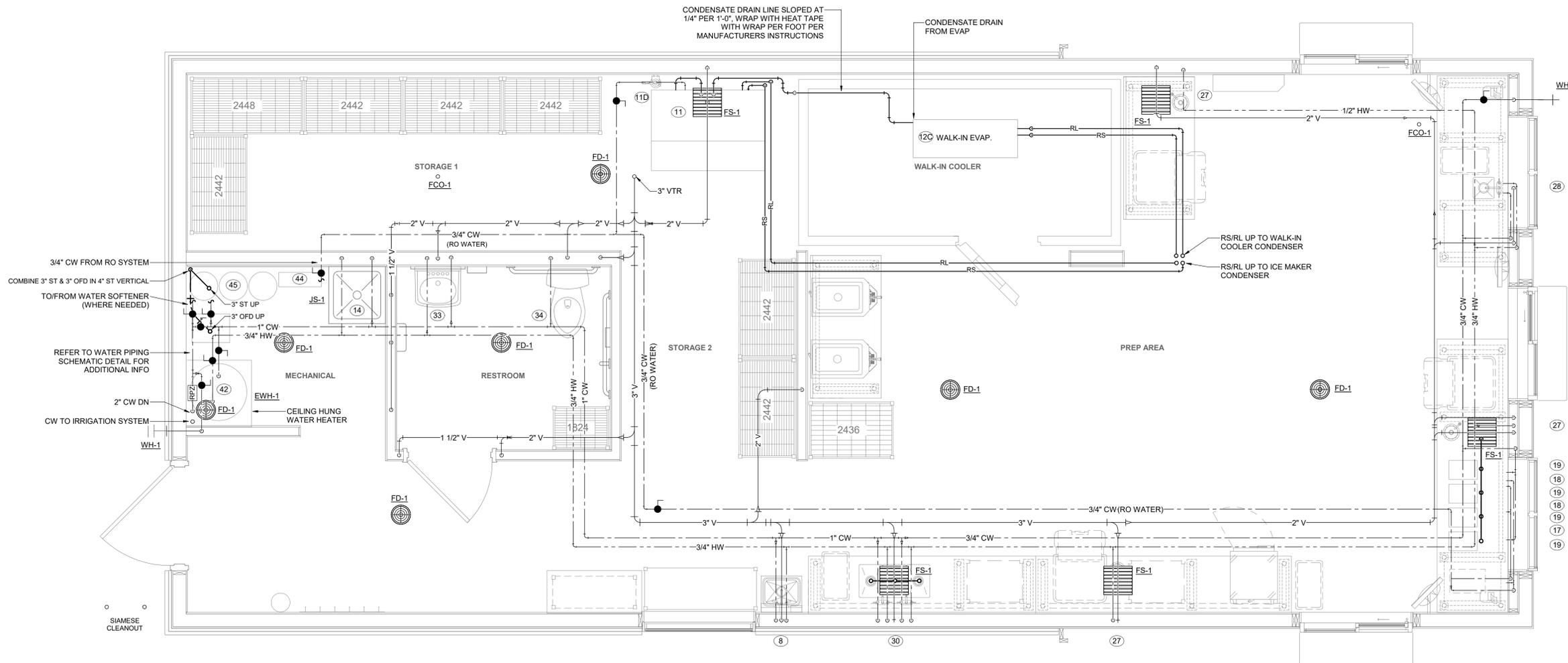
MECHANICAL & PLUMBING SYMBOLS LIST	
HVAC	
	SUPPLY DIFFUSER
	RETURN AIR GRILLE
	FLEX DUCT
	DUCT SIZE: HORIZONTAL WIDTH x VERTICAL HEIGHT (NET OUTSIDE SHEET METAL DIMENSION)
	VOLUME CONTROL DAMPER
	GRILLE/DIFFUSER TAG WITH TYPE NUMBER AND CFM
	S = SUPPLY, R = RETURN, E = EXHAUST
	THERMOSTAT
PLUMBING	
	DOMESTIC COLD WATER - CW
	DOMESTIC HOT WATER - HW
	DOMESTIC HOT WATER CIRCULATING - HWC
	SANITARY SEWER
	GREASE SANITARY SEWER
	VENT
	CONDENSATE DRAIN LINE
	REFRIGERANT LIQUID
	REFRIGERANT SUCTION
	FLOOR CLEANOUT

- GENERAL PLUMBING NOTES:
- CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL EQUIPMENT, PERMITS, LICENSES AND FEES NECESSARY TO INSTALL A COMPLETE WATER SUPPLY, WASTE, VENT, SYSTEM SUPPLY AND RETURN SYSTEM AS INDICATED AND NECESSARY TO OPERATE THE FOOD SERVICE EQUIPMENT.
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1 PLUMBING FLOOR PLAN
1/2" = 1'-0"

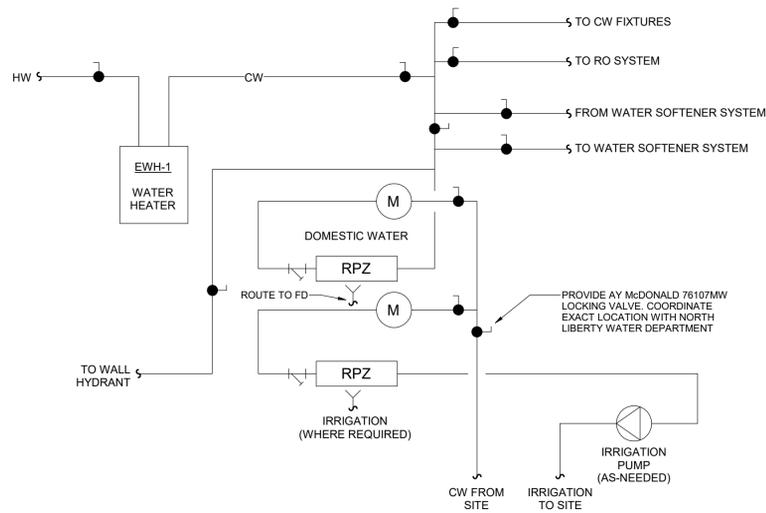
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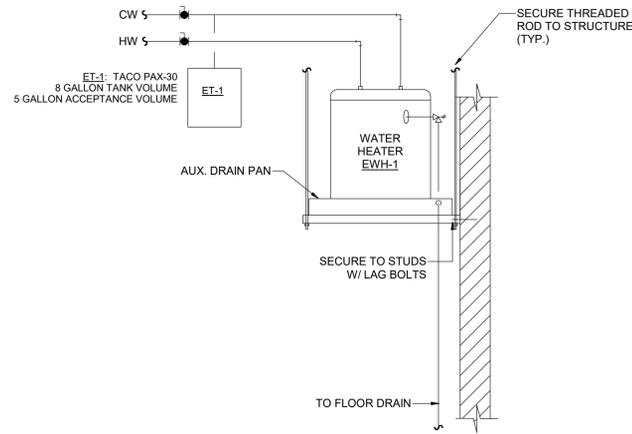
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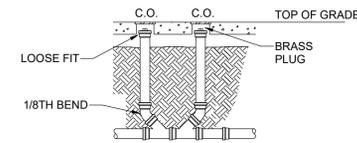
Project No. 595
Sheet Content:
PLUMBING FLOOR PLAN
Sheet No. P-1.1



1 WATER PIPING SCHEMATIC (FOR REFERENCE ONLY)
NO SCALE

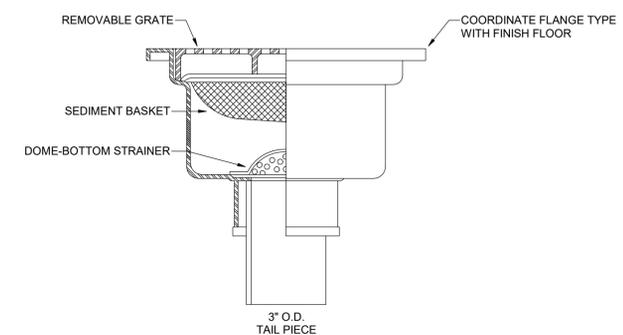


2 WATER HEATER DETAIL
NO SCALE

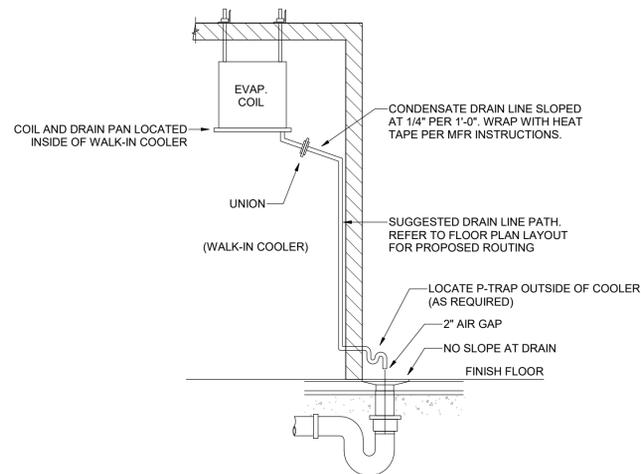


NOTES:
A. EXTERIOR CLEANOUTS SHOWN IN GRASSY AREAS SHALL HAVE 4" CONCRETE PAD AROUND CLEANOUTS.
B. SANITARY MAINS SHALL HAVE A MINIMUM 48" COVER.

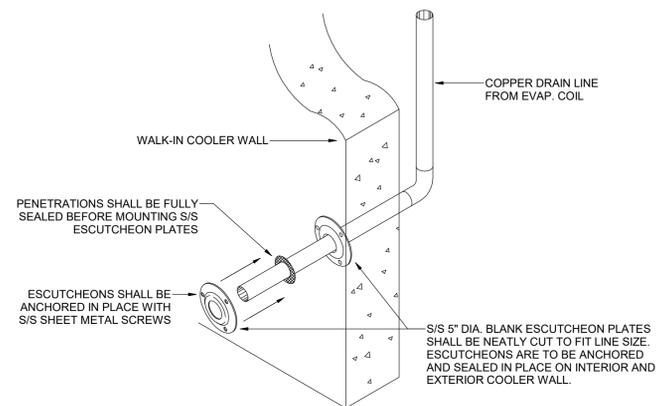
4 SIAMESE CLEANOUT DETAIL
NO SCALE



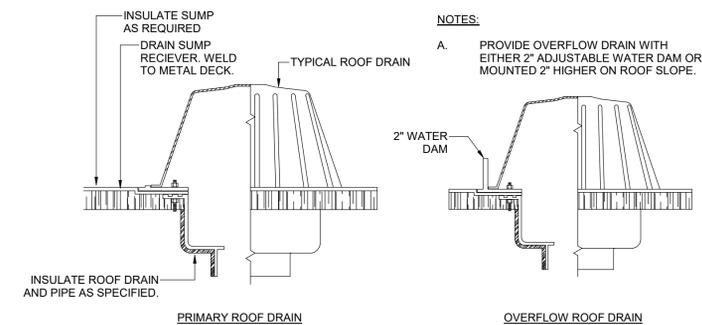
3 TYPICAL FLOOR SINK DETAIL
NO SCALE



5 TYPICAL WALK-IN COOLER EVAP. CONDENSATE DRAIN PIPING DETAIL
NO SCALE



6 WALK-IN COOLER WALL PENETRATION DETAIL
NO SCALE



7 ROOF DRAIN DETAIL
NO SCALE



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Project No.	595
Sheet Content:	PLUMBING DETAILS
Sheet No.	P-5.1

ELECTRIC WATER HEATER SCHEDULE						
TAG	MFR	MODEL	CAPACITY (GAL)	UPPER ELEMENT CAPACITY (W)	RECOVERY @ 90°F RISE GALLONS PER HOUR	VOLTS/PHASE/HZ
EW-1	STATE	ES6-20	20	2500	11	208/1/60 [240/1/60]

NOTES:
1. OTHER ACCEPTABLE MANUFACTURERS INCLUDE AO SMITH AND RHEEM.

PLUMBING FIXTURES SCHEDULE					
TAG	MFR	MODEL	DESCRIPTION	ACCESSORIES	NOTES
WC-1	KOHLER	HIGHLINE K-3979-0	FLOOR MOUNTED, COMFORT HEIGHT, 1.6 GPF SIPHON JET, ELONGATED FRONT RIM, LEFT-HAND POLISHED CHROME PLATED TRIP LEVER, 2-1/8" FULLY GLAZED TRAPWAY, ADA COMPLIANT, 12" ROUGH-IN.	ELONGATED OPEN FRONT SOLID PLASTIC SEAT, EXTENDED BACK, WHITE, STAINLESS STEEL MOUNTING BOLTS EQUAL TO CHURCH 295SSCT	
L-1	KOHLER	KINGSTON K-2005-0	21-1/4" X 18-1/8" WALL MOUNTED LAVATORY, THREE HOLE, 4" CENTERS, ADA HEIGHT, SINGLE HANDLE CENTERSET MANUAL SINGLE LEVER FACUET WITH 0.5 GPM LAMINAR FLOW VANDAL-RESISTANT AERATOR, METAL GRID STRAINER EQUAL TO DELTA 523LF-HGMHDF	WATTS WCA-411 FLOOR MOUNTED LAVATORY CARRIER, METAL GRID STRAINER WITH 1-1/2" 17 GA CHROME PLATED P-TRAP, OFFSET TAILPIECE AS REQUIRED, TRU-BRO LAV GUARD, 1/4 TURN LOOSE KEY STOPS	
JS-1	FIAT	MSB-2424	MOLDED STONE 24" X 24" X 10" DEEP FLOOR MOUNTED MOP SERVICE BASIN WITH 1" WIDE SHOULDERS.	MOP HANGER (889-CC), SST WALL GUARD (MSG2424), VINYL BUMPERGUARD (E-77-AA), AND HOSE/HOSE BRACKET (832-AA)	
FD-1	WATTS	FD-100	EPOXY COATED CAST IRON FLOOR DRAIN WITH ANCHOR FLANGE, REVERSIBLE CLAMPING COLLAR WITH PRIMARY AND SECONDARY WEEPHOLES AND ADJUSTABLE STRAINER. ASSEMBLY: ASME A112.6.3. STRAINER: SEVEN INCH (7") DIAMETER NICKEL BRONZE STRAINER.	PROVIDE WITH STRAINER EXTENSION TO ACCOMMODATE THICK FILLS AS REQUIRED.	CONTRACTOR SHALL SELECT OUTLET TYPE.
FS-1	WATTS	FS-740	SQUARE 12" X 12" X 8" DEEP SANITARY FLOOR SINK WITH WHITE PORCELAIN ENAMEL COATED INTERIOR, LOOSE SET PORCELAIN ENAMEL COATED CAST IRON GRATE AND ALUMINUM DOME BOTTOM STRAINER.	SEDIMENT BUCKET, FLANGE WITH WEEP HOLES. 1/2 GRATE WHERE REQUIRED.	CONTRACTOR SHALL SELECT OUTLET TYPE.
FCO-1	WATTS	CO-200-R	LACQUERED CAST IRON BODIES WITH INTEGRAL ANCHOR FLANGE, NEOPRENE "O" RING SECONDARY TEST SEAL AND ADJUSTABLE COMBINED ACCESS COVER AND PLUG WITH GASKET SEAL. NICKEL-BRONZE SCORIATED COVER IN SERVICE AREA AND ROUND WITH DEPRESSED COVER TO ACCEPT FLOOR FINISH IN FINISHED FLOOR AREAS.		CLEANOUT SIZE SHALL BE EQUAL TO PIPE SIZE UP TO 4 INCHES.
WH-1	WOODFORD	B67	ASSE 1019 NON-FREEZE, SELF DRAINING TYPE WITH CHROME PLATED LOCKABLE RECESSED BOX HOSE THREAD SPOUT, LOCKSHIELD AND REMOVABLE KEY WITH INTEGRAL DOUBLE CHECK BACKFLOW PREVENTER, EXTERIOR CHROME FINISH.		3/4" INLET AND OUTLET.
RD-1	WATTS	RD-100	EPOXY COATED CAST IRON ROOF DRAIN WITH FLASHING CLAMP WITH INTEGRAL GRAVEL STOP, SELF-LOCKING ALUMINUM DOME, NO HUB OUTLET.	ROVIDE WITH SUMP RECEIVER, UNDER DECK CLAMP AND ADJUSTABLE EXTENSION FLANGE.	CONTRACTOR SHALL SELECT OUTLET TYPE.
RD-2	WATTS	RD-100	EPOXY COATED CAST IRON ROOF DRAIN WITH FLASHING CLAMP WITH INTEGRAL GRAVEL STOP, SELF-LOCKING ALUMINUM DOME, NO HUB OUTLET.	PROVIDE WITH SUMP RECEIVER, UNDER DECK CLAMP AND ADJUSTABLE EXTENSION FLANGE. PROVIDE 2" EXTERNAL WATER DAM OR INSTALL 2" ABOVE PRIMARY DRAIN.	CONTRACTOR SHALL SELECT OUTLET TYPE.
ET-1	TACO	PAX-30	8 GALLON TANK VOLUME, 5 GALLON ACCEPTANCE VOLUME RATED FOR POTABLE WATER.		

PLUMBING CONNECTION KITCHEN SCHEDULE										
NO.	DESCRIPTION	QTY	COLD WATER	HOT WATER	AFF	DIRECT	INDIRECT	FURNISHED BY	INSTALLED BY	NOTES
8	HAND SINK	1	1/2"	1/2"	12"	X		FSEC	PC	
11A	ICE MACHINE	1	1/2"		84"		X	FSEC	PC	FILTERED WATER WITH REDUCED PRESSURE BACKFLOW ASSEMBLY.
11B	ICE MACHINE CONDENSER	1						FSEC	PC	MFR SHALL SIZE REFRIGERANT PIPING BETWEEN ICE MACHINE AND REMOTE CONDENSER.
11C	ICE BIN	1					X	FSEC	PC	
11D	WATER FILTER	1	3/4"		84"			FSEC	PC	INTERCONNECT TO ICE MAKER.
12C	WALK-IN COOLER EVAP. COIL	1	1/2"		12"		X	FSEC	PC	
12D	WALK-IN COOLER CONDENSER	1	1/2"		12"			FSEC	PC	
14	MOP SINK (JS-1)	1	1/2"	1/2"	36"	X		PC	PC	
17	ESPRESSO STEAMER	1	1/2"		21"			OWNER	PC	SUPPLIED WITH R.O. WATER.
18	ESPRESSO MACHINE	2	1/2"		21"			OWNER	PC	
19	ESPRESSO DROP-IN	4			21"		X	OWNER	PC	SUPPLIED WITH R.O. WATER.
27	DIPWELL	3		1/2"	12"		X	FSEC	PC	
28	HAND SINK	1	1/2"	1/2"	12"		X	FSEC	PC	MODULAR WASTE DRAIN VALVE WITH PULL HANDLE.
30	3-COMPARTMENT SINK	1	(2) 1/2"	(2) 1/2"	12"		X	FSEC	PC	INDIRECT DRAINS TO FS; PROVIDE MODULAR WASTE DRAIN VALVE WITH PULL HANDLE ON EACH SINK DRAIN.
33	LAVATORY (L-1)	1	1/2"	1/2"	14"	X		PC	PC	
34	WATER CLOSET (WC-1)	1	1/2"			X		PC	PC	
42	WATER HEATER (EW-1)	1	3/4"	3/4"	76"		X	PC	PC	CONFIRM FINAL INSTALLATION MOUNTING HEIGHT AND LOCATION WITH OWNER AND OTHER TRADES DURING CONTRUCTION.
44	R.O. SYSTEM	1	1/2" & 3/8"				X	OWNER	PC	
45	WATER SOFTNER	1	1/2"				X	OWNER	PC	

NOTES:
1. CONTRACTOR SHALL FURNISH ALL SHUT-OFF VALVES, PRESSURE REDUCING VALVES, PRESSURE/TEMPERATURE RELIEF VALVES, SYPHON BREAKERS, TAIL PIECES, "P" TRAPS, INDIRECT WASTES, CONTINUOUS WASTES, AND ANY OTHER FITTINGS NOT FURNISHED AS PART OF THE FOOD SERVICE EQUIPMENT SCOPE, BUT REQUIRED FOR PROPER INSTALLATION AND OPERATION OF EQUIPMENT OR BY APPLICABLE STATE AND LOCAL CODES.
2. REFER TO FOODSERVICE EQUIPMENT CONSULTANT DRAWINGS AND COORDINATE ALL CONNECTIONS, SIZES, LOCATIONS WITH APPROVED KITCHEN EQUIPMENT CUTSHEETS.
3. PROVIDE QUARTER TURN VALVE STOP AT EACH WATER TERMINATION AT WALL.



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