

HIGH SPRINGS FIRE STATION HVAC UPGRADES

FOR

CITY OF HIGH SPRINGS

LOCATION

18586 NW 238TH ST HIGH SPRINGS, FL 32643

DRAWING SHEET INDEX

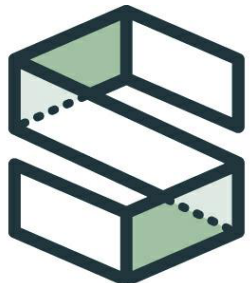
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APPLICABLE CODES

THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THE FOLLOWING
CODES AND STANDARDS:

2023 FLORIDA BUILDING CODE AND ITS SUPPLEMENTAL REFERENCES

NFPA 70 - NATIONAL ELECTRICAL CODE, 2020



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24062

ADDENDUM #1

ISSUE DATE: 02/21/2025

DESIGN: HTK
QC: KMS

REVISIONS		
NO.	REFERENCE	DATE

COVER PAGE

G001

MECHANICAL LEGEND

	EXISTING DUCTWORK/EQUIPMENT TO REMAIN
	EXISTING DUCTWORK/EQUIPMENT TO BE REMOVED
	NEW RETURN DUCTWORK (WITH 2" EXTERNAL INSULATION)
	NEW SUPPLY DUCTWORK (WITH 2" EXTERNAL INSULATION)
	NEW EXHAUST DUCTWORK
2408 CD 	NEW SUPPLY CEILING DIFFUSER: '24' = FACE SIZE, '08" = NECK DIAMETER 4-WAY THROW OR AS SHOWN ON PLANS
2408 RG 	NEW CEILING RETURN GRILLE (RG) OR NEW EXHAUST GRILLE (EG): '24' = FACE SIZE, '08" = NECK DIAMETER PROVIDE ADAPTER/ BLANK OFF PLATE FOR 12"x12" FACE GRILLES
	ROUND DUCT SYMBOL
	WALL-MOUNTED THERMOSTAT (UNIT NUMBER INDICATED)
	SPIN-IN WITH DAMPER
	VOLUME-BALANCING DAMPER
MD 	MOTORIZED DAMPER

AIR DISTRIBUTION NOTES

- DUCT SIZES ARE CLEAR INSIDE SHEET METAL SIZES. DUCT SIZES AND LOCATIONS ARE APPROXIMATE. AFTER THE START OF CONSTRUCTION, THE CONTRACTOR SHALL FIELD-VERIFY ROUTING WITH FIELD CONDITIONS AND OTHER TRADES. ADDITIONALLY, THE CONTRACTOR SHALL RELOCATE AND RESIZE DUCT AS REQUIRED TO FIT BELOW THE TRUSSES, MAINTAINING THE SAME DUCT FREE AREA.
- VERIFY COLLAR SIZES ON ALL AIR TERMINALS, EQUIPMENT INLETS AND OUTLETS. TRANSITION DUCTWORK AS NECESSARY. EXTERNALLY INSULATE TRANSITIONS AT EQUIPMENT CONNECTIONS.
- PROVIDE DUCT FLEX CONNECTIONS FOR AIR HANDLING UNITS. EXTERNALLY INSULATE FLEXIBLE CONNECTIONS.
- PROVIDE CLEAN FILTERS PRIOR TO TEST AND BALANCE WORK. PROVIDE NEW FILTERS AS REQUIRED PRIOR TO FINAL ACCEPTANCE BY OWNER. PROVIDE OWNER WITH ONE COMPLETE SET FILTERS FOR EACH A/C UNIT INSTALLED, FOR OWNERS USE AT SUBSTANTIAL COMPLETION.
- PROVIDE 2" EXTERNAL INSULATION (MINIMUM R-6) FOR ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK. EXHAUST DUCTWORK SHALL BE UNINSULATED.
- ALL DUCT ELBOWS AND TEE FITTINGS SHALL INCLUDE TURNING VANES.

MECHANICAL GENERAL NOTES

- IT IS THE RESPONSIBILITY OF MECHANICAL CONTRACTOR TO COORDINATE WITH ALL TRADES' WORK INDICATED IN ENTIRE CONSTRUCTION DOCUMENTS. DETAILS ON ALL SHEETS REFLECT CROSS DISCIPLINE ITEMS REQUIRING PRICING AND COORDINATION.
- CONTRACTOR SHALL PROVIDE PHENOLIC LABELS ON ALL NEW HVAC UNITS, TERMINAL UNITS, MAIN CONTROL DAMPERS AND THERMOSTATS INDICATING NAME, FUNCTION, ETC. CONTRACTOR SHALL PROVIDE STENCILE OR LAMINATED LABELS ON ALL NEW PIPING/DUCTWORK INDICATING SERVICE.

EQUIPMENT NOTES

- PROVIDE FULL-SIZE PVC CONDENSATE DRAINS FROM ALL UNITS TO DISPOSAL POINT INDICATED ON THE DRAWINGS.
- PROVIDE A "P" TRAP ON ALL CONDENSATE DRAIN OUTLETS. SLOPE ALL CONDENSATE DRAIN PIPING 1/4" INCH PER FOOT. CONDENSATE DRAINS SHALL BE ROUTED OUTSIDE SERVICE CLEARANCE AREAS OF UNITS. PROVIDE CLEANOUT PLUG AT TRAP PER DETAIL THIS SHEET.
- CONTRACTOR SHALL INSTALL ALL EQUIPMENT, PIPING AND DUCTWORK SUCH THAT MANUFACTURER'S RECOMMENDED CLEARANCES ARE MET FOR ALL ACCESS PANELS, MOTORS, FANS, BELTS, FILTERS, AIR INTAKES, ETC.
- PROVIDE ACCESS PANELS IN ALL NON-ACCESSIBLE CONSTRUCTIONS (INCLUDING CEILING, WALLS, ETC) SIZED AND LOCATED AS REQUIRED TO PROVIDE PROPER SERVICE ACCESS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION FOR ALL HVAC EQUIPMENT INCLUDING DAMPERS AND VALVES.

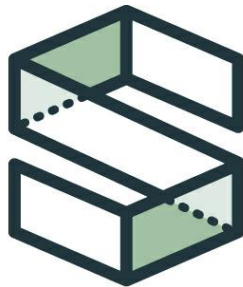
ABBREVIATIONS:

A	AMPS; AREA	LAT	LEAVING AIR TEMPERATURE
AAV	AUTOMATIC AIR VENT	LBS	POUNDS
ABV	ABOVE	LVG	LEAVING
ACU	AIR CONDITIONING UNIT	MA	MIXED AIR
AFF	ABOVE FINISHED FLOOR	MAX	MAXIMUM
AHUAIR	HANDLING UNIT	MBH	THOUSANDS OF BTUS
AP	ACCESS PANEL	MCA	MIN CIRCUIT AMPACITY
BD	BALANCING DAMPER	MD	MOTORIZED DAMPER
BTU	BRITISH THERMAL UNITS	MIN	MINUTE; MINIMUM
BTUH	BTU PER HOUR	MOCP	MAXIMUM OVER-CURRENT PROTECTION
C	CONDENSATE	NIC	NOT IN CONTRACT
CD	CEILING DIFFUSER	NC	NORMALLY CLOSED
CFH	CUBIC FEET PER HOUR	NO	NORMALLY OPENED
CFM	CUBIC FEET PER MINUTE	NTS	NOT TO SCALE
CFT	CUBIC FEET (FT³)	OA	OUTDOOR AIR
CH	(AIR-COOLED) CHILLER	OAL	OUTDOOR AIR LOUVER
CLG	FINISHED CEILING	OC	ON CENTER
CU	CONDENSER UNIT	OD	OUTSIDE DIAMETER
DB	DRY BULB	PH	PHASE
DEFL	DEFLECTION	PSI	POUNDS PER SQUARE INCH
DG	DOOR GRILLE	PSIA	PSI ABSOLUTE
DIA	DIAMETER	R	RADIUS
EA	EACH	RA	RETURN AIR
EAT	ENTERING AIR TEMPERATURE	RG	RETURN GRILLE
EER	ENERGY EFFICIENCY RATIO	RH	RELATIVE HUMIDITY
EF	EXHAUST FAN	RPM	REVOLUTIONS PER MINUTE
EG	EXHAUST GRILLE	RTU	ROOFTOP UNIT
ENT	ENTERING	SA	SUPPLY AIR
ESP	EXTERNAL STATIC PRESSURE	SEER	SEASONAL ENERGY EFFICIENCY RATIO
EXH	EXHAUST	SP	STATIC PRESSURE
EXIST.	EXISTING	SQ.FT.	SQUARE FEET (FT²)
F	DEGREE FAHRENHEIT	STL	STEEL
FCU	FAN COIL UNIT	TEMP	TEMPERATURE
FD	FLOOR DRAIN	TF	THERMA FUSER
FFM	FEET PER MINUTE	TG	TRANSFER GRILLE
FT	FEET	TSP	TOTAL STATIC PRESSURE
GPM	U.S. GALLONS PER MINUTE	TYP	TYPICAL
H ₂ O	WATER	V	VOLTS
HD	HEAD	VAR.	VARIABLE
HP	HORSEPOWER; HEAT PUMP	VAV	VAR. AIR VOLUME
HR	HOUR	VFD	VAR. FREQUENCY DRIVE
ID	INSIDE DIAMETER	VRF	VAR. REFRIGERANT FLOW
IN.	INCHES	WB	WET BULB
IN. WG	INCHES OF WATER GAUGE	WSHP	WATER-SOURCE HEAT PUMP
KW	KILOWATTS		
KWH	KILOWATT HOUR		

PACKAGED ROOFTOP UNIT SCHEDULE	
OUTDOOR UNIT TAG	RTU-1
NOMINAL TONNAGE	5
EER / SEER	12.3 / 14.7
MANUFACTURER	AAON
MODEL NUMBER	RQA-005
EVAPORATOR SECTION	
SUPPLY AIR FLOW (CFM)	1,500
OUTSIDE AIR (CFM) (CFM)	550
EXTERNAL STATIC PRESSURE (IN.WC)	1.0
ELECTRIC CHAR. (V-PH)	240-1
FAN MOTOR (HP)	2
MCA	46
MOCP	70
WEIGHT (LBS)	989
CONDENSING UNIT SECTION	
NUMBER OF COMPRESSORS & TYPE	1 / 2-STEP SCROLL
RUNNING LOAD AMPS EACH (A)	25.2
COOLING PERFORMANCE	
DESIGN SUMMER OA TEMP DB/WB (°F)	95.0 / 80.0
DESIGN SUMMER INDOOR TEMP DB(°F)/%RH	75.0 / 50%
ENTERING AIR TEMP DB/WB (°F)	82.2 / 69.6
MAXIMUM LEAVING AIR TEMP (COIL) DB/WB(°F)	55.0 / 55.0
TOTAL COOLING CAPACITY (BTU/H)	61,300
SENSIBLE COOLING CAPACITY (BTU/H)	41,700
HOT GAS REHEAT COIL CAPACITY (BTU/H)	37,200
REHEAT DISCHARGE TEMPERATURE DB/WB(°F)	75.0 / 62.1
HEAT PERFORMANCE (LP)	
DESIGN ENTERING AIR TEMP (°F)	57.6
LEAVING AIR TEMP (°F)	84.3
HEATING CAPACITY (BTU/H)	26,700
HEATER TYPE	LP FURNACE

NOTES:

- PACKAGED ROOFTOP UNIT WITH HOT GAS REHEAT AND PROPANE FURNACE.
- PROVIDED SLOPED STAINLESS-STEEL DRAIN PAN IN UNIT. PROVIDE TRAPPED CONDENSATE TO DISCHARGE TO EXISTING ROOF DRAIN/GUTTER.
- PROVIDE SEPARATE 120V-1PH POWER CONNECTION FOR GFI RECEPTACLE (BY DIVISION 26).
- LP FURNACE HEATER SHALL HAVE MINIMUM TURNDOWN RATIO OF 4:1.
- PROVIDE MODULATING HOT GAS REHEAT FOR LEAVING AIR TEMPERATURE CONTROL TO +/- 2°F
- PROVIDE SALT SPRAY COIL COATING ON ALL COILS.
- PROVIDE 2" PLEATED MERV-11 FILTERS. PROVIDE 2 SETS OF SPARE FILTERS WITH UNIT.
- UNIT MUST MEET THE AHRI 920 STANDARD FOR MOISTURE REMOVAL CAPACITY AND EFFICIENCY.
- PROVIDE UNIT WITH ROOF CURB.
- PROVIDE SINGLE POINT POWER FOR UNIT. PROVIDE MANUFACTURER'S ELECTRICAL DISCONNECT WITH UNIT.
- PROVIDE MANUFACTURER'S UNIT WITH EACH UNIT. FAN SHALL RUN CONTINUOUSLY AT SPECIFIED FLOW TO PROVIDE CONSTANT COOLING COIL LEAVING AIR TEMPERATURE OF 55°F (ADJUSTABLE). REHEAT SHALL BE MODULATED TO MAINTAIN SPECIFIED SPACE CONDITIONS. PROVIDE OPEN/CLOSED OA MOTORIZED DAMPER TO CLOSE WHEN UNIT IS OFF.



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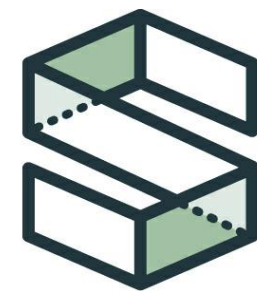
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MECHANICAL LEGEND,
ABBREVIATIONS, NOTES, &
SCHEDULES

M001



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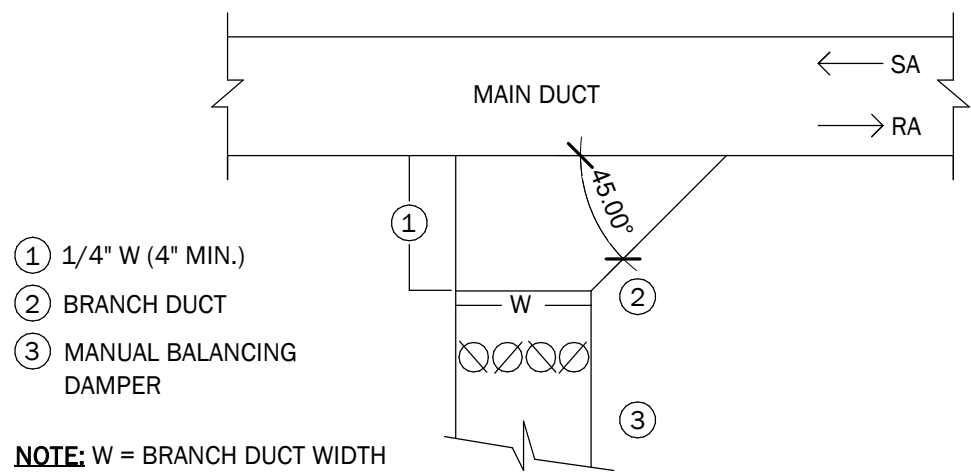
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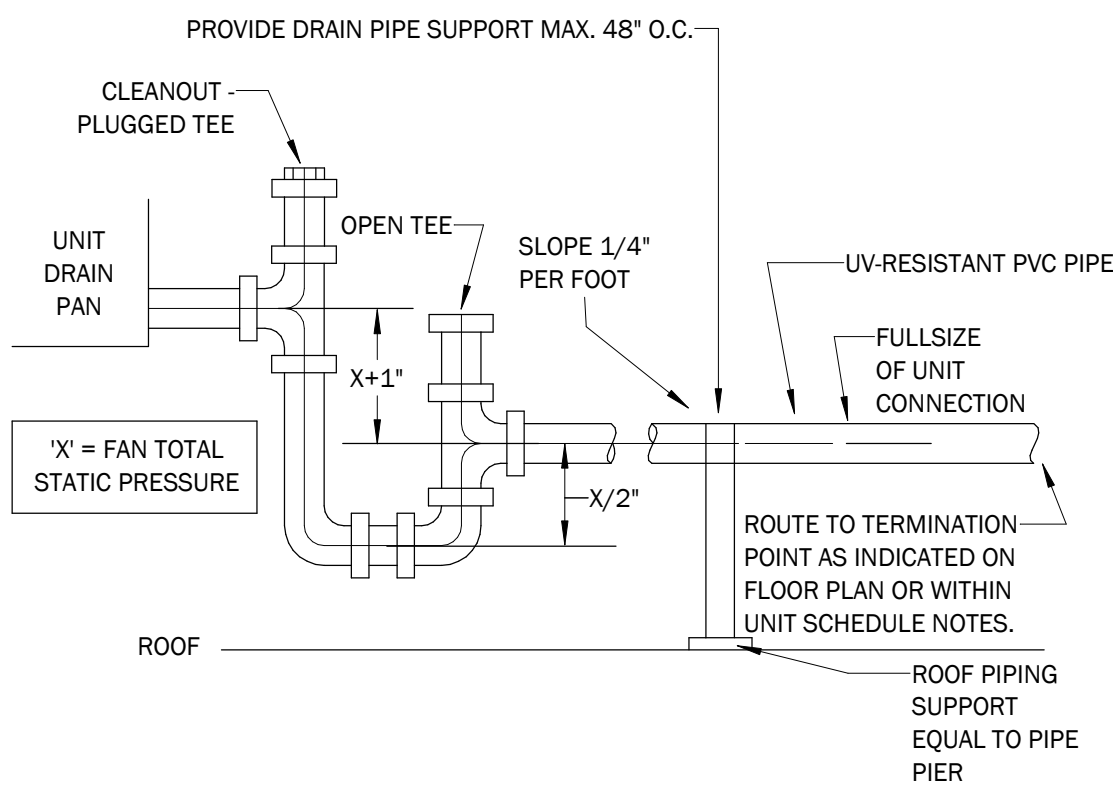
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MECHANICAL DETAILS

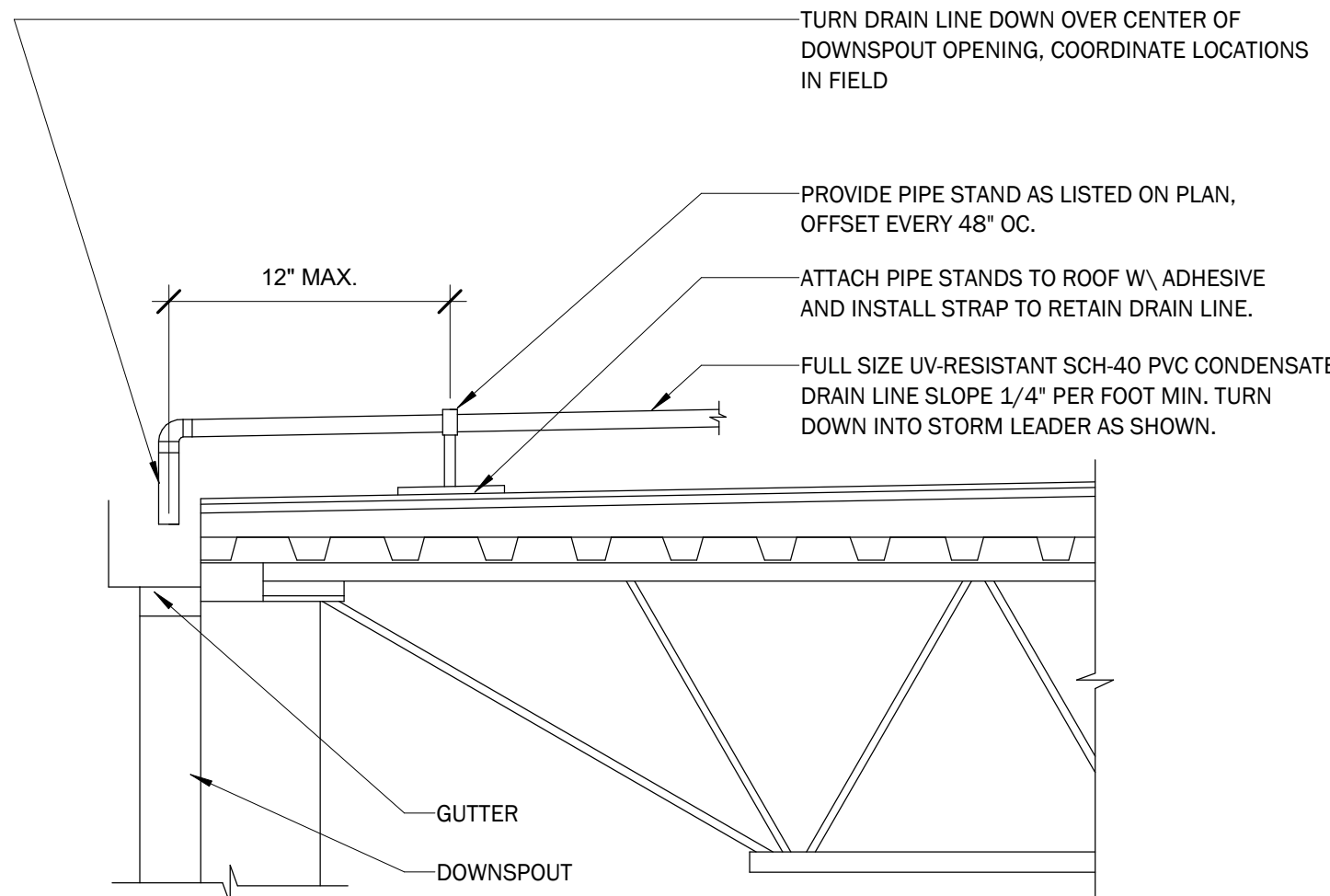
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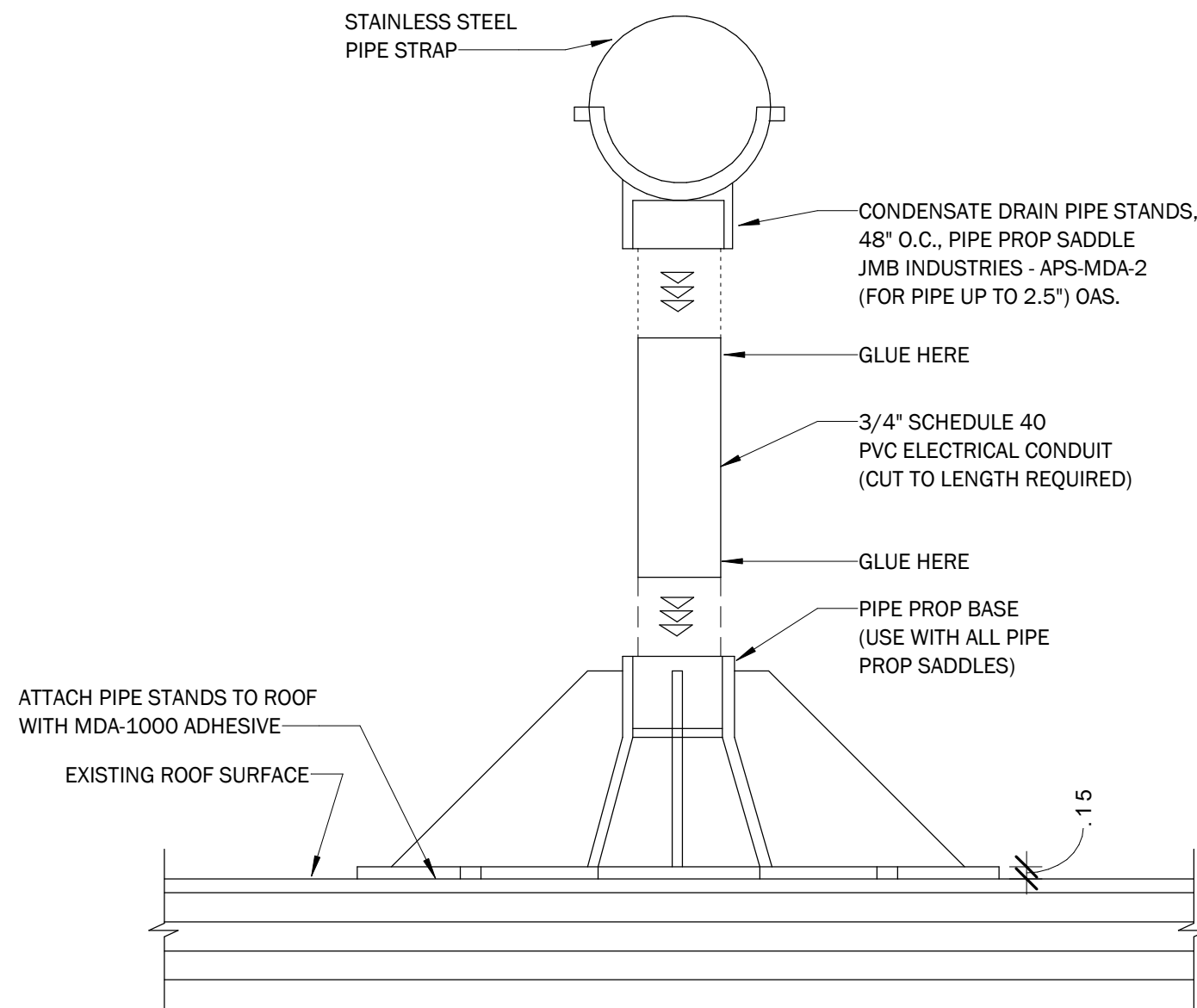
1 BRANCH DUCT TAKEOFF DETAIL
NOT TO SCALE



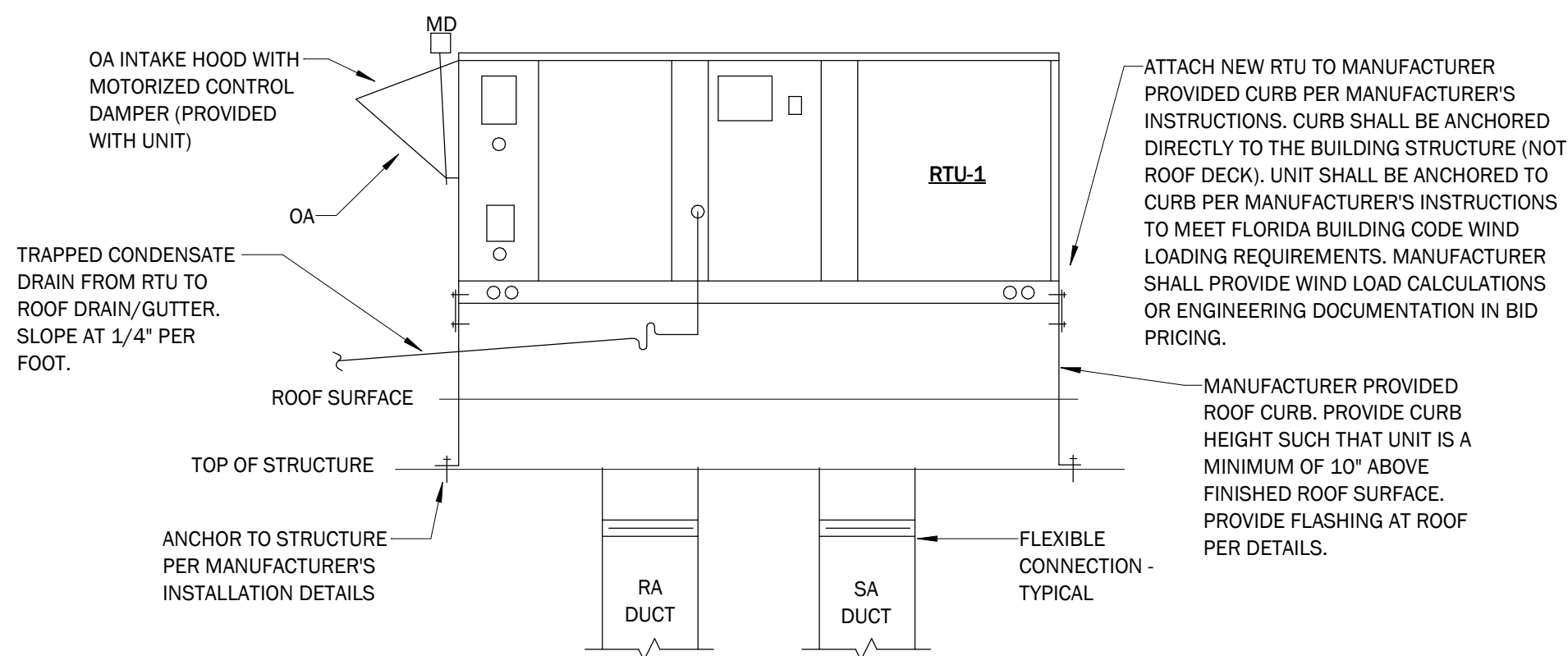
2 CONDENSATE DRAIN DETAIL
NOT TO SCALE



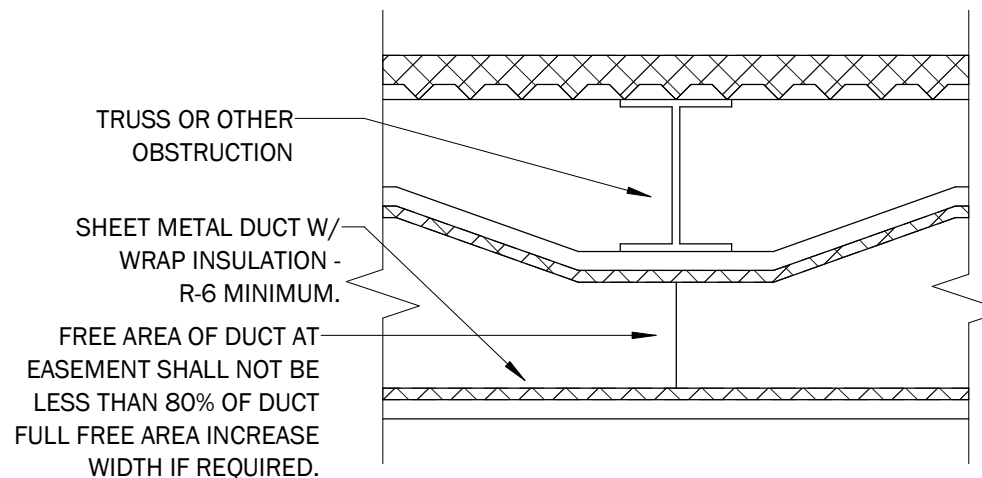
3 CONDENSATE DRAIN INTO ROOF GUTTER DETAIL
NOT TO SCALE



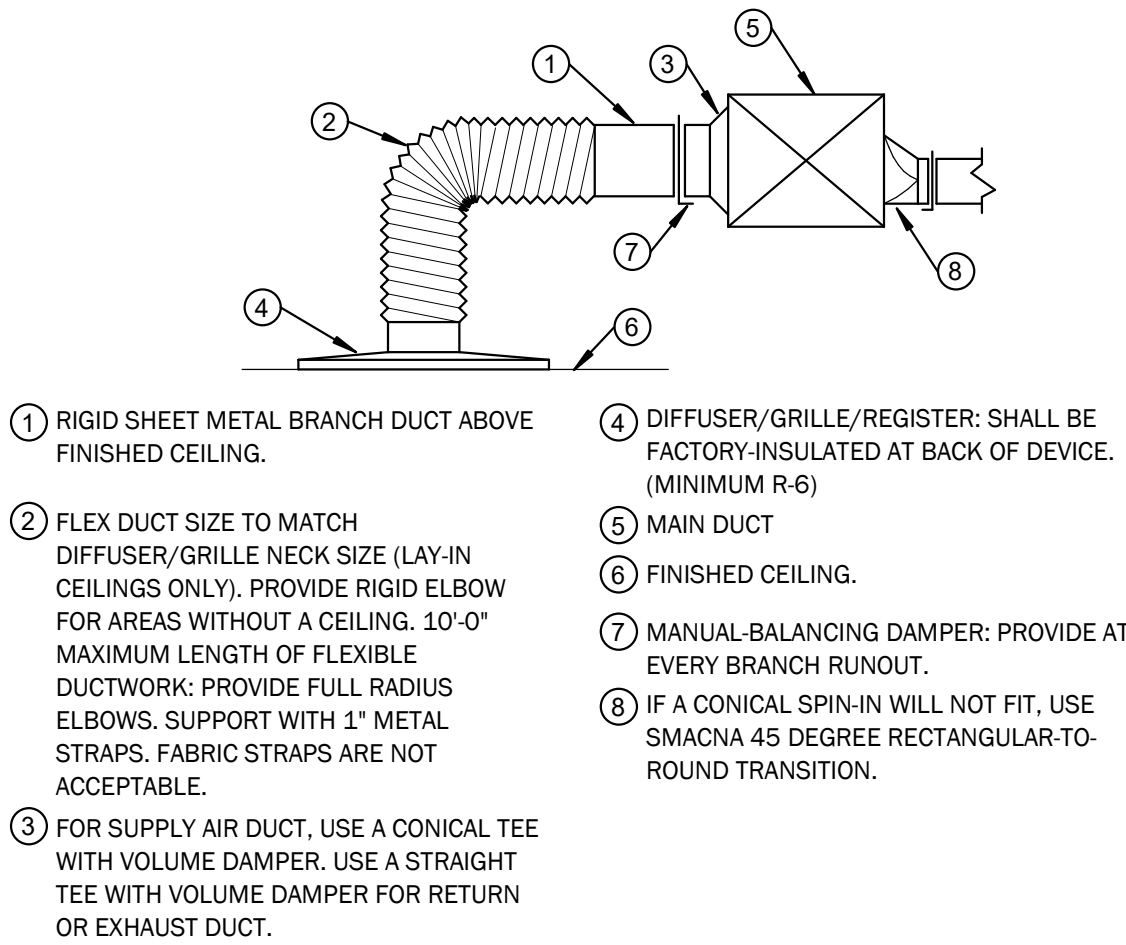
4 CONDENSATE DRAIN PIPE ROOF SUPPORT DETAIL
NOT TO SCALE



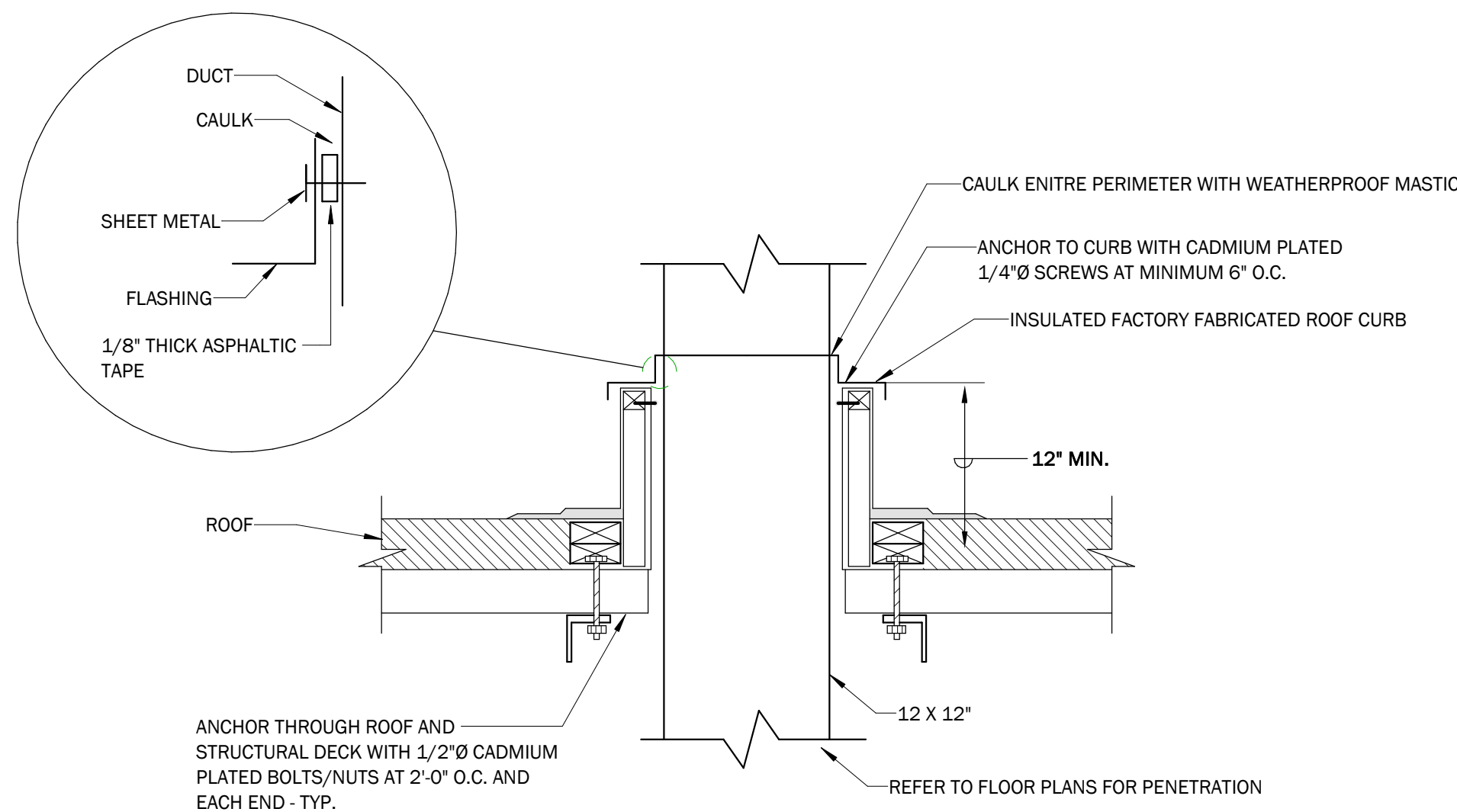
5 ROOF TOP AC UNIT DETAIL
NOT TO SCALE



6 DUCT EASEMENT DETAIL
NOT TO SCALE



7 DUCT RUNOUT TO DIFFUSER/GRILLE DETAIL
NOT TO SCALE



8 ROOF CURB OR PENETRATION DETAIL
NOT TO SCALE

230005 / MECHANICAL GENERAL

GENERAL:

THE WORK COVERED BY THIS DIVISION CONSISTS OF PROVIDING ALL LABOR, EQUIPMENT AND MATERIALS AND PERFORMING ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF THE MECHANICAL WORK AS HEREIN CALLED FOR AND SHOWN ON THE DRAWINGS.

REVIEW ALL OTHER CONTRACT DOCUMENTS TO BE AWARE OF CONDITIONS AFFECTING WORK HEREIN.

COORDINATE WORK IN THIS DIVISION WITH ALL OTHER TRADES IN PROPER SEQUENCE TO ENSURE THAT THE TOTAL WORK IS COMPLETED WITHIN CONTRACT TIME SCHEDULE AND WITH A MINIMUM CUTTING AND PATCHING.

INSTALL WORK AS REQUIRED TO FIT STRUCTURE, AVOID OBSTRUCTIONS, AND RETAIN CLEARANCE, HEADROOM, OPENINGS AND PASSAGEWAYS. **CUT NO STRUCTURAL MEMBERS WITHOUT WRITTEN APPROVAL.** PROVIDE SLEEVES AT ALL CONCRETE PENETRATIONS.

CAREFULLY EXAMINE ANY EXISTING CONDITIONS, PIPING, AND PREMISES. COMPARE DRAWINGS WITH EXISTING CONDITIONS. REPORT ANY OBSERVED DISCREPANCIES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROPERLY COORDINATE THE WORK AND TO IDENTIFY PROBLEMS IN A TIMELY MANNER. WRITTEN INSTRUCTIONS WILL BE ISSUED TO RESOLVE DISCREPANCIES.

APPROVAL SUBMITTALS:

SUBMITTALS SHALL NOT INCLUDE ITEMS FROM MORE THAN ONE SPECIFICATION SECTION IN THE SAME SUBMITTAL PACKAGE.

SUBMITTALS SHALL BE PROPERLY IDENTIFIED BY A COVER SHEET SHOWING THE PROJECT NAME, ARCHITECT AND ENGINEER NAMES, SUBMITTAL CONTROL NUMBER, SPECIFICATION SECTION, A LIST OF PRODUCTS OR ITEM NAMES WITH MODEL NUMBERS IN THE ORDER THEY APPEAR IN THE PACKAGE, AND SPACES FOR APPROVAL STAMPS. A SAMPLE COVER SHEET IS INCLUDED AT THE END OF THIS SECTION.

SUBMITTALS SHALL HAVE BEEN REVIEWED AND APPROVED BY THE GENERAL CONTRACTOR (OR PRIME CONTRACTOR). EVIDENCE OF THIS REVIEW AND APPROVAL SHALL BE AN 'APPROVED' STAMP WITH A SIGNATURE AND DATE.

INTERRUPTION OF SERVICE:

BEFORE ANY EQUIPMENT IS SHUT DOWN FOR DISCONNECTING OR TIE-INS, ARRANGEMENTS SHALL BE MADE WITH THE ARCHITECT/ENGINEER AND THIS WORK SHALL BE DONE AT THE TIME BEST SUITED TO THE OWNER. THIS WILL TYPICALLY BE ON WEEKENDS AND/OR HOLIDAYS AND/OR AFTER NORMAL WORKING HOURS. SERVICES SHALL BE RESTORED THE SAME DAY UNLESS PRIOR ARRANGEMENTS ARE MADE. ALL OVERTIME OR PREMIUM COSTS ASSOCIATED WITH THIS WORK SHALL BE INCLUDED IN THE BASE BID.

PAINTING:

TOUCH-UP FACTORY FINISHES ON EQUIPMENT LOCATED INSIDE AND OUTSIDE SHALL BE DONE UNDER DIVISION 23. OBTAIN MATCHED COLOR COATINGS FROM THE MANUFACTURER AND APPLY AS DIRECTED. IF CORROSION IS FOUND DURING INSPECTION ON THE SURFACE OF ANY EQUIPMENT, CLEAN, PRIME, AND PAINT, AS REQUIRED.

CLEAN-UP:

THOROUGHLY CLEAN ALL EXPOSED PARTS OF APPARATUS AND EQUIPMENT OF CEMENT, PLASTER, AND OTHER MATERIALS AND REMOVE ALL OIL AND GREASE SPOTS. REPAINT OR TOUCH UP AS REQUIRED TO LOOK LIKE NEW. DURING PROGRESS OF WORK, CONTRACTOR IS TO CAREFULLY CLEAN UP AND LEAVE PREMISES AND ALL PORTIONS OF BUILDING FREE FROM DEBRIS AND IN A CLEAN AND SAFE CONDITION.

START-UP AND OPERATIONAL TEST:

START EACH ITEM OF EQUIPMENT IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS; OR WHERE NOTED UNDER EQUIPMENT SPECIFICATION, START-UP SHALL BE DONE BY A QUALIFIED REPRESENTATIVE OF THE MANUFACTURER. ALIGNMENT, LUBRICATION, SAFETY, AND OPERATING CONTROL SHALL BE INCLUDED IN START-UP CHECK.

TEST AND BALANCE REPORT:

THE REPORT SHALL BE SUBMITTED FOR REVIEW PRIOR TO THE SUBSTANTIAL COMPLETION. TESTING AND BALANCING SHALL BE PROVIDED BY NEBB CERTIFIED CONTRACTOR.

230160 / MECHANICAL IDENTIFICATION

PAINTED IDENTIFICATION MATERIALS:

STENCILS:
STANDARD FIBERBOARD STENCILS, PREPARED FOR REQUIRED APPLICATIONS WITH LETTER SIZES GENERALLY COMPLYING WITH RECOMMENDATIONS OF ANSI A13.1 FOR PIPING AND SIMILAR APPLICATIONS, BUT NOT LESS THAN 1" HIGH LETTERS FOR DUCTWORK AND NOT LESS THAN 1" HIGH LETTERS FOR ACCESS DOOR SIGNS AND SIMILAR OPERATIONAL INSTRUCTIONS.

ENGRAVED PLASTIC-LAMINATE SIGNS:

GENERAL:
PROVIDE ENGRAVING STOCK MELAMINE PLASTIC LAMINATE, IN THE SIZES AND THICKNESSES INDICATED, ENGRAVED WITH ENGRAVER'S STANDARD LETTER STYLE OF THE SIZES AND WORDING INDICATED, PUNCHED FOR MECHANICAL FASTENING EXCEPT WHERE ADHESIVE MOUNTING IS NECESSARY BECAUSE OF SUBSTRATE.

THICKNESS:
1/16" FOR UNITS UP TO 20 SQ. IN. OR 8" LENGTH; * FOR LARGER UNITS.

FASTENERS:
SELF-TAPPING STAINLESS-STEEL SCREWS, EXCEPT CONTACT-TYPE PERMANENT ADHESIVE WHERE SCREWS CANNOT OR SHOULD NOT PENETRATE THE SUBSTRATE.

STAMPED NAMEPLATES:

PROVIDE EQUIPMENT MANUFACTURER'S STANDARD STAMPED NAMEPLATES FOR MOTORS, AHUS, PUMPS, ETC.

ACCESS DOORS:

PROVIDE STENCILED SIGNS ON EACH ACCESS DOOR IN DUCTWORK AND HOUSINGS, INDICATING PURPOSE OF ACCESS (TO WHAT EQUIPMENT) AND OTHER MAINTENANCE AND OPERATING INSTRUCTIONS, AND APPROPRIATE AND PROCEDURAL INFORMATION.

230230 / EXTERIOR INSULATION FOR DUCTWORK

ACCEPTABLE MANUFACTURERS:

SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE INSULATION PRODUCTS BY KNAUF, OWENS-CORNING, SCHULLER, CERTAINTED.

FLAME/SMOKE RATINGS:

PROVIDE COMPOSITE MECHANICAL INSULATION (INSULATION, COVERINGS, SEALERS, MASTIC, AND ADHESIVE) WITH A FLAME SPREAD RATING OF 25 OR LESS, AND A SMOKE-DEVELOPED RATING OF 50 OR LESS AS TESTED BY ANSI/ASTM 84. RETAIN OR DELETE PRODUCTS

FLEXIBLE FIBERGLASS INSULATION:

ASTM C553, TYPE I, CLASS B-3 (TEMPERATURE LESS THAN 350F). DUCT WRAP SHALL BE 1 PCF DENSITY R-6 WITH UL RATED ALUMINUM FOIL VAPOR BARRIER (FSK).

DUCT CEMENT (GENERAL PURPOSE MASTIC):

DUCT CEMENT SHALL BE NON-HARDENING, FIBER-REINFORCED AND RECOMMENDED SPECIFICALLY FOR CEMENTING FITTINGS, COMPONENTS, AND LONGITUDINAL SEAMS IN DUCTWORK INSULATION. DUCT CEMENT SHALL BE FLEXIBLE, WATER BASED, DESIGNED FOR USE IN PRESSURE DUCT SYSTEMS LISTED AS SMACNA CLASSES A, B, & C. CEMENT SHALL SEAL WATER AND AIR AND PROVIDE A VAPOR BARRIER. PRODUCT SHALL BE SUITABLE FOR BOTH INTERIOR AND EXTERIOR USE WITH UV INHIBITORS. PRODUCT SHALL BE NON-FLAMMABLE ASTM E-84 TESTED WITH A FLAME SPREAD OF LESS THAN 5 AND SMOKE SPREAD OF LESS THAN 5. PRODUCT SHALL BE UL LISTED 181A-M AND 181-B.

DUCT SEALANT (VAPOR BARRIER MASTIC):

DUCT SEALER SHALL BE FLEXIBLE, WATER BASED, DESIGNED FOR USE IN PRESSURE DUCT SYSTEMS LISTED AS SMACNA CLASSES A, B, & C. SEALER SHALL SEAL WATER AND AIR AND PROVIDE A VAPOR BARRIER. PRODUCT SHALL BE SUITABLE FOR BOTH INTERIOR AND EXTERIOR USE WITH UV INHIBITORS. PRODUCT SHALL BE NON-FLAMMABLE ASTM E-84 TESTED WITH A FLAME SPREAD OF LESS THAN 5 AND SMOKE SPREAD OF LESS THAN 5. PRODUCT SHALL BE UL LISTED 181A-M AND 181-B.

ADHESIVES:

ADHESIVE SHALL BE WATER BASED AND DESIGNED FOR ADHERING INSULATION TO DUCTWORK. PRODUCT SHALL BE SUITABLE FOR BOTH INTERIOR AND EXTERIOR USE WITH UV INHIBITORS. PRODUCT SHALL BE NON-FLAMMABLE ASTM E-84 TESTED WITH A FLAME SPREAD OF LESS THAN 5 AND SMOKE SPREAD OF LESS THAN 5. PRODUCT SHALL MEET THE REQUIREMENTS OF NFPA 90A & 90-B.

FIBER-GLASS MESH:

10X10 MESH. FOSTER MASTAFAB OR EQUAL.

- EXECUTION -

GENERAL:

INSULATE ALL SUPPLY, RETURN AND OUTDOOR AIR DUCTWORK EXPOSED IN MECHANICAL ROOMS, MEZZANINES, FAN LOFTS OR IN ANY FINISHED SPACES WITH 2" THICK FLEXIBLE FIBERGLASS INSULATION WITH VAPOR BARRIER.

INSTALLATION OF FLEXIBLE INSULATION:

INSULATE ROUND ELBOWS AND FITTINGS WITH WRAP SUCH THAT THICKNESS IS EQUAL TO ADJOINING DUCT COVERING. CLEAN AND DRY DUCTWORK PRIOR TO INSULATING.

ADHERE INSULATION TO DUCT WITH 50 PERCENT COVERAGE USING APPROVED INSULATION ADHESIVE APPLIED IN 6-INCH WIDE SWATHS WITH 6-INCH SPACES BETWEEN SWATHS. ADDITIONALLY SECURE INSULATION WITH PERFORATED PINS AND TUFF-BOND OR BY SELF-STICKING PINS WITH A 3/8" SELF-TAPPING SCREW OR BY WELDED CUP HEAD PINS. SPACE ON 12-INCH CENTERS AND 3 INCHES FROM ALL EDGES. DUCTS UP THROUGH 24" WIDE ONLY REQUIRE ONE ROW OF PINS. DUCTS OVER 24" WIDE SHALL HAVE PINS SPACED AS DESCRIBED HEREIN.

LAP ALL JOINTS 2 INCHES AND SEAL JOINTS WITH 4-INCH WIDE STRIPS OF OPEN MESH GLASS FABRIC EMBEDDED IN TWO COATS OF GENERAL PURPOSE MASTIC.

SEAL ALL PUNCTURES AND BREAKS IN ALUMINUM VAPOR BARRIER WITH OPEN MESH GLASS FABRIC AND VAPOR BARRIER SEALANT.

230840 / HVAC METAL DUCTWORK

SMACNA STANDARDS:

COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE" 1985 EDITION FOR FABRICATION AND INSTALLATION OF METAL DUCTWORK, UNLESS OTHERWISE NOTED.

NFPA 90A COMPLIANCE:

COMPLY WITH NFPA 90A "STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS".

GALVANIZED SHEET METAL:

EXCEPT AS OTHERWISE INDICATED, FABRICATE DUCTWORK FROM GALVANIZED SHEET STEEL COMPLYING WITH ASTM A 527, LOCK-FORMING QUALITY; WITH G 90 ZINC COATING IN ACCORDANCE WITH ASTM A 525; AND MILL PHOSPHATIZED FOR EXPOSED LOCATIONS. STAMP GAUGE AND MANUFACTURER'S IDENTIFICATION ON EACH SHEET. BREAK SHEETS SO THAT IDENTIFICATION IS EXPOSED.

AS AN ALTERNATIVE AND PER OWNER APPROVAL, FABRICATE DUCTWORK FROM TYPE 800 FIBERGLASS DUCTBOARD EQUAL TO JOHNS-MANVILLE "MICRO-AIRE" OR APPROVED EQUAL.

GENERAL:

EXCEPT MISCELLANEOUS MATERIALS AND PRODUCTS OF TYPES AND SIZES INDICATED AND, WHERE NOT OTHERWISE INDICATED, PROVIDE TYPE AND SIZE REQUIRED TO COMPLY WITH DUCTWORK SYSTEM REQUIREMENTS INCLUDING PROPER CONNECTION OF DUCTWORK AND EQUIPMENT.

DUCT SEALANT (VAPOR BARRIER MASTIC):

DUCT SEALER SHALL BE FLEXIBLE, WATER BASED, DESIGNED FOR USE IN PRESSURE DUCT SYSTEMS LISTED AS SMACNA CLASSES A, B, & C. SEALER SHALL SEAL WATER AND AIR AND PROVIDE A VAPOR BARRIER. PRODUCT SHALL BE SUITABLE FOR BOTH INTERIOR AND EXTERIOR USE WITH UV INHIBITORS. PRODUCT SHALL BE NON-FLAMMABLE ASTM E-84 TESTED WITH A FLAME SPREAD OF LESS THAN 5 AND SMOKE SPREAD OF LESS THAN 5. PRODUCT SHALL BE UL LISTED 181A-M AND 181-B. FOSTERS 32-17, 32-19

DUCTWORK SUPPORT MATERIALS:

EXCEPT AS OTHERWISE INDICATED, PROVIDE HOT-DIPPED GALVANIZED STEEL FASTENERS, ANCHORS, RODS, STRAPS, TRIM AND ANGLES FOR SUPPORT OF DUCTWORK.

FLEXIBLE DUCTS:

PROVIDE CPE INNER LINER WITH GALVANIZED STEEL HELIX WITH FACTORY APPLIED 2" THICK EXTERNAL INSULATION (R-6) AND VAPOR BARRIER. PROVIDE FIRE RETARDANT REINFORCED METALIZED POLYESTER JACKET, COMPLYING WITH UL 181. PROVIDE CONICAL FITTINGS WITH DAMPER AND WITHOUT SCOOP FOR ALL FLEXIBLE DUCT TAKE-OFFS. PROVIDE 1" STANDOFF FOR DAMPER. USE FLEXIBLE DUCTS ONLY WHERE SHOWN ON THE DRAWINGS. FLEXMASTER 8MR6 OR THERMAFLEX MKF R-6, ATCO 36, GEMFLEX SR-6A.

CONNECTIONS:

RETURN AIR GRILLE CONNECTIONS SHALL BE STRAIGHT SIDED WITH DAMPER AND ONE INCH HIGH INSULATION STANDOFF EQUIPMENT TO CROWN 724-D5 OR FLEXMASTER FLD-B0.

EXHAUST AIR GRILLE CONNECTIONS SHALL BE STRAIGHT SIDED WITH DAMPER EQUAL TO CROWN 724 OR FLEXMASTER FLD.

WHERE DUCT HEIGHT DOES NOT PERMIT THE USE OF CONICAL SPIN-IN FITTINGS, USE LOW PROFILE SIDE TAKE-OFF FITTINGS EQUAL TO CROWN 3300-DS OR FLEXMASTER ST0D-B0.

SPIN-IN AND SIDE TAKE-OFF FITTINGS:

PROVIDE ROUND BRANCH RUN-OUTS AS FOLLOWS.

SUPPLY AIR DIFFUSER CONNECTIONS SHALL BE CONICAL WITH DAMPER AND ONE INCH HIGH INSULATION STAND-OFF EQUAL TO CROWN 3200 DS OR FLEXMASTER CBD-B0.

FITTINGS:

PROVIDE RADIUS TYPE FITTINGS FABRICATED OF MULTIPLE SECTIONS WITH MAXIMUM 15 CHANGE OF DIRECTION PER SECTION, UNLESS SPECIFICALLY DETAILED OTHERWISE. USE 45 LATERALS AND 45 ELBOWS FOR BRANCH TAKEOFF CONNECTIONS. WHERE 90 BRANCHES ARE INDICATED, PROVIDE CONICAL TYPE TEES.

FABRICATION:

SHOP FABRICATE DUCTWORK IN 4, 8, 10 OR 12-FT LENGTHS, UNLESS OTHERWISE INDICATED OR REQUIRED TO COMPLETE RUNS. PREASSEMBLE WORK IN SHOP TO GREATEST EXTENT POSSIBLE, SO AS TO MINIMIZE FIELD ASSEMBLY OF SYSTEMS. DISASSEMBLE SYSTEMS ONLY TO EXTENT NECESSARY FOR SHIPPING AND HANDLING. MATCH-MARK SECTIONS FOR REASSEMBLY AND COORDINATED INSTALLATION.

SHOP FABRICATE DUCTWORK OF GAUGES AND REINFORCEMENT COMPLYING WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". SUPPLY DUCT BETWEEN AHU DISCHARGE AND TERMINAL UNITS SHALL BE MINIMUM 4" PRESSURE CLASS. DUCT DOWNSTREAM OF TERMINAL UNITS ALL RETURN AND EXHAUST DUCT SHALL BE MINIMUM 2" PRESSURE CLASS UNLESS OTHERWISE NOTED.

FABRICATE DUCT FITTINGS TO MATCH ADJOINING DUCTS, AND TO COMPLY WITH DUCT REQUIREMENTS AS APPLICABLE TO FITTINGS. EXCEPT AS OTHERWISE INDICATED, FABRICATE ELBOWS WITH CENTER-LINE RADIUS EQUAL TO 1 TIMES ASSOCIATED DUCT WIDTH; AND FABRICATE TO INCLUDE TURNING VANES IN ELBOWS WHERE SHORTER RADIUS IS NECESSARY. LIMIT ANGULAR TAPERS TO 30 FOR CONTRACTING TAPERS AND 20 FOR EXPANDING TAPERS.

- EXECUTION -

GENERAL:

EXAMINE AREAS AND CONDITIONS UNDER WHICH HVAC METAL DUCTWORK IS TO BE INSTALLED. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN MANNER ACCEPTABLE TO INSTALLER.

INSTALLATION OF METAL DUCTWORK:

GENERAL:
ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES WHICH WILL ACHIEVE AIR-TIGHT (5% LEAKAGE FOR SYSTEMS RATED 3" AND UNDER; 1% FOR SYSTEMS RATED OVER 3") AND NOISELESS (NO OBJECTIONABLE NOISE) SYSTEMS, CAPABLE OF PERFORMING EACH INDICATED SERVICE. INSTALL EACH RUN WITH MINIMUM NUMBER OF JOINTS. ALIGN DUCTWORK ACCURATELY AT CONNECTIONS AND WITH INTERNAL SURFACES SMOOTH. SUPPORT DUCTS RIGIDLY WITH SUITABLE TIES, BRACES, HANGERS AND ANCHORS OF TYPE WHICH WILL HOLD DUCTS TRUE-TO-SHAPE AND TO PREVENT BUCKLING. SUPPORT VERTICAL DUCTS AT EVERY FLOOR. SEAL ALL DUCT JOINTS AND SEAMS WITH SEALANT.

ROUTING:

LOCATE DUCTWORK RUNS, EXCEPT AS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY. AVOID DIAGONAL RUNS WHEREVER POSSIBLE. LOCATE RUNS AS INDICATED BY DIAGRAMS, DETAILS AND NOTATIONS OR, IF NOT OTHERWISE INDICATED, RUN DUCTWORK IN SHORTEST ROUTE WHICH DOES NOT OBSTRUCT USEABLE SPACE OR BLOCK ACCESS FOR SERVICING BUILDING AND ITS EQUIPMENT. HOLD DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING. LIMIT CLEARANCE TO 2" WHERE FURRING IS SHOWN FOR ENCLOSURE OR CONCEALMENT OF DUCTS, BUT ALLOW FOR INSULATION THICKNESS, IF ANY. WHERE POSSIBLE, LOCATE INSULATED DUCTWORK FOR 1" CLEARANCE OUTSIDE OF INSULATION. IN FINISHED AND OCCUPIED SPACES, CONCEAL DUCTWORK FROM VIEW BY LOCATING IN MECHANICAL SHAFTS, HOLLOW WALL CONSTRUCTION OR ABOVE SUSPENDED CEILINGS, UNLESS SPECIFICALLY NOTED AS "EXPOSED". DO NOT ENCASE HORIZONTAL RUNS IN SOLID PARTITIONS, EXCEPT AS SPECIFICALLY SHOWN. COORDINATE LAYOUT WITH SUSPENDED CEILING AND LIGHTING LAYOUTS AND SIMILAR FINISHED WORK.

ELECTRICAL EQUIPMENT SPACES:

DO NOT ROUTE DUCTWORK THROUGH TRANSFORMER VAULTS OR OTHER ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.

PENETRATIONS:

WHERE DUCTS PASS THROUGH INTERIOR PARTITIONS AND EXTERIOR WALLS, AND ARE EXPOSED TO VIEW, CONCEAL SPACE BETWEEN CONSTRUCTION OPENING AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME GAUGE AS DUCT. OVERLAP OPENING ON 4 SIDES BY AT LEAST 1". FASTEN TO DUCT AND SUBSTRATE. WHERE DUCTS PASS THROUGH FIRE-RATED FLOORS, WALLS, OR PARTITIONS, PROVIDE FIRESTOPPING BETWEEN DUCT AND SUBSTRATE.

COORDINATION:

COORDINATE DUCT INSTALLATIONS WITH INSTALLATION OF ACCESSORIES, DAMPERS, COIL FRAMES, EQUIPMENT, CONTROLS AND OTHER ASSOCIATED WORK OF DUCTWORK SYSTEM.

INSTALLATION:

INSTALL METAL DUCTWORK IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS. FAN DISCHARGE OUTLET DUCTS SHALL BE INSTALLED CORRECTLY WITH REGARD TO "SYSTEM EFFECT" PER AMCA PUBLICATION 201.

INSTALLATION OF FLEXIBLE DUCTS:

MAXIMUM LENGTH:

FOR ANY DUCT RUN USING FLEXIBLE DUCTWORK, DO NOT EXCEED 10'-0" EXTENDED LENGTH. FLEXIBLE DUCT SHALL ONLY BE ALLOWED AS DETAILED ON THE DRAWINGS.

INSTALLATION:

INSTALL IN ACCORDANCE WITH SECTION III OF SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE". SUPPORT FLEXIBLE DUCTS TO ELIMINATE PINCHING AND KINKING WHICH WOULD RESTRICT FLOW WITH CLOTH OR PLASTIC HANGING STRAPS AT LEAST 1" WIDE SPACED NOT MORE THAN 5 FEET APART. FLEXIBLE DUCT SHALL BE SUPPORTED WITH 1" METAL STRAPS. NO FABRIC STRAPS ARE PERMITTED.

SEAL INSIDE OF FLEXIBLE DUCT CONNECTIONS TO SHEET METAL DUCTS, BOOTS AND TERMINALS. ADDITIONALLY SECURE CONNECTION WITH STRAP CLAMP. PROVIDE OUTER COAT OF SEALANT AND INSULATE JOINT WITH FOAMED RUBBER INSULATION TO AVOID CONDENSATION. RETAIN IF REQUIRED

EQUIPMENT CONNECTIONS:

CONNECT METAL DUCTWORK TO EQUIPMENT AS INDICATED, PROVIDE FLEXIBLE CONNECTION FOR EACH DUCTWORK CONNECTION TO EQUIPMENT MOUNTED ON VIBRATION ISOLATORS, AND/OR EQUIPMENT CONTAINING ROTATING MACHINERY. PROVIDE ACCESS DOORS AS INDICATED.

CLEAN DUCTWORK INTERNALLY:

CLEAN DUCTWORK INTERNALLY SO ALL DUCTWORK IS FREE OF DUST AND DEBRIS. CLEAN EXTERNAL SURFACES OF FOREIGN SUBSTANCES WHICH MIGHT CAUSE CORROSIVE DETERIORATION OF METAL OR, WHERE DUCTWORK IS TO BE PAINTED, MIGHT INTERFERE WITH PAINTING OR CAUSE PAINT DETERIORATION. KEEP DUCTS CLOSED WITH POLY DURING CONSTRUCTION TO PREVENT CONTAMINATION BY CONSTRUCTION DUST AND DEBRIS.

230855 / DUCTWORK ACCESSORIES

LOW PRESSURE MANUAL DAMPERS:

PROVIDE 16 GAUGE DAMPERS OF SINGLE-BLADE TYPE (12" MAXIMUM BLADE WIDTH) OR MULTIBLADE TYPE. DAMPER BLADES TO BE GANG-OPERATED FROM A SINGLE SHAFT WITH NYLON OR BALL BEARINGS ON EACH END. PROVIDE INDEXED LOCKING QUADRANT. PARALLEL OR OPPOSED BLADE STYLE IS ACCEPTABLE. PROVIDE 2" STANDOFF ON LOCKING QUADRANT FOR EXTERNALLY INSULATED DUCT. FINAL DAMPER SETTINGS SHALL BE MARKED IN INDELIBLE INK OR PAINT. SHOW DETAILS ON DRAWINGS. SPECIAL FOR AHCA.

TURNING VANES:

PROVIDE MANUFACTURED OR FABRICATED SINGLE WALL TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS".

DUCT ACCESS DOORS:

CONSTRUCT OF SAME OR GREATER GAUGE AS DUCTWORK SERVED. PROVIDE INSULATED DOORS FOR INSULATED DUCTWORK. PROVIDE FLUSH FRAMES FOR UNINSULATED DUCTWORK, EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCT. PROVIDE ONE SIDE HINGED; OTHER SIDE WITH ONE HANDLE-TYPE LATCH FOR DOORS 12" HIGH AND SMALLER, 2 HANDLE-TYPE LATCHES FOR LARGER DOORS.

FLEXIBLE CONNECTIONS:

PROVIDE FLEXIBLE DUCT CONNECTIONS WHEREVER DUCTWORK CONNECTS TO VIBRATION ISOLATED EQUIPMENT. CONSTRUCT FLEXIBLE CONNECTIONS OF NEOPRENE-COATED FLAMEPROOF FABRIC CRIMPED INTO DUCT FLANGES FOR ATTACHMENT TO DUCT AND EQUIPMENT. MAKE AIRTIGHT JOINT. FLEXIBLE CONNECTIONS SHALL COMPLY WITH NFPA 90A, 90B, AND SPECIFICATION FORM DDFCD-11.

- INSTALLATION -

INSTALL DUCTWORK ACCESSORIES IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. WITH APPLICABLE PORTIONS OF DETAILS OF CONSTRUCTION AS SHOWN IN SMACNA STANDARDS, AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS SERVE INTENDED FUNCTION.

INSTALL BALANCING DAMPERS AT ALL MAIN DUCTS ADJACENT TO UNITS IN RETURN AIR, OUTSIDE AIR AND WHERE INDICATED. THERE MAY BE OPEN/CLOSE DAMPERS IN RA OR MODULATING DAMPERS IN RA OR OA.

INSTALL CONTROL DAMPERS IN THE OUTSIDE AIR DUCT AND RETURN AIR DUCT FOR EACH AIR HANDLER. DAMPER OPERATOR SHALL BE PROVIDED BY CONTROL CONTRACTOR.

INSTALL TURNING VANES IN SQUARE OR RECTANGULAR 90 ELBOWS IN SUPPLY, RETURN, AND EXHAUST AIR SYSTEMS, AND ELSEWHERE AS INDICATED.

INSTALL ACCESS DOORS TO OPEN AGAINST SYSTEM AIR PRESSURE. WITH LATCHES OPERABLE FROM EITHER SIDE, EXCEPT OUTSIDE ONLY WHERE DUCT IS TOO SMALL FOR PERSON TO ENTER.

INSTALL FLEXIBLE CONNECTIONS IN DUCTWORK SUCH THAT THE CLEAR LENGTH OF THE CONNECTOR IS APPROXIMATELY TWO INCHES. PROVIDE THRUST RESTRAINTS AS REQUIRED. FLEXIBLE MATERIAL SHALL NOT BE SO SLACK AS TO TAKE A DEFINITE CONCAVE OR CONVEX SHAPE DURING FAN OPERATION.

COORDINATE WITH OTHER WORK, INCLUDING DUCTWORK, AS NECESSARY TO INTERFACE INSTALLATION OF DUCTWORK ACCESSORIES PROPERLY WITH OTHER WORK. RETAIN IF REQUIRED. SHOW DETAILS ON DRAWINGS.

OPERATE INSTALLED DUCTWORK ACCESSORIES TO DEMONSTRATE COMPLIANCE WITH REQUIREMENTS. TEST FOR AIR LEAKAGE WHILE SYSTEM IS OPERATING. REPAIR OR REPLACE FAULTY ACCESSORIES AS REQUIRED TO OBTAIN PROPER OPERATION AND LEAK-PROOF PERFORMANCE.

ADJUSTING:

ADJUST DUCTWORK ACCESSORIES FOR PROPER SETTINGS. [INSTALL FUSIBLE LINKS IN FIRE DAMPERS AND ADJUST FOR PROPER ACTION.]

FINAL POSITIONING OF MANUAL DAMPERS IS SPECIFIED IN DIVISION-23 SECTION "TESTING, ADJUSTING, AND BALANCING". HOWEVER, THE SYSTEM SHALL BE LEFT FUNCTIONAL WITH ALL DAMPERS OPEN OR THROTTLED.

230860 / GRILLES, REGISTERS & DIFFUSERS

CEILING AND WALL COMPATIBILITY:

PROVIDE GRILLES, REGISTERS AND DIFFUSERS WITH BORDER STYLES THAT ARE COMPATIBLE WITH ADJACENT WALL AND CEILING SYSTEMS, AND THAT ARE SPECIFICALLY MANUFACTURED TO FIT INTO CEILING MODULE OR WALL WITH ACCURATE FIT AND ADEQUATE SUPPORT. REFER TO GENERAL CONSTRUCTION DRAWINGS AND SPECIFICATIONS FOR TYPES OF CEILING SYSTEMS AND WALLS WHICH WILL CONTAIN EACH TYPE OF CEILING DIFFUSER, GRILLE, OR REGISTER. ALL CEILING AND WALL-MOUNTED GRILLES, REGISTERS AND DIFFUSERS SHALL BE PROVIDED WITH GASKETS TO SEAL THEM WITH THE BUILDING ENVELOPE.

APPEARANCE: ALL GRILLES AND REGISTERS SHALL BE ALUMINUM WITH WHITE FINISH.

ACCEPTABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY TITUS, PRICE, OR METAL AIRE. NO DAMPERS AT OUTLETS. INSTALL IN RUNOUTS.

SUPPLY GRILLES (SG):

PROVIDE GRILLES WITH DOUBLE DEFLECTION, 3/4" SPACING, PARALLEL TO THE LONG DIMENSION. PROVIDE MOUNTING FRAME FOR ALL WALL AND PLASTER CEILING INSTALLATIONS. PRICE 22.

SQUARE PLAQUE CEILING DIFFUSERS (CD):

PROVIDE SQUARE FACE, ADJUSTABLE, 360 DEGREE PATTERN DIFFUSERS, NO CORNER JOINTS. ROUND NECKS. INNER PLAQUE ASSEMBLY SHALL BE FULLY REMOVABLE. PROVIDE LAY-IN PANEL AS REQUIRED. PROVIDE TRIM RING FOR DIFFUSERS IN HARD CEILINGS TO ALLOW OPENING TO BE USED FOR ACCESS. PROVIDE SQUARE TO ROUND DUCT BOOT ADAPTORS FOR CEILING-MOUNTED AIR DEVICES. PRICE MODEL ASPD OR EQUAL.

RETURN/EXHAUST GRILLES (RG/EG):

PROVIDE GRILLES WITH ONE SET OF 45 DEGREE FIXED LOUVERS, PARALLEL TO THE LONG DIMENSION. PROVIDE MOUNTING FRAME FOR ALL WALL AND PLASTER CEILING INSTALLATIONS. PRICE 600.

COORDINATE INSTALLATION WITH CEILING AND LIGHT FIXTURE INSTALLATION. LOCATE CEILING OUTLETS AS INDICATED ON ARCHITECTURAL REFLECTED CEILING PLANS. UNLESS OTHERWISE INDICATED, LOCATE CEILING OUTLETS IN THE CENTER OF ACCTOUCAL CEILING MODULES WITH SIDES PARALLEL TO THE GRID.

COORDINATE WITH OTHER WORK, INCLUDING DUCTWORK AND DUCT ACCESSORIES, AS NECESSARY TO INTERFACE INSTALLATION OF AIR OUTLETS AND INLETS WITH OTHER WORK.

230985 / TESTING AND BALANCING

EXTENT OF TESTING, ADJUSTING, AND BALANCING (TAB) WORK:

THE EXTENT OF TAB WORK IS INDICATED BY REQUIREMENTS OF THIS SECTION, AND ALSO BY DRAWINGS AND SCHEDULES, AND IS DEFINED TO INCLUDE, BUT IS NOT NECESSARILY LIMITED TO, AIR DISTRIBUTION SYSTEMS AND ASSOCIATED EQUIPMENT AND APPARATUS OF MECHANICAL WORK. THE WORK CONSISTS OF SETTING SPEED AND VOLUME (FLOW) ADJUSTING FACILITIES PROVIDED FOR SYSTEMS, RECORDING DATA, CONDUCTING TESTS, PREPARING AND SUBMITTING REPORTS, AND RECOMMENDING MODIFICATIONS TO WORK AS REQUIRED.

COORDINATION:

COORDINATE WITH THE GENERAL CONTRACTOR AND MECHANICAL CONTRACTOR RESPONSIBLE FOR THE HVAC SYSTEM INSTALLATION AS REQUIRED TO COMPLETE THE TAB WORK.

TOLERANCES:

AIR HANDLING:

THE SUPPLY AIR, RETURN AIR AND OUTDOOR AIR QUANTITIES SHALL BE BALANCED WITHIN 5% OF DESIGN VALUES.

EXHAUST FANS:

THE EXHAUST FAN QUANTITIES SHALL BE SET AS REQUIRED TO MAINTAIN THE DESIGN EXHAUST TERMINAL FLOWS WITHIN 5% OF DESIGN VALUES.

CEILING DIFFUSERS, SUPPLY REGISTERS, RETURN AND EXHAUST INLETS:

BALANCE TO AN AIR QUANTITY WITHIN 10% OF THE DESIGN VALUES.

AIR HANDLING TEMPERATURES:

THE CONTROLLED TEMPERATURES AT AHUS SHALL BE VERIFIED TO BE UNDER CONTROL WITHIN 1°F OF DESIGN VALUES.

ROOM TEMPERATURES:

BALANCE SYSTEMS AND CONTROLS WITHIN 2°F OF INDICATED SETTINGS.

QUALITY ASSURANCE:

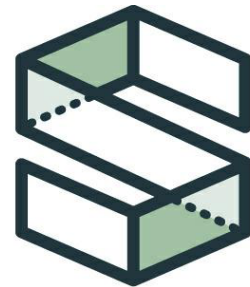
THE TAB CONTRACTOR SHALL BE CERTIFIED AS FOLLOWS:

TESTER:
A FIRM CERTIFIED BY NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) IN THOSE TESTING AND BALANCING DISCIPLINES REQUIRED FOR THIS PROJECT, WHO IS NOT THE INSTALLER OF THE SYSTEMS TO BE TESTED AND IS OTHERWISE INDEPENDENT OF THE PROJECT. COMPLY WITH NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING AND BALANCING OF ENVIRONMENTAL SYSTEMS" AS APPLICABLE TO THIS WORK.

INDUSTRY STANDARDS:
COMPLY WITH ASHRAE RECOMMENDATIONS PERTAINING TO MEASUREMENTS, INSTRUMENTS AND TESTING. ADJUSTING AND BALANCING, EXCEPT AS OTHERWISE INDICATED.

TEST, ADJUST AND BALANCE:

TEST, AD



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KEVIN M. SPELLICY
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HIGH SPRINGS FIRE STATION HVAC UPGRADES

18586 NW 238TH ST
HIGH SPRINGS, FL 32643

24062

ADDENDUM #1

ISSUE DATE: 02/21/2025

DESIGN: HTK
QC: KMS

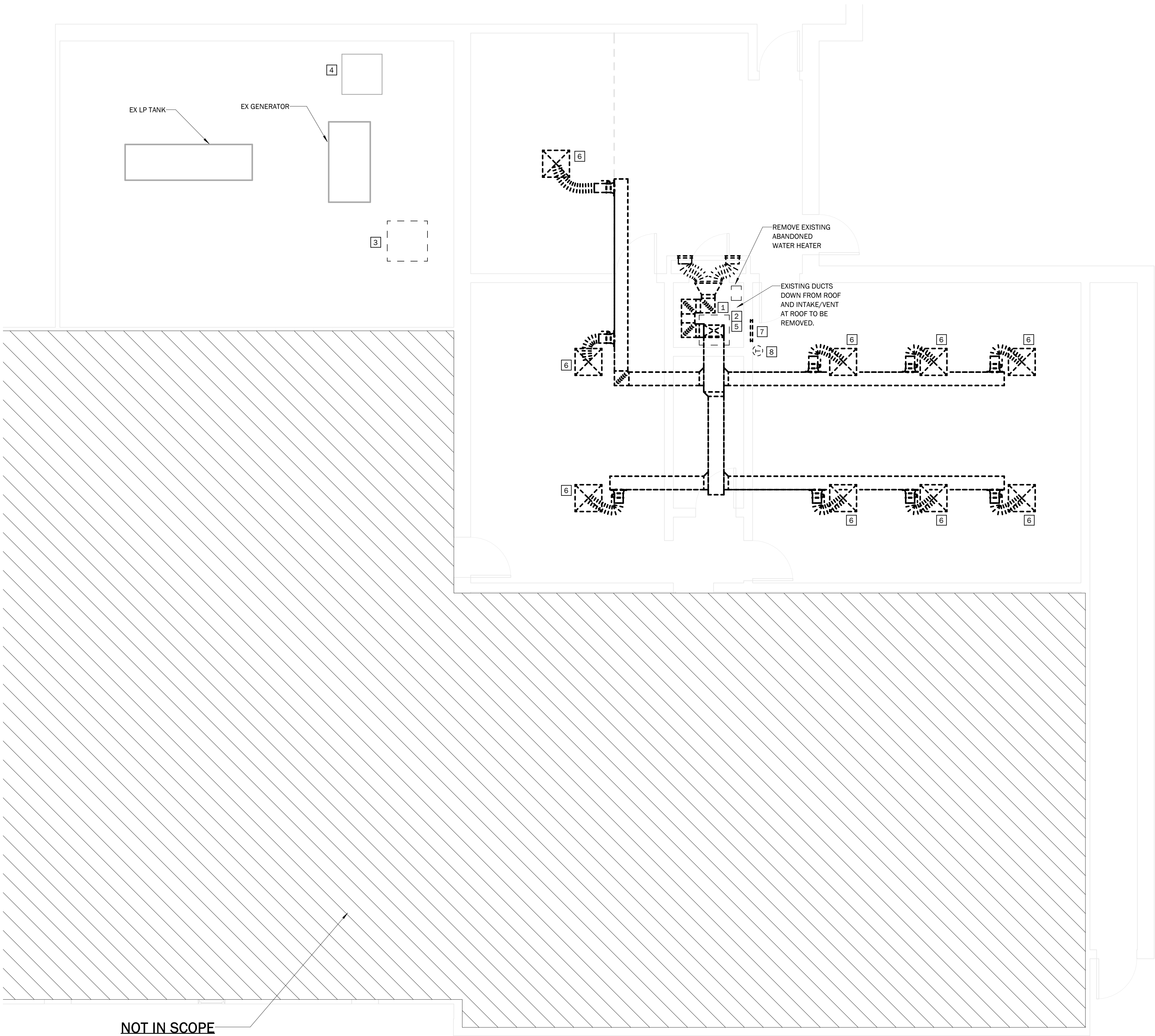
REVISIONS		
NO.	REFERENCE	DATE

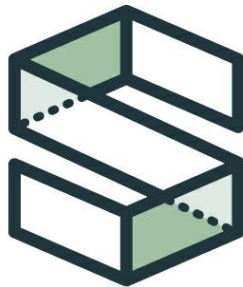
MECHANICAL FLOOR PLAN -
DEMOLITION

M101

SHEET NOTES:

- EXISTING AIR HANDLING UNIT AND ASSOCIATED CONTROLS, DUCTWORK, CONDENSATE PIPING, AND REFRIGERANT PIPING TO BE REMOVED.
- DEMOLISH EXISTING AIR HANDLING UNIT FURNACE PROPANE PIPING BACK TO WALL AND MAINTAIN FOR RECONNECTION.
- EXISTING CONDENSING UNIT TO BE REMOVED COMPLETELY.
- EXISTING CONDENSING UNIT TO REMAIN.
- EXISTING FURNACE INTAKE AND FLUE PIPING TO BE REMOVED. PROVIDE ROOF PATCHING AS REQUIRED. PLACE NEW ROOF CURB OVER EXISTING PENETRATIONS IF CLEARANCE FROM ROOF EDGE CAN BE MAINTAINED.
- EXISTING SUPPLY DIFFUSER TO BE REPLACED.
- EXISTING RETURN GRILLE AND ASSOCIATED DUCTWORK TO BE REMOVED.
- EXISTING THERMOSTAT TO BE REMOVED.





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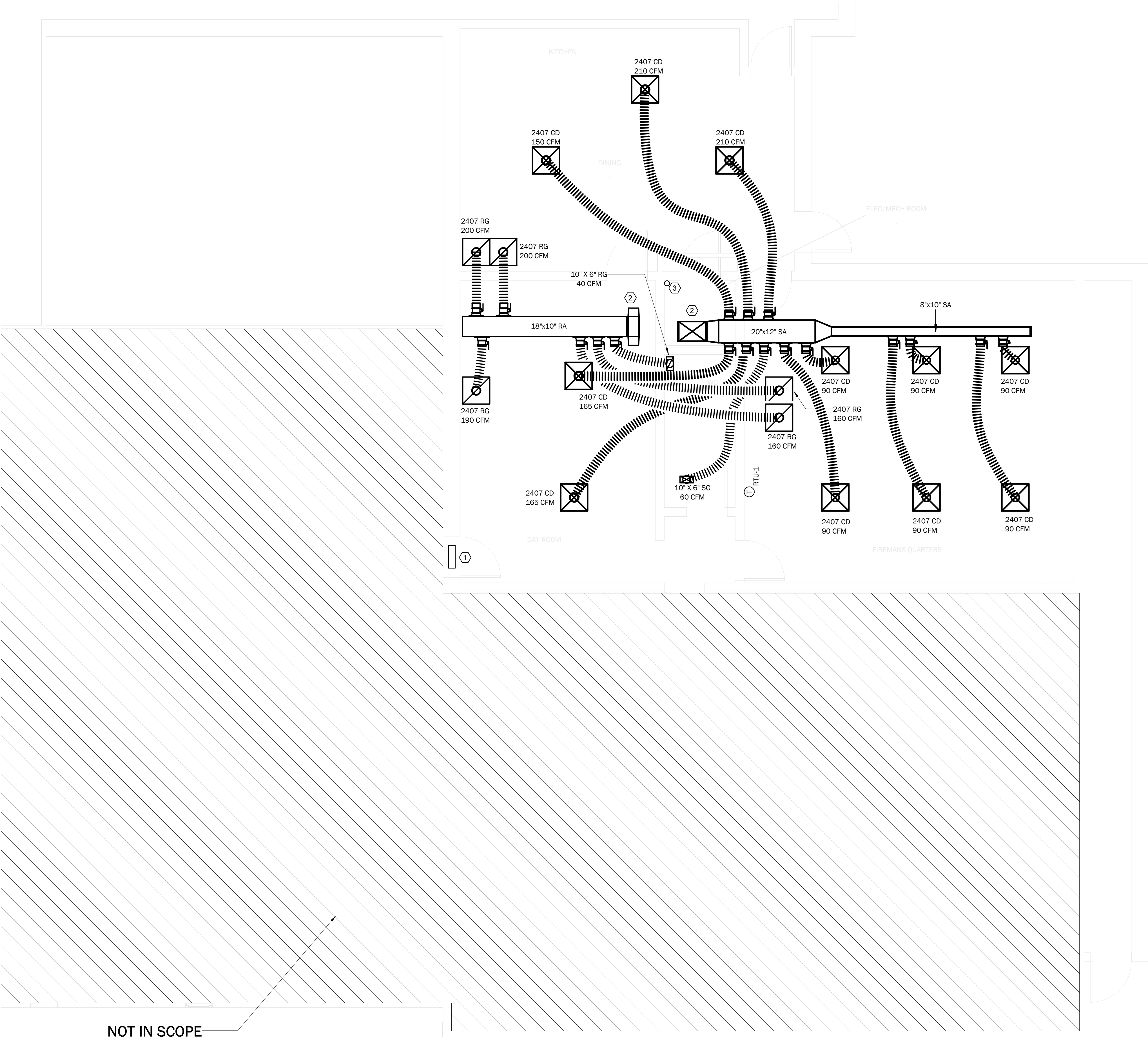
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MECHANICAL FLOOR PLAN -
NEW WORK

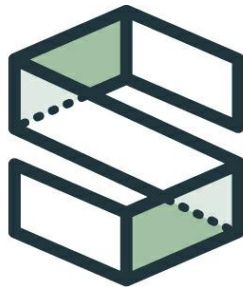
M201

SHEET NOTES:

- 1 NEW 18" X 10" TRANSFER GRILLE ABOVE
EXISTING DOOR.
- 2 NEW SUPPLY/RETURN DUCTWORK DOWN
FROM NEW PACKAGED ROOFTOP UNIT ON
ROOF.
- 3 EXTEND EXISTING 1/2" LP PIPING FROM
THIS ROOM UP TO NEW RTU (THROUGH
CURB).



MECHANICAL PARTIAL FLOOR PLAN - NEW WORK
SCALE: 1/4" = 1'-0"



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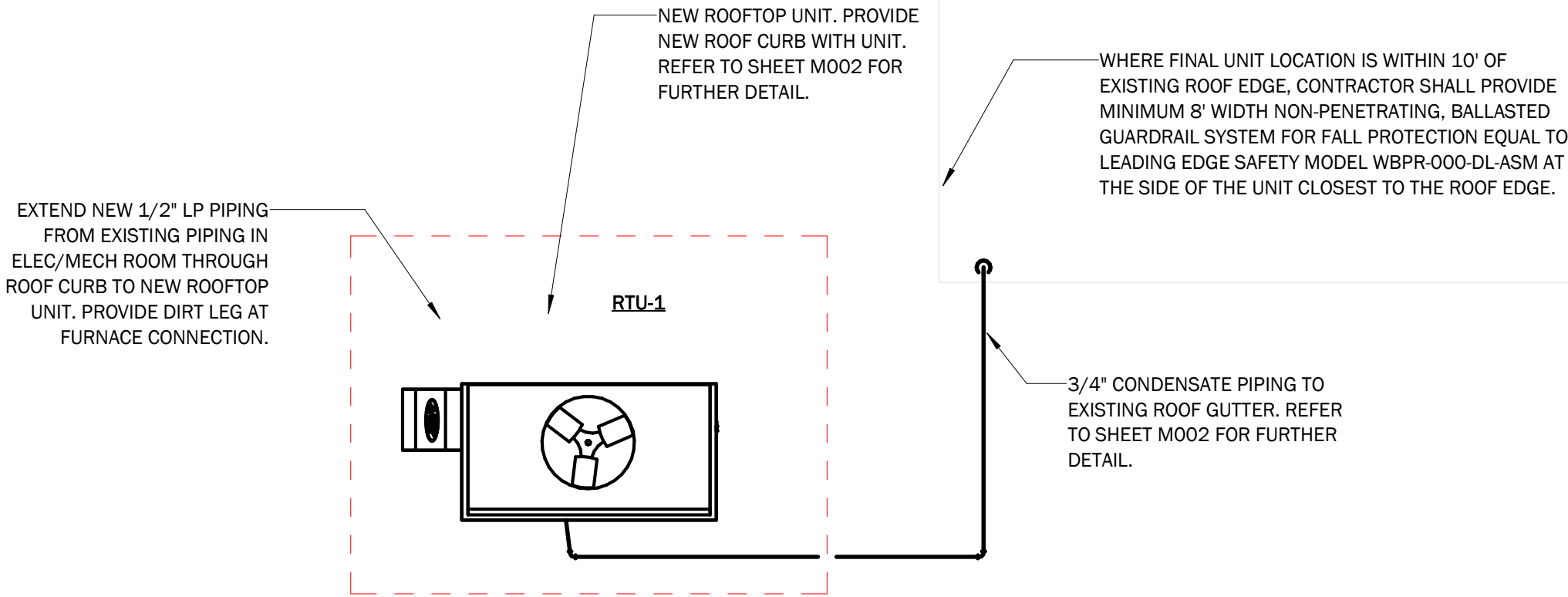
ISSUE DATE: 02/21/2025

DESIGN: HTK
QC: KMS

REVISIONS		
NO.	REFERENCE	DATE

MECHANICAL ROOF PLAN -
NEW WORK

M202



CONTRACTOR SHALL COORDINATE WITH OWNER'S EXISTING ROOF WARRANTY FOR ALL ROOF WORK.

GENERAL STRUCTURAL SUPPORT NOTE:
CONTRACTOR SHALL FIELD LOCATE FINAL RTU CURB LOCATION SUCH THAT SOUTH EDGE OF CURB IS OVER TOP OF EXISTING CMU WALL SEPARATING MECH ROOM FROM DINING AND SUCH THAT CURB STRADDLES EXISTING CMU WALL SEPARATING THE MECH ROOM FROM THE DAY ROOM TO ENSURE PROPER STRUCTURAL SUPPORT OF NEW RTU.

MECHANICAL ROOF PLAN - NEW WORK
SCALE: 1/4" = 1'-0"

SECTION 260005 / ELECTRICAL GENERAL

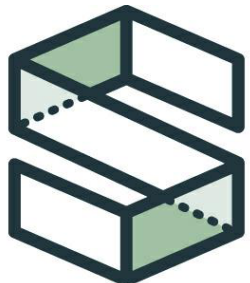
GENERAL THE WORK COVERED BY THIS DIVISION CONSISTS OF PROVIDING ALL LABOR, EQUIPMENT AND MATERIALS AND PERFORMING ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF THE ELECTRICAL WORK AS HEREIN CALLED FOR AND SHOWN ON THE DRAWINGS.	
RELATED DOCUMENTS: DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION.	
PROVISIONS OF THIS SECTION APPLY TO WORK OF ALL DIVISION 26 SECTIONS.	
REVIEW ALL PROJECT DRAWINGS TO BE AWARE OF CONDITIONS AFFECTING WORK HEREIN.	
DEFINITIONS PROVIDE: FURNISH, INSTALL, AND TEST, COMPLETE AND READY FOR INTENDED USE.	
FURNISH: SUPPLY AND DELIVER TO PROJECT SITE, READY FOR SUBSEQUENT REQUIREMENTS.	
INSTALL: OPERATIONS AT PROJECT SITE, INCLUDING UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TEST COMPLETE READY FOR INTENDED USE, AND SIMILAR REQUIREMENTS.	
PERMITS AND FEES: CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, METERS, AND INSPECTIONS REQUIRED FOR HIS WORK AND PAY ALL FEES AND CHARGES INCIDENTAL THERETO.	
VERIFICATION OF OWNER'S DATA: PRIOR TO COMMENCING WORK THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE ACCURACY OF ALL DATA INDICATED ON THE DRAWINGS AND/OR PROVIDED BY THE OWNER. SHOULD THE CONTRACTOR DISCOVER ANY INACCURACIES, INCONSISTENCIES, ERRORS, OMISSIONS IN THE DATA, AMBIGUITIES, OR OTHER CONDITIONS WHICH MIGHT PREVENT CONSTRUCTION BEING PROVIDED AS INDICATED, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER. COMMENCEMENT OF WORK BY THE CONTRACTOR SHALL BE HELD AS AN ACCEPTANCE OF THE DATA BY HIM AFTER WHICH TIME THE CONTRACTOR HAS NO CLAIM AGAINST THE OWNER RESULTING FROM ALLEGED ERRORS, OMISSIONS OR INACCURACIES OF THE SAID DATA. IF ANY PORTIONS OF THE CONTRACT DOCUMENTS OR ANY OTHER SUCH DATA PROVIDED BY THE OWNER IS INCONSISTENT OR OTHERWISE AMBIGUOUS, CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY IN THE BID AMOUNT TO PROVIDE THE MOST EXPENSIVE OF THE POSSIBLE INTERPRETATIONS OF THE REQUIREMENTS OF THIS CONTRACT FOR CONSTRUCTION. A CREDIT TO THE OWNER SHALL BE PROVIDED BY THE CONTRACTOR IF A LESS EXPENSIVE INTERPRETATION IS ACTUALLY PROVIDED; NO ADDITIONAL TIME OR ADDITION TO THE CONTRACT AMOUNT SHALL BE PROVIDED IF THE CONTRACTOR FAILS TO COMPLY WITH THIS REQUIREMENT OF THE CONTRACT DOCUMENTS. CONTRACTOR SHALL COORDINATE EXACT REQUIREMENTS OF DIVISION 26 WITH THE REQUIREMENTS OF OTHER DIVISIONS OF THIS CONTRACT PRIOR TO BID.	
DELIVERY AND STORAGE OF MATERIALS: MATERIALS DELIVERED TO SITE SHALL BE INSPECTED FOR DAMAGE, UNLOADED, AND STORED WITH A MINIMUM OF HANDLING. ALL MATERIAL SHALL BE STORED TO PROVIDE PROTECTION FROM THE WEATHER AND DAMAGE.	
EXTENT OF WORK IS INDICATED IN THE DRAWINGS, SCHEDULES, AND SPECIFICATION. SINGULAR REFERENCES SHALL NOT BE CONSTRUED AS REQUIRING ONLY ONE DEVICE IF MULTIPLE DEVICES ARE SHOWN ON THE DRAWINGS OR ARE REQUIRED FOR PROPER SYSTEM OPERATION.	
FIELD MEASUREMENTS AND COORDINATION: THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO OBTAIN A COMPLETE AND SATISFACTORY INSTALLATION. SEPARATE DIVISIONAL DRAWINGS AND SPECIFICATIONS SHALL NOT RELIEVE THE CONTRACTOR OR SUBCONTRACTORS FROM FULL COMPLIANCE OF WORK OF HIS TRADE INDICATED ON ANY OF THE DRAWINGS OR IN ANY SECTION OF THE SPECIFICATIONS. REPORT CONFLICTS PRIOR TO START OF WORK.	
VERIFY ALL FIELD DIMENSIONS AND LOCATIONS OF EQUIPMENT TO INSURE CLOSE, NEAT FIT WITH OTHER TRADES' WORK. MAKE USE OF ALL CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS TO VERIFY EXACT DIMENSION AND LOCATIONS. DO NOT SCALE ELECTRICAL DRAWINGS, RELY ON DIMENSIONS SHOWN ON ARCHITECTURAL OR STRUCTURAL DRAWINGS.	
COORDINATE WORK IN THIS DIVISION WITH ALL OTHER TRADES IN PROPER SEQUENCE TO INSURE THAT THE TOTAL WORK IS COMPLETED WITHIN CONTRACT TIME SCHEDULE AND WITH MINIMUM CUTTING AND PATCHING.	
LOCATE ALL EQUIPMENT, MATERIALS, AND APPARATUS SYMMETRICAL WITH ARCHITECTURAL ELEMENTS. INSTALL TO EXACT HEIGHT AND LOCATIONS WHEN SHOWN ON ARCHITECTURAL DRAWINGS. WHEN LOCATIONS ARE SHOWN ONLY ON ELECTRICAL DRAWINGS, BE GUIDED BY ARCHITECTURAL DETAILS AND CONDITIONS EXISTING AT JOB AND CORRELATE THIS WORK WITH THAT OF OTHERS.	
INSTALL WORK AS REQUIRED TO FIT STRUCTURE, AVOID OBSTRUCTIONS, AND RETAIN CLEARANCE, HEADROOM, OPENINGS AND PASSAGEWAYS. ~~CUT NO STRUCTURAL MEMBERS WITHOUT WRITTEN APPROVAL FROM ENGINEER OR ARCHITECT.~~	
CAREFULLY EXAMINE ANY EXISTING CONDITIONS, PIPING, AND PREMISES, COMPARE DRAWINGS WITH EXISTING CONDITIONS. REPORT ANY OBSERVED DISCREPANCIES. WRITTEN INSTRUCTIONS WILL BE ISSUED BY THE ENGINEER TO RESOLVE DISCREPANCIES.	
BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS AND FITTINGS OR TO LOCATE EVERY ACCESSORY. DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC. STUDY CAREFULLY THE SIZES AND LOCATIONS OF STRUCTURAL MEMBERS, WALL AND PARTITION LOCATIONS, TRUSSES, AND ROOM DIMENSIONS AND TAKE ACTUAL MEASUREMENTS ON THE JOB. LOCATE MATERIAL, EQUIPMENT AND ACCESSORIES WITH SUFFICIENT SPACE FOR INSTALLING AND SERVICING. CONTRACTOR IS RESPONSIBLE FOR ACCURACY OF HIS MEASUREMENTS AND SHALL NOT ORDER MATERIALS OR PERFORM WORK WITHOUT VERIFICATION. NO EXTRA COMPENSATION WILL BE ALLOWED BECAUSE FIELD MEASUREMENTS VARY FROM THE DIMENSIONS ON THE DRAWINGS. IF FIELD MEASUREMENTS SHOW THAT EQUIPMENT OR MATERIAL CANNOT BE FITTED, THE ENGINEER SHALL BE CONSULTED. REMOVE AND RELOCATE, WITHOUT ADDITIONAL COMPENSATION, ANY ITEM THAT IS INSTALLED AND IS LATER FOUND TO ENCROACH ON SPACE ASSIGNED TO ANOTHER USE.	
INTERPRETATION OF THE CONTRACT DOCUMENTS IS SOMETIMES NECESSARY DUE TO PERCEIVED AMBIGUITIES OR CONFLICTS IN THE CONTRACT REQUIREMENTS. WHERE EVER MORE THAN ONE INTERPRETATION OF THE REQUIREMENTS OF THE CONTRACT DOCUMENTS CAN BE MADE, THE CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO ACCOMMODATE PROVIDING THE MOST EXPENSIVE OF THE DIFFERENT INTERPRETATIONS. NO CHANGE ORDER SHALL BE PROCESSED FOR A FAILURE TO COMPLY WITH THIS REQUIREMENT.	
GUARANTEE AND SERVICE OWNER RESERVES THE RIGHT TO MAKE EMERGENCY REPAIRS AS REQUIRED TO KEEP EQUIPMENT IN OPERATION WITHOUT VOIDING CONTRACTOR'S GUARANTEE BOND NOR RELIEVING CONTRACTOR OF HIS RESPONSIBILITIES DURING GUARANTEE PERIOD.	
APPROVAL SUBMITTALS BEFORE ORDERING ANY MATERIALS OR EQUIPMENT, AND <u>WITHIN 30 DAYS AFTER THE AWARD OF CONTRACT THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER ONE COMPLETE SUBMITTAL CONTROL LOG</u> SHOWING THE MAKE, TYPE, MANUFACTURER'S NAME AND TRADE DESIGNATION OF ALL EQUIPMENT.	
THIS LOG SHALL BE ACCOMPANIED BY PDF COPIES OF THE MANUFACTURER'S PRINTED SPECIFICATIONS AND SHOP DRAWINGS FOR EACH PIECE OF EQUIPMENT OR SPECIALTY AND SHALL GIVE DIMENSIONS, DIAGRAMS, DESCRIPTIVE LITERATURE, CAPACITY OR RATING, KIND OF MATERIAL, FINISH, GUARANTEE, ETC., AND SUCH OTHER DETAILED INFORMATION AS THE ENGINEER MAY REQUIRE.	
WHEN APPROVED, THE SUBMITTAL CONTROL LOG AND SUBMITTALS SHALL BE AN ADDITION TO THE SPECIFICATIONS HEREWITH, AND SHALL BE OF EQUAL FORCE IN THAT NO DEVIATION WILL BE PERMITTED EXCEPT WITH THE APPROVAL OF THE ARCHITECT/ENGINEER.	
SHOP DRAWINGS, PRODUCT LITERATURE, AND OTHER APPROVAL SUBMITTALS WILL NOT BE REVIEWED IF THEY ARE SUBMITTED IN FULL ACCORDANCE WITH THE GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS <u>AND</u> THE FOLLOWING.	
SUBMITTALS SHALL BE PROPERLY ORGANIZED IN ACCORDANCE WITH THE APPROVED SUBMITTAL CONTROL LOG.	
SUBMITTALS SHALL NOT INCLUDE ITEMS FROM MORE THAN ONE SPECIFICATION SECTION IN THE SAME SUBMITTAL PACKAGE.	
SUBMITTALS SHALL BE PROPERLY IDENTIFIED BY A COVER SHEET SHOWING THE PROJECT NAME, ARCHITECT AND ENGINEER NAMES, SUBMITTAL CONTROL NUMBER, SPECIFICATION SECTION, A LIST OF PRODUCTS OR ITEM NAMES WITH MODEL NUMBERS IN THE ORDER THEY APPEAR IN THE PACKAGE, AND SPACES FOR APPROVAL STAMPS. A SAMPLE COVER SHEET IS INCLUDED AT THE END OF THIS SECTION.	
SUBMITTALS SHALL HAVE BEEN REVIEWED AND APPROVED BY THE GENERAL CONTRACTOR (OR PRIME CONTRACTOR). EVIDENCE OF THIS REVIEW AND APPROVAL SHALL BE AN "APPROVED" STAMP WITH A SIGNATURE AND DATE; OR AT A MINIMUM, STAMP SHALL INDICATE THE EXCEPTIONS TAKEN BY THE CONTRACTOR AND THESE EXCEPTIONS SHALL NOT INDICATE SUBSTANTIAL DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS IN THE JUDGEMENT OF THE ENGINEERS.	
SUBMITTALS THAT INCLUDE A SERIES OF FIXTURES OR DEVICES SHALL BE ORGANIZED BY THE FIXTURE NUMBER OR DEVICE TYPE AND BE MARKED ACCORDINGLY. EACH FIXTURE MUST INCLUDE <u>ALL</u> ITEMS ASSOCIATED WITH THAT FIXTURE REGARDLESS OF WHETHER OR NOT THOSE ITEMS ARE USED ON OTHER FIXTURES.	
THE ELECTRICAL DESIGN SHOWN ON THE DRAWINGS SUPPORTS THE MECHANICAL EQUIPMENT BASIS OF DESIGN SPECIFICATIONS AT THE TIME OF DESIGN. IF MECHANICAL EQUIPMENT IS SUBMITTED WITH DIFFERENT ELECTRICAL REQUIREMENTS, IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO RESOLVE ALL REQUIRED ELECTRICAL DESIGN CHANGES (WIRE AND CONDUIT SIZE, TYPE OF DISCONNECT OR OVERLOAD PROTECTION, POINT(S) OF CONNECTION, ETC.) AND CLEARLY SHOW THE NEW ELECTRICAL DESIGN ON THE MECHANICAL SUBMITTAL WITH A WRITTEN STATEMENT THAT THIS CHANGE WILL BE PROVIDED AT NO ADDITIONAL COST. MECHANICAL SUBMITTALS MADE WITH NO WRITTEN REFERENCE TO THE ELECTRICAL DESIGN WILL BE PRESUMED TO WORK WITH THE ELECTRICAL DESIGN. ANY CORRECTIONS REQUIRED WILL BE AT NO ADDITIONAL COST.	
IF THE SHOP DRAWINGS SHOW VARIATION FROM THE REQUIREMENTS OF CONTRACT BECAUSE OF STANDARD SHOP PRACTICE OR OTHER REASONS, THE CONTRACTOR SHALL MAKE SPECIFIC MENTION OF SUCH VARIATION IN WRITING IN HIS LETTER OF TRANSMITTAL AND ON THE SUBMITTAL COVER SHEET IN ORDER THAT, IF ACCEPTABLE, CONTRACTOR WILL NOT BE RELIEVED OF THE RESPONSIBILITY FOR EXECUTING THE WORK IN ACCORDANCE WITH THE CONTRACT.	
REVIEW OF SUBMITTALS, PRODUCT LITERATURE, CATALOG DATA, OR SCHEDULES BY THE ENGINEER SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM CONTRACT DRAWINGS OR SPECIFICATIONS, UNLESS HE HAS IN WRITING CALLED TO THE ATTENTION OF THE ARCHITECT/ENGINEER EACH SUCH DEVIATION IN WRITING AT THE TIME OF SUBMISSION, NOR SHALL IT RELIEVE HIM FROM RESPONSIBILITY FOR ERRORS OF ANY SORT IN SHOP DRAWINGS, PRODUCT LITERATURE, CATALOG DATA, OR SCHEDULES. ANY FEATURE OR FUNCTION SPECIFIED BUT NOT MENTIONED IN THE SUBMITTAL SHALL BE ASSUMED TO BE INCLUDED PER THE SPECIFICATION.	

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SUBMIT SHOP DRAWINGS AND ANY OTHER DRAWINGS SPECIFICALLY CALLED FOR IN OTHER SECTIONS AFTER AWARD OF THE CONTRACT AND BEFORE ANY MATERIAL IS ORDERED OR FABRICATED. SHOP DRAWINGS SHALL CONSIST OF PLANS, SECTIONS, ELEVATIONS AND DETAILS TO SCALE (NOT SMALLER THAN 1/4" PER FOOT), WITH DIMENSIONS CLEARLY SHOWING THE INSTALLATION. DIRECT COPIES OF SMALL-SCALE PROJECT DRAWINGS ISSUED TO THE CONTRACTOR ARE NOT ACCEPTABLE. DRAWINGS SHALL TAKE INTO ACCOUNT EQUIPMENT FURNISHED UNDER OTHER SECTIONS AND SHALL SHOW SPACE ALLOTTED FOR IT. INCLUDE CONSTRUCTION DETAILS AND MATERIALS.	
INDEPENDENT TESTING AGENCY: WHERE TESTING BY AN INDEPENDENT TESTING AGENCY IS REQUIRED OR SELECTED BY THE CONTRACTOR, THE REQUIREMENTS BELOW SHALL BE MET. THE TESTING FIRM SHALL BE AN INDEPENDENT TESTING ORGANIZATION WHICH SHALL FUNCTION AS AN UNBIASED TESTING AUTHORITY, PROFESSIONALLY INDEPENDENT OF THE MANUFACTURERS, SUPPLIERS, AND INSTALLERS OF EQUIPMENT OR SYSTEMS EVALUATED BY THE TESTING FIRM. THE TESTING FIRM SHALL BE REGULARLY ENGAGED IN THE TESTING OF ELECTRICAL EQUIPMENT DEVICES, INSTALLATIONS, AND SYSTEMS. THE TESTING FIRM SHALL UTILIZE TECHNICIANS WHO ARE REGULARLY EMPLOYED BY THE FIRM FOR TESTING SERVICES. THE TESTING FIRM SHALL SUBMIT PROOF OF THE ABOVE QUALIFICATIONS WITH BID DOCUMENTS.	
PRODUCTS ALL MATERIALS SHALL BE NEW AND UNUSED, THE BEST OF THEIR RESPECTIVE KINDS, SUITABLE FOR THE CONDITIONS AND DUTIES IMPOSED ON THEM. THE DESCRIPTION, CHARACTERISTICS, AND REQUIREMENTS OF MATERIALS TO BE USED SHALL BE IN ACCORDANCE WITH QUALIFYING CONDITIONS ESTABLISHED IN THE FOLLOWING SECTIONS. EQUIPMENT AND MATERIALS: EQUIPMENT AND MATERIALS FURNISHED UNDER THIS DIVISION SHALL BE THE PRODUCT OF A MANUFACTURER REGULARLY ENGAGED IN THE MANUFACTURE OF SUCH ITEMS FOR A PERIOD OF THREE YEARS. WHERE PRACTICAL, ALL OF THE COMPONENTS SHALL BE PRODUCTS OF A SINGLE MANUFACTURER IN ORDER TO PROVIDE PROPER COORDINATION AND RESPONSIBILITY. WHERE REQUIRED, CONTRACTOR SHALL FURNISH PROOF OF INSTALLATION OF SIMILAR EQUIPMENT OR MATERIALS. EACH ITEM OF EQUIPMENT SHALL BEAR A NAME PLATE SHOWING THE MANUFACTURER'S NAME, TRADE NAME, MODEL NUMBER, SERIAL NUMBER, RATINGS AND OTHER INFORMATION NECESSARY TO FULLY IDENTIFY IT. THIS PLATE SHALL BE PERMANENTLY MOUNTED IN A PROMINENT LOCATION AND SHALL NOT BE CONCEALED, INSULATED OR PAINTED. THE LABEL OF THE APPROVING AGENCY, SUCH AS UL OR NEMA, BY WHICH A STANDARD HAS BEEN ESTABLISHED FOR THE PARTICULAR ITEM SHALL BE IN FULL VIEW. MATERIALS SHALL BE UL-LISTED FOR THE APPLICATION SPECIFIED OR INDICATED ON THE DRAWINGS OR SPECIFICATIONS. ALL MATERIALS PROVIDED SHALL BE INSTALLED IN CONFORMANCE WITH THEIR UL-LISTING REQUIREMENTS AND WITH THEIR MANUFACTURER'S INSTALLATION INSTRUCTIONS. MATERIALS AND EQUIPMENT ARE SPECIFIED HEREIN BY A SINGLE OR BY MULTIPLE MANUFACTURERS TO INDICATE QUALITY, MATERIAL AND TYPE OF CONSTRUCTION DESIRED. MANUFACTURER'S PRODUCTS SHOWN ON THE DRAWINGS HAVE BEEN USED AS BASIS FOR DESIGN; IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THAT ALTERNATE MANUFACTURER'S PRODUCTS MEET DETAILED SPECIFICATIONS AND THAT SIZE AND ARRANGEMENT OF EQUIPMENT ARE SUITABLE FOR INSTALLATION. MODEL NUMBERS: CATALOG NUMBERS AND MODEL NUMBERS INDICATED IN THE DRAWINGS AND SPECIFICATIONS ARE USED AS A GUIDE IN THE SELECTION OF THE EQUIPMENT AND ARE ONLY LISTED FOR THE CONTRACTOR'S CONVENIENCE. THE CONTRACTOR SHALL DETERMINE THE ACTUAL MODEL NUMBERS FOR ORDERING EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE WRITTEN DESCRIPTION OF EACH ITEM AND WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS.	
REQUESTS FOR SUBSTITUTION: WHERE A PARTICULAR SYSTEM, PRODUCT OR MATERIAL IS SPECIFIED BY NAME, CONSIDER IT AS STANDARD BASIS FOR BIDDING, AND BASE PROPOSAL ON THE PARTICULAR SYSTEM, PRODUCT OR MATERIAL SPECIFIED. OTHER SYSTEMS, PRODUCTS, EQUIPMENT OR MATERIALS MAY BE ACCEPTED ONLY IF IN THE OPINION OF THE ENGINEER, THEY ARE EQUIVALENT IN QUALITY AND WORKMANSHIP AND WILL PERFORM SATISFACTORILY ITS INTENDED PURPOSE. ALL SUCH SUBSTITUTIONS IN MATERIALS OR EQUIPMENT SHALL BE APPROVED IN WRITING BY THE ENGINEER. IN MAKING REQUESTS FOR SUBSTITUTIONS, THE CONTRACTOR SHALL LIST THE PARTICULAR SYSTEM, PRODUCT, EQUIPMENT OR MATERIAL HE WISHES TO SUBSTITUTE AND AT BID TIME THE CONTRACTOR SHALL STATE THE AMOUNT HE WILL ADD OR DEDUCT FROM HIS BASE BID IF THE SUBSTITUTION IS APPROVED BY THE ENGINEER. IF NO DEDUCTION OR ADDITION TO THE BASE BID IS ALLOWED BY THE CONTRACTOR FOR SUCH SUBSTITUTION, IT SHALL BE SO STATED ON THE REQUEST. REQUESTS BY CONTRACTOR FOR SUBSTITUTION WILL BE CONSIDERED ONLY WHEN REASONABLE, TIMELY, FULLY DOCUMENTED, AND QUALIFYING UNDER ONE OR MORE OF THE FOLLOWING CIRCUMSTANCES. REQUIRED PRODUCT CANNOT BE SUPPLIED IN TIME FOR COMPLIANCE WITH CONTRACT TIME REQUIREMENTS. REQUIRED PRODUCT IS NOT ACCEPTABLE TO GOVERNING AUTHORITY, OR DETERMINED TO BE NON-COMPATIBLE, OR CANNOT BE PROPERLY COORDINATED, WARRANTED OR INSURED, OR HAS OTHER RECOGNIZED DISABILITY AS CERTIFIED BY CONTRACTOR. SUBSTANTIAL COST ADVANTAGE IS OFFERED OWNER AFTER DEDUCTING OFF-SETTING DISADVANTAGES INCLUDING DELAYS, ADDITIONAL COMPENSATION FOR REDESIGN, INVESTIGATION, EVALUATION AND OTHER NECESSARY SERVICES AND SIMILAR CONSIDERATIONS. ALL REQUESTS FOR SUBSTITUTION SHALL CONTAIN A "COMPARISON SCHEDULE" AND CLEARLY AND SPECIFICALLY INDICATE ANY AND ALL DIFFERENCES OR OMISSIONS BETWEEN THE PRODUCT SPECIFIED AS THE BASIS OF DESIGN AND THE PRODUCT PROPOSED FOR SUBSTITUTION. DIFFERENCES SHALL INCLUDE BUT SHALL NOT BE LIMITED TO DATA AS FOLLOWS FOR BOTH THE SPECIFIED AND SUBSTITUTED PRODUCTS: PRINCIPLE OF OPERATION. MATERIALS OF CONSTRUCTION OR FINISHES. THICKNESS OF MATERIALS. WEIGHT OF ITEM. DELETED FEATURES OR ITEMS. ADDED FEATURES OR ITEMS. CHANGES IN OTHER WORK CAUSED BY THE SUBSTITUTION. PERFORMANCE AND RATING DATA. IF THE APPROVED SUBSTITUTION CONTAINS DIFFERENCES OR OMISSIONS NOT SPECIFICALLY CALLED TO THE ATTENTION OF THE ENGINEER, THE OWNER RESERVES THE RIGHT TO REQUIRE EQUAL OR SIMILAR FEATURES TO BE ADDED TO THE SUBSTITUTED PRODUCTS AT THE CONTRACTOR'S EXPENSE.	
EXECUTION WORKMANSHIP: ALL MATERIALS, FIXTURES, AND EQUIPMENT SHALL BE INSTALLED AND COMPLETED IN A FIRST-CLASS WORKMANLIKE MANNER AND IN ACCORDANCE WITH THE BEST MODERN METHODS AND PRACTICE. ANY MATERIALS INSTALLED WHICH DO NOT PRESENT AN ORDERLY AND REASONABLY NEAT AND/OR WORKMANLIKE APPEARANCE, OR DO NOT ALLOW ADEQUATE SPACE FOR MAINTENANCE, SHALL BE REMOVED AND REPLACED WHEN SO DIRECTED BY THE ENGINEER. COORDINATION: THE CONTRACTOR SHALL BE RESPONSIBLE FOR FULL COORDINATION OF THE ELECTRICAL SYSTEMS WITH SHOP DRAWINGS OF THE BUILDING CONSTRUCTION SO THE PROPER OPENINGS AND SLEEVES OR SUPPORTS ETC., ARE PROVIDED FOR CONDUIT, DEVICES, OR OTHER EQUIPMENT PASSING THROUGH SLABS OR WALLS. MEANS OF SUPPORT FOR ALL LIGHTING FIXTURES, RACEWAY, DEVICES, OR OTHER ITEMS SUSPENDED FROM THE CEILING (OR OTHERWISE FROM ABOVE) SHALL BE FULLY COORDINATED WITH AND IN COMPLIANCE WITH ALL REQUIREMENTS AND RECOMMENDATIONS OF THE MANUFACTURER OF EQUIPMENT SUSPENDED. COORDINATION WITH OTHER DIVISIONS OF THIS CONTRACT SHALL BE PROVIDED, PRIOR TO BID, AS NECESSARY TO PROPERLY SUPPLY POWER TO EQUIPMENT IN COMPLIANCE WITH THE UL LISTINGS OF THIS EQUIPMENT. THE DIVISION 26 DESIGN MAY PROVIDE A NUMBER OF BRANCH CIRCUITS, PHASES, AMPACITY, AND OVERCURRENT PROTECTION DEVICES FOR DESIGN-BASIS EQUIPMENT, PROVIDED BY OTHER DIVISIONS OF THIS CONTRACT, CONFORMING WITH THE EQUIPMENT MANUFACTURER'S SPECIFICATIONS AVAILABLE AT THE TIME OF DESIGN. MANUFACTURER'S SPECIFICATIONS AVAILABLE AT THE TIME OF DESIGN OFTEN DIFFER SUBSTANTIALLY FROM THE SPECIFICATIONS OF THE EQUIPMENT ACTUALLY PROVIDED UNDER THE CONTRACT FOR CONSTRUCTION DUE TO VALUE ENGINEERING, DUE TO THE USE OF ALTERNATE APPROVED EQUIPMENT MANUFACTURERS, OR DUE TO PERIODIC CHANGES IN THE SPECIFICATIONS OF THE EQUIPMENT PROVIDED BY OTHER DIVISIONS OF THIS CONTRACT. PRIOR TO BID, CONTRACTOR SHALL COORDINATE WITH SPECIFICATIONS, RECOMMENDATIONS, AND REQUIREMENTS OF EQUIPMENT TO ACTUALLY BE PROVIDED UNDER CONTRACT FOR CONSTRUCTION. IF REQUIREMENTS OF EQUIPMENT ACTUALLY PROVIDED ARE DIFFERENT FROM ELECTRICAL DESIGN, CONTRACTOR SHALL MAKE ALL CHANGES REQUIRED WITHOUT INCREASE IN CONTRACT AMOUNT OR TIME SCHEDULE. SUCH CHANGES MAY INCLUDE - BUT SHALL NOT BE LIMITED TO - CHANGING THE SIZE, TYPE, OR QUANTITY OF CONDUCTORS, CONDUITS, CIRCUIT BREAKERS, FUSE PROTECTION, PANELBOARDS, SWITCHBOARDS, AND DISCONNECT SWITCHES. NO CHANGES IN TIME SCHEDULE OR CONTRACT AMOUNT SHALL BE APPROVED DUE TO A FAILURE TO PERFORM THIS REQUIRED COORDINATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL EQUIPMENT THAT MAY REQUIRE MAINTENANCE AND OPERATION ARE MADE EASILY ACCESSIBLE, REGARDLESS OF THE DIAGRAMMATIC LOCATION SHOWN ON THE DRAWINGS. ALL OPTIONAL COLOR SELECTIONS WHICH ARE MADE FOR ANY ELECTRICAL MATERIALS SHALL BE APPROVED BY THE ARCHITECT AND OWNER PRIOR TO ORDERING ANY MATERIALS. ALL CONNECTIONS TO FIXTURES AND EQUIPMENT SHOWN ON THE DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC UNLESS OTHERWISE INDICATED BY A SPECIFIC DETAIL ON THE DRAWINGS. THE ACTUAL CONNECTIONS SHALL BE MADE TO FULLY SUIT THE REQUIREMENTS OF EACH CASE AND ADEQUATELY PROVIDE FOR SERVICING. THE CONTRACTOR SHALL PROTECT EQUIPMENT AND FIXTURES AT ALL TIMES DURING STORAGE AND CONSTRUCTION. HE SHALL REPLACE ALL EQUIPMENT AND FIXTURES WHICH ARE DAMAGED AS A RESULT OF INADEQUATE PROTECTION. PRIOR TO STARTING AND DURING PROGRESS OF WORK, EXAMINE WORK AND MATERIALS INSTALLED BY OTHERS AS THEY APPLY TO WORK IN THIS DIVISION. REPORT CONDITIONS WHICH WILL PREVENT SATISFACTORY INSTALLATION. START OF WORK WILL BE CONSTRUED AS ACCEPTANCE OF SUITABILITY OF WORK OF OTHERS.	
CONSTRUCTION ELECTRICAL UTILITIES: PROVIDE ALL TEMPORARY WIRING FOR POWER AND LIGHT REQUIRED FOR CONSTRUCTION PURPOSES AND REMOVE SUCH TEMPORARY WIRING WHEN USE IS NO LONGER REQUIRED. INTERRUPTION OF SERVICE: BEFORE ANY EQUIPMENT IS SHUT DOWN FOR DISCONNECTING OR TIE-INS, ARRANGEMENTS SHALL BE MADE WITH THE ENGINEER AND OWNER AND THIS WORK SHALL BE DONE AT THE TIME BEST SUITED TO THE OWNER. OUTAGES MUST BE SCHEDULED THROUGH THE ENGINEER. EXTENT, LENGTH, AND DURING OF OUTAGES SHALL BE REVIEWED BY THE ENGINEER. SERVICES SHALL BE RESTORED THE SAME DAY. PROVIDE TEMPORARY POWER OR OTHER SERVICES AS REQUIRED DURING OUTAGES.	

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CUTTING AND PATCHING: CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING OF ALL HOLES, CHASES, SLEEVES, AND OTHER OPENINGS REQUIRED FOR INSTALLATION OF EQUIPMENT FURNISHED AND INSTALLED UNDER THESE SPECIFICATIONS. OBTAIN PERMISSION FROM ENGINEER BEFORE CUTTING ANY STRUCTURAL ITEMS. EQUIPMENT SETTING: BOLT EQUIPMENT DIRECTLY TO CONCRETE PADS OR FOUNDATIONS, USING HOT-DIPPED GALVANIZED ANCHOR BOLTS, NUTS AND WASHERS. LEVEL EQUIPMENT. ADDITIONAL STEEL SUPPORT HARDWARE REQUIRED FOR THE INSTALLATION OF ANY ELECTRICAL OR OTHER EQUIPMENT PROVIDED SHALL BE PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO ENSURE THAT ALL PRODUCTS ARE RIGIDLY SECURED TO STRUCTURE PURSUANT TO APPLICABLE PORTIONS OF NEC 300-11. THIS SHALL INCLUDE - BUT SHALL NOT BE LIMITED TO - PROVIDING ADDITIONAL THREADED RODS, METAL FRAMING, AND OTHER HARDWARE REQUIRED TO MINIMIZE HORIZONTAL AS WELL AS VERTICAL MOVEMENT. MEANS OF SUPPORT SHALL BE CLEARLY INDICATED AND FULLY DESCRIBED IN THE SUBMITTAL FOR ITEMS SUSPENDED. THREADED RODS SHALL NOT BE USED AS SOLE MEANS OF SUPPORT FOR SUSPENDED RACEWAY UNLESS APPROVED IN WRITING BY ENGINEER OR UNLESS ASSEMBLY CAN BE DEMONSTRATED TO BE SUBSTANTIALLY FREE FROM SIGNIFICANT HORIZONTAL OR VERTICAL SWAY OR MOVEMENT AS IS REQUIRED TO COMPLY WITH NEC. THREADED RODS SHALL NOT BE USED AS MEANS OF SUPPORT FOR LIGHTING FIXTURES UNLESS APPROVED IN WRITING BY ENGINEER. PAINTING: TOUCH-UP FACTORY FINISHES ON EQUIPMENT LOCATED INSIDE AND OUTSIDE SHALL BE DONE UNDER DIVISION 26. OBTAIN MATCHED COLOR COATINGS FROM THE MANUFACTURER AND APPLY AS DIRECTED BY MANUFACTURER. IF CORROSION IS FOUND DURING INSPECTION ON THE SURFACE OF ANY EQUIPMENT, CLEAN, PRIME, AND PAINT, AS REQUIRED. CLEAN-UP: THOROUGHLY CLEAN ALL EXPOSED PARTS OF APPARATUS AND EQUIPMENT OF CEMENT, PLASTER, AND OTHER MATERIALS AND REMOVE ALL OIL AND GREASE SPOTS. REPAINT OR TOUCH UP AS REQUIRED TO LOOK LIKE NEW. DURING PROGRESS OF WORK, CONTRACTOR IS TO CAREFULLY CLEAN AND LEAVE PREMISES FREE FROM DEBRIS AND IN A SAFE CONDITION. START-UP AND OPERATIONAL TEST: START EACH ITEM OF EQUIPMENT IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS; OR WHERE NOTED UNDER EQUIPMENT SPECIFICATION, START-UP SHALL BE DONE BY A QUALIFIED REPRESENTATIVE OF THE MANUFACTURER. ALIGNMENT, LUBRICATION, SAFETY, AND OPERATING CONTROL SHALL BE INCLUDED IN START-UP CHECK. RECORD DRAWINGS: DURING THE PROGRESS OF THE WORK THE CONTRACTOR SHALL RECORD ON THEIR FIELD SET OF DRAWINGS THE CORRECTIONS, VARIATIONS, AND DEVIATIONS FOR SYSTEMS WHICH ARE NOT INSTALLED EXACTLY AS SHOWN ON THE CONTRACT DRAWINGS. UPON COMPLETION OF THE WORK, RECORD DRAWINGS SHALL BE PREPARED AS DESCRIBED IN THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, AND DIVISION 1 SECTIONS. ACCEPTANCE: REQUEST INSPECTIONS AS REQUIRED UNDER THE SUPPLEMENTARY OR GENERAL CONDITIONS. CONCEAL NO WORK UNTIL INSPECTED. PUNCH LIST: SUBMIT WRITTEN CONFIRMATION THAT ALL PUNCH LISTS HAVE BEEN CHECKED AND THE REQUIRED WORK COMPLETED. INSTRUCTIONS: AT COMPLETION OF THE WORK, PROVIDE A COMPETENT AND EXPERIENCED PERSON WHO IS THOROUGHLY FAMILIAR WITH THE PROJECT, FOR A PERIOD DEEMED NECESSARY BY THE OWNER TO INSTRUCT PERMANENT OPERATING PERSONNEL IN THE OPERATION OF EQUIPMENT AND CONTROL SYSTEMS. OPERATION AND MAINTENANCE MANUALS: FURNISH FOUR COMPLETE MANUALS BOUND IN RING BINDERS AND ORGANIZED BY SYSTEM OR SECTION. MANUALS SHALL CONTAIN: DETAILED OPERATING INSTRUCTIONS AND INSTRUCTIONS FOR MAKING MINOR ADJUSTMENTS. COMPLETE WIRING AND CONTROL DIAGRAMS. ROUTINE MAINTENANCE OPERATIONS. MANUFACTURER'S CATALOG DATA, SERVICE INSTRUCTIONS, AND PARTS LISTS FOR EACH PIECE OF OPERATING EQUIPMENT. CONTROL DIAGRAMS: FRAME UNDER GLASS AND MOUNT ON EQUIPMENT ROOM WALL. TEST TOGETHER AND SEPARATELY TO DETERMINE THAT: SYSTEM IS FREE FROM SHORT CIRCUITS AND OTHER FAULTS. MOTOR STARTER OVERLOAD DEVICES ARE SIZED CORRECTLY. MOTORS ROTATE CORRECTLY. ALL EQUIPMENT OPERATES CORRECTLY AND AS SPECIFIED. WARRANTIES: SUBMIT COPIES OF ALL MANUFACTURER'S WARRANTIES. RECORD DRAWINGS: SUBMIT "RECORD DRAWINGS". INSTALL ENGRAVED METAL OR PLASTIC NAMEPLATES OR TAGS ON CONTROLS, PANELS, SWITCHES, STARTERS, TIMERS, AND SIMILAR OPERABLE EQUIPMENT, KEYED BY NUMBER TO OPERATING INSTRUCTIONS. DYMO TYPE LABELS ARE NOT ACCEPTABLE. CONTROLS WIRING AND ALARM WIRING SHALL BE LABELED BY TAGS AT ALL JUNCTION BOXES, DEVICE BOXES, AND ALL ENCLOSURES. LABELING FOR BOXES AND ELECTRICAL DEVICES - PROVIDE BOX AND DEVICE LABELING AS FOLLOWS: SWITCHES - EACH LIGHT SWITCH SHALL BE MARKED BY PANEL NAME AND CIRCUIT NUMBER USING NUMBERED VINYL CLOTH ADHESIVE MARKERS, 1/4" MINIMUM HEIGHT. LOCATE MARKER BEHIND DEVICE COVER PLATE SO IT CAN BE READILY IDENTIFIED BY REMOVAL OF THE COVER PLATE. THOMAS AND BETTS E-Z CODE MARKERS ARE ACCEPTABLE. RECEPTACLES - EACH RECEPTACLE SHALL BE MARKED BY PANEL NAME AND CIRCUIT NUMBER USING NUMBERED VINYL CLOTH ADHESIVE MARKERS, 1/4" MINIMUM HEIGHT. LOCATE MARKER BEHIND DEVICE COVER PLATE SO IT CAN BE READILY IDENTIFIED BY REMOVAL OF THE COVER PLATE. THOMAS AND BETTS E-Z CODE MARKERS ARE ACCEPTABLE. BOXES - ALL MEDIUM VOLTAGE JUNCTION AND PULL BOX COVERS SHALL BE PAINTED PER THE FOLLOWING COLOR CODING. 120 / 208 VOLT BLACK 120 / 208 VOLT EMERGENCY POWER (LIFE SAFETY, NEC 700) BLACK WITH YELLOW STRIPE 120 / 208 VOLT OPTIONAL POWER (NON LIFE SAFETY, NEC 702) BLACK WITH ORANGE STRIPE 277 / 480 VOLT BROWN 277 / 480 VOLT EMERGENCY POWER (LIFE SAFETY, NEC 700) BROWN WITH YELLOW STRIPE 277 / 480 VOLT OPTIONAL POWER (NON LIFE SAFETY, NEC 702) BROWN WITH ORANGE STRIPE ALL MEDIUM VOLTAGE JUNCTION BOX COVERS SHALL BE MARKED USING A PRINTED LABEL OR STENCIL 3/4" MINIMUM HEIGHT. LOCATE LABEL INSIDE OF BOX AS WELL AS ON COVER. BRANCH CIRCUITS: LABEL PANEL NUMBER AND CIRCUIT (USE CKT ABBREVIATION FOR CIRCUIT FOLLOWED BY NUMBER) FEEDER CIRCUITS: LABEL FEEDING PANEL AND LOAD PANEL. AUXILIARY SYSTEMS JUNCTION AND PULL BOX COVERS FIRE ALARM SYSTEMS RED ACCESS CONTROL SECURITY SYSTEMS YELLOW TELECOMMUNICATION SYSTEMS BLUE OTHER SYSTEMS PAINT A UNIQUE COLOR 1. DO NOT USE ANY OF THE ABOVE COLORS, GREEN OR WHITE FOR AREAS WITH NO CEILINGS WHERE ALL SYSTEMS ABOVE THE CEILING SHALL BE PAINTED A SINGLE COLOR. ALL JUNCTION BOXES SHALL HAVE A PRINTED LABEL ON THEM WITH VOLTAGE, POWER SOURCE IF NEEDED (E POWER), PANEL NUMBER (OR FEEDING AND LOAD PANEL NUMBERS), CIRCUIT(S) NUMBER OR WITH THE SERVICE IN THE JUNCTION BOX (FIRE ALARM, ACCESS CONTROL, TELECOM/DATA, HVAC/BAS, ETC.). LOCATE LABEL INSIDE OF BOX AS WELL AS ON COVER. LABELS SHALL BE SELF-ADHESIVE TYPE, WITH 1/2" TALL BLACK LETTERS ON A WHITE OR CLEAR BACKGROUND. ACCEPTANCE WILL BE ON THE BASIS OF TESTS AND INSPECTIONS OF THE WORK. A REPRESENTATIVE OF THE FIRM WHICH PERFORMED THE TESTING SHALL BE IN ATTENDANCE TO ASSIST DURING INSPECTION. CONTRACTOR SHALL FURNISH NECESSARY ELECTRICIANS TO OPERATE SYSTEM, MAKE ANY NECESSARY ADJUSTMENTS AND ASSIST WITH FINAL INSPECTION.	
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**CAMPBELL
SPELLICY**
ENGINEERING
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HIGH SPRINGS FIRE STATION HVAC UPGRADES
18586 NW 238TH ST
HIGH SPRINGS, FL 32643

24062

ADDENDUM #1

ISSUE DATE: 02/21/2025

DESIGN: CGD
QC: KMS

REVISENS

NO.	REFERENCE	DATE
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ELECTRICAL SPECIFICATIONS

SECTION 260020 / CODES AND STANDARDS

GENERAL ALL WORK UNDER DIVISION 26 SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CODES AND STANDARDS LISTED HEREIN. THE DESIGN HAS BEEN BASED ON THE REQUIREMENTS OF THESE CODES AND STANDARDS. WHILE IT IS NOT THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT ALL WORK CALLED FOR COMPLIES WITH THESE CODES AND STANDARDS, HE SHALL BE RESPONSIBLE FOR CALLING TO THE ENGINEER'S ATTENTION ANY DETAILS ON THE DRAWINGS AND/OR SPECIFICATIONS THAT ARE NOT IN CONFORMANCE WITH THESE OR OTHER CODES AND STANDARDS. CURRENT ISSUE OF CODE APPLIES UNLESS SPECIFICALLY NOTED OTHERWISE. COMPLY WITH REGULATIONS AND CODES OF SUPPLIERS OF UTILITIES. WHERE NO SPECIFIC METHOD OR FORM OF CONSTRUCTION IS CALLED FOR IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL COMPLY WITH CODE REQUIREMENTS WHEN CARRYING OUT SUCH WORK. WHERE CODE CONFLICT EXISTS, GENERALLY THE MOST STRINGENT REQUIREMENT APPLIES. CODES OR STANDARDS APPLYING TO A SPECIFIC PART OF THE WORK MAY BE INCLUDED IN THAT SECTION.
CODES FLORIDA BUILDING CODE (FBC) 2023, WITH ALL CURRENTLY-ADOPTED REVISIONS, SUPPLEMENTS, OR OTHER CHANGES. NATIONAL ELECTRICAL CODE (NFPA 70 (NATIONAL FIRE PROTECTION ASSOCIATION)), 2020 NATIONAL ELECTRICAL SAFETY CODE (NESC) LIFE SAFETY CODE (NFPA 101), 2021

STANDARDS ALL ELECTRICAL MATERIALS, INSTALLATION AND SYSTEMS SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS, INCLUDING THE LATEST ADDENDA AND AMENDMENTS: AMERICAN NATIONAL STANDARD INSTITUTES (ANSI) ILLUMINATING ENGINEERING SOCIETY (IES). INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE). NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATIONS (NEMA). NATIONAL FIRE PROTECTION ASSOCIATION (NFPA). OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA). UNDERWRITER'S LABORATORIES, INC. (UL).
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SECTION 260030 / ELECTRICAL RELATED WORK

DIVISION 1 - GENERAL REQUIREMENTS ALL DIVISION 1 SECTIONS APPLY TO ALL DIVISION 26 SECTIONS. COORDINATE WITH THE GENERAL CONTRACTOR FOR ALL CUTTING AND PATCHING. CONTRACTORS PERFORMING DIVISION 26 WORK SHALL INFORM THE GENERAL CONTRACTOR OF ALL CUTTING AND PATCHING REQUIRED PRIOR TO BIDDING AND SHALL COORDINATE INSTALLATION. DIVISION 3 - CONCRETE PERFORM THE FOLLOWING AS PART OF DIVISION 26 WORK, COMPLYING WITH THE REQUIREMENTS OF DIVISION 3, CONCRETE. ROUGH GROUTING IN AND AROUND ELECTRICAL WORK. PATCHING CONCRETE CUT TO ACCOMMODATE ELECTRICAL WORK. DIVISION 7 - THERMAL & MOISTURE PROTECTION REFER TO DIVISION 7, THERMAL AND MOISTURE PROTECTION FOR: INSTALLATION OF ALL SUPPORTS FOR ELECTRICAL WORK. CAULKING AND WATERPROOFING OF ALL WALL AND ROOF MOUNTED ELECTRICAL WORK. PERFORM THE FOLLOWING AS PART OF DIVISION 26 WORK, COMPLYING WITH DIVISION 7 REQUIREMENTS. FIRE BARRIER PENETRATION SEALS. CAULKING AND RELATED SHIELDING AROUND DUCTS AND PIPES FOR SOUND ISOLATION AND ATTENUATION. DIVISION 8 - DOORS AND WINDOWS REFER TO DIVISION 8, DOORS & WINDOWS FOR: INSTALLATION OF ALL ACCESS DOORS FOR ELECTRICAL WORK. DIVISION 9 - FINISHES REFER TO DIVISION 9, FINISHES FOR: PAINTING EXPOSED CONDUIT AND EQUIPMENT. PAINTING STRUCTURAL METAL AND CONCRETE FOR ELECTRICAL WORK. PAINTING ACCESS PANELS. COLORS SHALL BE SELECTED BY THE ARCHITECT FOR ALL PAINTING OF EXPOSED ELECTRICAL WORK UNLESS SPECIFIED HEREIN. PERFORM THE FOLLOWING AS PART OF DIVISION 26 WORK. TOUCH UP PAINTING OF FACTORY FINISHES.
DIVISION 23 - MECHANICAL MECHANICAL CONTRACTOR SHALL FURNISH TO ELECTRICAL CONTRACTOR ALL NECESSARY NAMEPLATE DATA, EQUIPMENT POWER REQUIREMENTS, WIRING DIAGRAMS, ETC., PERTAINING TO THE ELECTRICAL PHASE OF MECHANICAL INSTALLATION, AS WELL AS ALL REQUIRED MOTORS, ON/OFF SWITCHES, WARNING LIGHTS, RELAYS, AND CONTROL DEVICES. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL POWER WIRING, STARTERS AND CONTACTORS, AND MAKE FINAL ELECTRICAL CONNECTIONS TO MOTORS, ON/OFF SWITCHES, WARNING LIGHTS, RELAYS, AND CONTROL DEVICES. DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR, UNLESS SPECIFICALLY NOTED ON THE DRAWINGS AS BEING FURNISHED AS PART OF MECHANICAL EQUIPMENT. ALL DUCT-MOUNTED SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. END OF SECTION

SECTION 260125 / CIRCUIT BREAKERS, MOLDED CASE

GENERAL DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION. DIVISION-26 BASIC ELECTRICAL MATERIALS AND METHODS SECTIONS APPLY TO WORK OF THIS SECTION. SUBMITTALS: SUBMIT THE PRODUCER'S STANDARD DESCRIPTIVE DATA SHEETS FOR EACH TYPE OF PRODUCT BEING PROVIDED. MARK THE DATA SHEET FOR THE PRODUCT BEING PROVIDED WITH AN IDENTIFYING MARK OR ARROW. PRODUCTS ACCEPTABLE PRODUCERS: GENERAL ELECTRIC, SIEMENS/ITE, CUTLER-HAMMER, AND SQUARE D. PRODUCTS SHALL BE FURNISHED BY ONE PRODUCER. GENERAL: PRODUCTS LISTED HEREIN MAY BE COMMON TO VARIOUS DIVISIONS AND SPECIFICATION SECTIONS. PROVIDE MOLDED CASE CIRCUIT BREAKERS WITH A MINIMUM AIC RATING OF 10,000 AMPERES RMS SYMMETRICAL AND WITH HIGHER AIC RATINGS AS INDICATED ON THE DRAWINGS. ANY CIRCUIT BREAKER PROVIDED IN AN EXISTING PANELBOARD OR IN AN EXISTING SWITCHBOARD SHALL HAVE MINIMUM SHORT CIRCUIT INTERRUPTING RATINGS (AIC) EQUAL TO THE HIGHEST RATINGS OF ANY OF THE EXISTING OVERCURRENT DEVICES IN THE SAME PANELBOARD OR SWITCHBOARD AT THE GIVEN VOLTAGE OF THE PANELBOARD OR SWITCHBOARD. ALL CIRCUIT BREAKERS SHALL BE FULLY RATED FOR THE INTERRUPTING RATINGS INDICATED AND SHALL NOT BE SERIES RATED. EVERY OVERCURRENT DEVICE PROVIDED SHALL BE UL APPROVED TO INDIVIDUALLY INTERRUPT ITS RATED SHORT CIRCUIT CURRENT AND SHALL NOT DEPEND UPON OPERATION OF ANOTHER OVERCURRENT DEVICE TO ACHIEVE ITS RATING. SERIES-RATED DEVICES ARE NOT ACCEPTABLE. INDIVIDUAL CIRCUIT BREAKERS SHALL BE SAFETY DEAD FRONT UNITS IN NEMA TYPE ENCLOSURE. MOLDED CASE CIRCUIT BREAKERS SHALL HAVE OVERCENTER, TRIP FREE, TOGGLE-TYPE OPERATING MECHANISMS WITH QUICK-MAKE, QUICK-BREAK ACTION AND POSITIVE HANDLE INDICATION. ALL BREAKERS SHALL BE BOLT-ON TYPE. TWO AND THREE POLE CIRCUIT BREAKERS SHALL HAVE A COMMON TRIP. EACH CIRCUIT BREAKER SHALL HAVE A PERMANENT TRIP UNIT CONTAINING INDIVIDUAL THERMAL AND MAGNETIC TRIP ELEMENTS IN EACH POLE. THE CIRCUIT BREAKER SHALL BE CONSTRUCTED TO ACCOMMODATE THE SUPPLY CONNECTIONS AT EITHER END. CIRCUIT BREAKERS PROVIDED SHALL BE HACR-TYPE AS REQUIRED BY THE MANUFACTURERS OF THE EQUIPMENT SUPPLIED; SEE PARAGRAPH 3.1, BELOW. CIRCUIT BREAKER OPERATING HANDLE SHALL ASSUME A CENTER POSITION WHEN TRIPPED. CIRCUIT BREAKERS SHALL BE CALIBRATED FOR OPERATION IN AN AMBIENT TEMPERATURE OF 40 ° C. PROVIDE MOLDED CASE CIRCUIT BREAKERS WITH SHUNT TRIP FEATURES WHERE INDICATED ON THE DRAWINGS.

EXECUTION CONTRACTOR SHALL COORDINATE EXACT ELECTRICAL REQUIREMENTS AND CIRCUIT BREAKER TYPES WITH THAT WHICH IS REQUIRED BY MANUFACTURERS OF THE EQUIPMENT SUPPLIED ~ AS NECESSARY TO MAINTAIN EQUIPMENT'S UL LISTING; COORDINATE WITH OTHER DIVISIONS OF THIS CONTRACT. CONTRACTOR SHALL PROVIDE HACR-TYPE CIRCUIT BREAKERS AS REQUIRED BY MANUFACTURERS OF EQUIPMENT SUPPLIED. SEE PARAGRAPH 3.2.3 OF SECTION 26005 OF THE PROJECT MANUAL. PROVIDE CIRCUIT BREAKERS AS SPECIFIED IN THE PANELBOARD SCHEDULES ON THE DRAWINGS. AMPERE RATINGS AND THE NUMBER OF POLES ARE INDICATED ON THE PANELBOARD SCHEDULES. CIRCUIT BREAKERS SHALL BE SUITABLE FOR MOUNTING AND OPERATING IN ANY POSITION. CIRCUIT BREAKERS SHALL BE UL LISTED. SHUNT TRIP DEVICE WHERE REQUIRED SHALL OPERATE IN CONJUNCTION WITH CONTACT CLOSURE OF PUSH BUTTON, GROUND FAULT RELAY OR OTHER PILOT DEVICE TO TRIP OPEN ASSOCIATED CIRCUIT BREAKERS UPON COMMAND. COILS OF SHUNT TRIP DEVICE SHALL BE RATED CONTINUOUS DUTY AND SHALL INCLUDE INTERLOCK ARRANGEMENT TO CLEAR POWER FROM COIL AFTER OPERATION. CONTROL POWER WHERE NO OTHER SOURCE OF CONTROL POWER IS INDICATED, ENERGY TO ACTUATE TRIPPING DEVICES THROUGH ACTION OF PILOT DEVICE SHALL BE 120 VOLTS, 60 HZ AS FOLLOWS: 120/240 VOLT PANELBOARDS: ENERGY SHALL BE FROM DEDICATED BRANCH CIRCUIT BREAKER OF PANELBOARD SET TO TRIP AT NOT GREATER THAN 20 AMPERES. TESTING: TEST ALL CIRCUIT BREAKERS WHICH ARE RATED 200 AMPS OR GREATER, BOTH MAIN AND FEEDERS, USING STANDARD TESTS TO VERIFY OVERCURRENT AND TIME DELAY SETTINGS AND CHARACTERISTICS. DEFECTIVE DEVICES SHALL BE REPLACED AND THE REPLACEMENT DEVICE TESTED. ALL TESTING SHALL BE PERFORMED BY AND INDEPENDENT ELECTRICAL TESTING ORGANIZATION REGULARLY INVOLVED IN SUCH WORK. SUBMIT NAME OF TESTING AGENCY THIRTY DAYS PRIOR TO TEST AND ADVISE ENGINEER OF TEST TIME AND DATE AT LEAST TWO WEEKS IN ADVANCE. SUBMIT FOUR COPIES OF TEST RESULTS, INCLUDING DEVICE OPERATING CHARACTERISTICS PLOTTED ON LOG-LOG TIME-CURRENT PAPER AND OPERATING AND MAINTENANCE MANUALS.
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SECTION 260101 / CONDUCTOR AND CABLE IDENTIFICATION

GENERAL DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO THE WORK OF THIS SECTION. THIS SECTION IS A DIVISION-26 BASIC MATERIALS AND METHODS SECTION, AND IS PART OF EACH DIVISION-26 SECTION MAKING REFERENCE TO OR REQUIRING PRODUCTS SPECIFIED HEREIN. THIS SECTION PROVIDES THE REQUIREMENTS FOR IDENTIFICATION OF GROUNDED CONDUCTORS (NEUTRAL), GROUNDING CONDUCTORS, UNGROUNDED CONDUCTORS AND TERMINALS. GROUNDED CONDUCTOR (NEUTRAL), SIZE NO. 6 AWG OR SMALLER, SHALL BE IDENTIFIED BY A CONTINUOUS OUTER FINISH ALONG ITS ENTIRE LENGTH WHICH IS THE COLOR STATED BELOW. SIZES LARGER THAN NO. 6 AWG SHALL BE IDENTIFIED EITHER BY A CONTINUOUS OUTER FINISH ALONG ITS ENTIRE LENGTH OR AT THE TIME OF INSTALLATION BY A DISTINCTIVE MARKING AT ITS TERMINATIONS, WHICH IS THE COLOR STATED BELOW. A CONTINUOUS WHITE OR NATURAL GRAY COVERING ON A CONDUCTOR OR A TERMINATION MARKING OF WHITE OR NATURAL GRAY COLOR SHALL BE USED ONLY FOR THE GROUNDED CONDUCTOR (NEUTRAL). SEE BELOW COLORS. TERMINALS TO WHICH A GROUNDED CONDUCTOR IS TO BE CONNECTED SHALL BE SUBSTANTIALLY WHITE IN COLOR OR IDENTIFIED BY WHITE MARKINGS. OTHER TERMINALS SHALL BE A DIFFERENT, READILY DISTINGUISHABLE COLOR, OR BY MARKINGS IN DIFFERENT, READILY DISTINGUISHABLE COLORS. GROUNDED CONDUCTOR SIZE NO. 6 AWG OR SMALLER SHALL BE IDENTIFIED BY A CONTINUOUS GREEN OUTER FINISH ALONG ITS ENTIRE LENGTH. SIZES LARGER THAN NO. 6 AWG SHALL BE IDENTIFIED EITHER BY A CONTINUOUS GREEN OUTER FINISH ALONG ITS ENTIRE LENGTH OR AT THE TIME OF INSTALLATION BY A DISTINCTIVE GREEN MARKING AT ITS TERMINATION. TERMINALS TO WHICH GROUNDING CONDUCTORS ARE CONNECTED SHALL BE GREEN IN COLOR. A CONTINUOUS GREEN COVERING ON A CONDUCTOR OR A TERMINATION MARKING OF GREEN SHALL BE USED ONLY FOR THE GROUNDING CONDUCTOR. CONTROL WIRING AND DATA CABLES SHALL BE IDENTIFIED BY HEAT SHRINK SLEEVES AT BOTH ENDS HOT STAMPED WITH WIRE NUMBERS COORDINATED TO WIRING DIAGRAMS. ADHESIVELY ATTACHED BRADY TAG TYPE MARKERS ARE SPECIFICALLY FORBIDDEN. ALL TERMINAL BOARDS SHALL BE NUMBERED. PRODUCTS COMPLY WITH THE SECTION 26100, "BASIC MATERIALS AND METHODS."
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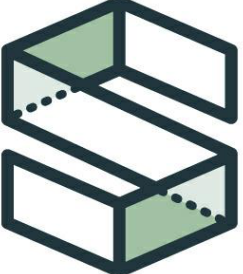
EXECUTION IDENTIFICATION OF CONDUCTORS SHALL FOLLOW THE FORMAT SET FORTH HEREIN FOR THE ELECTRICAL CHARACTERISTICS AS INDICATED: 120/240 VOLT THREE PHASE 4 WIRE DELTA NEUTRAL WHITE PHASE A BLACK PHASE B HIGH LEG RED PHASE C BLUE GROUNDING CONDUCTOR GREEN

WHERE MORE THAN ONE NOMINAL VOLTAGE SYSTEM EXISTS, PROVIDE 1/8" THICK ENGRAVED PHENOLIC WHITE ON BLACK LETTERED SIGN ON EVERY BRANCH CIRCUIT PANELBOARD IN THE PROJECT, NEW OR EXISTING, IN COMPLIANCE WITH NEC 210.5. COMMUNICATION, TEMPERATURE CONTROL AND FIRE ALARM CONDUCTORS SHALL BE COLOR CODED OR PERMANENTLY TAGGED FOR IDENTIFICATION. THE COLORS SHALL NOT INCLUDE WHITE, GRAY, OR GREEN BASE COLORS OR STRIPES (TRACERS) UNLESS THESE COLORS ARE USED ON GROUNDED CONDUCTORS OR GROUNDING CONDUCTORS. COLORS SHALL COMPLY WITH THE INSULATED POWER CABLE ENGINEERS ASSOCIATION (IPCEA) METHOD K-2 CHART. FOR DIRECT CURRENT (DC) SYSTEMS, BLACK SHALL BE NEGATIVE AND RED SHALL BE POSITIVE. IDENTIFICATION SHALL BE PROVIDED AT TERMINATIONS OF THE CONDUCTORS AND AT JUNCTION BOXES, TERMINALS OR CABINETS WHEN MULTI CONDUCTORS ARE INSTALLED AT THESE LOCATIONS. FIRE ALARM CONDUCTORS SHALL CONFORM WITH THE COLOR CODE SPECIFIED IN THE SPECIFICATION SECTION TITLED, "FIRE DETECTION AND ALARM SYSTEM." TAG OR LABEL EACH CONDUCTOR WITH ZONE NUMBERS AT EACH END AND IN EACH JUNCTION OR PULL BOX IN THE RACEWAY SYSTEM. EXAMPLE ZONE 1, ZONE 2 ETC. EACH CONDUCTOR SHALL HAVE IN ADDITION TO THE ZONE NUMBER A TERMINAL NUMBER AT EACH END.
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SECTION 260170 / GENERAL WIRING DEVICES

GENERAL DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION. DIVISION-26 BASIC ELECTRICAL MATERIALS AND METHODS SECTIONS APPLY TO WORK OF THIS SECTION. SUBMITTALS: SUBMIT THE PRODUCER'S STANDARD DESCRIPTIVE DATA SHEETS FOR EACH TYPE OF PRODUCT BEING PROVIDED. MARK THE DATA SHEET FOR THE PRODUCT BEING PROVIDED WITH AN IDENTIFYING MARK OR ARROW. PRODUCTS ACCEPTABLE PRODUCERS: LEVITON, GENERAL ELECTRIC, HUBBELL, PASS AND SEYMOUR, SIERRA, BRYANT, OR EAGLE ELECTRIC. GENERAL: DEVICES SHALL BE SPECIFICATION GRADE. USE WHITE FINISHED DEVICES THROUGHOUT EXCEPT AS HEREINAFTER NOTED OTHERWISE. ANY COLOR SELECTION SHALL BE APPROVED BY ARCHITECT PRIOR TO ORDERING. SEE ELECTRICAL DRAWINGS FOR GANG SWITCHES, RECEPTACLES AND NOTES FOR SPECIAL WIRING DEVICES. ALL WIRING DEVICES, INCLUDING DIMMER SWITCHES, SHALL BE RATED FOR 20A, MINIMUM. RECEPTACLES: CATALOG NUMBERS INDICATED BELOW ARE FOR HUBBELL DEVICES. HUBBELL CATALOG NUMBERS ARE USED TO GIVE A STANDARD FOR BIDDING PURPOSES. HOWEVER, APPROVED EQUALS WILL BE ACCEPTED AS INDICATED IN OTHER SECTIONS OF THESE SPECIFICATIONS. WHERE INDICATED ON THE DRAWINGS, THE FOLLOWING SUFFIXES SHALL BE ADDED TO THE HUBBELL CATALOG NUMBERS DEPENDING ON THE REQUIRED COLOR FINISH: NO SUFFIX INDICATES BLACK OR BROWN COLOR FINISH. ADD PREFIX IG TO INDICATE ISOLATED GROUND DEVICES. ADD PREFIX GF TO INDICATE GROUND FAULT INTERRUPTING DEVICES. DUPLEX RECEPTACLE DEVICES: 20-AMP, 2 POLE, 3 WIRE, 125V, NEMA 5-20R HUBBELL #5362 20-AMP, 2 POLE, 3 WIRE, 250V, NEMA 6-20R HUBBELL #5462 20-AMP, 2 POLE, 3 WIRE, 125V, NEMA 5-20R ONE BOSS, 250V, NEMA 6-20R SECOND BOSS HUBBELL #5492 WEATHERPROOF RECEPTACLES SHALL BE INSTALLED IN FLUSH WEATHERPROOF BOX WITH CAST GASKETED COVER AND SELF-CLOSING SPRING DOOR. PLATES: EXCEPT AS NOTED BELOW, ALL WIRING DEVICE PLATES SHALL BE NYLON OR FIBERGLASS REINFORCED WITH SMOOTH WHITE FINISH. ANY COLOR SELECTIONS SHALL BE APPROVED BY ARCHITECT PRIOR TO ORDERING. EXPOSED WIRING DEVICES SHALL BE PROVIDED WITH GALVANIZED STEEL PLATES WITH ROUNDED CORNERS. UNLESS NOTED OTHERWISE IN THE CONTRACT DOCUMENTS, FLOOR OUTLET COVER PLATES AND RACEWAYS SHALL BE SATIN BRONZE OR CHROME PLATED. BOXES IN WHICH NO DEVICES ARE INSTALLED SHALL BE EQUIPPED WITH BLANK PLATES.

EXECUTION OUTLET BOX HEIGHTS SHALL BE CONSIDERED TO BE MEASURED TO THE CENTER-LINE OF THE BOX UNLESS NOTED OTHERWISE. UNLESS NOTED OTHERWISE, LIGHT SWITCHES SHALL BE PROVIDED AT ONE OF THE FOLLOWING ELEVATIONS: IF THE SWITCH IS IN AN AREA WHICH IS REQUIRED TO BE COMPLIANT WITH THE ACCESSIBILITY REQUIREMENTS FOR THE AMERICANS WITH DISABILITIES ACT AND IF IT IS ABOVE A COUNTER-TOP OR OTHER SUCH PERMANENT OBSTRUCTION WHICH WOULD PREVENT THE CLOSE APPROACH OF A WHEELCHAIR, THEN THE SWITCH SHALL BE LOCATED AT AN ELEVATION OF 45-1/2" ABOVE THE FINISHED FLOOR; AND OTHERWISE, THE SWITCH SHALL BE AT AN ELEVATION OF 47-1/2" ABOVE THE FINISHED FLOOR OR GRADE. DETERMINE DOOR SWINGS FROM ARCHITECTURAL DOCUMENTS BEFORE INSTALLING ROOM SWITCH BOXES. INSTALL SWITCHES ON LATCH SIDE OF DOOR. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO ENSURE THAT ALL SPACES IN BUILDINGS WHICH ARE LARGER THAN 5,000 SQUARE FEET ARE PROVIDED WITH OCCUPANCY SENSORS OR AUTOMATIC LIGHTING CONTROLS SYSTEM FOR THE OCCUPANCY-SENSED OR SCHEDULED CONTROL, RESPECTIVELY. OF ALL LIGHTING FIXTURES PROVIDED UNDER THIS CONTRACT EXCEPT FOR THE APPLICABLE EXCEPTIONS SPECIFIED IN THE FLORIDA BUILDING CODE, AS IS REQUIRED BY THE FLORIDA BUILDING CODE. SOME OF THESE EXCEPTIONS IN THE FLORIDA BUILDING CODE ARE WHERE LIGHTING IS DESIGNATED FOR 24-HOUR ILLUMINATION, WHERE LIGHTING IS FOR SECURITY, OR WHERE LIGHTING IS FOR AREAS WHERE AUTOMATIC CONTROL MIGHT BE DANGEROUS SUCH AS IN MECHANICAL, ELECTRICAL, OR JANITOR ROOMS. PROVIDE GROUND WIRE (#12 AWG GREEN) IN EACH CONDUIT IN ADDITION TO PHASE AND NEUTRAL WIRES. GROUND WIRES SHALL INTERCONNECT EQUIPMENT GROUNDS, RECEPTACLE GROUNDS, OUTLETS AND EXPOSED EQUIPMENT CONDUCTIVE SURFACES WITH GROUND BARS IN PANELBOARDS. FURNISH TEMPLATE FOR RECEPTACLES, SWITCHES AND OTHER CUTOUTS IN CASEWORK TO THE MILLWORK SUPPLIER. WHERE SWITCHES ARE LOCATED IN TILE WALL FINISH, INSTALL THEM IN TILE, VARYING STANDARD MOUNTING HEIGHT IF NECESSARY. DO NOT MOUNT OVER 48" ABOVE FINISHED FLOOR UNLESS SO INDICATED ON THE DRAWINGS. WHERE SEVERAL ROWS OF LIGHTS ARE TO BE CONTROLLED, THE SWITCH NEAREST THE DOOR SHALL CONTROL THE ROW NEAREST THE INTERIOR WALL, AND THE SWITCH FURTHEST FROM THE DOOR SHALL CONTROL THE ROW FURTHEST FROM THE INTERIOR WALL. SWITCHES THAT CONTROL REMOTE OUTLETS, FANS, ETC., SHALL HAVE ENGRAVED PLASTIC NAME TAGS INDICATING THE OUTLETS, FANS, ETC. THAT ARE CONTROLLED. A SPECIAL RECEPTACLE SHALL BE PROVIDED IN ANY MECHANICAL ROOM IN WHICH COILS ARE LOCATED, UNLESS SUCH A RECEPTACLE IS FOUND TO BE EXISTING TO REMAIN IN THAT ROOM. THIS RECEPTACLE SHALL BE A NEMA 6-20R RECEPTACLE SUPPLIED WITH 208V POWER, AND IT SHALL BE LOCATED NEAR THE DOOR INTO THE ROOM AND WITHIN 50 FEET OF ANY COILS. UNLESS STATED OTHERWISE ELSEWHERE IN THE CONTRACT DOCUMENTS, PROVIDE MATERIALS AND LABOR NECESSARY TO SUPPLY THESE RECEPTACLES FROM THE NEAREST AVAILABLE POWER SOURCES WITH SUFFICIENT CAPACITY. COORDINATE THE EXACT REQUIREMENTS WITH FIELD CONDITIONS. IF COILS OR AIR HANDLERS WITH COILS ARE ADDED TO AN EXISTING BUILDING. RECEPTACLE OUTLETS: MOUNTING HEIGHTS FOR RECEPTACLE OUTLETS SHALL BE 18" ABOVE FINISHED FLOOR OR AS INDICATED ON THE DRAWINGS. WIRING DEVICES AND PLATES: WIRING DEVICES SHALL BE RIDGILY INSTALLED PROPERLY ALIGNED AND PLUMB WITH WALL AND FLOOR LINES. A DEVICE PLATE SHALL BE FURNISHED FOR EACH DEVICE. PLATES SHALL BE INSTALLED WITH ALL FOUR EDGES IN CONTINUOUS CONTACT WITH THE FINISH. PLATES SHALL NOT SUPPORT THE WIRING DEVICES. GASKETS SHALL BE INSTALLED WHERE NECESSARY TO INSURE WATERTIGHT AND VAPOR TIGHT CONSTRUCTION.



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24062

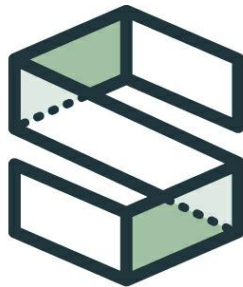
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ELECTRICAL SPECIFICATIONS

E003

SECTION 260100 / BASIC MATERIALS AND METHODS - CONTINUATION

BOXES: ATTACH BOXES TO CONCRETE FORMWORK, OR TO OTHER SURROUNDING BUILDING MATERIAL. PROVIDE ADDITIONAL JUNCTION AND PULL BOXES WHERE INJURY TO INSULATION OR DEFORMATION OF WIRE WOULD OCCUR DUE TO EXCESSIVE PULLING RESISTANCE. WHEN SEVERAL FEEDERS PASS THROUGH A COMMON PULL BOX, TAG EACH FEEDER SEPARATELY, INDICATING ELECTRICAL CHARACTERISTICS AND DESTINATION. BOXES SHALL BE ACCURATELY LOCATED. CONSULT ARCHITECTURAL PLANS FOR DIMENSIONS. MOUNT BOXES IN THE COURSE NEAREST TO THE HEIGHT SPECIFIED WHEN INSTALLED IN FINISHED BLOCK, BRICK OR TILE WALLS. RECESSED INSTALLATION: BOXES AND COVERS SHALL BE INSTALLED SO THAT THE COVERS ARE FLUSH WITH THE FINISHED SURFACES. BOXES IN MASONRY OR TILE CONSTRUCTION SHALL HAVE MASONRY BOXES OR BOXES WITH SQUARE CUT TILE COVERS. DO NOT CUT CONCRETE BLOCK THROUGH ITS ENTIRETY IN ORDER TO ACCOMMODATE ANY TYPE BOX. "HANDY" BOXES SHALL NOT BE USED. BOXES IN PARTITIONS: THROUGH TYPE BOXES ARE NOT PERMITTED EXCEPT WHERE SHOWN ON ELECTRICAL DRAWINGS. RECESSED OUTLET BOXES, CABINETS, CONSOLES, ETC., WHEN SHOWN LOCATED BACK-TO-BACK SHALL BE PROVIDED WITH 1/2" FIBERGLASS INSULATION BETWEEN THE BOXES. LIGHTING OUTLETS: COORDINATE LOCATION OF ELECTRICAL OUTLETS WITH ARCHITECTURAL FEATURES OF THE BUILDING AND WITH THE EQUIPMENT OF OTHER TRADES. PANELED OR PATTERNED CEILINGS SHALL HAVE OUTLETS LOCATED ACCORDING TO THE CEILING PATTERN. BOXES MOUNTED BETWEEN BAR JOISTS OR "T" BARS SHALL BE SUPPORTED FROM TWO BARS OR JOISTS. MOUNTING HEIGHTS OF WALL LIGHTING OUTLETS SHALL BE AS LISTED BELOW EXCEPT WHEN OTHERWISE INDICATED ON THE DRAWINGS. GENERAL - 7'6" ABOVE THE FINISHED FLOOR. OVER LAVATORIES - 6" TO CENTER ABOVE TOP OF MIRROR. OVER DOORS - 18" TO CENTER ABOVE DOOR. HEIGHT MAY BE ADJUSTED TO ALLOW WALL BLOCKS TO BE CUT TO NEAREST EDGE. WIRING GENERAL: CONDUCTORS SHALL NOT BE INSTALLED UNTIL CONDUIT SYSTEM IS COMPLETE. BENDING RADIUS OF INSULATED WIRE OR CABLE SHALL NOT BE LESS THAN THE MINIMUM RECOMMENDED BY WIRE OR CABLE MANUFACTURER. MAXIMUM PULLING TENSION OF ANY WIRE OR CABLE SHALL NOT EXCEED MANUFACTURER'S RECOMMENDED VALUES. DO NOT INJURE INSULATION WHILE INSTALLING WIRE IN CONDUITS. COLOR CODING: CONDUCTORS OF SIZE NO. 6 AND SMALLER SHALL HAVE COLOR CODED INSULATION. SIZES LARGER THAN NO. 6 MAY HAVE COLOR CODED INSULATION OR COLOR-CODED TAPE FOR THE PURPOSE. SHOULD TAPE BE USED, COVER NOT LESS THAN 2" OF CONDUCTOR WITHIN THE ENCLOSURE. SWITCHLEG CONDUCTORS SHALL BE A COLOR OTHER THAN WHITE, GREEN OR THE PHASE OR LINE COLOR. GREEN SHALL BE USED ONLY AS THE <u>GROUNDING</u> CONDUCTOR. WHITE OR GRAY SHALL BE USED ONLY AS THE <u>GROUND</u> ED CONDUCTOR WHICH IS THE NEUTRAL CONDUCTOR. THE NEUTRAL SHALL NOT BE USED AS THE <u>GROUNDING</u> CONDUCTOR AND THE GROUNDING CONDUCTOR SHALL NOT BE USED AS THE <u>NEUTRAL</u> . INTERCOMMUNICATIONS, COMMUNICATIONS, TEMPERATURE CONTROL, AND FIRE ALARM CONDUCTORS SHALL BE COLOR CODED OR PERMANENTLY TAGGED FOR IDENTITY. IF TAGGED, CONDUCTOR COLORS SHALL NOT INCLUDE WHITE, GRAY OR GREEN BASE COLOR OR STRIPES. COLORS SHALL COMPLY WITH THE INSULATED POWER CABLE ENGINEERS ASSOCIATION (IPCEA) METHOD K-2. CONDUCTORS IN PARALLEL: CONDUCTORS CONNECTED IN PARALLEL (ELECTRICALLY JOINED AT BOTH ENDS TO FORM A SINGLE CONDUCTOR) SHALL BE OF THE SAME LENGTH, OF THE SAME CONDUCTOR MATERIAL, THE SAME CIRCULAR-MIL AREA, THE SAME INSULATION TYPE AND TERMINATE IN THE SAME MANNER. WHERE INSTALLED IN SEPARATE RACEWAYS OR CABLES, THE RACEWAYS OR CABLES SHALL HAVE THE SAME PHYSICAL CHARACTERISTICS. WIRING IN MOTOR CONTROL, SWITCHBOARDS, PANELBOARDS, JUNCTION CABINETS, ETC., SHALL BE NEATLY FORMED TO PRESENT A NEAT AND ORDERLY APPEARANCE. A SINGLE NEUTRAL SHALL NOT BE SHARED BY MORE THAN ONE LOAD ON DIFFERENT PHASES OF POWER AS PART OF A MULTIWIRE BRANCH CIRCUIT. IF A MULTIWIRE BRANCH CIRCUIT SUPPLIES ONLY ONE INDIVIDUAL LOAD THEN ONLY ONE NEUTRAL SHALL BE REQUIRED. UNLESS THEY SUPPLY ONLY ONE INDIVIDUAL LOAD, ALL BRANCH CIRCUITS SHALL HAVE A SEPARATE AND DEDICATED GROUND(ED) (NEUTRAL) CONDUCTOR. PROVIDE MATERIALS AND LABOR NECESSARY TO INCREASE THE CONDUIT SIZES FROM THAT WHICH IS SPECIFIED, AS NECESSARY, TO ACCOMMODATE PULLING THESE ADDITIONAL DEDICATED GROUND(ED) (NEUTRAL) CONDUCTORS. THE CONTRACTORS SHALL NOT PROVIDE TWO-POLE CIRCUIT BREAKERS, THREE-POLE CIRCUIT BREAKERS, OR SEPARATE CIRCUIT BREAKERS WITH BREAKER TIES IN ORDER TO AVOID PROVIDING THESE ABOVE-REQUIRED DEDICATED GROUND(ED) (NEUTRAL) CONDUCTORS (AS WOULD OTHERWISE BE REQUIRED FOR COMPLIANCE WITH NEC 210.4 (B) (2008 ED.) FOR MORE THAN ONE LOAD BEING SUPPLIED BY A MULTIWIRE BRANCH CIRCUIT IF THE ABOVE-REQUIRED ADDITIONAL NEUTRALS WERE NOT PROVIDED.) THE MINIMUM SIZE OF WIRE SHALL BE NO. 12 AWG. INTERCONNECTIONS OF CONTROL WIRING SHALL BE ON IDENTIFIED NUMBERED TERMINAL STRIPS. SPLICES: SPLICES SHALL BE PERMITTED IN JUNCTION BOXES, OUTLET BOXES OF OTHER PERMANENTLY ACCESSIBLE LOCATIONS WHERE PERMITTED BY APPLICABLE CODES. CONDUCTORS NO. 6 OR SMALLER SHALL BE SPLICED WITH DEVICES APPROVED BY UNDERWRITERS LABORATORIES, INC., AS SPLICING CONNECTORS. SPLICES IN CONDUCTORS LARGER THAN NO. 6 SHALL BE ACCOMPLISHED WITH DEVICES APPROVED BY UNDERWRITERS LABORATORIES AS PRESSURE CABLE CONNECTORS. SPLICES MADE IN UNDERGROUND BOXES OR WET LOCATIONS SHALL BE MADE WITH A COMMERCIAL, UL APPROVED CAST RESIN SPLICING KIT. WIRE PULLING LUBRICATION: SHALL BE USED WHEN ANY WIRE IS PULLED BY MECHANICAL MEANS. WIRE AND CABLE SHALL BE CAREFULLY HANDLED DURING INSTALLATION. SOAP FLAKES OR VEGETABLE SOAPS SHALL NOT BE USED FOR LUBRICATION. EQUIPMENT IDENTIFICATION: SECURE TAGS AND MARKERS TO EACH ITEM OF EQUIPMENT. SECURE ALL CABINET NAMEPLATES WITH SELF-TAPPING SCREWS OR MACHINE SCREWS AND NUTS. DO NOT RELY ON ADHESIVE MOUNTING. NAME TAGS FOR EQUIPMENT OPERATED FROM NORMAL POWER SHALL BE "BLACK." NAME TAGS FOR EQUIPMENT OPERATED FROM EMERGENCY POWER SHALL BE "RED." SLEEVES, INSERTS AND SUPPORTS EQUIPMENT SUPPORTS: CONCRETE BASES AND STRUCTURAL STEEL TO SUPPORT THIS DIVISION'S EQUIPMENT AND RACEWAYS, AND NOT SPECIFICALLY SHOWN ON STRUCTURAL OR ARCHITECTURAL DRAWINGS SHALL BE FURNISHED BY CONTRACTOR WHOSE EQUIPMENT OR RACEWAYS IS TO BE SUPPORTED. PROVIDE A RAISED REINFORCED 4" CONCRETE BASE FOR ALL FLOOR SUPPORTED EQUIPMENT, OR AS INDICATED ON THE DRAWINGS. SETTING IN CONCRETE: PLACE ALL INSERTS IN CONCRETE FORMS PRIOR TO TIME CONCRETE IS POURED. IF ADDITIONAL INSERTS ARE REQUIRED IN EXISTING CONCRETE WORK, USE SELF-DRILLING SCREW ANCHORS. SUPPORT SPACING: COMPLY WITH CODES AND REGULATIONS REFERENCED EARLIER AND AS FOLLOWS: SUPPORT NO ELECTRICAL WORK FROM PIPING, DUCTWORK, ETC. WHERE METAL DECKING IS USED, PROVIDE SUPPORTS INDEPENDENT OF DECKING SO THAT LOADS WILL NOT BE TRANSFERRED TO DECKING. DRILL THROUGH DECKING AND SECURE SUPPORTS TO CONCRETE SLAB. VERTICAL CONDUIT INSIDE BUILDING SHALL BE SUPPORTED AT EACH FLOOR LEVEL AND AT 10'0" INTERVALS. SUPPORT CONDUIT WITHIN ONE FOOT OF CHANGES OF DIRECTION, AND WITHIN ONE FOOT OF EACH ENCLOSURE TO WHICH IT IS CONNECTED. SLEEVES THROUGH ROOFS: COORDINATE SETTING WITH DIVISION 7. CONTRACTOR SHALL PROVIDE PENETRATIONS COMPLYING WITH ARCHITECTURAL REQUIREMENTS. ADDITIONAL STEEL SUPPORT HARDWARE REQUIRED FOR THE INSTALLATION OF ANY ELECTRICAL OR OTHER EQUIPMENT OR DEVICES PROVIDED SHALL BE PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO ENSURE THAT ALL PRODUCTS ARE RIGIDLY SECURED TO STRUCTURE PURSUANT TO APPLICABLE PORTIONS OF NEC 300.11. THIS SHALL INCLUDE - BUT SHALL NOT BE LIMITED TO - PROVIDING ADDITIONAL THREADED RODS, METAL FRAMING, AND OTHER HARDWARE REQUIRED TO MINIMIZE HORIZONTAL AS WELL AS VERTICAL MOVEMENT. MEANS OF SUPPORT SHALL BE CLEARLY INDICATED AND FULLY DESCRIBED IN THE SUBMITTAL FOR ITEMS SUSPENDED. THREADED RODS SHALL NOT BE USED AS SOLE MEANS OF SUPPORT FOR SUSPENDED RACEWAY UNLESS APPROVED IN WRITING BY ENGINEER OR UNLESS ASSEMBLY CAN BE DEMONSTRATED TO BE SUBSTANTIALLY FREE FROM SIGNIFICANT HORIZONTAL OR VERTICAL SWAY OR MOVEMENT AS IS REQUIRED TO COMPLY WITH NEC. LIGHTING FIXTURES SHALL NOT BE SUPPORTED BY THREADED RODS OR CHAINS UNLESS APPROVED IN WRITING BY ENGINEER. SEE PROJECT MANUAL SECTION, "LIGHTING FIXTURE SUPPORTS, STANDARDS AND POLES." CAULKING AND SEALS: WHERE CONDUITS, WIREWAYS, AND OTHER ELECTRICAL RACEWAYS PASS THROUGH FIRE PARTITIONS, FIRE WALLS, SMOKE PARTITIONS, OR FLOORS, INSTALL A FIRE STOP THAT PROVIDES AN EFFECTIVE BARRIER AGAINST THE SPREAD OF FIRE, SMOKE AND GASES IN ACCORDANCE WITH DIVISION 7 REQUIREMENTS. FIRE STOP SHALL BE UL LISTED AND NFPA APPROVED FOR SUCH SERVICE. COMPLETELY FILL AND SEAL CLEARANCES BETWEEN RACEWAYS AND OPENINGS WITH THE FIRE STOP MATERIAL. ADHERE TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. AT FLOOR, EXTERIOR WALL, AND ROOF CONDUIT PENETRATIONS, COMPLETELY SEAL CLEARANCES AROUND THE CONDUIT AND MAKE WATERTIGHT. PAINTING: PAINTING FOR DIVISION 26 WORK SHALL BE BY THE DIVISION 9 FINISHES CONTRACTOR AND AS PROVIDED IN DIVISION 9 - FINISHES.	SECTION 260100 / BASIC MATERIALS AND METHODS - CONTINUATION THE DIVISION 26 CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE DIVISION 9 - FINISHES CONTRACTOR THE PAINTING OF THE MATERIALS AND EQUIPMENT OF DIVISION 26. REFER TO THE FINISH SCHEDULE ON DRAWINGS FOR LOCATION AND TYPE OF PAINT. NEC WORKING SPACE SHALL BE INDICATED - AREAS THAT PERTAIN TO WORKING SPACE IN ARTICLE 110.26 OF THE NEC SHALL HAVE YELLOW STRIPING INSTALLED DIAGONALLY WITH STRIPES BEING THREE INCHES WIDE AND THREE INCHES APART. THE CENTER OF THE AREA SHALL HAVE THE WORDS "SAFETY ZONE" INSTALLED WITH LETTERS AT LEAST FOUR INCHES HIGH. ARCHITECT OR ENGINEER SHALL BE CONSULTED FOR PROJECTS IN WHICH THIS AREA IS CARPETED, TILED, OR OTHERWISE HAS FLOORING WHICH IS NOT APPROPRIATE FOR SUCH PAINTING. FINISH IN AREAS NOT LISTED OR OTHERWISE NOTED SHALL BE BLACK ENAMEL. HANGERS, SUPPORTS, STRUCTURAL STEEL AND EQUIPMENT THAT ARE NOT FACTORY FINISHED SHALL BE PRIME COATED AND FINISHED COATED WITH COLOR TO MATCH THE AREA IN WHICH IT WILL BE LOCATED. ELECTRIC CABINETS, SWITCHBOARDS, PANELBOARDS AND EQUIPMENT THAT ARE FACTORY FINISHED AND HAVE DAMAGED FINISH SHALL BE TOUCHED UP TO MATCH THE FACTORY FINISH. ALL SURFACES THAT ARE TO BE PAINTED SHALL BE FREE OF RUST, SCALE, OIL AND GREASE BEFORE PRIME COAT IS APPLIED. GROUNDING: GROUND AND BOND IN ACCORDANCE WITH NEC ARTICLE 250 AND OTHER APPLICABLE ARTICLES. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR WHICH SHALL BE SEPARATE FROM THE ELECTRICAL SYSTEM NEUTRAL CONDUCTOR. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE COLORED GREEN. IT SHALL BE CONTINUOUS FROM A CONNECTION AT THE SERVICE ENTRANCE EQUIPMENT GROUND TO ALL SWITCHBOARDS, DISTRIBUTION AND BRANCH PANELBOARDS. EQUIPMENT GROUNDING CONDUCTORS SHALL BE PROVIDED IN ALL BRANCH CIRCUITS SERVING CONVENIENCE OUTLETS, RECEPTACLES, PORTABLE AND PERMANENTLY INSTALLED ELECTRICAL APPLIANCES, EQUIPMENT APPARATUS AND OTHER MISCELLANEOUS METAL ENCLOSING BODIES INCLUDING LIGHT SWITCH BOXES NORMALLY WITHIN CONTACT OF PERSONNEL. BRANCH CIRCUIT GROUNDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. CONNECTIONS AT PANELBOARDS, OUTLETS, EQUIPMENT AND APPARATUS SHALL BE MADE IN AN APPROVED AND PERMANENT MANNER. RESISTANCE TO GROUND SHALL NOT EXCEED 25 OHMS. BOND BUSHINGS OF THE RACEWAY SYSTEM TO GROUND LUGS IN BOXES, CABINETS, MOTORS AND EQUIPMENT TO ASSURE ELECTRICAL CONTINUITY OF ALL METALLIC COMPONENTS OF THE ELECTRICAL SYSTEMS. COMPLY WITH THE REQUIREMENTS OF NEC. EQUIPMENT BACKBOARDS: LOCATE EQUIPMENT BACKBOARDS WHERE INDICATED ON THE DRAWINGS. INSTALL STRAIGHT AND PLUMB. SECURE TO STRUCTURE USING SCREWS, TOGGLE BOLTS OR MASONRY ANCHORS. <u>DO NOT</u> USE PLASTIC OR WOOD PLUGS IN MASONRY OR CONCRETE. DO NOT INSTALL COMBUSTIBLE BACKBOARDS IN AIR HANDLING SPACE, PLENUMS OR WHERE PROHIBITED BY THE LOCAL GOVERNING AUTHORITY. UNDERGROUND RACEWAY MARKINGS: PROVIDE MONUMENT MARKER ABOVE THE ENDS OF ANY "STUB OUT" RACEWAY. SEE MONUMENT MARKER DETAIL IN THESE SPECIFICATIONS. TESTING: AT THE COMPLETION OF THE INSTALLATION OF THE CONDUCTORS OR CABLES INTO THE RACEWAY SYSTEMS, TESTS SHALL BE CONDUCTED BY "MEGGER" TO ASCERTAIN THAT THE INSULATION FOR THE CONDUCTORS OR CABLES HAS NOT BEEN DAMAGED. MEGGER TEST EACH FEEDER AND BRANCH CIRCUIT CONDUCTOR OR CABLE WITH AN INSTRUMENT CAPABLE OF PRODUCING APPROXIMATELY 500 VOLTS FOR CONDUCTORS OR CABLES INSULATED WITH 600-VOLT INSULATION. THE MINIMUM INSULATION RESISTANCE SHALL BE 100 MEGOHMS PER 1000 FEET OF 500 KCMIL CONDUCTORS OR SMALLER INSULATED WITH THW OR THWN, AND 1,000 MEGOHMS PER 100 FEET OF 500 KCMIL CONDUCTORS OR SMALLER INSULATED WITH XHHW OR OTHER CROSS-LINKED INSULATION.	PRODUCTS ACCEPTABLE PRODUCERS THE SYSTEM AND ITS COMPONENTS SHALL BE UNDERWRITERS LABORATORIES, INC. (UL) LISTED UNDER THE APPROPRIATE UL TESTING STANDARD AS LISTED HEREIN FOR FIRE ALARM APPLICATIONS AND SHALL BE INSTALLED IN COMPLIANCE WITH THE UL LISTING. EQUIPMENT AND MATERIAL PROVIDED SHALL ALSO COMPLY WITH THE LATEST REVISIONS OF APPLICABLE CODES AND STANDARDS OF ANSI, NEMA, AND NFPA AND SHALL BE LISTED, APPROVED, AND LABELED FOR THE APPLICATIONS. ALL FIRE ALARM AND DETECTION SYSTEM COMPONENTS PROVIDED SHALL BE SPECIFICALLY UL LISTED AND LABELED FOR USE WITH THE PARTICULAR BRAND AND TYPE OF FIRE ALARM AND DETECTION SYSTEM TO WHICH THEY ARE CONNECTED, AND ALL SUCH COMPONENTS SHALL ALSO BE APPROVED BY THE MANUFACTURER OF THE EXISTING FIRE ALARM AND DETECTION SYSTEM. WHEREVER POSSIBLE, SHALL HAVE THE SAME MANUFACTURER AS THE EXISTING FIRE ALARM AND DETECTION SYSTEM CONTROL PANEL. ALL FIRE ALARM AND DETECTION SYSTEM COMPONENTS PROVIDED SHALL BE SPECIFICALLY UL LISTED AND LABELED FOR THE FORM OF INSTALLATION AND FOR THE TYPE OF USAGE WHICH IS PROVIDED. MATERIALS AND EQUIPMENT PULL STATIONS (MANUAL FIRE ALARM BOXES) SHALL BE INTELLIGENT ADDRESSABLE TYPE, SINGLE ACTION, NON-CODED, KEYED ALIKE FOR ALL CABINETS AND BOXES IN SYSTEM AND WITH KEY LOCK FOR TEST AND RESET, RECESSED PULL LEVER AND PROTECTIVE SHIELD. BOXES SHALL HAVE SURFACE OR SEMI-FLUSH MOUNTING AND CAST METAL OR LEXAN BOX WITH RED FINISH. SMOKE DETECTORS SHALL OPERATE ON THE PHOTOELECTRIC PRINCIPLE TO DETECT AND REPORT THE PRESENCE OF PRODUCTS OF COMBUSTION GASES. DETECTORS SHALL HAVE A MINIMUM COVERAGE RATING ADEQUATE FOR 30 FOOT SPACINGS, AS DETERMINED BY THE MANUFACTURER. SMOKE DETECTORS SHALL HAVE MATCHING BASE AND SHALL BE INTELLIGENT ADDRESSABLE TYPE. THE DETECTORS SHALL SUPPORT AUTOMATIC COMPENSATION ADJUSTMENT OF SETPOINTS AND MEASUREMENT OF ANALOG DETECTOR SENSITIVITY FROM THE FIRE ALARM CONTROL PANEL. THE DETECTORS SHALL HAVE BUILT-IN TYPE IDENTIFICATION AND TWO BLINKING LEDS. THE LEDS SHALL BLINK EACH TIME THE DEVICE IS ADDRESSED AND SHALL BE CONTINUOUSLY ILLUMINATED WHEN THE DEVICE IS IN ALARM. CEILING SMOKE DETECTORS SHALL MOUNT ON A 4" SQUARE BOX AND SHALL HAVE A REMOTE RESET AT THE CONTROL PANEL. SMOKE DETECTORS (DUCT-MOUNTED) SHALL OPERATE ON THE PHOTOELECTRIC PRINCIPLE TO DETECT AND REPORT THE PRESENCE OF PRODUCTS OF COMBUSTION GASES. DUCT-MOUNTED SMOKE DETECTORS SHALL BE INTELLIGENT, ADDRESSABLE TYPE AND PROVIDED WITH AIR DUCT TYPE HOUSING AND SAMPLING TUBES (EXTENDED THE FULL WIDTH OF THE DUCT). THE DETECTORS SHALL SUPPORT AUTOMATIC COMPENSATION ADJUSTMENT OF SETPOINTS AND MEASUREMENT OF ANALOG DETECTOR SENSITIVITY FROM THE FIRE ALARM CONTROL PANEL. THE DETECTORS SHALL HAVE BUILT-IN TYPE IDENTIFICATION AND TWO BLINKING LEDS. THE LEDS SHALL BLINK EACH TIME THE DEVICE IS ADDRESSED AND SHALL BE CONTINUOUSLY ILLUMINATED WHEN THE DEVICE IS IN ALARM. DETECTORS SHALL BE UL LISTED SPECIFICALLY FOR USE IN AIR HANDLING SYSTEMS. DETECTORS, INCLUDING HOUSING AND SAMPLING TUBES, SHALL BE LISTED OR APPROVED FOR THE RANGE OF AIR VELOCITIES WHICH MAY EXIST IN SERVICE AND FOR THE MAXIMUM TEMPERATURE WHICH MAY EXIST IN SERVICE. DUCT-MOUNTED SMOKE DETECTORS CONNECTED IN THE SIGNAL ACTUATING CIRCUIT OF THE FIRE PROTECTIVE SIGNALING SYSTEM SHALL BE LISTED OR APPROVED FOR THIS APPLICATION. A REMOTE ANNUNCIATOR LED SHALL BE PROVIDED WHERE DETECTOR IS CONCEALED ABOVE CEILING OR IN OTHER LOCATIONS. HEAT DETECTORS: SHALL OPERATE ON THE RATE-OF-RISE PLUS FIXED TEMPERATURE PRINCIPLE TO DETECT AND REPORT A RISE IN TEMPERATURE OF 15EF PER MINUTE OR A FIXED TEMPERATURE OF 135EF. DETECTOR SHALL MOUNT ON 4" SQUARE BOX. SPEAKER/STROBE SIGNAL APPLIANCE SHALL BE A COMBINED MODULAR SPEAKER AND LAMP ASSEMBLY. LAMP SHALL BE A XENON STROBE-CLEAR OR NOMINAL WHITE-- WITH A MINIMUM INTENSITY OF 75 CANDELA UNLESS NOTED TO BE HIGHER IN THE DRAWINGS (PER REQUIREMENTS OF UL 1971; COMPLIANCE WITH UL 1638 AT 75CD IS NOT SUFFICIENT AND SHALL NOT BE APPROVED UNLESS DEVICE IS ALSO RATED AT MINIMUM OF 75CD PER UL 1971). HOUSING SHALL BE RED IN COLOR. SOUND INTENSITY SHALL EXCEED 85 DB AT 10 FEET. APPLIANCES SHALL BE SEMI-FLUSH MOUNTING. ASSEMBLY SHALL BE DC OPERATED. ASSEMBLY SHALL BE ADA APPROVED. VISUAL SIGNAL APPLIANCE (STROBE) SHALL BE A MODULAR LAMP ASSEMBLY. LAMP SHALL BE A XENON STROBE - CLEAR OR NOMINAL WHITE - WITH A MINIMUM INTENSITY OF 75 CANDELA UNLESS NOTED TO BE HIGHER IN THE DRAWINGS (PER REQUIREMENTS OF UL 1971; COMPLIANCE WITH UL 1638 AT 75CD IS NOT SUFFICIENT AND SHALL NOT BE APPROVED UNLESS DEVICE IS ALSO RATED AT MINIMUM OF 75CD PER UL 1971). HOUSING SHALL BE RED IN COLOR. APPLIANCE SHALL BE SEMI-FLUSH MOUNTING. ASSEMBLY SHALL BE DC OPERATED. ASSEMBLY SHALL BE ADA APPROVED. SPEAKER NOTIFICATION APPLIANCE SHALL BE SEMI-FLUSH MOUNTED, CONSISTING OF A THERMOPLASTIC INJECTION MOLDED ACOUSTIC PANEL AND A 4" TREATED PAPER CONE SPEAKER. SOUND INTENSITY SHALL EXCEED 85 DB AT 10 FEET. INDIVIDUAL ADDRESSABLE MODULES SHALL BE LOCATED IN BACK BOXES OF FIELD DEVICES OR IN ENCLOSURES NEAR FIELD DEVICES. THE INDIVIDUAL ADDRESSABLE MODULES SHALL ALLOW TAMPER SWITCHES, PRESSURE SWITCHES OR ANY OTHER NON-ADDRESSABLE DEVICES TO BE ADDRESSED BY THE FIRE ALARM CONTROL PANEL. REMOTE LCD ANNUNCIATOR SHALL BE FULLY COMPATIBLE WITH FIRE ALARM CONTROL PANEL AND SHALL HAVE KEY CONTROLLED TROUBLE SILENCE, SYSTEM RESET, ALARM SILENCE AND LCD READOUT MATCHING CONTROL PANEL. FIRE ALARM CONTROL PANEL IS EXISTING TO REMAIN. WIRING AND CONDUCTORS TO CONNECT THE EQUIPMENT AND MATERIALS FOR THE FIRE ALARM SYSTEM SHALL ONLY BE TYPE THWN INSULATED COPPER CONDUCTORS RATED FOR 600 VOLTS. SYSTEM WIRING SHALL BE COLOR CODED AS LISTED IN SECTION 3.10. BELOW. WIRE SIZE SHALL BE AS RECOMMENDED BY THE FIRE ALARM MANUFACTURER. ADDRESSABLE LOOP CONDUCTOR DATA CABLES SHALL BE TWO-CONDUCTOR TWISTED SHIELDED PAIRS. EXECUTION CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY TO ACCOMMODATE THE ADDITION OF NEW FIRE ALARM SYSTEM COMPONENTS UNDER THIS CONTRACT, TO THE EXISTING FIRE ALARM CONTROL PANEL. THIS SHALL INCLUDE - BUT SHALL NOT BE LIMITED TO - PROVIDING DETECTION SYSTEM REPROGRAMMING AND PROVIDING ADDITIONAL SIGNAL AND INITIATING CIRCUIT EXPANSION CARDS TO BE MOUNTED INSIDE OF OR ADJACENT TO EXISTING FIRE ALARM CONTROL PANEL. AS NECESSARY, PROVIDE CABINET FOR ENCLOSING EXPANSION CARDS AS NECESSARY. IF IT IS DETERMINED THAT THE EXISTING FIRE ALARM CONTROL PANEL OR PANELS WILL NOT ACCOMMODATE THE ADDITION OF THE DEVICES INDICATED, THEN THE CONTRACTOR SHALL INCLUDE IN THE BID PRICE ALL COSTS NECESSARY TO PROVIDE NEW FIRE ALARM CONTROL PANELS AS NECESSARY TO ACCOMMODATE THE EXISTING AND NEW FIRE ALARM DEVICES TO BE ADDED. COORDINATE EXACT REQUIREMENTS WITH EXISTING CONDITIONS PRIOR TO BID. NO CHANGE ORDER WILL BE APPROVED FOR A FAILURE TO COMPLY WITH THESE REQUIREMENTS. WIRING SHALL BE IN METALLIC CONDUIT SOLELY FOR THE FIRE DETECTION AND ALARM SYSTEM. INSTALL AND CONNECT WIRING IN CONFORMANCE WITH THE RECOMMENDATIONS AND WIRING DIAGRAMS PROVIDED BY THE FIRE ALARM AND DETECTION SYSTEM MANUFACTURER. PROVIDE SURGE PROTECTION COMPLIANT WITH UL 497B FOR ALL FIRE ALARM CIRCUITS WHICH LEAVE THE AIR-CONDITIONED ENVELOPE OF A BUILDING; PROTECTION SHALL BE PROVIDED AT EACH END OF EACH CIRCUIT NEAR WHERE CIRCUIT ENTERS OR LEAVES A BUILDING. ALL WIRING SHALL BE TAGGED, NUMBERED, COLOR CODED AND TERMINATED ON TERMINAL BLOCKS IN THE CABINETS, IN BOXES, AT EQUIPMENT AND AT DEVICES. WIRE NUTS OR SPLICES SHALL NOT BE USED. CONTRACTOR SHALL PROVIDE THE QUANTITY OF DUCT-MOUNTED SMOKE DETECTORS - IN LOCATIONS WHERE INDICATED - AS SPECIFIED BY THE DIVISION 15 DOCUMENTS. ANY INDICATIONS OF QUANTITIES OR LOCATIONS OF DUCT-MOUNTED SMOKE DETECTORS SHOWN IN THE DIVISION 26 DOCUMENTS SHALL BE CONSIDERED TO BE FOR GENERAL REFERENCE PURPOSES ONLY; EXACT QUANTITIES AND LOCATIONS SHALL BE COORDINATED WITH DIVISION 15 CONTRACT DOCUMENTS PRIOR TO PRICING, AND PRICE SHALL BE BASED ON QUANTITIES AND LOCATIONS INDICATED IN THE DIVISION 15 DOCUMENTS, ONLY. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO PROVIDE A SMOKE DETECTOR ABOVE ALL FIRE ALARM CONTROL PANELS AND ABOVE ALL FIRE ALARM TERMINAL CABINETS. COMPLY WITH ALL NFPA REQUIREMENTS AS APPLICABLE TO CONSTRUCTION AND INSTALLATION OF FIRE ALARM AND DETECTION COMPONENTS AND ACCESSORIES. MOUNTING OF PULL STATIONS SHALL BE 48" ABOVE FINISHED FLOOR TO THE TOP OF THE BOX (HANDICAPPED CODE). UNLESS INDICATED OTHERWISE IN THE CONTRACT DOCUMENTS, MOUNTING OF ALL FIRE ALARM STROBES SHALL BE AT AN ELEVATION SUCH THAT THE LOWEST PORTION OF THE STROBE LENS IS BETWEEN 80" AND 81" ABOVE THE FINISHED FLOOR ELEVATION AT THAT LOCATION UNLESS THIS DEVICE ELEVATION WOULD REQUIRE THAT THE HIGHEST PORTION OF THE STROBE LENS WOULD BE LESS THAN 5' BELOW THE LOWEST PORTION OF THE CEILING AT THAT LOCATION. IF THIS DEVICE ELEVATION WOULD BE SUCH THAT THE HIGHEST PORTION OF THE LENS WOULD BE LESS THAN 5' FROM THE LOWEST PORTION OF THE CEILING AT THAT LOCATION THEN THIS FIRE ALARM STROBE SHALL BE PROVIDED AT A LOWER ELEVATION SUCH THAT THE HIGHEST PORTION OF THE STROBE LENS IS BETWEEN 5" AND 6" BELOW THE LOWEST PORTION OF THE CEILING AT THAT LOCATION, AND THE ENGINEER SHALL BE IMMEDIATELY NOTIFIED IN WRITING OF THIS LOWER ELEVATION BEING PROVIDED, SO THAT THE NECESSARY DE-RATING MANDATED BY NFPA 72 FOR DEVICES PROVIDED AT LOWER ELEVATIONS MAY BE CONSIDERED. JUNCTION BOXES AND CABINETS FOR THE FIRE ALARM SYSTEM, SHALL BE PAINTED INTERNATIONAL FIRE RED. PROVIDE, IN A FRAME AND UNDER GLASS, A PROFESSIONALLY DRAFTED MYLAR PLAN OF THE BUILDING AND SITE WHICH DENOTES THE LOCATIONS AND ADDRESSES OF ALL DEVICES CONNECTED TO THE FIRE ALARM AND DETECTION SYSTEM. INSTALL FRAME NEAR THE FIRE ALARM ANNUNCIATOR PANEL OR AT A LOCATION DESIGNATED BY THE OWNER'S REPRESENTATIVE. PROVIDE A SPARE PARTS KIT WHICH INCLUDES THE FOLLOWING: ONE OF EACH KIND OF DETECTOR HEAD AND BASE, ONE PULL STATION, ONE SPEAKER-LIGHT COMBINATION, ONE SPEAKER AND TWO OF ANY TYPE OF LINE RESISTOR OR CAPACITOR NECESSARY. DUCT-MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY THE FIRE ALARM CONTRACTOR, INSTALLED BY A MECHANICAL CONTRACTOR, AND WIRED BY THE FIRE ALARM CONTRACTOR. AIR DUCT SMOKE DETECTORS SHALL NOT INITIATE A BUILDING GENERAL FIRE ALARM BUT SHALL INITIATE A FIRE ALARM SUPERVISORY ALARM AND SHALL SHUTDOWN ALL AIR HANDLERS IN THE BUILDING. NEW FIRE ALARM CONDUCTORS PROVIDED SHALL MATCH THE COLORS USED FOR ANY EXISTING FIRE ALARM SYSTEM CONDUCTORS; OR IF NONE ARE EXISTING, THE FOLLOWING COLORS SHALL BE USED: STROBES: PURPLE (-) WHITE (+) INITIATING CIRCUITS: YELLOW (-) BLUE (+) A/C AND VENTILATION SHUT DOWN: ORANGE (-) BROWN (+) MISCELLANEOUS CIRCUITS: TAN (-) VIOLET (+) SPEAKERS: BLACK (-) CLEAR (+) DATA: RED JACKET TESTS SHALL BE PROVIDED. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR AND THE MANUFACTURER'S AUTHORIZED REPRESENTATIVE TOGETHER SHALL TEST EVERY ALARM INITIATING DEVICE FOR PROPER RESPONSE AND LOCATION INDICATION, EVERY ALARM SIGNALING DEVICE FOR EFFECTIVENESS AND ALL AUXILIARY FUNCTIONS. REPEAT ALL TESTS WITH NORMAL POWER DISCONNECTED. AT A MINIMUM, ALL TESTING SHALL COMPLY WITH NFPA 72 REQUIREMENTS FOR SUCH TESTING INCLUDING - BUT NOT NECESSARILY LIMITED TO - THE CHAPTER, "INSPECTION, TESTING, AND MAINTENANCE." THE OWNER AND DESIGNATED REPRESENTATIVE SHALL BE GIVEN THE OPPORTUNITY TO WITNESS THESE TESTS. AN ITEMIZED TEST REPORT SHALL BE SUBMITTED TO THE OWNER, DETAILING AND CERTIFYING ALL RESULTS. INSTRUCTIONS INCLUDING 16 HOURS OF COMPLETE INSTRUCTIONS AND TRAINING FOR OPERATION AND MAINTENANCE OF SYSTEM SHALL BE FURNISHED TO OWNER'S DESIGNATED REPRESENTATIVE UPON COMPLETION.



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KEVIN M. SPELLICY
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HIGH SPRINGS FIRE STATION HVAC UPGRADES

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HIGH SPRINGS, FL 32643

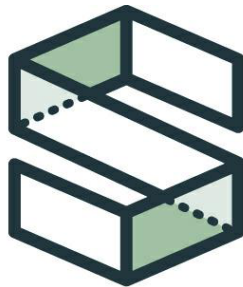
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ADDENDUM #1

ISSUE DATE: 02/21/2025	
DESIGN: QC:	CGD KMS
REVISIONS	
NO.	REFERENCE
	DATE

ELECTRICAL SPECIFICATIONS

E005



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ISSUE DATE: 02/21/2025

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REVISIONS		
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ELECTRICAL FLOOR PLAN -
DEMOLITION

E101

DEMOLITION SHEET NOTES:

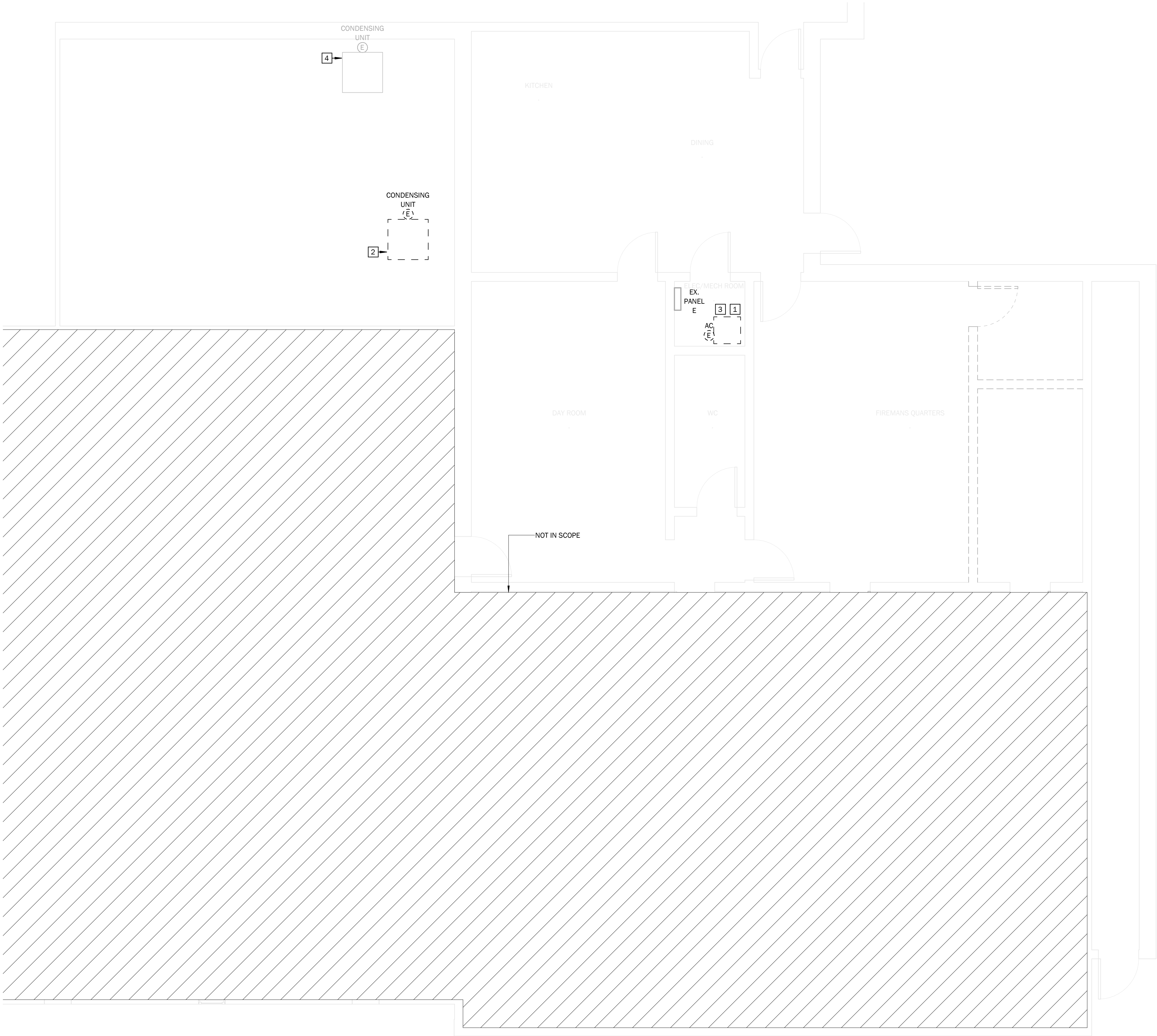
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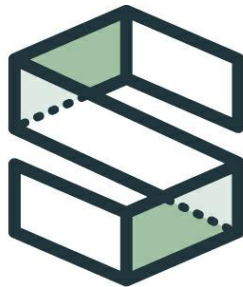
ALL ELECTRICAL EQUIPMENT AND FIRE ALARM DEVICES SERVING AIR HANDLER UNIT TO BE REMOVED INCLUDING ALL CONDUIT AND WIRING BACK TO PANEL BOARD E.
- 2

ALL ELECTRICAL EQUIPMENT SERVING CONDENSER UNIT TO BE REMOVED INCLUDING ALL CONDUIT AND WIRING BACK TO PANEL BOARD E.
- 3

ALL EXISTING ELECTRICAL DEVICES ASSOCIATED WITH EXISTING FURNACE TO BE REMOVED.
- 4

EXISTING CONDENSING UNIT TO REMAIN.





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HIGH SPRINGS FIRE STATION HVAC UPGRADES

18586 NW 238TH ST
HIGH SPRINGS, FL 32643

24062

ADDENDUM #1

ISSUE DATE: 02/21/2025

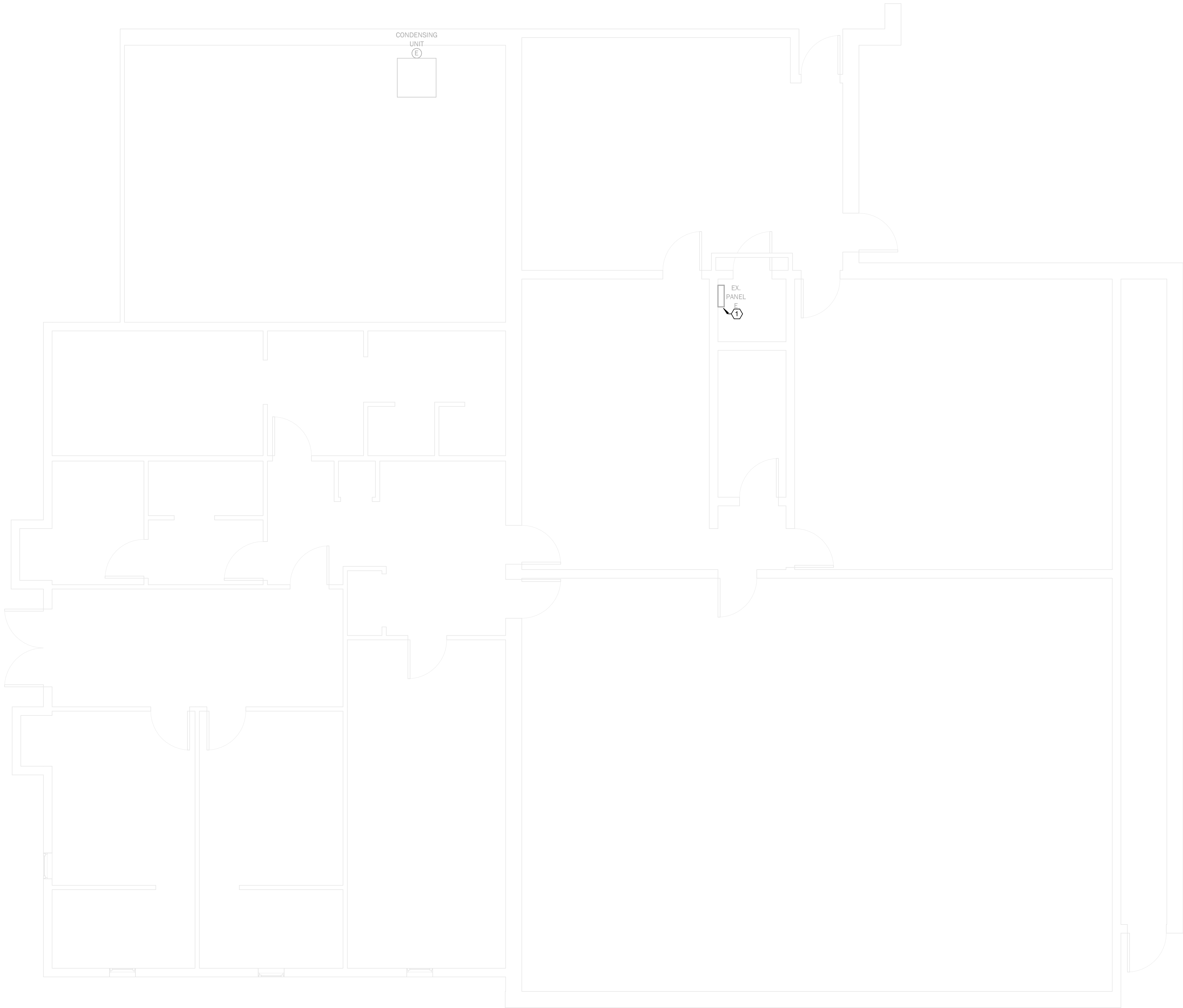
DESIGN: CGD
QC: KMS

REVISIONS		
NO.	REFERENCE	DATE

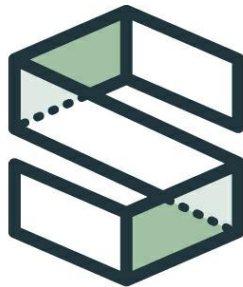
ELECTRICAL FLOOR PLAN -
POWER AND SYSTEMS

E202

SHEET NOTES:
① EXISTING PANEL BOARD E TO REMAIN



N ELECTRICAL ROOF PLAN -MECHANICAL
SCALE: 1/4" = 1'-0"



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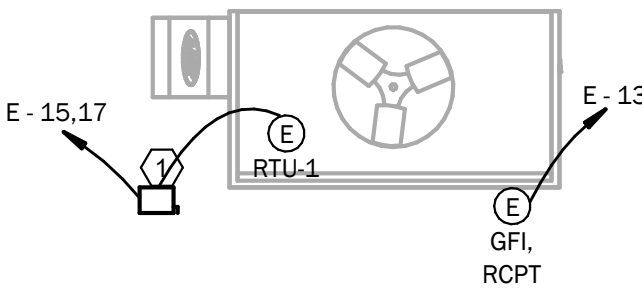
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ELECTRICAL ROOF PLAN -
MECHANICAL EQUIPMENT

E203

SHEET NOTES:

- 1 PROVIDE N3R FSS ADJACENT TO RTU ON ROOF. MOUNT FSS ON A CONTRACTOR PROVIDED UNISTRUT SYSTEM. COORDINATE FINAL LOCATION OF RTU WITH MECH.



ELECTRICAL ROOF PLAN - MECHANICAL EQUIPMENT
SCALE: 1/4" = 1'-0"