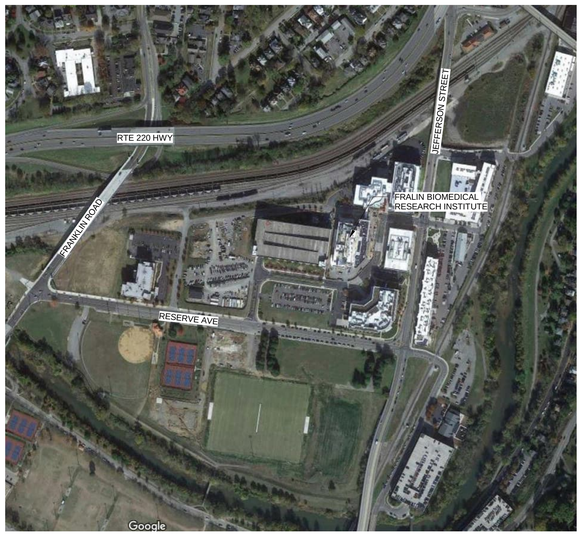
VTC FBRI CHILLER PROJECT

ROANOKE, VIRGINIA

100% WORKING DRAWING SUBMITTAL

MARCH 03, 2025
VT WORK ORDER NUMBER - 25-688604
AECOM PROJECT NO. 60738913

LOCATION MAP



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BUILDING CODE / LIFE SAFETY CODE ANALYSIS

1. PRIMARY APPLICABLE BUILDING CODES:

- VIRGINIA CONSTRUCTION CODE, 2021
- VIRGINIA EXISTING BUILDING CODE, 2021
- VIRGINIA STATEWIDE FIRE PREVENTION CODE, 2021
- VT DESIGN AND CONSTRUCTION STANDARDS MANUAL, 2023
- NFPA 70, NATIONAL ELECTRICAL CODE, 2020
- NFPA 72, NATIONAL FIRE ALARM AND SIGNALING CODE, 2019

2. OCCUPANCY CLASSIFICATION:

THE EXISTING BUILDING IS CLASSIFIED AS MIXED SEPARATED OCCUPANCIES GROUPS A-2, A-3, B, AND R-3 (VCC §303.3, §303.4, §304, AND §310.4). THE BUILDING WILL NOT UNDERGO A CHANGE OF OCCUPANCY IN THIS PROJECT.

3. CONSTRUCTION TYPE:

CONSTRUCTION IS TYPE IIA (VCC §602 & TABLE 601). THE CONSTRUCTION TYPE WILL NOT BE MODIFIED AS PART OF THIS PROJECT.

4. REHABILITATION CLASSIFICATION:

THE WORK IS CLASSIFIED AS A LEVEL 2 ALTERATION IN ACCORDANCE WITH VEBC §601.2.2 SINCE IT INVOLVES THE REPLACEMENT AND INSTALLATION OF NEW MECHANICAL EQUIPMENT AND ASSOCIATED EQUIPMENT PLATFORMS.

ALTERATIONS MUST BE PERFORMED IN A MANNER THAT DOES NOT MAKE THE EXISTING BUILDING LESS CONFORMING TO THE REQUIREMENTS OF VCC IN ACCORDANCE WITH VEBC §601.1.

ALTERATIONS ARE REQUIRED TO MAINTAIN THE LEVEL OF FIRE PROTECTION THAT IS EXISTING AS WELL AS THE LEVEL OF PROTECTION THAT IS EXISTING FOR THE MEANS OF EGRESS IN ACCORDANCE WITH VEBC §602.2.

NEW CONSTRUCTION ELEMENTS, COMPONENTS, AND SYSTEMS ARE REQUIRED TO COMPLY WITH THE REQUIREMENTS OF VCC IN ACCORDANCE WITH VEBC §603.3

5. FIRE SUPPRESSION & FIRE ALARM:

THE BUILDING IS SPRINKLERED THROUGHOUT IN ACCORDANCE WITH VCC §903.3.1.1 AND NFPA 13.

THE BUILDING IS PROVIDED WITH AN AUTOMATIC FIRE ALARM SYSTEM IN ACCORDANCE WITH VCC §907 AND NFPA 72.

THE EXISTING FIRE SUPPRESSION AND FIRE ALARM SYSTEMS WILL NOT BE MODIFIED AS PART OF THIS PROJECT.

6. ACCESS TO MECHANICAL EQUIPMENT:

THE NEW MECHANICAL EQUIPMENT WILL BE INSTALLED ON THE UNOCCUPIED ROOF, ON NEW EQUIPMENT PLATFORMS COMPLYING WITH VCC §505.3.

SINCE THESE PLATFORMS ARE UNOCCUPIED, ACCESS TO THEM IS VIA LADDERS DESIGNED IN ACCORDANCE WITH VCC §1011.16

7. PENETRATIONS:

PENETRATIONS OF FIRE-RESISTANCE RATED HORIZONTAL ASSEMBLIES AND FIRE-RESISTANCE RATED WALLS MUST COMPLY WITH VCC §714.

CONTRACTOR'S SAFETY NOTE

The contractor shall comply with Virginia Tech's Safety requirements for contractors and subcontractors program, which is incorporated by reference. Copies of this program are available from the owner or may be downloaded at www.ehss.vt.edu.

ASBESTOS AND LEAD GENERAL NOTES:

ASBESTOS/LEAD DISCLOSURE:
ASBESTOS CONTAINING MATERIALS:
AN ASBESTOS INSPECTION HAS BEEN PERFORMED AND NO ASBESTOS CONTAINING MATERIALS WERE DISCOVERED. IF A SUSPECT ASBESTOS MATERIAL IS ENCOUNTERED IN THE COURSE OF THE WORK THAT IS NOT DISCUSSED AS PART OF THE REPORT, THE WORK MUST BE STOPPED AND FACILITIES SAFETY SHOULD BE CONTACTED AT 540-315-2898 OR 540-315-2396.

LEAD CONTAINING MATERIALS:
A LEAD PAINT INSPECTION HAS BEEN PERFORMED AND NO LEAD CONTAINING MATERIALS WERE DISCOVERED. THIS REPORT IS PROVIDED FOR THE CONTRACTOR'S USE AND MAY NOT BE ALL-INCLUSIVE. IF SUSPECT LEAD MATERIALS ARE ENCOUNTERED IN THE COURSE OF WORK THAT ARE NOT DISCUSSED AS PART OF THE REPORT, THE WORK MUST BE STOPPED AND FACILITIES SAFETY SHOULD BE CONTACTED AT 540-231-4255.

UBO APPROVAL STAMP

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PROJECT

VTC FBRI CHILLER PROJECT

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ISSUE/REVISION

I/R	DATE	DESCRIPTION
I	03/03/2025	100% WORKING DRAWINGS

KEY PLAN

PROJECT NUMBER

60738913

SHEET TITLE

COVER SHEET

SHEET NUMBER

G-001

ABBREVIATIONS

#	POUND OR NUMBER
&	AND
Ø	ROUND (DIAMETER) PHASE
A	AMPERE, AIR COMPRESSED AIR
A.C.T	ACOUSTICAL CEILING TILE
A/E	ARCHITECT / ENGINEER
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB	ANCHOR BOLT
ABT	ABOUT
ABUT.	ABUTMENT
ABV	ABOVE
AC	ALTERNATING CURRENT, AIR CONDITIONING UNIT, ACRE, AIR COMPRESSOR
ACCS	ACCESSORIES
ACI	AMERICAN CONCRETE INSTITUTE
ACM	ASBESTOS CONTAINING MATERIAL
ACMU	ACOUSTICAL CONCRETE MASONRY UNIT
ACP	ASBESTOS CEMENT PIPE, ACOUSTICAL CEILING PANEL
ACS	ACESS, ACCESSIBLE
ACST	ACOUSTIC, ACOUSTICAL
ACV	ALARM CHECK VALVE
ADA	AMERICANS WITH DISABILITY ACT
ADD.	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJACENT
ADMIN	ADMINISTRATIVE
ADO	AUTOMATIC DOOR OPENER
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFF	ABOVE FINISH FLOOR
AFFF	AQUEOUS FILMM FORMING FOAM
AFG	ABOVE FINISH GRADE
AFMS	AIRFLOW MEASURING STATION
AGGR	AGGREGATE
AH	AIR HANDLING, AIR-HANDLING UNIT
AHR	ANCHOR
AIC	AMPERE INTERRUPTING CAPACITY
AISI	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AL	ALUMINUM
ALT	ALTERNATE
AM	AMMETER
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AO	AUTOMATIC OPENER
AP	ACCESS PANEL
APPR	APPROVED
APROX	APPROXIMATE
APS	ALARM PRESSURE SWITCH
ARCH	ARCHITECT / ARCHITECTURAL
BITUM	BITUMINOUS
BL	BUILDING LINE, BASE LINE
BLDG	BUILDING
BLK	BLOCK, BLOCKING
BLW	BELOW
BM	BEAM, BENCH MARK, SOIL STABILIZATION BLANKET & MATTING
BOL	BEGINNING OF LINE
BOT	BOTTOM
BP	BASE PLATE, BACKFLOW PREVENTER, BEARING PLATE
BR	BARE ROOT, BOTTOM REGISTER
BRG	BEARING
BRK	BRICK
BRKT	BRACKET
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BU	BUILT-UP
BUR	BUILT-UP ROOF(ING), BURIED
CORR	CORRIDOR, CORRUGATED
COV	COVER
CP	CEMENT PILASTER, CONDENSATE PUMP
CPT	CARPET
CR	CEILING REGISTER, HOT-CONDENSER WATER CONTROL RELAY
CSD	CELLULAR STEL DECK
CT	CERAMIC TILE, CURRENT TRANSFORMER
CTR	CENTER
CTRL	CONTROL
CTSK	COUNTERSINK
CTWT	COUNTERWEIGHT
CU	CUBIC, COPPER
CULV	CULVERT
CV	CONVERTER, CHECK VALVE
CW	DOMESTIC COLD WATER
CWB	CAPILLARY WATER BARRIER
°C	DEGREES CELSIUS
D	DEPTH, DEGREE, OF CURVE, DIMMER SWITCH, DRAINLINE, MOUNTED IN DUCT
DB	DRY BULB, DIRECT BURIAL DUCT, DEEP BANK, DECIBELS, DEED BOOK, DRAINAGE BASIN
DBL	DOUBLE
DC	DIRECT CURRENT
DEC	DECIDUOUS
DEFL	DEFLECT, DEFLECTION
DEG	DEGREE
DEM	DEMOUNTABLE
DEPR	DEPRESSED
DEPT	DEPARTMENT
DET	DETAIL / DETAILS
DF	DRINKING FOUNTAIN
DH	DUCT HEATER, DOOR HOLDER
DI	DROP INLET,DUCTILE IRON, DEIONIZED WATER

ABBREVIATIONS

DIA	DIAMETER
DIAG	DIAGRAM, DIAGONAL
DIFF	DIFFUSER
DIM	DIMENSION
DIP.	DUCTILE IRON PIPE
DIR	DIRECTION, DIRECT, DEIONIZED WATER RETURN
DISC.	DISCONNECT
DISCH	DISCHARGE
DISP	DISPENSER
DIST	DISTRIBUTION, DISTANCE
DIV	DIVISION
DK	DECK
DL	DEAD LOAD
DMH	DROP MANHOLE
DML	DEMOLITION, DEMOLISH
DMPR	DAMPER
DN	DOWN
DP	DISTRIBUTION PANEL
DR	DOOR, DRIVE
DS	DOWNSPOUT, DRIP STATION, DIGESTED SLUDGE, DISCONNECT SWITCH
DSD	DUCT SMOKE DETECTOR
DTWH	DUAL TEMP WALL HYDRANT
DUP	DUPLICATE
DV	DRAIN VALVE
DVTL	DOVETAIL
DW	DUMBWAITER, DISHWASHER
DWD	DRINKING WATER DISPENSER
DWEL	DWELLING
DWG	DRAWING
DWLS	DOWELS
DWV	DRAIN WASTE AND VENT
DX	DUPLEX, DIRECT EXPANSION,
E TO E	END TO END
E.A.T	ENTERING AIR TEMPERATURE
E.W.T	ENTERING WATER TEMPERATURE
EA	EACH
EC	EMPTY CONDUIT, ELECTRICAL CONTRACTOR
ECB	ENCLOSED CIRCUIT BREAKER
ECL	EMERGENCY CRITICAL LIGHTING
ECMT	ENCASEMENT
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR, ELEVATION
ELL	EMERGENCY LIFE SAFETY LIGHTING
ELP	EMERGENCY LIFE SAFETY POWER
EM	EXPANDED METAL
EMER	EMERGENCY
EMF	WALK-OFF ENTRY MAT
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSE, ENCLOSURE
ENG	ENGINE
ENGR	ENGINEER
ENT	ENTERING
ENTR	ENTRANCE
EOL	END OF LINE
EP	EXPLOSION-PROOF, EDGE OF PAVEMENT
EPX	EPOXY
EQL	EQUAL
EQPT	EQUIPMENT
EQUIP	EQUIPMENT
ER	EXISTING TO REMAIN
ES	EDGE OF SHOULDER
ESMT	EASEMENT
EV	EVERGREEN
EW	EACH WAY, END WALL
EWC	ELECTRIC WATER COOLER
EXC	EXCAVATE, EXCAVATION
EXH	EXHAUST
EXP	EXPOSED
EXPN	EXPANSION
EXST	EXISTING
EXT	EXTERIOR, EXTERNAL
EXTN	EXTENSION
F	FUSED, FAN
F TO F	FACE TO FACE
F&T	FLOAT AND THERMOSTATIC
FA	FIRE ALARM
FAB	FABRICATE
FABL	FIRE ALARM BELL
FACP	FIRE ALARM CONTROL PANEL
fC	FOOTCANDLE, FAN COIL UNIT, FACE OF CURB
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN, FIRE DAMPER
FDC	FIRE DEPARTMENT CONNECTION
FDN	FOUNDATION
FDR	FEEDER
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FES	FLARED END SECTION
FFE	FINISH FLOOR ELEVATION
FGL	FIBERGLASS
FH	FIRE HOSE
FHC	FIRE HOSE CABINET
FHYD	FIRE HYDRANT
FIG.	FIGURE
FIN FL EL	FINISH FLOOR ELEVATION
FIN.	FINISH
FL	FLOOR, FLASHING
FLA	FULL LOAD AMPERAGE
FLC	FULL LOAD CURRENT
FLEX.	FLEXIBLE
FLG	FLANGE
FLSH	FLASHING
FLUOR	FLUORESCENT

ABBREVIATIONS

FM	FLOW METER
FMC	FLEXIBLE METAL CONDUIT
FO	FIBER OPTIC
FOB	FACE OF BRICK, FRONT OF BUILDING
FOR	FUEL-OIL RETURN
FOS	FUEL-OIL SUPPLY
FOV	FUEL-OIL VENT
FPM	FEET PER MINUTE
FR	FRAME, FROM
FRICT	FRICTION
FRT	FIRE RETARDANT TREATED
FRZR	FREEZER
FS	FAR SIDE, FULL SIZE, FLOW SWITCH, FLOOR SINK, FUSE SIZE
FSCP	FLAME SAFEGUARD CONTROL PANEL
FSS	FUSED SAFETY SWITCH
FT	FOOT
FTG	FOOTING
FUR	FURRED, FURRING
FURN	FURNISH
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING
FWC	FABRIC WALL COVERING
FWP	FABRIC WRAPPED PANEL
FXTR	FIXTURE
°F	DEGREES FAHRENHEIT
G	GAS MAIN OR SERVICE LINE, NATURAL GAS PIPE
GA	GAGE, GAUGE
GAL	GALLON
GALV	GALVANIZE, GALVANIZED
GC	GROUND COUNTERPOISE
GCMU	GLAZED CONCRETE MASONRY UNIT
GDR	GUARDRAIL
GEN	GENERATOR
GFCI	GOVERNMENT FURNISHED CONTRACTOR INSTALLED
GFE	GOVERNMENT FURNISHED EQUIPMENT
GFECI	GOVERNMENT FURNISHED EQUIPMENT CONTRACTOR INSTALLED
GFGI	GOVERNMENT FURNISHED GOVERNMENT INSTALLED
GFI	GROUND FAULT INTERRUPTER
GFM	GOVERNMENT FURNISHED MATERIAL
GHZ	GIGAHERTZ
GI	GALVANIZED IRON
GL	GLASS
GND	GROUND
GOVT	GOVERNMENT
GPH	GALLON PER HOUR
GPM	GALLONS PER MINUTE
GR	GRADE
GRAD	GRADUATED
GRL	GRILLE
GRS	GALVANIZED RIGID STEEL
GRT	GROUT
GSU	GLAZED STRUCTURAL UNITS
GT	GLASS TILE
GTB	GROUND TERMINAL BOX
GTV	GATE VALVE
GV	GAS VALVE
GVL	GRAVEL
GWB	GYPSUM WALLBOARD
GYP	GYPSUM
H	HIGH
H.I.D	HIGH-INTENSITY DISCHARGE
HB	HOSE BIB
HBD	HARDBOARD
HC	HANDICAPPED, HORIZONTAL CROSS CONNECT
HD	HEAD, HEAT DEFLECTOR
HDPE	HIGH DENSITY POLYETHLENE
HDR	HANDRAIL
HDW	HARDWARE
HDWD	HARDWOOD
HDWL	HEADWALL
HGR	HANGER
HGT	HEIGHT
HH	HANDHOLE
HM	HOLLOW METAL
HOA	HAND-OFF AUTOMATIC
HORIZ	HORIZONTAL
HP	HORSEPOWER, HEAT PUMP
HPF	HIGH POWER FACTOR
HPS	HIGH-PRESSURE SODIUM, HIGH-PRESSURE STEAM
HPT	HIGH POINT
HR	HOUR
HS	HORIZONTAL SLOT
HTG	HEATING
HTR	HEATER
HV	HIGH VOLTAGE, HEATING-VENTILATING UNIT
HW	DOMESTIC HOT WATER
HWC	DOMESTIC HOT WATER CIRCULATING
HWL	HIGH-WATER LINE
HYD	HYDRANT
hZ	HERTZ
I	INTERCOM
IC	INTERRUPTING CAPACITY, INTERMEDIATE CROSS CONNECT
ID	INSIDE DIAMETER
IEEE	THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IN.	INCH

ABBREVIATIONS

INCAND	INCANDESCENT
INCL	INCLUSIVE
INCR	INCREMENT
IND	INDUCTION
INFL	INFLUENT
INSTL	INSTALL, INSTALLATION
INSUL	INSULATION, INSULATED, INSULATOR, INSULATING
INT	INTEGRATED, INTERIOR
INTMD	INTERMEDIATE
INV	INVERT, INVERSE
IP	IRON PIN, STORM DRAIN INLET PROTECTION, INTERNET PROTOCOL
IPF	IRON PIN FOUND, IRON PIPE FOUND
IR	IRRIGATION
ISOL	ISOLATOR
J	JOULE, JUNCTION BOX
JB	JUNCTION BOX
MCC	MOTOR CONROL CENTER
MCCB	MOTOR CASE CIRCUIT BREAKER
MCOV	MAXIMUM CONTINUOUS OPERATING VOLTAGE
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MEMB	MEMBRANE
MER	MAIN EQUIPMENT ROOM
MET.	METAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE, MOUNTING HEIGHT, METAL HALIDE
MHz	MEGAHERTZ
MID	MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MK	MARK
MKBD	MARKER BOARD
MLO	MAIN LUGS ONLY
mm	MILLIMETERS
MO	MASONRY OPENING
MON	MONUMENT
MOV	METAL OXIDE VARISTOR
MP	MEDIUM PRESSURE
MPa	MEGAPASCAL
MPH	MILES PER HOUR
MR	MOP RECEPTOR, MOISTURE RESISTANT
MSL	MEAN SEA LEVEL
MT	MOUNT
MTD	MOUNTED
MTG	MOUNTING
MTR	MOTOR
MTZ	MOTORIZED
MU	MULCHING
MUL	MULLION
MUTCO	MANUAL OF UNIFORM TRAFFIC CONTROL
MUTOA	MULTI-USER TELECOMMUNICATION OUTLET ASSEMBLY
MV	MEDIUM VOLTAGE
MWP	MEMBRANE WATERPROOFING
N	NORTH
N2	NITROGEN
N2O	NITROGEN OXIDE
N & D	NAIL & DISC
N-G	NEUTRAL TO GROUND
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NA	NOT APPLICABLE
NEC	NATIONAL ELECTRICAL CODE
NEUT	NEUTRAL
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO. NOS	NUMBER, NUMBERS
NOM	NOMINAL
NPRN	NEOPRANE
NPW	NONPOTABLE WATER
NRS NRS	NONRISING STEM
NS	NEAR SIDE
NST	NONSLIP TREAD
NTS	NOT TO SCALE
02	MEDICAL OXYGEN
O TO O	OUT TO OUT
O.F.	OUTSIDE FACE
OA	OVERALL OUTSIDE AIR
OC	ON CENTER
OCPD	OVER CURRENT PROTECTOR SERVICE
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OH	OVERHEAD
OP	OUTLET PROTECTION
OPNG	OPENING
OPP	OPPOSITE
OS&Y	OUTSIDE SCREW AND YOKE
OSP	OUTSIDE PLANT
OVHD	OVERHEAD
OZ	OUNCE
P	POLE, POWER, PUMP
P.F.	POWER FACTOR
P.R.S	PRESSURE REDUCING STATION
RAF	RAISED ACCESS FLOORING
RAS	RESILIENT BASE / RUBBER BASE, RETURN ACTIVATED SLUDGE
RB	RUBBER BASE
RBR	RUBBER

ABBREVIATIONS

RCP	REINFORCED CONCRETE PIPE
RCPT	RECEPTACLE
RCRC	RESIINOUS CHEMICAL, RESISTANT COATING
RCRTC	RESIINOUS CHEMICAL RESISTANT TRAFFIC COATING
RCVG	RECEIVING
RCVR	RECEIVER
RD	ROOF DRAIN, ROAD
RDCR	REDUCER
REC	RECESS
RECIR	RECIRCULATING
RECT	RECTANGLE, RECTANGULAR
RED.	REDUCING
REF	REFERENCE
REFL	REFLECTED
REFR	REFRIGERATOR
REINF	REINFORCE, REINFORCEMENT, REINFORCED
REM	REMAINDER
REQD	REQUIRED
RESIL	RESILENT
REV	REVISION
RF	ROOF, RADIO FREQUENCY, RESILIENT FLOOR
RFG	ROOFING
RFH	ROOF HATCH
RFI	RADIO FREQUENCY INTERFERENCE
RL	ROOF LEADER, REFRIGERANT LIQUID
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTION PER MINUTE
RR	RIPRAP, RAILROAD
RS	ROLLER SHADE
RTE	ROUTE
S	SOUTH, SANITARY, SEWER, SPEAKER, SWITCH, SUPPLY
S/N	SOLID NEUTRAL
SA	SUPPLY AIR
SAN	SANITARY
SCFM	STANARD CUBIC FEET PER MINUTE
SCHED	SCHEDULE
SCONC	SEALED CONC
SD	STORM DRAIN, SMOKE DETECTOR
SDF	STATIC DISSIPATIVE FLOORING
SDMH	STORM DRAIN MANHOLE
SDT	STATIC DISSIPATIVE TILE
SEC	SECONDARY
SECT	SECTION
SF	SILT FENCE, SQUARE FEET
SFM	SEWER FORCE MAIN
SFP	SPRAYED FIRE PROTECTION
SH	SHEET
SHV	SHELVING
SIM	SIMILAR
SK	SKETCH
SPEC	SPECIFICATIONS
TO.	TELECOMMUNICATIONS OUTLET
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOS	TOP OF STEEL
TOT.	TOTAL
UL	UNDERWRITERS LABORATORY
ULT	ULTIMATE
VS	VERTICAL SLOT
VT	VINYL TILE
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WEST, WIDTH/WIDE
W/	WITH
W/O	WITHOUT
WA	WAINSCOT
WAGD	WASTE ANESTHESIA DISPOSAL
WAS	WASTE ACTIVATED SLUDGE
WB	WET BULB, WIND BEAM
WC	WATER CLOSET, WALL COVERING, WINDOW COVERING
WD	WOOD, WIDTH
WDO	WINDOW
WFD	WATERFLOW DETECTOR
WG	WALL GUARD, WATER GAGE
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTER
WHS	WELDED HEAD STUD
WI	WROUGHT IRON
WL	WIND LOAD, WATER LINE
WM	WATER METER
WP	WORKING POINT, WATERPROOF
WPF	WATERPROOFING
WS	WATERSURFACE, WATERSTOP
WST	WASTE
WT	WEIGHT, WINDOW TREATMENT
WTR	WATER
WTS	WELDED THREADED STUD
WV	WATER VALVE, WOOD VENEER
WWR	WELDED WIRE FABRIC (WELDED WIRE REINFORCEMENT)
XARM	CROSS ARM
XFMR	TRANSFORMER
XFR	TRANSFER
XMIT	TRANSMITTER
XP	EXPLOSION PROOF
YD	YARD
YHYD	YARD HYDRANT

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

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I	03/03/2025	100% WORKING DRAWINGS

KEY PLAN

PROJECT NUMBER

60738913

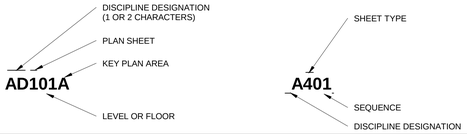
SHEET TITLE

ABBREVIATIONS

SHEET NUMBER

G-002

SHEET NUMBERING



SHEET FILE DISCIPLINE DESIGNATORS

- G- GENERAL - **1**
- GI GENERAL INFORMATION - **2**
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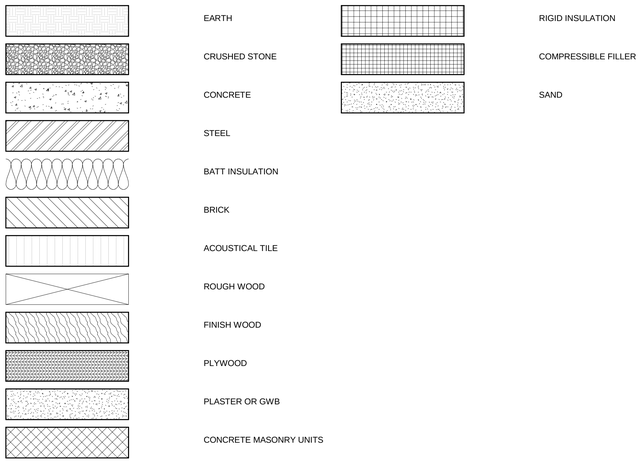
- HA ASBESTOS ABATEMENT
- V- SURVEY - **4**
- B- GEOTECHNICAL - **5**
- BB BORING LOGS
- CD CIVIL DEMOLITION - **6**
- C- CIVIL
- CC CIVIL EROSION AND SEDIMENT CONTROL
- CE CIVIL EXISTING
- CS CIVIL SITE
- CG CIVIL GRADING
- CP CIVIL PAVING
- CU CIVIL UTILITIES
- LD LANDSCAPE DEMOLITION - **7**
- L- LANDSCAPE
- LS LANDSCAPE SITE
- LL LANDSCAPE LIGHTING
- LP LANDSCAPE PLANTING
- SD STRUCTURAL DEMOLITION - **8**
- S- STRUCTURAL
- SS STRUCTURAL SITE
- SB STRUCTURAL SUBSTRUCTURE
- SF STRUCTURAL FRAMING
- SC STRUCTURAL COMPONENTS
- SR STRUCTURAL REINFORCEMENT
- SC STRUCTURAL COMPONENTS
- SR STRUCTURAL REINFORCEMENT
- AD ARCHITECTURAL DEMOLITION - **10**
- A- ARCHITECTURAL
- AS ARCHITECTURAL SITE
- AE ARCHITECTURAL ELEMENTS
- AI ARCHITECTURAL INTERIORS
- AF ARCHITECTURAL FINISHES
- ID INTERIORS DEMOLITION - **11**
- I- INTERIORS
- IN INTERIOR DESIGN
- IF INTERIOR FURNISHINGS
- IG INTERIOR GRAPHICS
- QF FOOD SERVICE - **12**
- FD FIRE PROTECTION DEMOLITION - **13**
- F- FIRE PROTECTION
- FA FIRE ALARM
- FX FIRE PROTECTION/SUPPRESSION
- PD PLUMBING DEMOLITION - **14**
- P- PLUMBING
- PS PLUMBING SITE
- PL PLUMBING FIXTURES
- PP PLUMBING PIPING
- PQ PLUMBING EQUIPMENT
- DQ MATERIAL HANDLING - **15**
- MD MECHANICAL DEMOLITION - **16**
- M- MECHANICAL
- MH MECHANICAL HVAC
- MI MECHANICAL INSTRUMENTATION
- MP MECHANICAL PIPING
- MS MECHANICAL SITE
- MY MECHANICAL HYDRAULIC SYSTEMS
- MW MECHANICAL DISTRIBUTED ENERGY
- ED ELECTRICAL DEMOLITION - **17**
- E- ELECTRICAL
- ES ELECTRICAL SITE
- EI ELECTRICAL INSTRUMENTATION
- EL ELECTRICAL LIGHTING
- EP ELECTRICAL POWER
- ET ELECTRICAL TELECOMMUNICATIONS
- EY ELECTRICAL AUXILIARY SYSTEMS
- EG ELECTRICAL GROUNDING
- TD TELECOMMUNICATIONS DEMOLITION - **18**
- T- TELECOMMUNICATIONS
- TA AUDIO VISUAL
- TC CLOCK AND PROGRAM
- TI INTERCOM
- TM MONITORING
- TN DATA NETWORKS
- TT TELEPHONE
- TY SECURITY
- TS SCADA

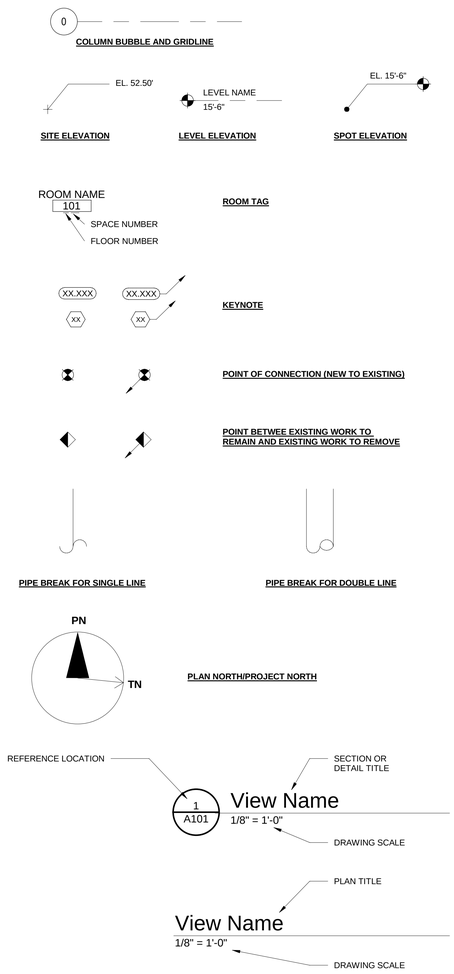
SHEET TYPE DESIGNATORS

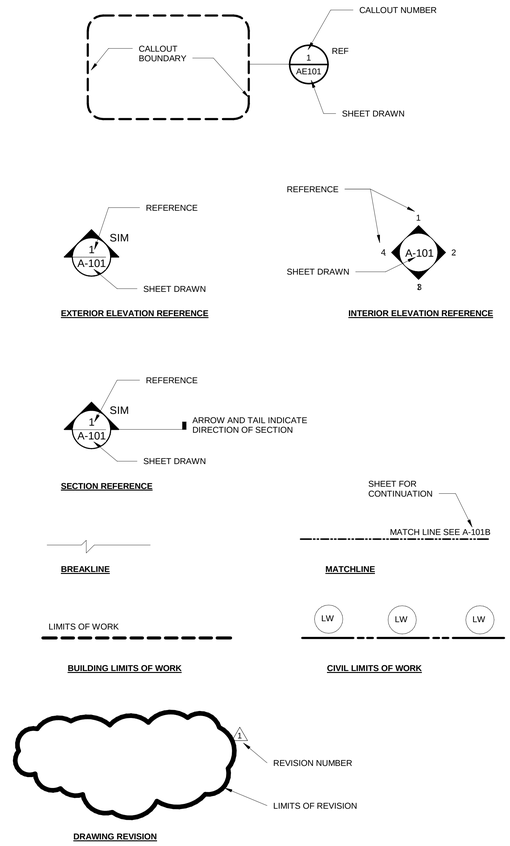
- 0 GENERAL (SYMBOLS LEGEND, NOTES, ETC.)
- 1 PLANS (HORIZONTAL VIEWS)
- 2 ELEVATIONS AND PROFILES (VERTICAL VIEWS)
- 3 SECTIONS (SECTIONAL VIEWS, CROSS-SECTIONS, ETC.)
- 4 LARGE SCALE VIEWS (ENLARGED PLANS AND ELEVATIONS)
- 5 DETAILS
- 6 SCHEDULES AND DIAGRAMS
- 7 USER DEFINED
- 8 USER DEFINED
- 9 3D REPRESENTATIONS (PERSPECTIVES AND PHOTOGRAPHS)

BUILDING MATERIALS



SYMBOLOGY





GENERAL NOTES

1. VERIFY ALL DIMENSIONS AND CONDITIONS IN FIELD PRIOR TO START OF WORK.

2. ALL CONSTRUCTION AND WORK SHOWN ON THE COMPLETE SET OF DRAWINGS IS ASSUMED TO BE NEW AND FURNISHED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED NIC.

3. IF A CONFLICT EXISTS WITHIN THE DRAWINGS AND/OR SPECIFICATIONS THE MORE STRINGENT AND MORE COSTLY REQUIREMENT SHALL APPLY. ITEMS SHOWN ON DRAWINGS, BUT NOT SPECIFIED, SHALL APPLY AND BE FURNISHED AND INSTALLED BY THE CONTRACTOR. IF AN ITEM IS SHOWN ON THE DRAWINGS, BUT IS NOT INCLUDED IN THE SPECIFICATIONS, PROVIDE ITEM OF A QUALITY LEVEL CONSISTENT WITH THE GENERAL QUALITY LEVEL OF THE CONTRACT REQUIREMENTS. BRING CONFLICTS BETWEEN DRAWINGS AND SPECIFICATIONS TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY FOR CLARIFICATION.

4. WRITTEN INFORMATION TAKES GENERAL PRECEDENCE OVER DRAWING LINES. BRING CONFLICTS BETWEEN WRITTEN INFORMATION AND DRAWN LINES TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.

5. IF AN AREA OR SPACE IS SHOWN, BUT IS NOT CLEARLY DEFINED OR INDICATED BY NOTES, PROVIDE THE SAME MATERIALS, FINISHES AND QUALITY OF CONSTRUCTION AS SCHEDULED OR DETAILED FOR AREAS OF SIMILAR USE ELSEWHERE IN THE WORK.

6. TYPICAL DETAILS THROUGHOUT THE DRAWING SET SHALL APPLY FOR ALL APPLICABLE CONDITIONS, EVEN IF NOT SPECIFICALLY SHOWN OR REFERENCED.

7. ALL APPURTENANCES BUILT INTO OR THROUGH WALLS, AND/OR ROOFS INCLUDING DUCTS, LOUVERS, GRILLES, PIPING, MECHANICAL WORK, ETC. SHALL FIT TIGHTLY AND BE THOROUGHLY SEALED AROUND PERIMETERS. USE FIRESTOPPING SYSTEMS THAT HAVE RATINGS THAT MEET REQUIREMENTS OF ASSEMBLIES BEING PENETRATED.

8. PRIOR TO PROCEEDING WITH ANY WORK WITHIN THE EXISTING STRUCTURE, THE CONTRACTOR SHALL BECOME FAMILIAR WITH EXISTING CONDITIONS. DURING THE PROCESS OF CONSTRUCTION, IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO MAINTAIN THE INTEGRITY OF EXISTING WORK WHERE EXISTING WORK IS MODIFIED TO ACCOMMODATE NEW CONSTRUCTION AND TO PROTECT FROM DAMAGE THOSE PORTIONS OF EXISTING WORK, WHICH ARE TO REMAIN.

9. CONTRACTOR SHALL VERIFY EXISTING ROOF ELEVATIONS PRIOR TO BEGINNING WORK.

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I/R	DATE	DESCRIPTION
I	03/03/2025	100% WORKING DRAWINGS

KEY PLAN

PROJECT NUMBER

60738913

SHEET TITLE

GENERAL SYMBOLOGY

SHEET NUMBER

G-003

GENERAL NOTES:

LOAD CRITERIA

1. STRUCTURE IS DESIGNED IN ACCORDANCE WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE, 2021 EDITION.
2. DESIGN LIVE LOADS (REDUCED AS ALLOWED BY THE BUILDING CODE):

   ROOF 30 PSF

   *OR EQUIPMENT WEIGHT IF GREATER
3. DESIGN SNOW LOAD:

GROUND SNOW LOAD,	Pg	50 PSF
FLAT ROOF SNOW LOAD,	Pf	46 PSF
EXPOSURE FACTOR,	Ce	1.0
ROOF THERMAL FACTOR,	Ct	1.2
SLOPE FACTOR,	Cs	1.0
IMPORTANCE FACTOR,	Is	1.1

4. DESIGN WIND LOADS:

BASIC WIND SPEED, Vult	116 MPH (THREE SECOND GUST)
ALLOWABLE WIND SPEED, Vasd	90 MPH (THREE SECOND GUST)
RISK CATEGORY,	III
EXPOSURE	B
INTERNAL PRESSURE COEFF	GCpi +/-0.18

5. DESIGN SEISMIC LOADS ARE BASED ON THE FOLLOWING DATA:

MAPPED SHORT PERIOD SPECTRAL RESPONSE ACCELERATION,	Ss = 0.22
MAPPED 1-SEC PERIOD SPECTRAL RESPONSE ACCELERATION,	S1 = 0.069
SHORT PERIOD DESIGN SPECTRAL RESPONSE ACCELERATION,	Sds = 0.18
1-SEC PERIOD DESIGN SPECTRAL RESPONSE ACCELERATION,	Sd1 = 0.097
RISK CATEGORY	III
SEISMIC DESIGN CATEGORY	B
SITE CLASS	D

COORDINATION

1. DO NOT SCALE DRAWINGS. CHANGES AFFECTING THE LAYOUT SHOWN MUST BE SPECIFIC AND CLEARLY CONVEYED TO THE OWNER'S REPRESENTATIVE IN WRITTEN FORM AS A CHANGE FOR INCLUSION INTO THESE PLANS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LAYOUT PRIOR TO CONSTRUCTION. ALL DIMENSIONS ON STRUCTURAL DRAWINGS SHALL BE CHECKED AGAINST ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, AND CIVIL DRAWINGS AND ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE IMMEDIATELY. SEE THE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO MECHANICAL, ELECTRICAL AND ARCHITECTURAL DRAWINGS FOR OPENINGS NOT SHOWN ON STRUCTURAL DRAWINGS.
2. SHOP DRAWINGS SHALL BE PREPARED BY THE FABRICATOR. COPYING OF THESE CONSTRUCTION DOCUMENTS FOR USE AS SHOP DRAWINGS WILL NOT BE PERMITTED.
3. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE-DOWNS MAY BE NECESSARY.
4. ALL TEMPORARY SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. EQUIPMENT FRAMING LOADS, OPENINGS AND STRUCTURE IN ANY WAY RELATED TO HVAC, PLUMBING, PROCESS OR ELECTRICAL REQUIREMENTS ARE SHOWN FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL OBTAIN APPROVAL OF THE PERTINENT TRADES BEFORE PROCEEDING WITH SUCH PORTION OF THE WORK. EXCESS COST RELATED TO VARIATION IN THESE REQUIREMENTS SHALL BE BORNE BY THE APPROPRIATE CONTRACTOR.

STEEL

1. MATERIAL STRENGTH

WIDE FLANGE SHAPES ASTM A 992	Fy = 50 KSI
STEEL PIPE ASTM A 53 GRADE B (NOTED AS "PIPE 3 STD")	Fy = 35KSI
ALL OTHER STRUCTURAL STEEL ASTM A 36	Fy = 36KSI

2. THE CENTERLINES OF ALL COLUMNS AND BEAMS SHALL BE LOCATED ON COLUMN LINES UNLESS OTHERWISE SHOWN.
3. BEAMS SHALL BE FABRICATED AND INSTALLED WITH THE NATURAL CAMBER UP.
4. BOLTS SHALL BE ¾ INCH DIAMETER, ASTM F3125, GRADE A325N GALVANIZED, UNLESS OTHERWISE INDICATED.
5. WELDING ELECTRODES SHALL CONFORM TO REQUIREMENTS SHOWN IN TABLE 5.4 OF AWS D1.1:2020, AND FILLER METAL SHALL HAVE A MINIMUM YIELD STRENGTH OF 70 KSI. WHERE WELD SIZE IS NOT GIVEN WELD SIZE SHALL BE A MINIMUM IN ACCORDANCE WITH TABLE 7.7 OF AWS D1.1:2020.
6. WELDS INDICATED "CJP" SHALL BE COMPLETE JOINT PENETRATION GROOVE WELDS. FABRICATOR SHALL PRODUCE COMPLETE JOINT PENETRATION GROOVE WELDS WHICH CONFORM TO ALL AWS D1.1 QUALIFIED WELD REQUIREMENTS AND WHICH ARE APPLICABLE TO THE SPECIFIC CONDITIONS SHOWN.
7. WHERE THE WORK OF OTHER TRADES REQUIRES CUTS, HOLES, ETC., IN STRUCTURAL STEEL MEMBERS, CUTS, HOLES, ETC., SHALL BE MADE IN THE SHOP AND SHALL BE SHOWN ON THE SHOP DRAWINGS. MAKING HOLES OR CUTS IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED WITHOUT SPECIFIC APPROVAL OF THE OWNER'S REPRESENTATIVE.
8. PROVIDE SHOP DRAWINGS SHOWING FABRICATION OF STRUCTURAL-STEEL COMPONENTS.
9. QUALIFY PROCEDURES AND PERSONNEL IN ACCORDANCE WITH AWS D1.1.
10. PERFORMANCE REQUIREMENTS SHALL COMPLY WITH ANSI/AISC 303 AND 360.
11. STRUCTURAL STEEL SHALL BE FABRICATED AND ASSEMBLED IN SHOP TO GREATEST EXTENT POSSIBLE. FABRICATE IN ACCORDANCE WITH ANSI/AISC 303 AND TO ANSI/AISC 360.
12. PROVIDE HOT-DIP GALVANIZED FINISH FOR ALL STRUCTURAL STEEL, APPLY ZINC COATING BY THE HOT-DIP PROCESS TO STRUCTURAL STEEL IN ACCORDANCE WITH ASTM A123.

RENOVATION AND EXISTING STRUCTURES

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, ETC., NECESSARY FOR THE PROPER CONSTRUCTION AND ALIGNMENT OF THE NEW PORTIONS OF THE STRUCTURE TO THE EXISTING STRUCTURE. THE CONTRACTOR SHALL VERIFY ALL MEASUREMENTS NECESSARY FOR PROPER FABRICATION AND ERECTION OF ALL STRUCTURAL MEMBERS. THE CONTRACTOR SHALL SUPPORT, BRACE AND SECURE EXISTING STRUCTURES AS REQUIRED. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SAFETY OF EXISTING STRUCTURES DURING CONSTRUCTION.
2. BEFORE PROCEEDING WITH ANY WORK WITHIN OR ADJACENT TO THE EXISTING STRUCTURE, THE CONTRACTOR SHALL BECOME FAMILIAR WITH EXISTING CONDITIONS. DURING THE PROCESS OF CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE INTEGRITY OF THE EXISTING STRUCTURE WHERE THE EXISTING STRUCTURE IS MODIFIED TO ACCOMMODATE NEW CONSTRUCTION AND TO PROTECT FROM DAMAGE THOSE PORTIONS OF THE EXISTING STRUCTURE, WHICH ARE TO REMAIN.
3. ALL EXISTING STRUCTURAL ELEMENTS (SLABS, BEAMS, WALLS, COLUMNS, FOUNDATIONS...) SHALL REMAIN INTACT UNLESS SPECIFICALLY NOTED TO BE REMOVED BY THE DEMOLITION DOCUMENTS OR OTHERWISE NOTED ON THE STRUCTURAL DRAWINGS.
4. INFORMATION PROVIDED ON THESE DRAWINGS RELATED TO EXISTING CONDITIONS IS BASED ON AVAILABLE DESIGN DOCUMENTS AND LIMITED FIELD OBSERVATION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY AND AWAIT DIRECTION FROM THE OWNER'S REPRESENTATIVE IF ANY DISCREPANCY BETWEEN THE CONTRACT DOCUMENTS AND THE EXISTING CONDITIONS IS DISCOVERED.
5. CORE DRILLS REQUIRED BY MECHANICAL OR ELECTRICAL TRADES BUT NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE DOCUMENTED SHOWING EXACT DIMENSIONS AND LOCATIONS. THE DRAWING SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO PROCEEDING WITH THE DRILLING OPERATION.

SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS WILL BE PERFORMED IN ACCORDANCE WITH THE STATEMENT OF SPECIAL INSPECTIONS
2. OWNER, OR ARCHITECT/STRUCTURAL ENGINEER OF RECORD ACTING AS THE OWNER'S AGENT, SHALL DIRECTLY EMPLOY AND PAY FOR SERVICES OF THE SPECIAL INSPECTORS TO PERFORM REQUIRED SPECIAL INSPECTIONS.
3. THE FOLLOWING GENERAL TYPES OF WORK REQUIRE SPECIAL INSPECTION:
   STRUCTURAL STEEL
   STRUCTURAL WELDING
   HIGH STRENGTH BOLTS

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03-03-25
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ISSUE/REVISION

I/R	DATE	DESCRIPTION
I	03/03/2025	100% WORKING DRAWINGS

KEY PLAN

PROJECT NUMBER

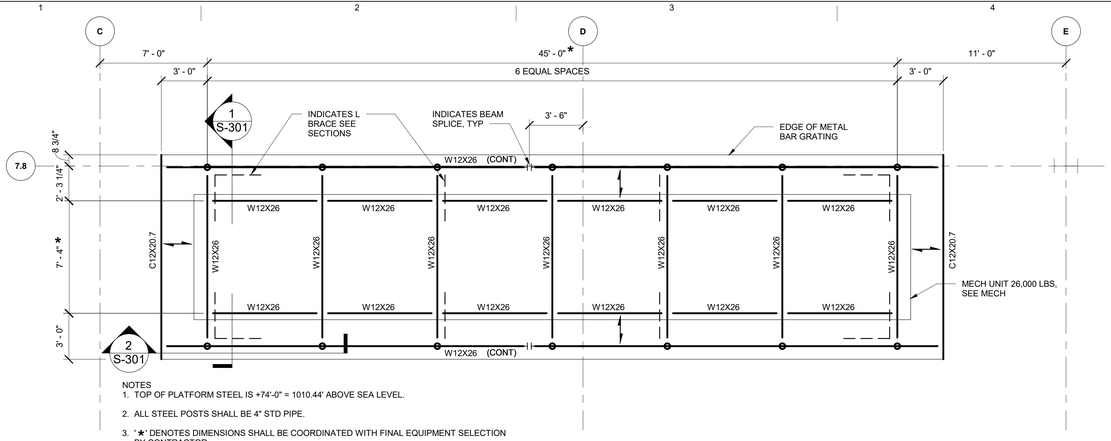
60544603

SHEET TITLE

GENERAL NOTES AND SPECS

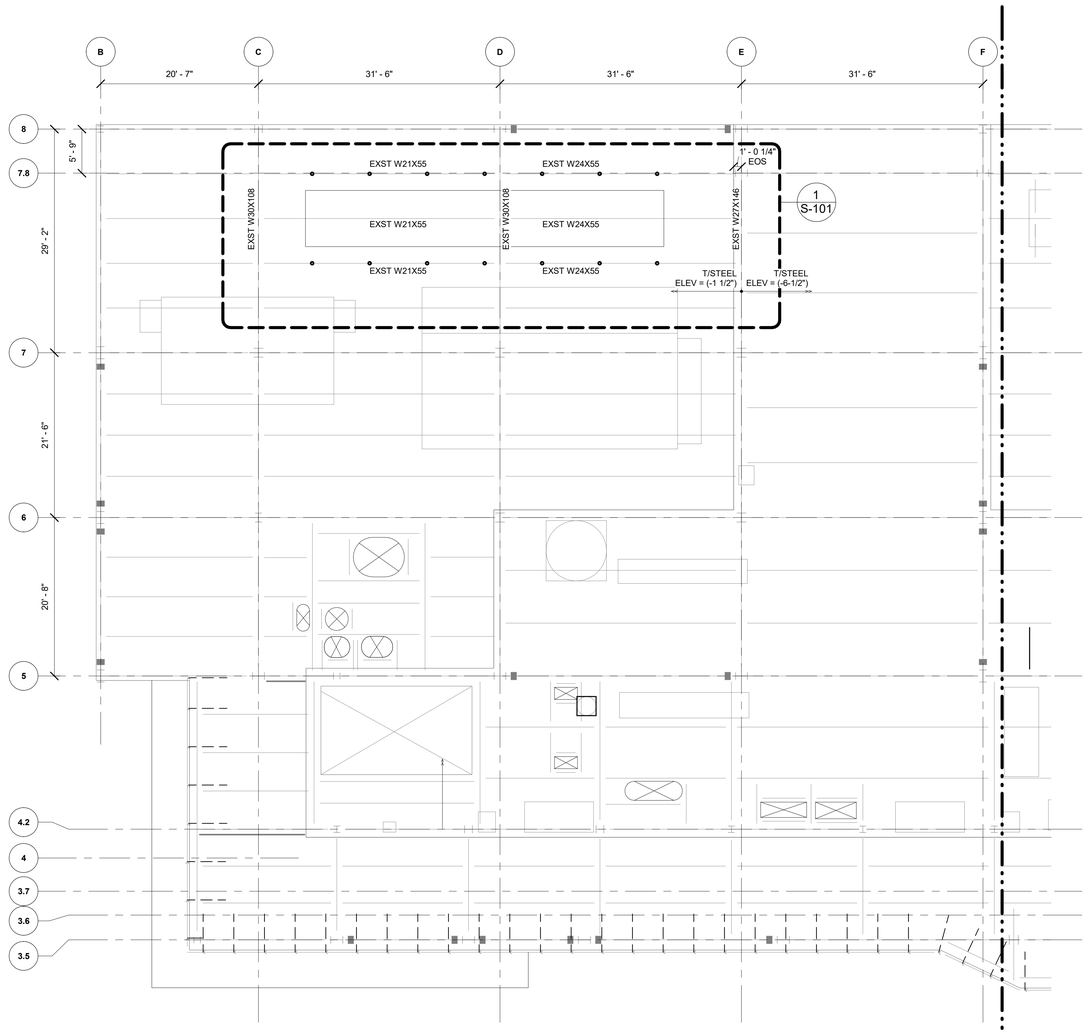
SHEET NUMBER

S-001



NOTES
1. TOP OF PLATFORM STEEL IS +74'-0" = 1010.44' ABOVE SEA LEVEL.
2. ALL STEEL POSTS SHALL BE 4" STD PIPE.
3. '★' DENOTES DIMENSIONS SHALL BE COORDINATED WITH FINAL EQUIPMENT SELECTION BY CONTRACTOR.
4. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED.
5. METAL BAR GRATING SHALL BE 19W4 (1-1/4"X1/8") GALVANIZED.
6. ⟷ DENOTES METAL BAR GRATING SPAN.

1 S-101 STEEL PLATFORM AT CHILLERS
1/4" = 1'-0"



ROOF AND PENTHOUSE FLOOR FRAMING PLAN - AREA F
1/8" = 1'-0"

FRAMING PLAN NOTES THIS SHEET:

A. SEE SHEET S-001 FOR GENERAL NOTES.

B. EXISTING FINISH PENTHOUSE FLOOR/TOP ROOF DECK FLOOR ELEVATION +70'-0" = 1006.44' ABOVE SEA LEVEL.

C. TOP OF STEEL IS INDICATED [+/- X'-X"] RELATIVE TO TOP OF FINISH FLOOR SLAB.

E. "CONT" INDICATES BEAM IS CONTINUOUS OVER COLUMN.

F. "EOS" INDICATES EDGE OF SLAB.

G. SEE MEP DRAWINGS FOR ROOF TOP EQUIPMENT REQUIREMENTS. CONTRACTOR TO COORDINATE FINAL EQUIPMENT WEIGHT, SIZE AND LOCATION WITH SUPPORTING STRUCTURE.

H. SEE ELECTRICAL DRAWINGS FOR REQUIRED CORE DRILLING. MINIMUM CLEAR SPACING OF CORE DRILLINGS SHALL BE EQUAL TO THE CORE DRILL SIZE.

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GRAPHIC SCALES
1/4"=1'-0" 4' 2' 0 4' 8'
1/8"=1'-0" 8' 4' 0 8' 16'

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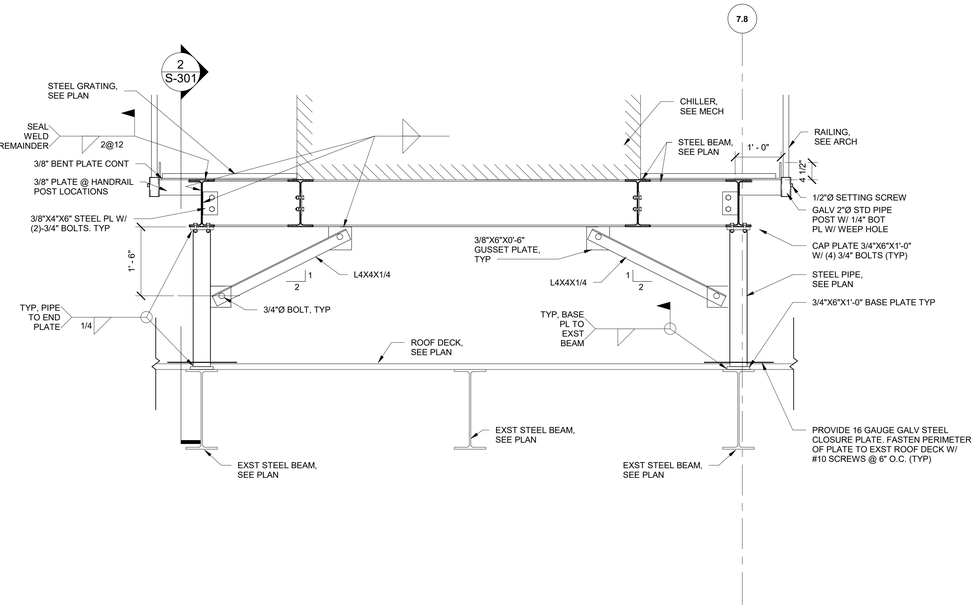
KEY PLAN

PROJECT NUMBER
60544603

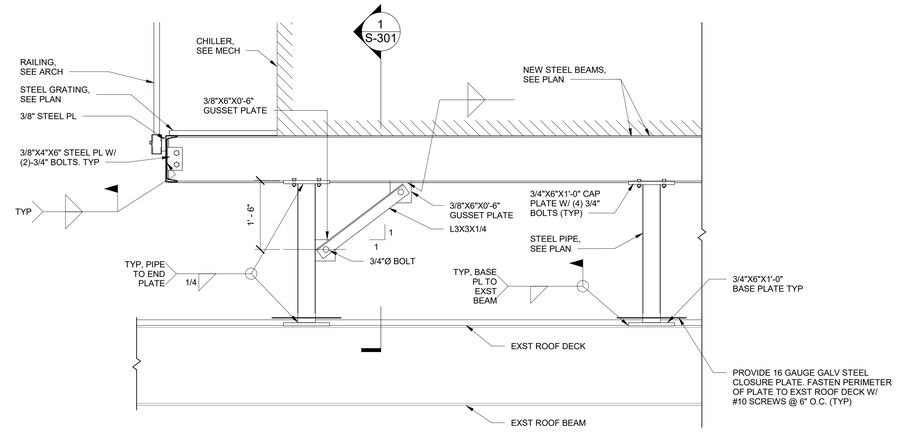
SHEET TITLE
FRAMING PLANS - NEW WORK

SHEET NUMBER
S-101



1 S-301 SECTION

3/4" = 1'-0"



2 S-301 SECTION

3/4" = 1'-0"

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3/4"=1'-0" 12" 6" 0 1' 2' 3'

GRAPHIC SCALES

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KEY PLAN

PROJECT NUMBER

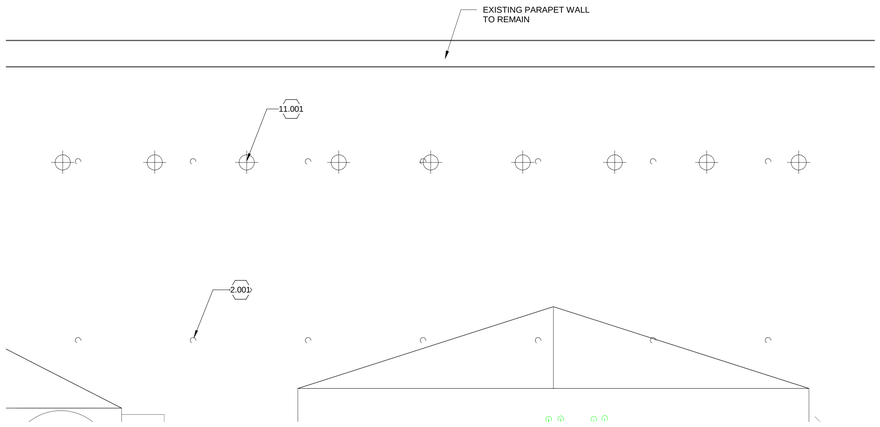
60544603

SHEET TITLE

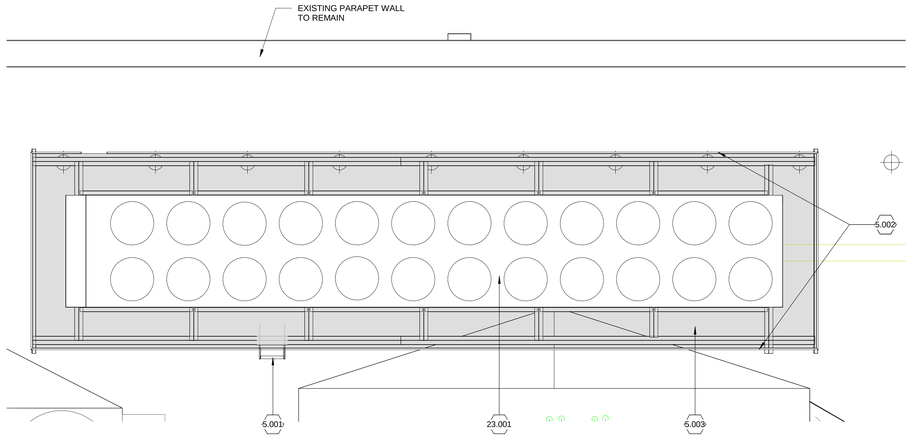
SECTIONS AND DETAILS - NEW WORK

SHEET NUMBER

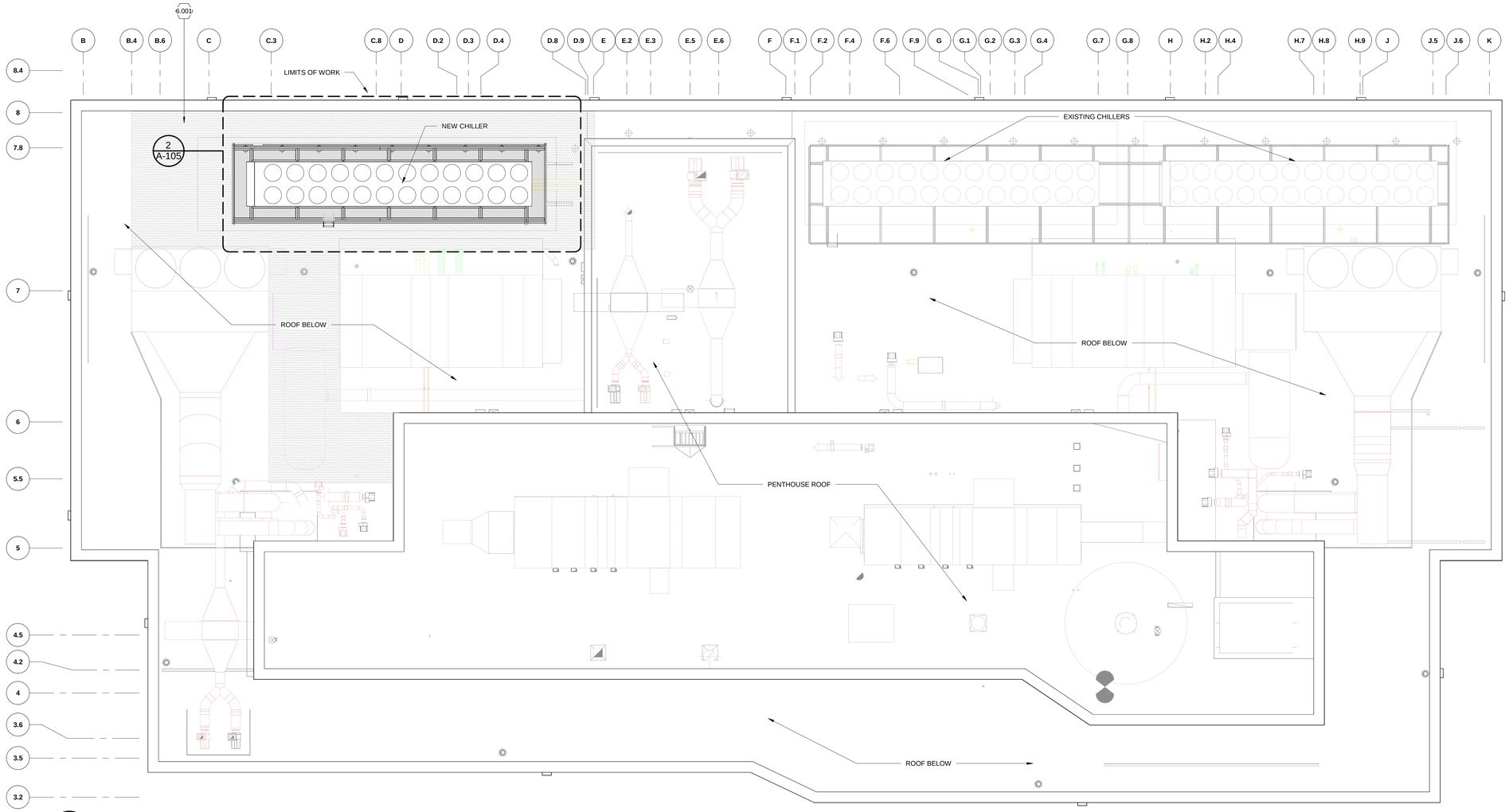
S-301



3 A-105
ENLARGED DEMO ROOF PLAN
1/4" = 1'-0"



2 A-105
ENLARGED ROOF PLAN
1/4" = 1'-0"



1 A-105
ROOF PLAN
1/8" = 1'-0"

SHEET KEYNOTES:

2.001	REMOVE ROOFING WHERE REQUIRED TO INSTALL NEW STRUCTURAL MEMBERS. PROTECT ROOF AS NOTED BELOW IN ROOF PROTECTION NOTES. ROOF NEEDS TO MAINTAIN WARRANTY SO MODIFY AND REINSTALL PER MANUFACTURER'S INSTRUCTIONS, TYP.
5.001	FIXED GALVANIZED PAINTED STEEL LADDER.
5.002	3' 6" HIGH GALVANIZED PAINTED STEEL GUARDRAIL. STYLE TO MATCH EXISTING. PROVIDE REMOVABLE CONNECTION WHERE NEEDED FOR EQUIPMENT ACCESS, SERVICE, OR REPLACEMENT.
5.003	STEEL PLATFORM. REFER TO STRUCTURAL DRAWINGS.
6.001	APPROXIMATE AREA OF PLYWOOD / POLYISOCYANURATE INSULATION AS ROOF MEMBRANE PROTECTIVE BARRIER. FIELD VERIFY EXTENTS.
11.001	EXISTING ROOF ANCHORS TO REMAIN
23.001	ROOFTOP MECHANICAL EQUIPMENT, SEE MECH

GENERAL NOTES THIS SHEET:

A. REFER TO SHEET G-002 FOR ABBREVIATIONS AND SHEET G-003 FOR GENERAL SYMBOLOGY AND GENERAL NOTES.
B. REFER TO STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL WORK AND COORDINATE EXTENT WITH RESPECTIVE TRADES.
C. PROVIDE WALKWAY PADS TO NEW LADDER LOCATION, CONNECT WITH EXISTING WALKWAY PATHS ON ROOF
D. LIGHTNING PROTECTION TO BE PROVIDED. REFER TO ELECTRICAL DRAWINGS FOR MORE INFORMATION.
E. MODIFICATION TO THE EXISTING CEILING MAY INCLUDE RELOCATION OF SPRINKLER HEADS. REPLACE ANY DAMAGED OR BROKEN CEILING TILES AS NEEDED.
F. GUARDS TO BE DESIGNED TO WITHSTAND CODE REQUIRED LOAD LIMITATIONS.

ROOF PROTECTION NOTES:

1. ALL WORK ASSOCIATED WITH THE NEW CHILLER INSTALLATION TO BE COORDINATED WITH EXISTING ROOF WARRANTY. THIS INCLUDES ANY ROOF PENETRATIONS AND WORK REQUIRED TO INSTALL THE NEW CHILLER PLATFORM AND CHILLER EQUIPMENT.
2. PROVIDE ROOF PROTECTION BOARD SYSTEM CONSISTING OF 1/2" POLYISOCYANURATE INSULATION ON TOP OF EXISTING ROOF MEMBRANE AND COVERED WITH 3/4" EXTERIOR GRADE PLYWOOD OR SIMILAR ON TOP OF THE POLYISOCYANURATE INSULATION TO PROTECT EXISTING MEMBRANE DURING CONSTRUCTION. PROVIDE IN AREA OF WORK, AND NO LESS THAN AREA SHOWN ON SHEET A-105.
3. AT THE END OF EACH DAY PROVIDE WATERTIGHT PROTECTION TO ALL EXPOSED AREAS OF THE BUILDING ENVELOPE.

PN
TN

1/4"=1'-0" 4' 2' 0 4' 8'
1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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KEY PLAN

PROJECT NUMBER

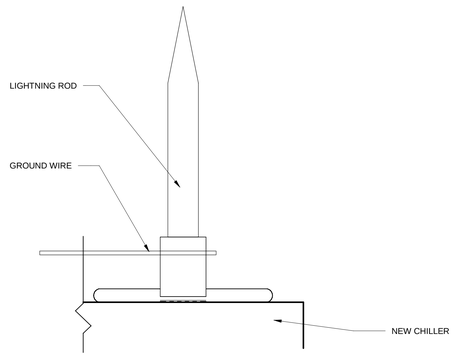
60738913

SHEET TITLE

ROOF PLAN

SHEET NUMBER

A-105

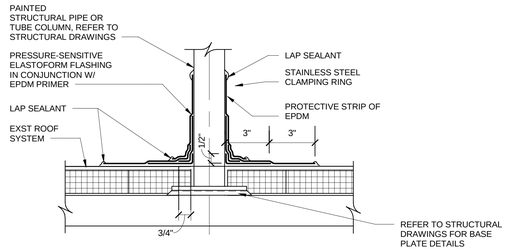


NOTES:

1. GROUND WIRE SUPPORTS SHALL BE INSTALLED IN SIMILAR MANNER TO LIGHTNING RODS.
2. A SUFFICIENT NUMBER OF GROUND WIRE SUPPORTS MUST BE INSTALLED TO ASSURE THAT THE GROUND WIRE DOES NOT COME IN CONTACT WITH FIELD OF FLASHING MEMBRANE.
3. IF THE GROUND WIRE COMES IN CONTACT WITH THE FIELD OR FLASHING MEMBRANE THEN A BATTEN COVER WILL NEED TO BE INSTALLED UNDER THE GROUND WIRE TO PREVENT CONTACT WITH THE MEMBRANE.
4. MATCH EXISTING LIGHTNING ROD SHOWN ON EXISTING CHILLER.

1 / A-501 LIGHTNING ROD

3" = 1'-0"

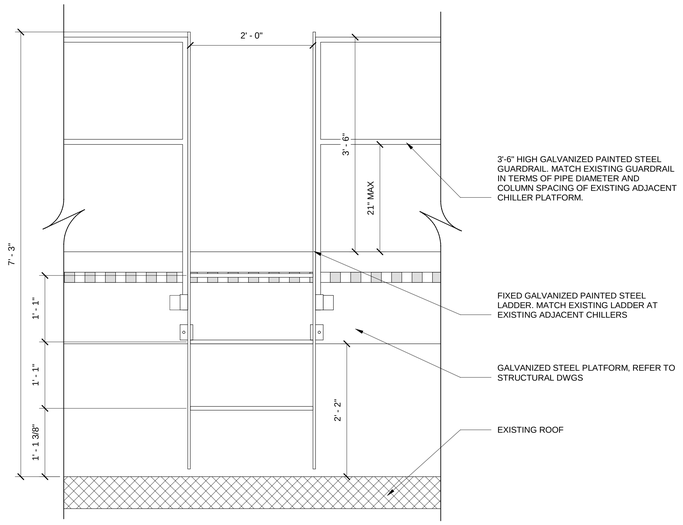


NOTES:

1. PIPE FLASHING MAY BE USED WITH SQUARE OR RECTANGULAR STRUCTURAL TUBING WITH ROUNDED CORNERS.
2. EPDM PRIMER MUST BE APPLIED TO THE MATING SURFACES PRIOR TO APPLYING PRESSURE-SENSITIVE ELASTOFORM FLASHING.
3. IN COLDER TEMPERATURES, A HEAT GUN MUST BE USED WHEN FORMING PRESSURE-SENSITIVE ELASTOFORM FLASHING.
4. ON MECHANICALLY FASTENED ROOFING SYSTEMS, ADDITIONAL MEMBRANE SECUREMENT IS REQUIRED.

3 / A-501 ROOF FLASHING DETAIL

3" = 1'-0"



2 / A-501 PLATFORM LADDER

1" = 1'-0"

GENERAL NOTES THIS SHEET:

A. REFER TO SHEET G-002 FOR ABBREVIATIONS AND SHEET G-003 FOR GENERAL SYMBOLOGY AND GENERAL NOTES.
B. REFER TO STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL WORK AND COORDINATE EXTENT WITH RESPECTIVE TRADES.
C. PROVIDE WALKWAY PADS TO NEW LADDER LOCATION, CONNECT WITH EXISTING WALKWAY PATHS ON ROOF
D. LIGHTNING PROTECTION TO BE PROVIDED; REFER TO ELECTRICAL DRAWINGS FOR MORE INFORMATION.
E. MODIFICATION TO THE EXISTING CEILING MAY INCLUDE RELOCATION OF SPRINKLER HEADS. REPLACE ANY DAMAGED OR BROKEN CEILING TILES AS NEEDED.
F. GUARDS TO BE DESIGNED TO WITHSTAND CODE REQUIRED LOAD LIMITATIONS.

UBO APPROVAL STAMP

12" 9" 6" 3" 0
3"=1'-0"

12" 9" 6" 3" 0 1' 2'
1"=1'-0"

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

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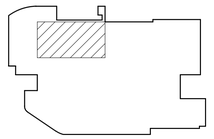
3-03-25
ARCHITECT

ISSUE/REVISION

I/R	DATE	DESCRIPTION
I	03/03/2025	100% WORKING DRAWINGS

KEY PLAN



PROJECT NUMBER

60738913

SHEET TITLE

ROOF DETAILS

SHEET NUMBER

A-501

PIPING SYMBOLS

(E)	EXISTING PIPING TO REMAIN
	EXISTING PIPING TO BE REMOVED
HRS	HEAT RECOVERY SUPPLY
HRR	HEAT RECOVERY RETURN
HPS	HIGH PRESSURE STEAM (80 PSIG)
HPR	HIGH PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM (15 PSIG)
LPR	LOW PRESSURE CONDENSATE
SV	STEAM VENT
HWS	HEATING-HOT WATER SUPPLY
HWR	HEATING-HOT WATER RETURN
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
HCS	HOT/CHILLED WATER SUPPLY
HCR	HOT/CHILLED WATER RETURN
B	BRINE SUPPLY
BR	BRINE RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
MU	MAKE-UP WATER
HG	REFRIGERANT HOT GAS
RS	REFRIGERANT SUCTION
RL	REFRIGERANT LIQUID
CP	CONDENSATE PUMP DISCHARGE
BFW	BOILER FEEDWATER
BD	BOILER BLOW DOWN
FOS	FUEL-OIL SUPPLY
FOR	FUEL-OIL RETURN
FOV	FUEL-OIL VENT
RHS	REHEAT HOT WATER SUPPLY
RHR	REHEAT HOT WATER RETURN
PSC	PUMPED STEAM CONDENSATE
	STEAM TRAP
DS	DRIP STATION
P.R.S	PRESSURE REDUCING STATION
D	DRAINLINE

PA	PIPE ANCHOR
PG	PIPE GUIDE OR SLEEVES
	EXPANSION JOINT
	VENTURI
	GATE VALVE
	GLOBE VALVE
	HOSE VALVE WITH CAP
	BUTTERFLY VALVE
	CHECK VALVE
	BALANCING VALVE
	CALIBRATED BALANCING VALVE
PICBV	TWO WAY PRESSURE INDEPENDENT CONTROL AND BALANCING VALVE
	AUTOMATIC FLOW CONTROL VALVE
	BALL VALVE
	PLUG VALVE
S	SOLENOID VALVE
	SAFETY OR PRESSURE RELIEF, ANGLE VALVE
	SAFETY OR PRESSURE RELIEF, STRAIGHT THRU VALVE
	PRESSURE REDUCING VALVE (PRV)
	AUTOMATIC CONTROL VALVE, 2 WAY
	AUTOMATIC CONTROL VALVE, 3 WAY
	BLIND FLANGE
	LATERAL Y
	CAP
	ELBOW, 90°
	ELBOW, 90° TURNED UP
	ELBOW 90°, TURNED DOWN
	ELBOW, 45°
	TEE
	TEE, OUTLET TURNED UP
	TEE, OUTLET TURNED DOWN
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER (STRAIGHT INVERT)
	UNION
	FLEXIBLE PIPE CONNECTION
	PRESSURE GAGE WITH SHUT OFF COCK AND SIPHON OR PULSATION DAMPENER.
T	TEMPERATURE GAGE

MISC SYMBOLS

0000	ROOM NUMBER
ø	ROUND DUCT
	FLAT OVAL DUCT
	POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
	POINT BETWEEN EXISTING WORK TO REMAIN AND EXISTING WORK TO BE REMOVED
	EXISTING WORK TO BE REMOVED
	EXISTING WORK TO REMAIN

MECHANICAL GENERAL NOTES

1. SEE SH G002 & G003 FOR ABBREVIATIONS AND SYMBOLS.
2. MECHANICAL LAYOUTS ARE SCHEMATIC. PROVIDE ANY ADDITIONAL DROPS, RISES, OR OFFSETS REQUIRED FOR A COMPLETE INSTALLATION,COORDINATE EXACT ROUTING OF WORK WITH ALL OTHER TRADES AND OBSTRUCTIONS.
3. INSTALL CALIBRATED BALANCING VALVES AND VENTURIS WITH A MINIMUM UNRESTRICTED STRAIGHT RUN OF 5 PIPE DIAMETERS UPSTREAM AND 3 PIPE DIAMETERS DOWNSTREAM.
4. RELOCATE ALL EXISTING HANGERS, CONDUITS, WIRING, PIPING, AND DUCTWORK AS NECESSARY TO PROVIDE PIPING AND DUCTWORK AS INDICATED.
5. VERIFY EXACT SIZES AND LOCATIONS OF EXISTING WORK BEFORE PURCHASING OR FABRICATING NEW WORK FOR CONNECTION TO OR INSTALLATION IN EXISTING WORK.
6. SOME SYMBOLS INDICATED ON THIS LEGEND SHEET MAY NOT APPEAR ON THE DRAWINGS.
7. COMPLY WITH VIRGINIA UNIFORM STATEWIDE BUILDING CODE (USBC) AND ALL OTHER GOVERNING CODES. THERE SHALL BE NO EXCEPTION. REPORT ANY DEFICIENCIES WITHIN THIRY (30) DAYS UPON AUTHORIZATION TO PROCEED.

SCHEDULES

AIR COOLED CHILLER SCHEDULE

MARK	LOCATION	PERFORMANCE DATA		COMPRESSOR DATA		EVAPORATOR DATA					ELECTRICAL DATA			WEIGHT	BASIS OF DESIGN		SCHEDULE NOTES
		CAPACITY (TONS)	AMBIENT (°F)	REFRIG TYPE	TYPE	FLOW (GPM)	MIN FLOW (GPM)	EWT (°F)	LWT (°F)	WPD (FT HD)	MCA	VOLTS	PHASE	(LBS)	MANUFACTURER	MODEL	
C-3	ROOF	380.0	95.0	R-513A	SCREW	800.0	336.0	54.0	42.0	10.00	791	460	3	25,993	DAIKIN	AWV028B	

SPECIFICATIONS

MECHANICAL SPECIFICATIONS
SUBMITTALS:
CHILLERS
PIPING
HEAT TRACE
VIBRATION ISOLATORS

1. COORDINATION OF WORK:
COORDINATE MECHANICAL WORK WITH OTHER TRADES INVOLVED IN THE CONSTRUCTION PROJECT. PROVIDE DROPS, RISES, OR OFFSETS NOT INDICATED BUT NECESSARY FOR PROPER INSTALLATION OF WORK. CAREFULLY LAY OUT ALL WORK IN ADVANCE TO COORDINATE WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL FEATURES OF CONSTRUCTION. VERIFY AT SITE ALL LOCATIONS, GRADES, ELEVATIONS, AND UTILITY SERVICE CONNECTIONS. MAKE REQUIRED CHANGES OR RELOCATIONS NECESSARY TO RESOLVE ANY CONFLICTS. DRAIN CHILLED WATER SYSTEM AS REQUIRED TO MAKE CHILLED WATER CONNECTIONS. COORDINATE CHILLED WATER OUTAGES WITH OWNER.

2. TESTING AND BALANCING:
TAB CONTRACTOR SHALL BE AN INDEPENDENT TESTING, ADJUSTING, AND BALANCING AGENCY CERTIFIED BY AABC AND/OR NEBB IN THE TESTING AND BALANCING DISCIPLINES REQUIRED FOR THIS PROJECT. AGENCY SHALL HAVE AT LEAST 3 YEARS OF SUCCESSFUL TESTING, ADJUSTING, AND BALANCING EXPERIENCE ON PROJECTS OF SIMILAR SIZE AND COMPLEXITY AS THIS PROJECT. AGENCY SHALL BE THE SINGLE SOURCE OF RESPONSIBILITY FOR TESTING, ADJUSTING, AND BALANCING THE BUILDING MECHANICAL SYSTEMS TO MEET THE DESIGN OBJECTIVES. SERVICES SHALL INCLUDE CHECKING INSTALLATIONS FOR CONFORMITY TO DESIGN, MEASUREMENT AND ESTABLISHMENT OF THE FLOW QUANTITIES OF THE MECHANICAL SYSTEMS AS REQUIRED TO MEET DESIGN SPECIFICATION, AND RECORDING AND REPORTING THE RESULTS.

3. IDENTIFICATION AND LABELS:
PROVIDE AND INSTALL LABELS ON EQUIPMENT AND PIPING. LABELS SHALL BE BLACK WITH WHITE LETTERING. LABELS SHALL BE CLEARLY READABLE FROM A DISTANCE OF 5 FT. PROVIDE AND INSTALL LABELS INDICATING LOCATION AND MARK OF EQUIPMENT LOCATED ABOVE CEILING REQUIRING ROUTINE MAINTENANCE. PROVIDE PRE-PRINTED, SELF-ADHESIVE PIPE LABELS WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION ACCORDING TO ASME A13.1. PROVIDE PLASTIC-LAMINATED, SELF-ADHESIVE LABELS.

4. AIR-COOLED, ROTARY-SCREW WATER CHILLERS
CHILLER DESCRIPTION
A. THE CONTRACTOR SHALL FURNISH AND INSTALL AIR-COOLED WATER CHILLER WITH SCREW COMPRESSORS AS SHOWN AS SCHEDULED ON THE CONTRACT DOCUMENTS. THE CHILLERS SHALL BE INSTALLED IN ACCORDANCE WITH THIS SPECIFICATION AND PERFORM AT THE SPECIFIED CONDITIONS AS SCHEDULED.

CHILLER OPERATION:
A. CHILLER SHALL BE CAPABLE OF STARTING AND RUNNING AT OUTDOOR AMBIENT TEMPERATURES FROM 14°F (-10° C) TO 115°F (46°C).
B. CHILLER SHALL BE CAPABLE OF OPERATING WITH A LEAVING SOLUTION TEMPERATURE RANGE 40 TO 68°F (4.4 TO 20°C) WITHOUT GLYCOL.
C. CHILLER SHALL BE CAPABLE OF STARTING UP WITH 95°F (35°C) ENTERING FLUID TEMPERATURE TO THE EVAPORATOR. MAXIMUM WATER TEMPERATURE THAT CAN BE CIRCULATED WITH THE CHILLER NOT OPERATING IS 108°F (52°C)
D. CHILLER SHALL PROVIDE EVAPORATOR FREEZE PROTECTION AND LOW LIMIT CONTROL TO AVOID LOW EVAPORATOR REFRIGERANT TEMPERATURE TRIP-OUTS DURING CRITICAL PERIODS OF CHILLER OPERATION. WHENEVER THIS CONTROL IS IN EFFECT, THE CONTROLLER SHALL INDICATE THAT THE CHILLER IS IN ADAPTIVE MODE. IF THE CONDITION EXISTS FOR MORE THAN 30 SECONDS, A LIMIT WARNING ALARM RELAY SHALL ENERGIZE.
E. RAPID RESTART™ AFTER POWER RESTORATION. THE CHILLER SHALL BE CAPABLE OF STARTING IN 45 SECONDS AND FULL CAPACITY RECOVERY IN LESS THAN 4 MINUTES.

COMPRESSORS
A. CONSTRUCT CHILLER USING SEMI-HERMETIC, VARIABLE SPEED DRIVE, HELICAL ROTARY SCREW COMPRESSORS.
B. PROVIDE COMPRESSOR MOTOR THAT IS SUCTION GAS COOLED WITH ROBUST CONSTRUCTION AND SYSTEM DESIGN PROTECTION.
C. PROVIDE OIL LUBRICATION SYSTEM WITH OIL CHARGING VALVE AND OIL FILTER TO ENSURE ADEQUATE LUBRICATION DURING STARTING, STOPPING, AND NORMAL OPERATION.
D. PROVIDE COMPRESSOR HEATER TO EVAPORATE REFRIGERANT RETURNING TO COMPRESSOR DURING SHUT DOWN. ENERGIZE HEATER WHEN COMPRESSOR IS NOT OPERATING.
E. PROVIDE COMPRESSOR WITH AUTOMATIC CAPACITY REDUCTION EQUIPMENT CONSISTING OF CAPACITY CONTROL VIA VARIABLE SPEED DRIVE AND/OR SLIDE VALVE. COMPRESSOR MUST START UNLOADED FOR SOFT START ON MOTORS.
F. CHILLER SHALL BE CAPABLE OF OPERATION DOWN TO 15% LOAD WITHOUT HOT GAS BYPASS.

EVAPORATOR
A. THE EVAPORATOR SHALL BE DESIGNED, TESTED, AND STAMPED IN ACCORDANCE WITH ASME CODE FOR A REFRIGERANT SIDE WORKING PRESSURE OF 200 PSIG. WATERSIDE WORKING PRESSURE SHALL BE 150 PSIG.
B. INSULATE THE EVAPORATOR WITH A MINIMUM OF 0.75 INCH (K=0.28) UV RATED INSULATION. IF THE INSULATION IS FIELD INSTALLED, THE ADDITIONAL MONEY TO COVER MATERIAL AND INSTALLATION COSTS IN THE FIELD SHOULD BE INCLUDED IN THE BID.
C. EVAPORATOR HEATERS SHALL BE FACTORY INSTALLED AND SHALL PROTECT CHILLER DOWN TO -4°F (-20°C). CONTRACTOR SHALL WIRE SEPARATE POWER TO ENERGIZE HEAT TAPE AND PROTECT EVAPORATOR WHILE CHILLER IS DISCONNECTED FROM THE MAIN POWER.
D. PROVIDE SHELL AND TUBE TYPE EVAPORATOR, SEAMLESS OR WELDED STEEL CONSTRUCTION WITH CAST IRON OR FABRICATED STEEL HEADS, SEAMLESS INTERNALLY AND EXTERNALLY FINNED COPPER TUBES, ROLLER EXPANDED INTO TUBE SHEETS.
E. PROVIDE ABILITY TO REMOVE EVAPORATOR TUBES FROM EITHER END OF THE HEAT EXCHANGER.
F. EVAPORATOR SHALL HAVE CLEANABLE TUBES
G. PROVIDE WATER DRAIN CONNECTION, VENT AND FITTINGS. FACTORY INSTALLED LEAVING WATER TEMPERATURE CONTROL AND LOW TEMPERATURE CUTOUT SENSORS.
I. PROOF OF FLOW SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER, MECHANICALLY INSTALLED AND ELECTRICALLY WIRED, AT THE FACTORY OF ORIGIN.

FANS
A. FANS SHALL BY DYNAMICALLY BALANCED AND DIRECT DRIVEN.
B. ALL CONDENSER FAN TEAO MOTORS HAVE PERMANENTLY LUBRICATED BALL BEARINGS AND EXTERNAL OVERLOAD PROTECTION.
C. ALL CONDENSER FANS SHALL HAVE DRIVES TO PROVIDE VARIABLE SPEED FOR OPTIMIZED EFFICIENCY.

CONDENSER
A. CONSTRUCT CONDENSER COILS OF MICROCHANNEL ALL ALUMINUM BRAZED FIN CONSTRUCTION. THE CONDENSER COILS SHALL HAVE AN INTEGRAL SUB-COOLING CIRCUIT AND SHALL BE DESIGNED FOR AT LEAST 350 PSIG WORKING PRESSURE. LEAK TESTED AT 1.5 TIMES WORKING PRESSURE. COILS CAN BE CLEANED WITH HIGH PRESSURE WATER.
B. CONDENSER COILS SHALL BE TRANSVERSE DESIGN. IF COILS ARE NOT TRANSVERSE DESIGN, PROVIDE COIL PROTECTION FOR SHIPPING.
C. CONDENSER COILS SHALL INCLUDE BAKED EPOXY COATING PROVIDING 6000+ HOUR SALT SPRAY RESISTANCE PER ASTM B117-90 APPLIED TO THE COIL.

ENCLOSURES/CHILLER CONSTRUCTION
A. CHILLER PANELS, BASE RAILS AND CONTROL PANELS SHALL BE FINISHED WITH A BAKED ON POWDER PAINT. CONTROL PANEL DOORS SHALL HAVE DOOR STAYS.
B. MOUNT STARTERS AND TERMINAL BLOCKS IN A UL 1995 RATED WEATHERPROOF PANEL PROVIDED WITH FULL OPENING ACCESS DOORS. IF A CIRCUIT BREAKER IS CHOSEN, IT SHOULD BE A LOCKABLE, THROUGH-THE-DOOR TYPE WITH AN OPERATING HANDLE AND CLEARLY VISIBLE FROM OUTSIDE OF CHILLER INDICATING IF POWER IS ON OR OFF.
C. THE COATING OR PAINT SYSTEM SHALL WITHSTAND 500 HOURS IN A SALT-SPRAY FOG TEST IN ACCORDANCE WITH ASTM B117.

CHILLER MOUNTED LOW VOLTAGE VARIABLE SPEED DRIVE (VSD)
A. THE WATER CHILLER SHALL BE FURNISHED WITH AN AIR COOLED VARIABLE SPEED DRIVE (VSD) AS SHOWN ON THE DRAWINGS.
B. THE VSD EFFICIENCY SHALL BE 97% OR BETTER AT FULL SPEED AND FULL LOAD. FUNDAMENTAL DISPLACEMENT POWER FACTOR SHALL BE A MINIMUM OF 0.96 AT ALL LOADS FOR VSD. ALL OTHER STARTERS SHALL HAVE A MINIMUM DISPLACEMENT POWER FACTOR OF 0.85.
C. POWER SEMI-CONDUCTOR AND CAPACITOR COOLING SHALL BE FROM A LIQUID OR AIR COOLED HEATSINK.

REFRIGERANT CIRCUIT
A. ALL CHILLERS SHALL HAVE 2 REFRIGERATION CIRCUITS, EACH WITH ONE OR TWO (MANIFOLDED) COMPRESSOR(S) ON EACH CIRCUIT.
B. PROVIDE FOR REFRIGERANT CIRCUIT:
1. LIQUID LINE SHUTOFF VALVE
2. SUCTION SERVICE VALVE
3. DISCHARGE SERVICE VALVE
4. FILTER (REPLACEABLE CORE TYPE)
5. LIQUID LINE SIGHT GLASS.
6. ELECTRONIC EXPANSION VALVE SIZED FOR MAXIMUM OPERATING PRESSURE
7. CHARGING VALVE
8. DISCHARGE AND OIL LINE CHECK VALVES
9. HIGH SIDE PRESSURE RELIEF VALVE
10. INTEGRATED OIL LOSS SENSOR
C. FULL OPERATING CHARGE OF R-513A AND OIL.
1. PROVIDE A FULLY CONVERTIBLE AND COMPATIBLE NEXT GENERATION LOW GWP REFRIGERANT CHILLER.
2. IF THE CHILLER CANNOT BE FACTORY SUPPLIED AS A FULLY CONVERTIBLE AND COMPATIBLE NEXT GENERATION LOW GWP REFRIGERANT CHILLER, THEN THE CONTRACTOR SHALL PROVIDE A FIELD RETROFIT OR A REFRIGERANT GUARANTEE.

VIBRATION ISOLATION: 2-1/2" STATIC DEFLECTION RESTRAINED SPRING VIBRATION ISOLATORS.

CONTROLS:
INTEGRATE CHILLER WITH EXISTING CHILLER CONTROLS. UPDATE SEQUENCING WITH EXISTING CHILLERS, GRAPHICS, AND ALARMS.

START-UP:
ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE. INSPECT FIELD-ASSEMBLED COMPONENTS, EQUIPMENT INSTALLATION, AND PIPING AND ELECTRICAL CONNECTIONS FOR PROPER ASSEMBLY, INSTALLATION, AND CONNECTION. FLUSH THE SYSTEMS, CLEAN WITH DETERGENTS, AND INITIALLY FILL SYSTEMS WITH REQUIRED CHEMICAL TREATMENT PRIOR TO OPERATION. PREPARE TEST AND INSPECTION STARTUP REPORTS.

WARRANTY PERIOD: FIVE YEARS PARTS AND LABOR FROM DATE OF SUBSTAINTIAL COMPLETION.

5. STEEL PIPE AND FITTINGS
A. STEEL PIPE: ASTM A 53/A 53M, BLACK STEEL WITH PLAIN ENDS; WELDED AND SEAMLESS, GRADE B.
B. CAST-IRON THREADED FITTINGS: ASME B16.4; CLASSES 125 AND 250.
C. MALLEABLE-IRON THREADED FITTINGS: ASME B16.3, CLASSES 150 AND 300.
D. MALLEABLE-IRON UNIONS: ASME B16.39; CLASSES 150, 250, AND 300.
E. CAST-IRON PIPE FLANGES AND FLANGED FITTINGS: ASME B16.1, CLASSES 25, 125, AND 250; RAISED GROUND FACE, AND BOLT HOLES SPOT FACED.
F. WROUGHT-STEEL FITTINGS: ASTM A 234/A 234M, WALL THICKNESS TO MATCH ADJOINING PIPE.
G. WROUGHT CAST- AND FORGED-STEEL FLANGES AND FLANGED FITTINGS: ASME B16.5, INCLUDING BOLTS, NUTS, AND GASKETS OF THE FOLLOWING MATERIAL GROUP, END CONNECTIONS, AND FACINGS:
   1. MATERIAL GROUP: 1.1.
   2. END CONNECTIONS: BUTT WELDING.
   3. FACINGS: RAISED FACE.
H. STEEL PRESSURE-SEAL FITTINGS:
   1. HOUSING: STEEL.
   2. O-RINGS AND PIPE STOP: EPDM.
   3. TOOLS: MANUFACTURER'S SPECIAL TOOL.
   4. MINIMUM 300-PSIG WORKING-PRESSURE RATING AT 230 DEG F.
I. STEEL PIPE NIPPLES: ASTM A 733, MADE OF SAME MATERIALS AND WALL THICKNESSES AS PIPE IN WHICH THEY ARE INSTALLED.

INSTALL BRANCH CONNECTIONS TO MAINS USING MECHANICALLY FORMED TEE FITTINGS IN MAIN PIPE, WITH THE BRANCH CONNECTED TO THE BOTTOM OF THE MAIN PIPE. FOR UP-FEED RISERS, CONNECT THE BRANCH TO THE TOP OF THE MAIN PIPE.

6. PIPE INSULATION
FOR INDOOR PIPING PROVIDE CELLULAR GLASS: 1-1/2 INCHES THICK WITH PVC JACKET.
FOR OUTDOOR PIPING PROVIDE CELLULAR GLASS: 3 INCHES THICK WITH METAL JACKET.

CELLULAR GLASS: INORGANIC, INCOMBUSTIBLE, FOAMED OR CELLULATED GLASS WITH ANNEALED, RIGID, HERMETICALLY SEALED CELLS.
1. BLOCK INSULATION: ASTM C 552, TYPE I.
2. SPECIAL-SHAPED INSULATION: ASTM C 552, TYPE III.
3. BOARD INSULATION: ASTM C 552, TYPE IV.
4. PREFORMED PIPE INSULATION WITHOUT JACKET: COMPLY WITH ASTM C 552, TYPE II, CLASS 1.
5. PREFORMED PIPE INSULATION WITH FACTORY-APPLIED ASJ: COMPLY WITH ASTM C 552, TYPE II, CLASS 2.
6. FACTORY FABRICATE SHAPES ACCORDING TO ASTM C 450 AND ASTM C 585.

PVC JACKET: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, CLASS 16354-C; THICKNESS AS SCHEDULED; ROLL STOCK READY FOR SHOP OR FIELD CUTTING AND FORMING. THICKNESS IS INDICATED IN FIELD-APPLIED JACKET SCHEDULES.
1. ADHESIVE: AS RECOMMENDED BY JACKET MATERIAL MANUFACTURER.
2. COLOR: COLOR-CODE JACKETS BASED ON SYSTEM REFER TO SECTION 230553.
3. FACTORY-FABRICATED FITTING COVERS TO MATCH JACKET IF AVAILABLE; OTHERWISE, FIELD FABRICATE.
A. SHAPES: 45- AND 90-DEGREE, SHORT- AND LONG-RADIUS ELBOWS, TEES, VALVES, FLANGES, UNIONS, REDUCERS, END CAPS, SOIL-PIPE HUBS, TRAPS, MECHANICAL JOINTS, AND P-TRAP AND SUPPLY COVERS FOR LAVATORIES.

METAL JACKET:
1. ALUMINUM JACKET: COMPLY WITH ASTM B 209, ALLOY 3003, 3005, 3105, OR 5005, TEMPER H-14.
A. FINISH AND THICKNESS ARE INDICATED IN FIELD-APPLIED JACKET SCHEDULES.
B. MOISTURE BARRIER FOR INDOOR APPLICATIONS: 3-MIL-THICK, HEAT-BONDED POLYETHYLENE AND KRAFT PAPER.
C. MOISTURE BARRIER FOR OUTDOOR APPLICATIONS: 3-MIL-THICK, HEAT-BONDED POLYETHYLENE AND KRAFT PAPER.
D. FACTORY-FABRICATED FITTING COVERS:
1) SAME MATERIAL, FINISH, AND THICKNESS AS JACKET.
2) PREFORMED 2-PIECE OR GORE, 45- AND 90-DEGREE, SHORT- AND LONG-RADIUS ELBOWS.
3) TEE COVERS.
4) FLANGE AND UNION COVERS.
5) END CAPS.
6) BEVELED COLLARS.
7) VALVE COVERS.
8) FIELD FABRICATE FITTING COVERS ONLY IF FACTORY-FABRICATED FITTING COVERS ARE NOT AVAILABLE

7. PIPELINE HEAT TRACING
MANUFACTURERS:
1. RAYCHEM, XL-CR.
2. CHROMALOX.
3. THERMON.
CONSTRUCTION
1. SIZE TO MAINTAIN A 45-DEGREE F PIPE TEMPERATURE WITH ZERO-DEGREE F AMBIEANT AIR TEMPERATURE.
2. SELF-REGULATING, ELECTRIC-HEATING TYPE.
3. UL-LISTED AND PROVIDED WITH ALL REQUIRED ACCESSORIES.
4. PROVIDE TRACING CORE CONSISTING OF PARALLEL COPPER WIRES, EITHER SEPARATED BY A SELF-REGULATING SEMI-CONDUCTIVE CORE OR WRAPPED WITH SELF-REGULATING SEMI-CONDUCTIVE FIBER.
5. INSULATE WIRE BY A FLUOROPOLYMER OR POLYOLEFIN INNER JACKET.
6. COVER INNER JACKET WITH A TINNED-COPPER SHIELD AND A FLUOROPOLYMENR OR POLYOLEFIN OUTER JACKET.
7. HAVE TRACING DECREASE ITS HEAT OUTPUT WITH AN INCREASE IN SURFACE TEMPERATURE.
8. CONSTANT-WATTAGE TRACING IS NOT ACCEPTABLE.
9. AUTOMATICALLY CONTROL BY A PIPELINE THERMOSTAT INSTALLED IN ACCORDANCE WITH TRACING MANUFACTUERER'S INSTRUCTIONS.
10. PROVIDE TRACING POWER CORD WEATHERPROOF AND HARD-WIRED TO A NEMA 3R DISCONNECT SWITCH.
11. PROVIDE END OF CIRCUIT RELAY FOR EACH HEAT TRACING CIRCUIT TO TRANSMIT A SIGNAL INDICATING THAT POWER IS APPLIED TO CIRCUIT. INTERFACE RELAY WITH DIRECT DIGITAL CONTROL SYSTEM (DDC). MONITOR HEAT TRACE STATUS BY DIGITAL INPUT TO THE DDC.

UBO APPROVAL STAMP

AECOM

PROJECT
VTC FBRI CHILLER PROJECT

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ISSUE/REVISION

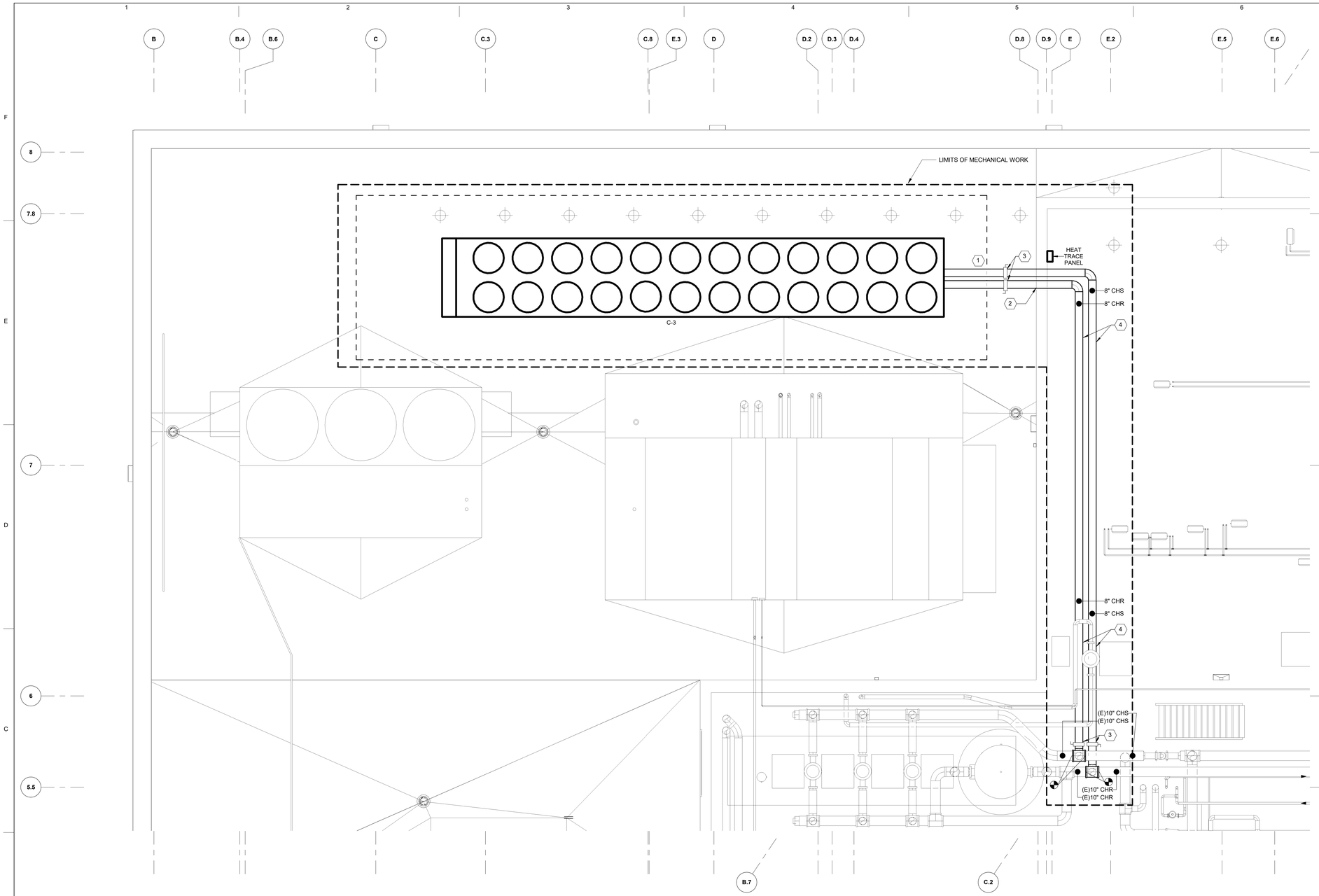
I	03/03/2025	100% WORKING DRAWINGS
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER
60738913

SHEET TITLE
MECHANICAL LEGEND AND GENERAL NOTES

SHEET NUMBER
M-001



GENERAL NOTES THIS SHEET

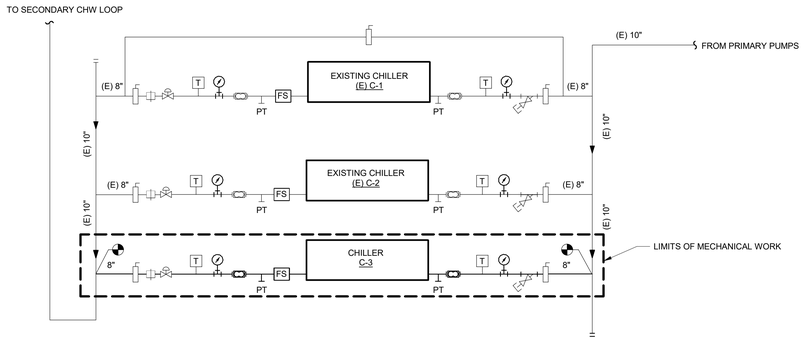
A. REFER TO SHEET M001 FOR MECHANICAL LEGEND AND GENERAL NOTES.
B. REFER TO SHEET G002 FOR ABBREVIATIONS.

SHEET KEYNOTES:

1 PROVIDE HEAT TRACING FOR OUTDOOR PIPING.
2 REFER TO DETAIL ON THIS SHEET FOR WALL PENETRATION.
3 PROVIDE ISOLATION VALVES.
4 FIELD VERIFY PIPING PATHWAYS AROUND EXISTING OBSTRUCTIONS.

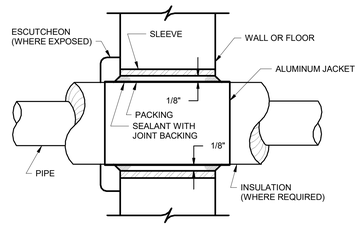
05 PENTHOUSE - ENLARGED PIPING PLAN - AREA A

1/4" = 1'-0"



PARTIAL CHILLED WATER PIPING SCHEMATIC

NO SCALE



NOTE:
THIS DETAIL IS FOR NONFIRE-RATED CONSTRUCTION.
PIPE PENETRATIONS IN FIRE-RATED CONSTRUCTION SHALL BE FIRESTOPPED WITH A UL-CLASSIFIED SYSTEM.

1 / M-403

TYPICAL PIPE PENETRATIONS THRU WALLS AND FLOORS

NO SCALE

PN
TN

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALES

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

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ISSUE/REVISION

I	03/03/2025	100% WORKING DRAWINGS
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60738913

SHEET TITLE

ENLARGED FLOOR PLANS

SHEET NUMBER

M-403

POWER DISTRIBUTION

HA-1,3 — CIRCUIT HOME RUN. LETTERS AND NUMBERS DESIGNATE PANEL AND CIRCUITS.

POWER DEVICES

ANNOTATION FOR RECEPTACLE AND JUNCTION BOX WIRING DEVICES AND EQUIPMENT CONNECTIONS.

SUBSCRIPTS INDICATE THE FOLLOWING FOR ALL RECEPTACLES, JUNCTION BOXES AND EQUIPMENT CONNECTIONS;

AC	MOUNT ABOVE COUNTER TOP, MH 42"AFF UON.
BFS	BOTTLE FILLING STATION
CCS	CAGE CHANGING STATION
E	EMERGENCY
EX	EXISTING
G	GROUND FAULT CIRCUIT INTERRUPTER (GFCI)
GFP	GROUND FAULT PROTECTION
RH	VENTILATED RODENT HOUSING
WP	WEATHERPROOF WHILE-IN-USE COVER

EXISTING DUPLEX RECEPTACLE.

DUPLEX RECEPTACLE. WALL MOUNT AT 18" AFF TO CENTER UON.

QUADRAPLEX,TYP OR DOUBLE DUPLEX RECEPTACLE. WALL MOUNT AT 18" AFF TO CENTER UON

CEILING MOUNTED DUPLEX RECEPTACLE.

JUNCTION BOX. WALL MOUNT AT 18" AFF TO CENTER UON.

TECHNOLOGY INFRASTRUCTURE

COMBINATION TELECOMMUNICATIONS/DATA OUTLET, MH 18" AFF UON.

AC	ABOVE COUNTER MOUNT AT 42" AFF UON.
DR	MOUNT AT 48" AFF UON.
TV	MOUNT AT 60" AFF OR TO COORDINATE WITH DISPLAY, SEE A/V AND INTERIORS FOR DISPLAY LOCATIONS.
C	CAMERA.

EXISTING COMBINATION TELECOMMUNICATIONS/DATA OUTLET.

WAP — EXISTING WIRELESS ACCESS POINT. CEILING MOUNTED.

LIGHTING

ANNOTATION FOR LIGHTING.

SUBSCRIPTS INDICATE THE FOLLOWING FOR ALL LIGHTING FIXTURES.
A DENOTES FIXTURE TYPE
a DENOTES CONTROL ZONE

CEILING MOUNTED RECESSED, SURFACE OR PENDANT MOUNTED LIGHT FIXTURE. DESIGNATION DENOTES TYPE, SEE THE FIXTURE SCHEDULE. SOLID FILL INDICATES EMERGENCY FIXTURE. LIGHT GRAY LINE TYPE INDICATES EXISTING FIXTURE TO REMAIN.

CEILING MOUNTED RECESSED, SURFACE OR PENDANT MOUNTED LIGHT FIXTURE TO BE DEMOLISHED OR RELOCATED.

WALL MOUNTED LIGHT FIXTURE. DESIGNATION DENOTES TYPE, SEE THE FIXTURE SCHEDULE. SOLID FILL INDICATES EMERGENCY FIXTURE. LIGHT GRAY LINE TYPE INDICATES EXISTING FIXTURE TO REMAIN.

CEILING MOUNTED RECESSED, SURFACE OR PENDANT MOUNTED FIXTURE. DESIGNATION DENOTES TYPE, SEE THE FIXTURE SCHEDULE. SOLID FILL INDICATES EMERGENCY FIXTURE. LIGHT GRAY LINE TYPE INDICATES EXISTING FIXTURE TO REMAIN.

OS DT — CEILING MOUNTED — CEILING MOUNTED OCCUPANCY SENSOR.
SUBSCRIPT DESIGNATES PIR UNO TYPE (WHEN PRESENT).
H = HALLWAY, DT = DUAL TECHNOLOGY, C = CORNER

DH a — CEILING MOUNTED DAYLIGHT HARVESTING SENSOR.

$_a$ $ — SINGLE POLE SWITCH. SUBSCRIPT 'a' DESIGNATES ZONE CONTROLLED (WHEN PRESENT). LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

$_{Ta}$ $_T$ — 0-30 MINUTE MARK TIME SWITCH. SUBSCRIPT 'a' DESIGNATES ZONE CONTROLLED.LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

$_{VSa}$ $_{VS} — VACANCY SENSING SWITCH, SINGLE POLE. SUBSCRIPT 'a' DESIGNATES ZONE CONTROLLED (WHEN PRESENT). LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

$_{VSa}$ $_{VS} — VACANCY SENSING DIMMER SWITCH. SUBSCRIPT 'a' DESIGNATES ZONE CONTROLLED (WHEN PRESENT). LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

$_{OSa}$ $_{OS} — OCCUPANCY SENSING SWITCH, SINGLE POLE. SUBSCRIPT 'a' DESIGNATES ZONE CONTROLLED (WHEN PRESENT). LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

$_{WS}$ $_{WS} — LIGHTING CONTROL WALL STATION, ON-OFF AND DIMMING. LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

$_D$ $_D — TOGGLE DIMMER SWITCH. LIGHT GRAY LINE TYPE INDICATES EXISTING DEVICE.

ONE LINE DIAGRAM

CIRCUIT BREAKER
X INDICATES FRAME SIZE,
Y INDICATES TRIP RATING,
Z INDICATES NUMBER OF POLES IF OTHER THAN 3.

SPD — SURGE PROTECTION DEVICE

FAN — FEEDER SCHEDULE INDICATOR

MOTOR

TRANSFORMER

DRAWOUT BREAKER
X INDICATES FRAME SIZE,
Y INDICATES TRIP RATING,
Z INDICATES NUMBER OF POLES IF OTHER THAN 3.

G G — GENERATOR

AUTOMATIC TRANSFER SWITCH WITH MAINTENANCE BYPASS

C — ONE-LINE DIAGRAM CONTINUATION SYMBOL

M — SUB-METER WITH PEAK DEMAND AND KWH

N NEUTRAL BAR

G GROUND BAR

ELECTRICAL GENERAL NOTES - DEMO

1. REMOVE INDICATED ELECTRICAL WORK. REMOVE RACEWAYS, WIRING, AND EQUIPMENT WHERE INSTALLED EXPOSED OR WHERE INSTALLED CONCEALED BEHIND ACCESSIBLE CONSTRUCTION. RACEWAYS THAT CANNOT BE REMOVED AS INDICATED ABOVE SHALL BE ABANDONED IN PLACE AND ASSOCIATED WIRING AND DEVICES SHALL BE REMOVED.
2. ASSOCIATED CIRCUITRY SHALL BE DEFINED TO INCLUDE ALL RACEWAYS, CONDUCTORS, BOXES, WIRING DEVICES, PLATES, LAMPS, LUMINAIRES, SWITCHES, STARTERS, ETC. WHICH ARE ASSOCIATED WITH THE ITEM TO BE REMOVED.
3. THE PROTECTIVE DEVICE SHALL REMAIN AS AN INTEGRAL PART OF THE EXISTING PANEL.
4. WHERE CONDUIT ASSOCIATED WITH AN ITEM TO BE REMOVED IS IN AN INACCESSIBLE AREA, SUCH AS ENCASED IN CONCRETE, THE INACCESSIBLE CONDUIT ONLY SHALL BE ABANDONED IN PLACE, UNLESS INDICATED TO BE REUSED. ALL CONDUCTORS SHALL BE REMOVED AND CONDUIT SHALL BE CUT OFF FLUSH AND CAPPED. LABEL BOTH ENDS OF CONDUIT.
5. WHERE SUCH INACCESSIBLE CONDUIT ENDS OR MUST BE TERMINATED IN FINISHED SPACE, REMOVE THE CONDUIT OR BOX TO BELOW THE FINISHED SURFACE OF WALL, CEILING OR FLOOR, FILL VOID WITH NON-SHRINKING GROUT AND FINISH TO MATCH SURROUNDING SURFACES.
6. WHERE DEMOLITION OF CONDUITS WOULD CREATE OPENINGS IN THE EXTERIOR WALLS OR ROOF THAT WOULD REQUIRE PATCHING, DEMOLISH UP TO 12" OF WALL OR ROOF AND CAP CONDUIT.
7. WHERE A PORTION OF EQUIPMENT IS IDENTIFIED TO BE REMOVED, REMOVE ONLY THAT PORTION AND MAINTAIN REMAINING EQUIPMENT IN GOOD CONDITION FOR RECONNECTION.
8. WHERE EXTENSION OF AN EXISTING CIRCUIT IS REQUIRED TO MAINTAIN SERVICE, RUN CONDUIT AND WIRE AS INDICATED FROM THE CIRCUIT'S EXISTING LOCATION TO ITS NEW LOCATION.
9. REMOVE EQUIPMENT, DEVICES, AND CIRCUITRY ASSOCIATED WITH WORK OF OTHER TRADES; SEE ARCHITECTURAL/INTERIORS, MECHANICAL, PLUMBING, DRAWINGS FOR DETAILS.
10. WHERE AN ITEM OF EQUIPMENT IS INDICATED TO BE RETAINED, REMOVE AND STORE. INFORM OWNER AND ENGINEER OF ANY DEFECTS AT TIME OF REMOVAL.
11. REMOVE ANY ELECTRICAL ASSOCIATED WITH ABANDONED EQUIPMENT OR SYSTEMS.
12. DEMOLITION WORK SHALL BE COORDINATED WITH THE OWNER OR THE OWNER'S REPRESENTATIVE AND SHALL NOT INTERFERE WITH ACTIVITIES IN OTHER BUILDING AREAS. DEMOLISHED MATERIALS, UNLESS SPECIFICALLY INDICATED TO REMAIN OR BE TURNED OVER TO THE OWNER, SHALL BE PROMPTLY AND APPROPRIATELY REMOVED DISPOSED OF, PARTICULARLY MATERIALS CONTAINING HAZARDOUS MATERIALS SUCH AS LAMPS CONTAINING MERCURY OR TRANSFORMERS CONTAINING PCB'S. CONTRACTOR SHALL COORDINATE APPROPRIATE STAGING AREA WITH THE OWNER. COORDINATE WITH OWNER FOR OWNER-REMOVAL OF PROPERTY FROM THE PROJECT LOCATION. COORDINATE ANY POWER INTERRUPTIONS THAT AFFECT AREAS OUTSIDE THE LIMITS OF WORK WITH OWNER PRIOR A MINIMUM OF TEN WORKING DAYS PRIOR TO WORK.
13. DEMOLITION DRAWINGS AND/OR NOTES ARE BASED ON AS BUILT DRAWINGS AND CASUAL FIELD OBSERVATION AND SCHEMATICALLY INDICATE THE GENERAL SCOPE OF DEMOLITION. THE CONTRACTOR SHALL FIELD-VERIFY EXISTING CONDITIONS BEFORE WORK. FAILURE BY THE CONTRACTOR TO HAVE ACQUAINTED HIM/HERSELF WITH AVAILABLE INFORMATION CONCERNING EXISTING CONDITIONS, INCLUDING EXISTING DRAWINGS, SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITIES OF PERFORMANCE OF WORK IN ACCORDANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS.
14. CONTRACTOR SHALL REPAIR DAMAGE TO THE BUILDING AREAS IDENTIFIED TO REMAIN WHICH OCCURS DURING THE COURSE OF THE DEMOLITION. REPAIR TO MATCH SURROUNDING SURFACES.
15. PROVIDE TEMPORARY POWER FOR EQUIPMENT REQUIRED TO REMAIN OPERATIONAL FOR THE PRESERVATION OF THE BUILDING. EXISTING ELECTRICAL WORK ASSOCIATED WITH SUCH EQUIPMENT SHALL REMAIN UNTIL REPLACEMENT EQUIPMENT IS OPERATIONAL.
16. PERFORM DEMOLITION IN PHASES WHERE INDICATED OR REQUIRED. PROVIDE TEMPORARY SERVICES TO AFFECTED SYSTEMS FROM SOURCES OUTSIDE AFFECTED AREA TO MAINTAIN SERVICE WHERE REQUIRED.
17. WHERE TEMPORARY REMOVAL OF WORK IS REQUIRED TO ACCOMMODATE WORK OF THIS OR OTHER TRADES, REMOVE AND STORE ELECTRICAL ITEMS IN THE PATH OF WORK. REINSTALL AND RECONNECT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND/OR AS DIRECTED AFTER COMPLETION OF THE WORK IN THE AREA. PROVIDE TEMPORARY SERVICES SUCH AS EGRESS LIGHTING AND EXIT SIGNAGE AND ASSOCIATED CIRCUITRY TO AN UNAFFECTED APPROPRIATE POWER SOURCE WHERE THE WORK AREA MUST BE MAINTAINED OPEN FOR EGRESS.
18. WHERE CEILINGS ARE REMOVED TEMPORARILY FOR ABOVE-CEILING WORK, REMOVE/STORE OR TEMPORARILY SUPPORT CEILING-MOUNTED DEVICES/EQUIPMENT IN PLACE. REINSTALL AND RECONNECT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND/OR AS DIRECTED AFTER COMPLETION OF THE WORK IN THE AREA.

ELECTRCAL GENERAL NOTES - NEW WORK

1. SEE SHEET G002 FOR ABBREVIATIONS. SEE SHEET G003 FOR GENERAL LEGEND.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC VERSION 2017), APPLICABLE NFPA SECTIONS AND ALL OTHER APPLICABLE CODES INCLUDING LOCAL AMENDMENTS.
3. THE DRAWINGS REPRESENT THE DESIGN INTENT. PROVIDE ALL ACCESSORIES AND APPURTENANCES INCLUDING, BUT NOT LIMITED TO, SLEEVES, OPENINGS, SUPPORTS, BOXES, AND PATCHING AS REQUIRED TO EXECUTE THE CONTRACT DOCUMENTS.
4. MOUNTING HEIGHT, UNLESS OTHERWISE NOTED, IS TO CENTER LINE OF EQUIPMENT; EXCEPT MOUNTING HEIGHT OF LIGHTING FIXTURES IS TO BOTTOM OF FIXTURE.
5. MOUNT OUTLET BOXES SO THAT NONE OCCUR BACK TO BACK IN WALLS. COORDINATE DEVICE MOUNTING HEIGHTS WITH DETAIL 6 SHEET E-501, APPROVED CASEWORK SUBMITTALS, ARCHITECTURAL ELEVATIONS AND DETAILS, AND WORK OF OTHER TRADES PRIOR TO INSTALLATION.
6. MECHANICAL EQUIPMENT IS SHOWN IN APPROXIMATE LOCATIONS. FOR EXACT LOCATIONS OF MECHANICAL EQUIPMENT AND PIPING, SEE MECHANICAL DRAWINGS.
7. COORDINATE THE LOCATIONS AND MOUNTING HEIGHTS OF LIGHTING FIXTURES IN MECHANICAL, ELECTRICAL AND ELEVATOR ROOMS WITH THE FINAL LOCATIONS OF PIPES, DUCTS AND OTHER EQUIPMENT FOR BEST ARRANGEMENT. FIXTURES SHALL BE EASILY ACCESSIBLE FOR MAINTENANCE.
8. MOUNT BOTTOM OF WALL-MOUNTED EXIT SIGNS 6" ABOVE THE TOP OF DOOR FRAME.
9. WHERE LIGHT SWITCHES ARE INDICATED TO BE MOUNTED BEHIND DOOR, MOUNT SUCH SWITCHES A MINIMUM OF 3'-9" FROM HINGED SIDE.
10. WHERE MORE THAN ONE SWITCH OCCURS IN HOLLOW METAL FRAME, MOUNT ONE ABOVE THE OTHER WITH TOP SWITCH MOUNTED AT 4'-0".
11. GROUNDING CONDUCTORS ARE NOT INDICATED IN BRANCH CIRCUIT RACEWAYS. PROVIDE GROUND CONDUCTORS AS SPECIFIED.
12. REVISE PANELBOARD SCHEDULES ON AS-BUILT-DRAWING AND PANEL DIRECTORIES TO REFLECT FINAL INSTALLATION CONDITIONS.
13. CONDUIT ROUTING IS PROVIDED FOR DESIGN INTENT UNLESS INDICATED OTHERWISE. COORDINATE ROUTE WITH FIELD CONDITIONS AND WORK OF OTHER TRADES. ROUTE CONDUIT WITHIN BUILDING PARALLEL AND PERPENDICULAR TO THE BUILDING LINES.
14. LOCATE ALL RACEWAYS TO AVOID INTERFERENCE WITH DUCTS, PIPES, MECHANICAL EQUIPMENT, WITH REMOVAL OF CEILING TILES, OR WITH ACCESS TO EQUIPMENT WHICH REQUIRES PERIODIC ADJUSTMENT OR MAINTENANCE.
15. COORDINATE THE LOCATION OF CONDUIT ENTRANCES FOR ALL EQUIPMENT WITH APPROVED SUBMITTALS PRIOR TO INSTALLING THE PATHWAYS TO SERVE THE EQUIPMENT.
16. EXTEND 2-1" EMPTY CONDUITS FROM RECESSED PANELBOARDS TO ABOVE CEILING AND CAP AND LABEL IN AN ACCESSIBLE LOCATION FOR FUTURE USE.
17. PROVIDE PULL BOXES TO FACILITATE CABLE PULLING AT A MINIMUM OF ONE PULL BOX EVERY 100 FEET OF STRAIGHT CONDUIT AND ONE AFTER TWO 90 DEGREE (OR EQUIVALENT) BENDS).
18. SEAL PENETRATIONS THROUGH FLOORS OR RATED PARTITIONS TO MAINTAIN THE INTEGRITY OF THE FIRE AND ACOUSTIC RATINGS. COORDINATE LOCATIONS OF SMOKE/FIRE PARTITIONS WITH LIFE-SAFETY DRAWINGS.
19. STOP CABLE TRAY SHORT OF RATED PARTITIONS. UTILIZE CONDUIT SLEEVES OF EQUIVALENT CAPACITY AND LISTED FIRESTOP ASSEMBLIES TO PENETRATE RATED PARTITIONS.
20. CONDUCTOR QUANTITIES (HASH MARKS) ARE NOT INDICATED ON CONDUIT SYMBOL. PROVIDE CONDUCTORS AS REQUIRED TO ACCOMPLISH INDICATED CIRCUIT INSTALLATION AND SWITCHING AS INDICATED FOR LIGHTING.
21. INDIVIDUAL BRANCH CIRCUITS FROM SIMILAR POWER SOURCE MAY BE CONSOLIDATED UNLESS INDICATED OTHERWISE; CONDUIT FILL AND CONDUCTOR DERATING SHALL BE PER NEC. CONSIDER NEUTRAL CONDUCTORS TO BE CURRENT CARRYING WHEN DERATNG CONDUCTORS.
22. PROVIDE A 4" THICK CONCRETE PAD UNDER ALL FLOOR-MOUNTED ELECTRICAL DISTRIBUTION EQUIPMENT.
23. THE CONTRACTOR BEFORE INSTALLING ANY OF THE WORK SHALL COORDINATE THE CLEARANCES REQUIRED FOR ELECTRICAL EQUIPMENT AND FINISHED COLUMNS, HUNG CEILING, AND PARTITIONS. THE CONTRACTOR IS RESPONSIBLE FOR NEGATIVE CONSEQUENCES RESULTING FROM MISCOORDINATION OF EQUIPMENT.
24. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL WALL OUTLET BOXES FOR RECEPTACLES, SWITCHES, ETC. WITH THE ARCHITECT AND OTHER TRADES PRIOR TO INSTALLATION.
25. VERIFY THE FINAL CONNECTION REQUIREMENTS FOR ALL EQUIPMENT WITH SUPPLIER AND PROVIDE JUNCTION BOXES, RECEPTACLES OR DISCONNECT SWITCHES AS REQUIRED. MAKE ALL CONNECTIONS AS REQUIRED.
26. ALL RACEWAYS RUNNING ACROSS AN EXPANSION JOINT SHALL BE EQUIPPED WITH EXPANSION FITTINGS. FURNISH APPROVED EXPANSION FITTINGS.
27. ALL EXTERIOR ELECTRICAL EQUIPMENT, RACEWAYS AND DEVICES SHALL BE WEATHERPROOF TYPE.
28. FURNISH PULL STRING IN EACH RACEWAY OVER 10'-0" IN LENGTH WHERE PERMANENT WIRE IS NOT INSTALLED. PULL STRING SHALL BE RATED FOR 200LBS.
29. ALL WIRING SHALL BE RUN CONCEALED UNLESS SPECIFIED OTHERWISE.
30. PROVIDE MINIMUM NUMBER OF LUGS AND NECESSARY PROVISIONS TO ACCOMMODATE FEEDERS.
31. IF A CONFLICT EXISTS WITHIN THE DRAWINGS AND/OR SPECIFICATIONS THE MORE STRINGENT AND MORE COSTLY REQUIREMENT SHALL APPLY. ITEMS SHOWN ON DRAWINGS, BUT NOT SPECIFIED, SHALL APPLY AND BE FURNISHED AND INSTALLED BY THE CONTRACTOR. IF AN ITEM SHOWN ON THE DRAWINGS, BUT IS NOT INCLUDED IN THE SPECIFICATIONS, PROVIDE ITEM OF A QUALITY LEVEL CONSISTENT WITH THE GENERAL QUALITY LEVEL OF THE CONTRACT REQUIREMENTS. BRING CONFLICTS BETWEEN DRAWINGS AND SPECIFICATIONS TO THE ATTENTION OF THE ENGINEER IMMEDIATELY FOR CLARIFICATION.
32. TYPICAL DETAILS THROUGHOUT THE DRAWING SET SHALL APPLY FOR ALL APPLICABLE CONDITIONS, EVEN IF NOT SPECIFICALLY SHOWN OR REFERENCED.
33. PROVIDE NAMEPLATES ON THE EXTERIOR OF ALL ELECTRICAL PANELS AND ENCLOSURES AS FOLLOWS:

LINE 1: DEVICE ID
LINE 2: DEVICE RATING
LINE 3: POWER SOURCE
LINE 4: INSTALLATION DATE

PANEL L1D1
100A, 208Y/120V - 3ϕ, 4W
FEEDS FROM PANEL MDP
INSTALLED: 2022

FOR DISCONNECT SWITCHES AND MOTOR STARTERS THE TOP LINE SHALL BE THE NAME/DESIGNATION OF THE EQUIPMENT BEING FED BY THE SWITCH/STARTER.

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

4 RIVERSIDE CIRCLE, ROANOKE, 24016

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03/10/2025
PROFESSIONAL ENGINEER

ISSUE/REVISION

I	03/03/2025	100% WORKING DRAWINGS
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60738913

SHEET TITLE

ELECTRICAL ABBREVIATIONS AND LEGEND

SHEET NUMBER

E-003

PART 1 - GENERAL

1.1 REFERENCES

A. CONDITIONS OF THE CONTRACT AND DIVISION 1, GENERAL REQUIREMENTS, APPLY TO WORK OF THIS SECTION. WHERE PARAGRAPHS OF THIS SECTION CONFLICT WITH SIMILAR PARAGRAPHS OF DIVISION 1, REQUIREMENTS OF THIS SECTION SHALL PREVAIL.

B. EXAMINE DRAWINGS AND OTHER SECTIONS OF SPECIFICATIONS FOR REQUIREMENTS THAT AFFECT WORK OF THIS SECTION.

C. AS USED IN THIS SECTION, "PROVIDE" MEANS "FURNISH AND INSTALL" AND "POS" MEANS "PROVIDED UNDER OTHER SECTIONS." "FURNISH" MEANS "TO PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT," AND "INSTALL" MEANS "TO UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT." THE WORD "PROVIDE" IS IMPLIED IN ALL STATEMENTS.

D. PERFORM WORK AND PROVIDE MATERIAL AND EQUIPMENT AS SHOWN ON DRAWINGS AND AS SPECIFIED OR INDICATED IN THIS SECTION OF THE SPECIFICATIONS. COMPLETELY COORDINATE WORK OF THIS SECTION WITH WORK OF OTHER TRADES AND PROVIDE A COMPLETE AND FULLY FUNCTIONAL INSTALLATION. DRAWINGS AND SPECIFICATIONS FORM COMPLIMENTARY REQUIREMENTS; PROVIDE WORK SPECIFIED AND NOT SHOWN, AND WORK SHOWN AND NOT SPECIFIED AS THOUGH EXPLICITLY REQUIRED BY BOTH. ALTHOUGH WORK IS NOT SPECIFICALLY SHOWN OR SPECIFIED, PROVIDE SUPPLEMENTARY OR MISCELLANEOUS ITEMS, APPURTENANCES, DEVICES, AND MATERIALS OBVIOUSLY NECESSARY FOR A SOUND, SECURE, AND COMPLETE INSTALLATION. REMOVE ALL DEBRIS CAUSED BY CONTRACTORS WORK.

E. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN CONTRACT. IT IS NOT INTENDED TO SPECIFY OR TO SHOW EVERY OFFSET, FITTING, OR COMPONENT; HOWEVER, CONTRACT DOCUMENTS REQUIRE COMPONENTS AND MATERIALS WHETHER OR NOT INDICATED OR SPECIFIED AS NECESSARY TO MAKE INSTALLATION COMPLETE AND OPERATIONAL.

F. PERFORM WORK STRICTLY AS REQUIRED BY APPLICABLE RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND OTHER AUTHORITIES THAT HAVE LAWFUL JURISDICTION.

G. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES (IF REQUIRED), PAY FEES AND BACKCHARGES, AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION.

H. AS WORK PROGRESSES AND FOR DURATION OF CONTRACT, MAINTAIN COMPLETE AND SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT JOB SITE AT ALL TIMES. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS CLEARLY AND ACCURATELY, INCLUDING WORK INSTALLED AS A MODIFICATION OR ADDITION TO THE ORIGINAL DESIGN.

I. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
1. AUTOMATIC TRANSFER SWITCHES
2. GROUNDING COMPONENTS
3. CIRCUIT BREAKERS
4. CONDUIT AND RACEWAYS
5. WIRE AND CABLE
6. WIRING DEVICES AND PLATES
7. SAFETY SWITCHES
8. FIRE SEAL, (AND) FIRE-PROOF FOAM
9. NAMEPLATES, LABELS, AND TAGS
10. TESTING
11. LIGHTNING PROTECTION COMPONENTS
12. PANELBOARDS

1.2 CONTRACT DOCUMENTS

A. WORK TO BE PERFORMED UNDER THIS SECTION IS SHOWN PRIMARILY ON THE ELECTRICAL DRAWINGS.

B. LISTING OF DRAWINGS DOES NOT LIMIT RESPONSIBILITY OF DETERMINING FULL EXTENT OF WORK REQUIRED BY CONTRACT DOCUMENTS. REFER TO ARCHITECTURAL, ELECTRICAL, AND OTHER DRAWINGS AND OTHER SECTIONS THAT INDICATE TYPES OF CONSTRUCTION IN WHICH WORK SHALL BE INSTALLED AND WORK OF OTHER TRADESWITH WHICH WORK OF THIS SECTION MUST BE COORDINATED.

C. EXCEPT WHERE MODIFIED BY A SPECIFIC NOTATION TO THE CONTRARY, IT SHALL BE UNDERSTOOD THAT THE INDICATION AND/OR DESCRIPTION OF ANY ITEM, IN THE DRAWINGS OR SPECIFICATIONS OR BOTH, CARRIES WITH IT THE INSTRUCTION TO FURNISH AND INSTALL THE ITEM, REGARDLESS OF WHETHER OR NOT THIS INSTRUCTION IS EXPLICITLY STATED AS PART OF THE INDICATION OR DESCRIPTION.

D. ITEMS REFFERED TO IN SINGULAR NUMBER IN CONTRACT DOCUMENTS SHALL BE PROVIDED IN QUANTITIES NECESSARY TO COMPLETE WORK.

E. DRAWINGS ARE DIAGRAMMATIC. THEY ARE NOT INTENDED TO BE ABSOLUTELY PRECISE; THEY ARE NOT INTENDED TO SPECIFY OR TO SHOW EVERY OFFSET, FITTING, AND COMPONENT. THE PURPOSE OF THE DRAWINGS IS TO INDICATE A SYSTEMS CONCEPT, THE MAIN COMPONENTS OF THE SYSTEMS, AND THE APPROXIMATEGEOMETRICAL RELATIONSHIPS. BASED ON THE SYSTEMS CONCEPT, THE MAIN COMPONENTS, AND THE APPROXIMATE GEOMETRICAL RELATIONSHIPS, THE CONTRACTOR SHALL PROVIDE ALL OTHER COMPONENTS AND MATERIALS NECESSARY TO MAKE THE SYSTEMS FULLY COMPLETE AND OPERATIONAL.

1.3 DISCREPANCIES IN DOCUMENTS

A. ADDRESS QUESTIONS REGARDING DRAWINGS TO ENGINEER IN WRITING BEFORE AWARD OF CONTRACT. OTHERWISE, ENGINEER'S INTERPRETATION OF MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.

1.4 CODES, STANDARDS, AUTHORITIES, AND PERMITS

A. PERFORM WORK IN STRICT ACCORDANCE WITH THE APPLICABLE RULES, REGULATIONS, STANDARDS,CODES,ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND OTHER AUTHORITIES HAVING LEGAL JURISDICTION OVER THE SITE.

1.5 RECORD DRAWINGS

A. MAINTAIN RECORD DRAWINGS ON SITE. RECORD SET MUST BE COMPLETE AND CURRENT AND AVAILABLE FOR INSPECTION WHEN REQUISITIONS FOR PAYMENT ARE SUBMITTED.

1.6 SUBMITTALS

A. SUBMIT SHOP DRAWINGS AND PRODUCT DATA WITHIN 5 DAYS AFTER AWARD OF CONTRACT. CHECK, STAMP AND MARK WITH PROJECT NAME SUBMITTALS BEFORE TRANSMITTING TO OWNER. INDICATE DEVIATIONS FROM CONTRACT DOCUMENTS.

B. SCHEDULE AT LEAST TEN WORKING DAYS, EXCLUSIVE OF TRANSMITTAL TIME, FOR SUBMITTAL REVIEW.

C. MATERIAL AND EQUIPMENT REQUIRING SHOP DRAWING AND PRODUCT DATA SUBMITTAL SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO:
1. AUTOMATIC TRANSFER SWITCHES
2. WIRING DEVICES AND PLATES
3. RACEWAY, PULL BOXES, JUNCTION BOXES
4. SAFETY SWITCHES
5. CIRCUIT BREAKERS
6. PANELBOARDS
8. GROUNDING AND LIGHTNING PROTECTION COMPONENTS
8. FEEDERS AND BRANCH CIRCUIT WIRING

D. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PREPARE AN OPERATION AND MAINTENANCE MANUAL, WHICH SHALL INCLUDE CATALOG DATA, EQUIPMENT INFORMATION, WIRING DIAGRAMS, WARRANTY INFORMATION, TEST REPORTS, ETC., FOR THE ELECTRICAL INSTALLATION. SUBMIT TWO COPIES TO THE OWNER FOR APPROVAL.

E. UPON COMPLETION OF WORK THE CONTRACTOR SHALL DEMONSTRATE THE INSTALLATION AND MAKE SUCH TESTS AS MAY BE REQUIRED TO SATISFY THE ARCHITECT/ENGINEER AND OWNER THAT WORK IS INSTALLED IN ACCORDANCE WITH DRAWINGS, SPECIFICATIONS AND INSTRUCTIONS.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. ELECTRICAL METALLIC TUBING (EMT), ANSI C80.3 GALVANIZED STEEL.

B. FLEXIBLE METAL CONDUIT (FMC), GALVANIZED STEEL, UL1. LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC) IN WET LOCATIONS.

C. RIGID STEEL CONDUIT (RGS), ANSI C80.1.

D. MALLEABLE IRON OR STEEL CONNECTORS AND COUPLINGS WITH INSULATED THROATS; MANUFACTURED ELBOWS; LOCKNUTS; AND PLASTIC OR BAKELITE BUSHINGS AT TERMINATIONS. COUPLINGS AND CONNECTORS SHALL BE GLAND AND RING COMPRESSION OR STAINLESS STEEL MULTIPLE POINT LOCKING OR STEEL CONCRETE-TIGHT SET SCREW. COMPRESSION COUPLINGS & CONNECTORS SHALL FORM POSITIVE GROUND. SET-SCREW CONNECTORS AND COUPLINGS SHALL HAVE WALL THICKNESS EQUAL TO CONDUIT, CASE-HARDENED, HEX-HEAD SCREWS AND SEPARATE GROUND WIRE. BUSHINGS FOR RIGID STEEL AND CONNECTORS FOR EMT SHALL HAVE INSULATING INSERTS THAT MEET REQUIREMENTS OF UL 514 FLAME TEST.

E. RACEWAYS SHALL BE 3/4" MINIMUM UNLESS INDICATED OTHERWISE, COMPLY WITH APPLICABLE UL AND ANSI STANDARDS APPLICABLE FOR RACEWAYS USED.

2.2 OUTLET BOXES

A. FOR CONCEALED WORK SHALL BE AT LEAST 4" SQUARE OR OCTAGONAL, GALVANIZED PRESSED STEEL WITH PLASTER RINGS AS REQUIRED. FOR EXPOSED CONDUIT WORK SHALL BE CAST ALUMINUM ALLOY WITH CAST ALUMINUM ALLOY COVERS.

B. FITTED WITH GALVANIZED STEEL PLASTER COVERS OF REQUIRED DEPTH TO FINISH FLUSH WITH FINISHED WALL OR CEILING.

C. SWITCH BOXES, RECEPTACLE BOXES, AND OTHER OUTLET BOXES SHALL BE STANDARD 4" SQUARE WITH PLASTER RINGS OR GANG COVER AS REQUIRED.

D. PROVIDE ONLY ENOUGH CONDUIT OPENINGS TO ACCOMMODATE CONDUITS AT INDIVIDUAL LOCATION. EACH BOX SHALL BE LARGE ENOUGH TO ACCOMMODATE NUMBER AND SIZES OF CONDUITS, WIRES, AND SPLICES TO MEET NEC REQUIREMENTS, BUT SHALL BE AT LEAST SIZE SHOWN OR SPECIFIED. NECESSARY VOLUME SHALL BE OBTAINED BY USING BOXES OF PROPER DIMENSIONS.

2.3 JUNCTION BOXES AND PULL BOXES

A. PROVIDE CODE GAUGE GALVANIZED STEEL JUNCTION AND PULL BOXES FOR CONDUIT 1-1/4" TRADE SIZE AND LARGER, WHERE INDICATED AND AS NECESSARY TO FACILITATE INSTALLATION, OF REQUIRED DIMENSIONS, WITH ACCESSIBLE, REMOVABLE SCREW-ON COVERS. PROVIDE JUNCTION AND PULL BOXES IN SPECIAL SIZES AND SHAPES DETERMINED IN FIELD WHERE NECESSARY.

B. COVERS SHALL BE ACCESSIBLE. DO NOT INSTALL JUNCTION BOXES ABOVE CEILING EXCEPT WHERE CEILING IS REMOVABLE OR WHERE ACCESS PANEL IS PROVIDED.

C. SHEET METAL PULL BOXES SHALL BE SUPPORTED ADEQUATELY TO MAINTAIN SHAPE. LARGER BOXES SHALL HAVE STRUCTURAL STEEL BRACING WELDED INTO RIGID ASSEMBLY FORMED ADEQUATELY TO MAINTAIN ALIGNMENT IN SHIPMENT AND INSTALLATION. SECURE COVERS WITH CORROSION-RESISTANT SCREWS OR BOLTS.

2.4 WIRE AND CABLE (600 V INSULATION)

A. PROVIDE SINGLE-CONDUCTOR, ANNEALED COPPER WIRE AND CABLE WITH INSULATION RATED 600V, OF SIZES SPECIFIED AND SCHEDULED ON DRAWINGS, FOR SECONDARY SERVICE, FEEDERS, BRANCH, AND SYSTEM WIRING. WIRE INSULATED FOR 300V MAY BE USED WHERE VOLTAGE IS LESS THAN 100V, IF ISOLATED FROM HIGHER VOLTAGES. WIRE SIZES SHOWN AND SPECIFIED ARE AMERICAN WIRE GAUGE FOR COPPER.

B. WIRE #10 AND LARGER SHALL BE STRANDED; #12 AND SMALLER SHALL BE SOLID. WIRE AND CABLE SHALL HAVE THWN-THHN OR XHHW INSULATION, 75°C.

C. WIRING WITHIN LIGHT FIXTURES AND OTHER HIGH-TEMPERATURE EQUIPMENT SHALL HAVE 150°C INSULATION AS REQUIRED BY NEC.

D. SPLICES AND TERMINATIONS
1. MAKE SPLICES IN BRANCH CIRCUIT WIRING WITH UL-LISTED, SOLDERLESS CONNECTORS RATED 600V, OF SIZES AND TYPES REQUIRED BY MANUFACTURER'S RECOMMENDATIONS WITH TEMPERATURE RATINGS EQUAL TO THOSE OF WIRES. SPLICE CONNECTORS SHALL BE SCREW-ON. INSULATE SPLICES WITH INTEGRAL COVERS OR WITH PLASTIC OR RUBBER FRICTION TAPE TO PRESERVE CHARACTERISTICS OF WIRE AND CABLE INSULATION.
2. PROVIDE STANDARD BOLT-ON LUGS WITH HEX SCREWS TO ATTACH COPPER WIRE AND CABLE TO PANELBOARDS AND ELECTRICAL EQUIPMENT.
3. AMPACITY OF SPLICES AND CONNECTORS SHALL BE EQUAL TO THOSE OF ASSOCIATED WIRES AND CABLES.
4. PRODUCTS TO COMPLY WITH UL 486A AND UL 486B.

2.5 COLOR CODING

A. COLOR CODE SECONDARY SERVICE, FEEDERS, AND BRANCH CIRCUIT CONDUCTORS AS FOLLOWS: 208Y/120V WHITE (NEUTRAL), BLACK, RED AND BLUE. PROVIDE WITH SOLID GREEN GROUNDING CONDUCTOR. 480Y/277V GRAY (NEUTRAL), BROWN, ORANGE, AND YELLOW. PROVIDE GREEN WITH YELLOW STRIPE GROUNDING CONDUCTOR.

B. BRANCH CIRCUIT CONDUCTORS #12 AND #10 SHALL HAVE SOLID COLOR COMPOUND, SOLID COLOR COATING. NEUTRALS AND EQUIPMENT GROUNDS SHALL HAVE SOLID COMPOUND OR SOLID COLOR COATING (WHITE AND GREEN), EXCEPT WHERE COLORED STRIPES ARE REQUIRED. CONDUCTORS #8 AND LARGER WITH STRIPES, BANDS OR HASH MARKS SHALL HAVE BACKGROUND COLOR OTHER THAN WHITE AND GREEN.

2.6 WIRE PULLING EQUIPMENT

A. PROVIDE POLYETHYLENE ROPES WITH NOT LESS THAN 200-LB TENSILE STRENGTH FOR PULLING WIRE.

B. PROVIDE FISH WIRES FOR TELEPHONE AND OTHER EMPTY CONDUIT SYSTEMS REQUIRED, WITHOUT SPLICES AND WITH AMPLE EXPOSED LENGTHS AT EACH END.

2.7 WIRING DEVICES

A. PROVIDE WIRING DEVICES BY SINGLE MANUFACTURER. DEVICE COLORS SHALL BE WHITE.

B. TOGGLE SWITCHES:
1. SINGLE-POLE SHALL BE 20A., 120-277V AC.
2. THREE-WAY SHALL BE 20A., 120-277V AC.
3. SPECIFICATION GRADE TO COMPLY WITH UL20.

C. RECEPTACLES:
1. DUPLEX SHALL BE 125V, 20A, 2-POLE, 3W GROUNDING.
2. HEAVY DUTY RECEPTACLES SHALL BE SIZED AS REQUIRED FOR INTENDED SERVICE.
3. SPECIFICATION GRADE, COMPLY WITH NEMA WD1 AND UL 498.

D. OCCUPANCY SENSORS:
1. WALL SWITCH: PASSIVE INFRARED SENSOR WITH SINGLE OR DOUBLE OVERRIDE SWITCH AS INDICATED BY SYMBOL.
   a. DEVICE SHALL FIT STANDARD DECORA-STYLE DEVICE PLATE.
   b. DEVICE SHALL DETECT SMALL MOTION WITHIN 20' IN ALL DIRECTIONS (180 DEGREE PATTERN).
   c. SHALL HAVE PHOTOCELL OPTION (WITH DISABLE) WHERE DEVICE IS SHOWN IN A ROOM WITH NATURAL LIGHT.
   d. ADJUST SENSORS FOR CONSISTENT DETECTION OF PEOPLE WITHOUT FALSE TRIGGERING DUE TO HVAC OR SUNLIGHT.
   e. COORDINATE TIME DELAY SETTING WITH OWNER.
2. CEILING SENSOR: PASSIVE INFRARED SENSOR OR PASSIVE INFRARED AND ULTRASONIC DUAL-TECHNOLOGY.
   a. DEVICE SHALL DETECT MOTION WITHIN 20' IN ALL DIRECTIONS (360 DEGREE PATTERN).
   b. PROVIDE POWER PACK FOR EACH CONTROLLED CIRCUIT.
   c. SYSTEM SHALL ACCEPT INTERCONNECTION OF MULTIPLE SENSORS AND/OR MULTIPLE POWER PACKS.
   d. POWER PACKS SHALL BE RATED FOR 20A, 120/277V. PROVIDE ISOLATED HVAC CONTROL RELAY OPTION.
   e. COORDINATE TIME DELAY SETTING WITH OWNER.

E. ALL LIGHTING CONTROLS SHALL BE PROVIDED BY THE SAME MANUFACTURER AND SHALL BE COMPATIBLE WITH THE LUMAIRES PROVIDED. COORDINATE WITH THE LIGHTING CONTROLS MANUFACTURER TO PROVIDE A COMPLETE AND FULLY FUNCTIONING SYSTEM, INCLUDING BUT NOT LIMITED TO POWER PACKS, MODULES, INTERCONNECTING CIRCUITRY AND ACCESSORIES. LIGHTING CONTROLS MANUFACTURER TECHNICIAN SHALL BE ON SITE FOR PRE-WIRING CONSULTATION AND COMMISSIONING.

2.8 WIRING DEVICE PLATES

A. ONE-PIECE, SCREW FASTENED, COMPLY WITH UL 514A.

B. NAMEPLATE DESIGNATIONS FOR DEVICE PLATES SHALL BE ENGRAVED DIRECTLY ON PLATES AND FILLED IN IN BLACK.

C. PROVIDE PLASTIC DEVICE WALL PLATES FOR TELEPHONE/DATA DEVICES. COORDINATE WALL PLATE WITH TELEPHONE/DATA OUTLET INSERT.

D. DEVICE PLATES SHALL BE BY MANUFACTURER OF WIRING DEVICES.

E. RECEPTACLE DEVICE PLATES FOR CIRCUITS OTHER THAN 120V, 2-WIRE, SHALL BE ENGRAVED WITH 1/4" LETTERS, FILLED RED, INDICATING VOLTAGE CHARACTERISTICS AND CIRCUIT NUMBER OF OUTLET.

F. OUTLETS SHALL BE FLUSH TO SURFACE UNLESS OTHERWISE INDICATED.

2.9 LUMINAIRES

A. INSTALL LIGHTING FIXTURES, EQUIPMENT AND COMPONENTS WHERE SHOWN ON DRAWINGS, AS LISTED IN FIXTURE SCHEDULES AND AS SPECIFIED, WIRED AND ASSEMBLED. PROVIDE APPROVED ALIGNER CANOPIES, HANGERS, AND OTHER APPURTENANCES AS REQUIRED.

B. LED AND LOW VOLTAGE FIXTURES SHALL BE SUPPLIED AS A SINGLE SYSTEM. ALL CONTROL GEAR (POWER SUPPLIES, TRANSFORMERS, DIMMING INTERFACES, LED DRIVERS, ETC.) REQUIRED FOR NORMAL OPERATION OF LED LUMINAIRES SHALL BE SUPPLIED.

C. ALL LED FIXTURES REPRESENT THE MOST CURRENT VERSION AVAILABLE FROM THE SPECIFIED MANUFACTURER AT TIME OF SPECIFICATION. DUE TO THE INEVITABLE DELAY BETWEEN 100% CD SPECIFICATION AND FIXTURE SUBMITTAL BY CONTRACTOR AND INEVITABLE IMPROVEMENTS IN LED TECHNOLOGY, UPDATES TO THE LED FIXTURES ARE ANTICIPATED. AT TIME OF FIXTURE SUBMITTAL, CONTRACTOR MUST SUBMIT THE MOST CURRENT, UP TO DATE FIXTURE EQUIVALENT OF THE SPECIFIED FIXTURE FROM THE MANUFACTURER.

D. LED DRIVERS SHALL HAVE A 10-YEAR MINIMUM WARRANTY, 10%-100% DIMMING USING 0-10V LOW VOLTAGE SIGNAL.

E. WHERE LUMINAIRE IS INDICATED TO BE POWERED VIA A LIGHTING INVERTER FOR EMERGENCY SERVICE, PROVIDE UL 924 LISTED RELAY DESIGNED TO ALLOW FOR OVERRIDE OF LUMINAIRE CONTROLLER AND FOR FULL LIGHT OUTPUT FOR 90 MINUTES FOLLOWING A POWER LOSS.

2.11 CIRCUIT BREAKERS

A. PROTECTIVE DEVICES SHALL BE MOLDED CASE CIRCUIT BREAKERS PROVIDING COMPLETE CIRCUIT OVERCURRENT PROTECTION BY HAVING INVERSE TIME AND INSTANTANEOUS TRIPPING CHARACTERISTICS.

B. CIRCUIT BREAKERS SHALL BE OPERATED BY A TOGGLE-TYPE HANDLE AND SHALL HAVE A QUICK-MAKE, QUICK-BREAK OVER-CENTER SWITCHING MECHANISM THAT IS MECHANICALLY TRIP FREE.

C. AUTOMATIC TRIPPING OF THE BREAKER SHALL BE CLEARLY INDICATED BY THE HANDLE POSITION.

D. PROVIDE HACR RATED CIRCUIT BREAKERS FOR MOTOR CIRCUIT PROTECTION WHERE CONNECTED TO MOTORS OR MECHANICAL EQUIPMENT.

E. COMPLY WITH UL 489.

F. SERIES RATED EQUIPMENT SHALL NOT BE UTILIZED.

G. FAULT BRACING RATING WILL BE COORDINATED WITH EXISTING EQUIPMENT.

G CIRCUIT BREAKERS PROVIDED IN EXISTING EQUIPMENT MUST MATCH TYPE,
H. RATINGS AND SETTINGS OF EXISTING.

2.12 SURGE PROTECTIVE DEVICES:

A. COMPLY WITH UL 1449.

2.13 GROUNDING AND BONDING:

COMPLY WITH UL 467.

2.14 SAFETY SWITCHES:

A. FUSED AND NONFUSED SAFETY SWITCHES SHALL BE PROVIDED AS REQUIRED. SAFETY SWITCHES SHALL BE ENCLOSED HEAVY-DUTY TYPE WITH QUICK-MAKE, QUICK-BREAK
B. MECHANISM AND EXTERNAL LOCKING OPERATING HANDLE.

C. FUSES SHALL BE NON-RENEWABLE. DUAL ELEMENT, TIME DELAY "RK5".

D. ALL DISCONNECT SWITCHES SHALL BE CAPABLE OF BEING LOCKED IN THE OFF POSITION.

E. SERIES RATED EQUIPMENT SHALL NOT BE UTILIZED.

PART 3 - EXECUTION

3.1 MATERIALS AND WORKMANSHIP

A. WORK SHALL BE EXECUTED IN WORKMANLIKE MANNER AND SHALL PRESENT NEAT, RECTILINEAR, AND MECHANICAL APPEARANCE WHEN COMPLETED. MAINTAIN MAXIMUM HEADROOM AT ALL TIMES. DO NOT RUN PIPES AND DUCTS EXPOSED UNLESS SHOWN EXPOSED ON DRAWINGS. MATERIAL AND EQUIPMENT SHALL BE NEW AND INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDED BEST PRACTICE SO THAT COMPLETED INSTALLATION SHALL OPERATE SAFELY AND EFFICIENTLY.

3.2 CONTINUITY OF SERVICES

A. DO NOT INTERRUPT EXISTING SERVICES WITHOUT OWNER'S AND ARCHITECT'S APPROVALS.

3.3 TESTING, INSPECTION, AND CLEANING

A. TEST WIRING AND CONNECTIONS FOR CONTINUITY AND GROUNDS BEFORE FIXTURES ARE CONNECTED; DEMONSTRATE INSULATION RESISTANCE BY MEGGER TEST AS REQUIRED. INSULATION RESISTANCE BETWEEN CONDUCTORS AND GROUNDS FOR SECONDARY DISTRIBUTIONS SYSTEMS SHALL MEET NEC REQUIREMENTS.

B. TEST LIGHTING FIXTURES WITH SPECIFIED LAMPS IN PLACE FOR 10 HOURS; CHECK FIXTURES IN SECTIONS. DO NOT OPERATE LAMPS OTHER THAN FOR TESTING BEFORE FINAL INSPECTION BY ARCHITECT. REPLACE LAMPS THAT FAIL WITHIN 90 DAYS AFTER ACCEPTANCE BY ARCHITECT WITHIN CONTRACT PRICE.

C. FAILURE OR DEFECTS IN WORKMANSHIP OR MATERIALS REVEALED BY TESTS OR INSPECTION SHALL BE CORRECTED PROMPTLY AND RETESTED. REPLACE DEFECTIVE MATERIAL.

D. CLEAN PANELS AND OTHER EQUIPMENT. PANELBOARD INTERIORS SHALL BE CLEANED AND VACUUMED. EQUIPMENT WITH DAMAGE TO PAINTED FINISH SHALL BE REPAIRED TO ARCHITECT'S SATISFACTION.

E. EQUIPMENT
1. AFTER COMPLETION OF PROJECT, CLEAN THE EXTERIOR SURFACE OF EQUIPMENT INCLUDED IN THIS SECTION, INCLUDING CONCRETE RESIDUE.

F. ELECTRICAL AND MECHANICAL CLOSETS SHALL BE CLEANED AND VACUUMED.

3.4 NAMEPLATES

A. PROVIDE NAMEPLATES IN OR ON PANELBOARDS, JUNCTION BOXES AND CABINETS, AND FOR SPECIAL PURPOSE SWITCHES OR OTHER CONTROLS FURNISHED OR INSTALLED UNDER THIS SECTION. NAMEPLATES SHALL DESIGNATE EQUIPMENT CONTROLLED AND FUNCTION.

B. NAMEPLATES SHALL BE LAMINATED BLACK BAKELITE WITH 1/4" HIGH WHITE RECESSED LETTERS. NAMEPLATES SHALL BE SECURELY ATTACHED TO THE EQUIPMENT WITH GALVANIZED SCREWS. ADHESIVES OR CEMENTS SHALL NOT BE USED.

C. LABEL RECEPTACLES AND SWITCHES WITH PANEL AND CIRCUIT NUMBER.

D. LABEL PANELBOARDS WITH ARC FLASH LABELS IN ACCORDANCE WITH NFPA ARTICLE 70 (NEC)110.16 AND NFPA ARTICLE 70E.

E. LABEL DISCONNECT SWITCHES WITH ARC FLASH LABELS IN ACCORDANCE WITH NFPA ARTICLE 70 (NEC) 110.16 AND NFPA ARTICLE 70E.

3.5 WIRING METHODS

A. INSTALL WIRE AND CABLE IN APPROVED RACEWAYS AS SPECIFIED AND AS APPROVED BY AUTHORITIES THAT HAVE JURISDICTION. SURFACE METAL RACEWAYS SHALL NOT BE USED UNLESS EXPLICITLY SPECIFIED AND SHOWN ON DRAWINGS. DO NOT USE SURFACE RACEWAYS ON FLOOR. DO NOT USE ARMORED CABLE.

B. WIRE FROM POINT OF SERVICE CONNECTION TO RECEPTACLES, LIGHTING FIXTURES, DEVICES, EQUIPMENT, OUTLETS FOR FUTURE EXTENSION, AND OTHER ELECTRICAL APPARATUS AS SHOWN ON DRAWINGS. PROVIDE SLACK WIRE FOR CONNECTIONS. TAPE ENDS OF WIRES AND PROVIDE BLANK COVERS FOR OUTLET BOXES DESIGNATED FOR FUTURE USE.

C. FOLLOW HOMERUN CIRCUIT NUMBERS SHOWN ON DRAWINGS TO CONNECT CIRCUITS TO PANELBOARDS. WHERE HOMERUN CIRCUIT NUMBERS ARE NOT SHOWN ON DRAWINGS, DIVIDE SIMILAR TYPES OF CONNECTED LOADS AMONG PHASE BUSES SO THAT CURRENTS ARE APPROXIMATELY EQUAL IN NORMAL USAGE. CONNECT EACH BRANCHCIRCUIT HOMERUN WITH TWO OR MORE CIRCUITS AND COMMON NEUTRAL TO CIRCUIT BREAKER OR SWITCH IN THREE-WIRE OR FOUR-WIRE BRANCH CIRCUIT PANELBOARD SO THAT NO TWO CIRCUITS ARE FED FROM SAME BUS. WHERE PANELBOARD CABINETS ARERECESSED, PROVIDE CONDUITS WITH SUFFICIENT CAPACITY FOR FUTURE CONDUCTORS FOR SPARE BRANCH CIRCUIT CIRCUIT PROTECTIVE DEVICES AND SPACES IN PANELBOARD; STUB UP CONCEALED TO JUNCTION BOX. PROVIDE EXTENSIONS ABOVECEILING.

D. ELECTRICAL METALLIC TUBING MAY BE USED GENERALLY, IF APPROVED BY LOCAL CODES, FOR LIGHTING FIXTURE AND RECEPTACLE CIRCUITS, TELEPHONE, INTER-COMMUNICATIONS, SIGNAL AND INSTRUMENTATION CIRCUITS, AND FOR CONTROL CCIRCUITS. EMT MAY BE USED GENERALLY, IF APPROVED BY AUTHORITIES, IN MASONRY WALLS, ABOVE HUNG CEILINGS, IN EQUIPMENT ROOMS, IN MECHANICAL AND ELECTRICAL CHASES AND CLOSETS, IN EXPOSED LOCATIONS ALONG CEILINGS OR WALLS ABOVENORMAL TRAFFIC LEVEL AND WHERE NOT SUBJECT TO ACCIDENTAL DAMAGE OR ABUSE.

E. INSTALL CONNECTORS AND COUPLINGS AS RECOMMENDED BY MANUFACTURERS. COMPRESSION FITTINGS SHALL NOT BE USED WITH RGS.

F. PROVIDE FLEXIBLE CONDUITS FOR CONNECTIONS TO ELECTRICAL EQUIPMENT THAT IS SUBJECT TO MOVEMENT, VIBRATION, OR MISALIGNMENT, AND WHERE NOISE TRANSMISSION MUST BE ELIMINATED OR REDUCED.
FLEXIBLE CONDUIT SHALL BE LIQUID-TIGHT UNDER THE FOLLOWING CONDITIONS:
1. MOISTURE OR HUMIDITY-LADEN ATMOSPHERES
2. CORROSIVE ATMOSPHERES
3. WHERE WASH-DOWN OPERATIONS ARE POSSIBLE
4. WHERE SEEPAGE OR DRIPPING OF OIL, GREASE, OR WATER IS POSSIBLE.

G. RUN CONCEALED CONDUIT IN AS DIRECT LINES AS POSSIBLE WITH MINIMUM NUMBER OF BENDS OF LONGEST POSSIBLE RADIUS. RUN EXPOSED CONDUIT AND EMT PARALLEL TO OR AT RIGHT ANGLES TO BUILDING LINES. ENDS SHALL BE FREE FROM DENTS OR FLATTENING.

H. CONDUIT AND EMT RUNS SHALL BE MECHANICALLY AND ELECTRICALLY CONTINUOUS FROM SERVICE ENTRANCE TO OUTLETS. CONDUIT SHALL ENTER AND BE SECURED TO CABINET, JUNCTION BOX, PULL BOX, OR OUTLET BOX WITH LOCKNUT OUTSIDE AND BUSHING INSIDE, OR WITH LIQUID-TIGHT, THREADED, SELF-LOCKING, COLD-WELD WEDGE ADAPTER. PROVIDE ADDITIONAL WRENCH-TIGHTEN LOCKNUT FOR EMT OR FLEXIBLE CONDUIT WHERE CIRCUIT VOLTAGE EXCEEDS 250 V. LOCKNUTS AND BUSHINGS OR SELF-LOCKING ADAPTERS WILL NOT BE REQUIRED WHERE CONDUITS ARE SCREWED INTO TAPPED CONNECTIONS. VERTICAL CONDUIT RUNS THAT TERMINATE IN BOTTOMS OF WALL BOXES OR CABINETS SHALL BE PROTECTED FROM ENTRANCE OF FOREIGN MATERIAL BEFORE INSTALLATION OF CONDUCTORS.

I. SIZE CONDUIT AND FLEXIBLE METALLIC CONDUIT AS REQUIRED BY NEC EXCEPT AS SPECIFIED OR SHOWN ON DRAWINGS OTHERWISE.

J. CHECK RACEWAY SIZES TO DETERMINE THAT GREEN EQUIPMENT GROUND CONDUCTOR FITS IN SAME RACEWAY WITH PHASE AND NEUTRAL CONDUCTORS TO MEET NEC PERCENTAGE OF FILL REQUIREMENTS. INCREASE DUCT, CONDUIT, TUBING, AND RACEWAY SIZES SHOWN OR SPECIFIED AS REQUIRED TO ACCOMMODATE CONDUCTORS.

K. UNLESS SPECIFIED OR SHOWN ON DRAWINGS OTHERWISE, INSTALL CONDUIT AND EMT CONCEALED. UNLESS SPECIFIED OR SHOWN OTHERWISE, CONDUIT MAY BE RUN EXPOSED ON UNFINISHED WALLS AND UNFURRED BASEMENT CEILINGS AND IN UNFINISHED PENTHOUSES, ATTICS, AND ROOF SPACES. PROVIDE STAND-OFF CLIPS FOR CONDUITS ON EXTERIOR MASONRY WALLS.

L. INSTALL CONDUIT SYSTEMS COMPLETE BEFORE DRAWING IN CONDUCTORS. BLOW THROUGH AND SWAB AFTER PLASTER IS FINISHED AND DRY, AND BEFORE CONDUCTORSARE INSTALLED.

M. ATTACH PULL ROPES TO CONDUCTORS WITH BASKET-WEAVE GRIPS ON PULLING EYES. PULL CABLES THAT SHARE CONDUIT AT SAME TIME.

N. PROVIDE INSERTS, HANGERS, ANCHORS AND STEEL SUPPORTS AS NECESSARY.

O. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE ADEQUATELY SIZED TO ACCOMMODATE VOLTAGE DROP.

3.6 INSTALLATION OF LIGHT FIXTURES

A. VERIFY CEILING CONSTRUCTIONS, AND PROVIDE FIXTURES, BALLASTS, FRAMES, RINGS, AND OTHER ACCESSORIES SUITABLE FOR CONSTRUCTION ENCOUNTERED.

B. COORDINATE INSTALLATION OF FIXTURES WITH INSTALLATION OF CEILING MATERIALS AND SUSPENSION SYSTEMS.

C. COORDINATE THE INSTALLATION OF THE LIGHT FIXTURES WITH OTHER TRADES TO AVOID DAMAGE TO FIXTURES.

D. INVESTIGATE LIGHTING FIXTURE LOCATIONS AND SUPPORTS TO ENSURE THAT NO INTERFERENCE EXISTS WITH HANGERS, DUCTS, SPRINKLERS, PIPES, AND OTHER EQUIPMENT.

E. PROVIDE PLASTER FRAMES FOR FIXTURES RECESSED IN GYPSUM BOARD OR PLASTER CEILING.

F. DO NOT SUSPEND OR SUPPORT LIGHTING FIXTURES OR SAFETY CHAINS FROM HUNG CEILING, CONDUIT, OR DUCT. SUPPORT FIXTURES FROM STRUCTURAL MEMBERS ONLY.

G. CEILING MOUNTED FIXTURES SHALL BE SUPPORTED INDEPENDENT OF HUNG CEILING WITH BOW CHAIN.

H. PROVIDE UNISTRUT BELOW DUCTS WHERE FIXTURE LOCATIONS COINCIDE WITH DUCT RUNS. PROVIDE THREADED RODS TO SUPPORT UNISTRUT.

I. PATCH SPRAY-ON FIREPROOFING DAMAGED DURING INSTALLATION.

J. SUPPORT SURFACE-MOUNTED LUMINAIRES AT LEAST TWO CONCEALED POINTS TO PREVENT ROTATION.

K. MOUNTING HEIGHT OF SUSPENDED OR WALL-MOUNTED LUMINAIRES SHALL BE SHOWN ON THE BUILDING MANUFACTURER DRAWINGS.

3.7 GROUNDING

A. PER NFPA 70: PROVIDE JUMPERS OR BONDING CONDUCTORS WHERE RACEWAY IS ELECTRICALLY DISCONTINUOUS. PROVIDE COPPER GROUND CONDUCTOR MINIMUM #12 AWG IN ALL CIRCUITS AND FEEDERS. EACH BRANCH CIRCUIT OR MULTI-WIRE CIRCUIT TO HAVE SEPARATE GROUND CONDUCTOR.

B. PROVIDE GROUND BUS AS INDICATED ON DRAWINGS.

3.8 VOLTAGE CHECK:

A. AT COMPLETION OF JOB AND AFTER FULL BUILDING OCCUPANCY. CHECK VOLTAGE AT SEVERAL POINTS OF UTILIZATION ON THE SYSTEM WHICH HAS BEEN INSTALLED UNDER THIS CONTRACT. DURING THE TEST, ENERGIZE ALL LOADS INSTALLED.

3.9 FIREPROOFING:

A. MAINTAIN THE INTEGRITY OF FIRE, SMOKE AND VAPOR BARRIERS.

3.10 SWITCHBOARDS AND PANELBOARDS

A. REVISE ALL EXISTING SWITCHBOARD AND PANELBOARD DIRECTORIES WITH NEW TYPE WRITTEN INDEX SHOWING CIRCUIT CHANGES UNDER THIS CONTRACT, INCLUDING UPDATING OF EXISTING CIRCUITS NOT CHANGED. PLACE DIRECTORY IN CLEAR PLASTIC SLEEVE AND POSITIVELY ATTACH TO THE INSIDE OF THE PANELBOARD DOOR.

B. PROVIDE TERMINAL STRIPS IN EXISTING PANELS TO ACCOMMODATE THE INCREASE IN NEUTRAL AND GROUND WIRES.

C. PROVIDE NEW CIRCUIT BREAKERS OF TYPE AND SHORT CIRCUIT RATING TO MATCH EXISTING WHERE REQUIRED TO SUPPLEMENT EXITING QUANTITY. PROVIDE "HACR" RATED CIRCUIT BREAKERS FOR HVAC EQUIPMENT.

3.11 MOTORS, CONNECTIONS AND CONTROLS

A. CHECK ELECTRICAL CONNECTIONS AND SIZING OF MOTOR PROTECTION CIRCUIT AND PREVENT DAMAGE TO MOTORS AND EQUIPMENT FROM INCORRECT ROTATION.

B. CONSULT SHOP DRAWINGS FOR VERIFICATION OF SIZE, SPEED AND OPERATION FOR MOTORS

C. OBTAIN NECESSARY ELECTRICAL CONNECTION DATA, INCLUDING WIRING, CONTROL WIRING, OVERCURRENT PROTECTION AND INTERLOCKING DIAGRAMS FROM EQUIPMENT SUPPLIERS FOR INSTALLATION AND PROPER SEQUENCE OF OPERATION.

D. DETERMINE APPROPRIATE ARC FLASH LABELS FOR DISCONNECT SWITCHES IN ACCORDANCE WITH NFPA ARTICLE 70 (NEW) 110.16 AND NFPA 70E.

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

4 RIVERSIDE CIRCLE, ROANOKE, 24016

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REGISTRATION

ISSUE/REVISION

I	03/03/2025	100% WORKING DRAWINGS
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

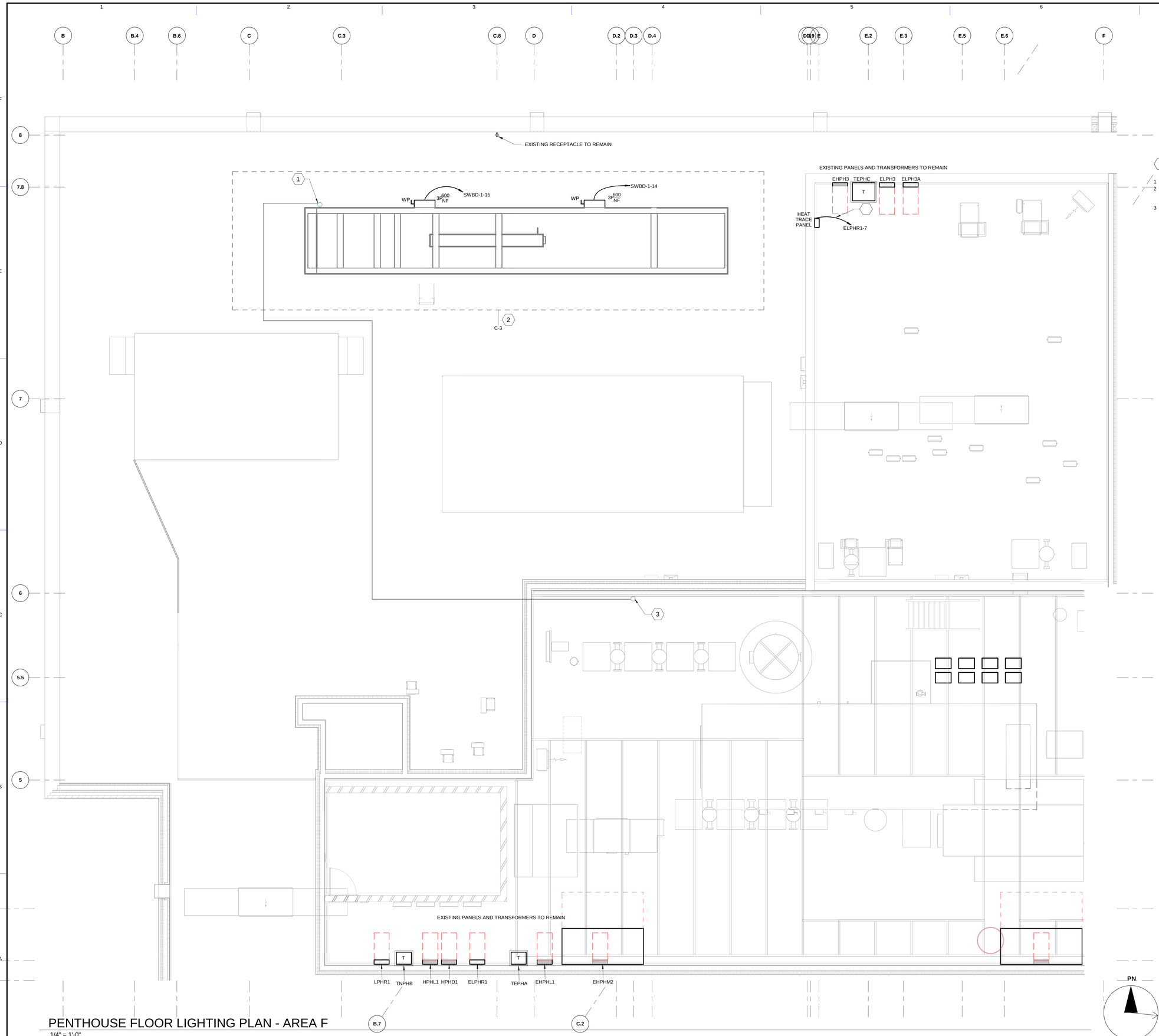
60738913

SHEET TITLE

ELECTRICAL SPECIFICATIONS

SHEET NUMBER

E-004



PENTHOUSE FLOOR LIGHTING PLAN - AREA F

1/4" = 1'-0"

GENERAL NOTES - POWER

A. REFER TO SHEET E-001 FOR ELECTRICAL LEGEND, ABBREVIATIONS, AND FOR ADDITIONAL DEMOLITION ELECTRICAL GENERAL NOTES.

GENERAL NOTES THIS SHEET:

A. WHERE VFD'S ARE IN USE, COORDINATE TYPE OF EQUIPMENT SERVED, LOCATION, AND OPERATING ENVIRONMENT WITH VFD MANUFACTURERS. PROVIDE MANUFACTURER RECOMMENDED ACCESSORIES SUCH AS LINE REACTORS, SHIELDED CABLING, ETC. TO MITIGATE VFD DISTANCE FROM SERVED EQUIPMENT, ELECTROMAGNETIC FIELDS, AND ENVIRONMENTAL FACTORS THAT COULD NEGATIVELY AFFECT VFO OPERATION.

SHEET KEYNOTES

PROVIDE 2#12 + 1#12G IN 3/4" CONDUIT.

1 NEW CONDUIT CONNECTION AT CHILLER.

2 CONNECT CHILLER PLATFORM TO EXISTING LIGHTNING PROTECTION SYSTEM. REFER TO DETAIL #1 ON SHEET E-718 FOR LIGHTNING PROTECTION INFORMATION AND DETAILS.

3 NEW CONDUIT FOR CHILLER DOWN TO UTILITY CORRIDOR ON 3RD FLOOR.

PN

TN

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALES

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

4 RIVERSIDE CIRCLE, ROANOKE, 24016

CLIENT

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03/10/2025

ISSUE/REVISION

I/R	DATE	DESCRIPTION
I	03/03/2025	100% WORKING DRAWINGS

KEY PLAN

PROJECT NUMBER

60738913

SHEET TITLE

PENTHOUSE FLOOR POWER PLAN - AREAS A & C

SHEET NUMBER

EP104

SHEET KEYNOTES

1. NEW CONDUIT CONNECTION IN ELECTRICAL ROOM.
2. NEW CONDUIT UP TO MECHANICAL SHAFT.
3. REFER TO SHEET E-404 FOR DETAIL 1 FOR LOCATION OF EXISTING SWITCHBOARD SWBD-1 WITHIN THE MAIN ELECTRICAL ROOM.

GROUND FLOOR PLAN

1/4" = 1'-0"

PN

TN

GRAPHIC SCALES

1/4"=1'-0" 4' 2' 0 4' 8'

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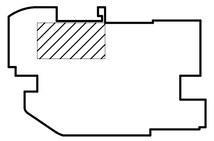
KEY PLAN



PROJECT NUMBER

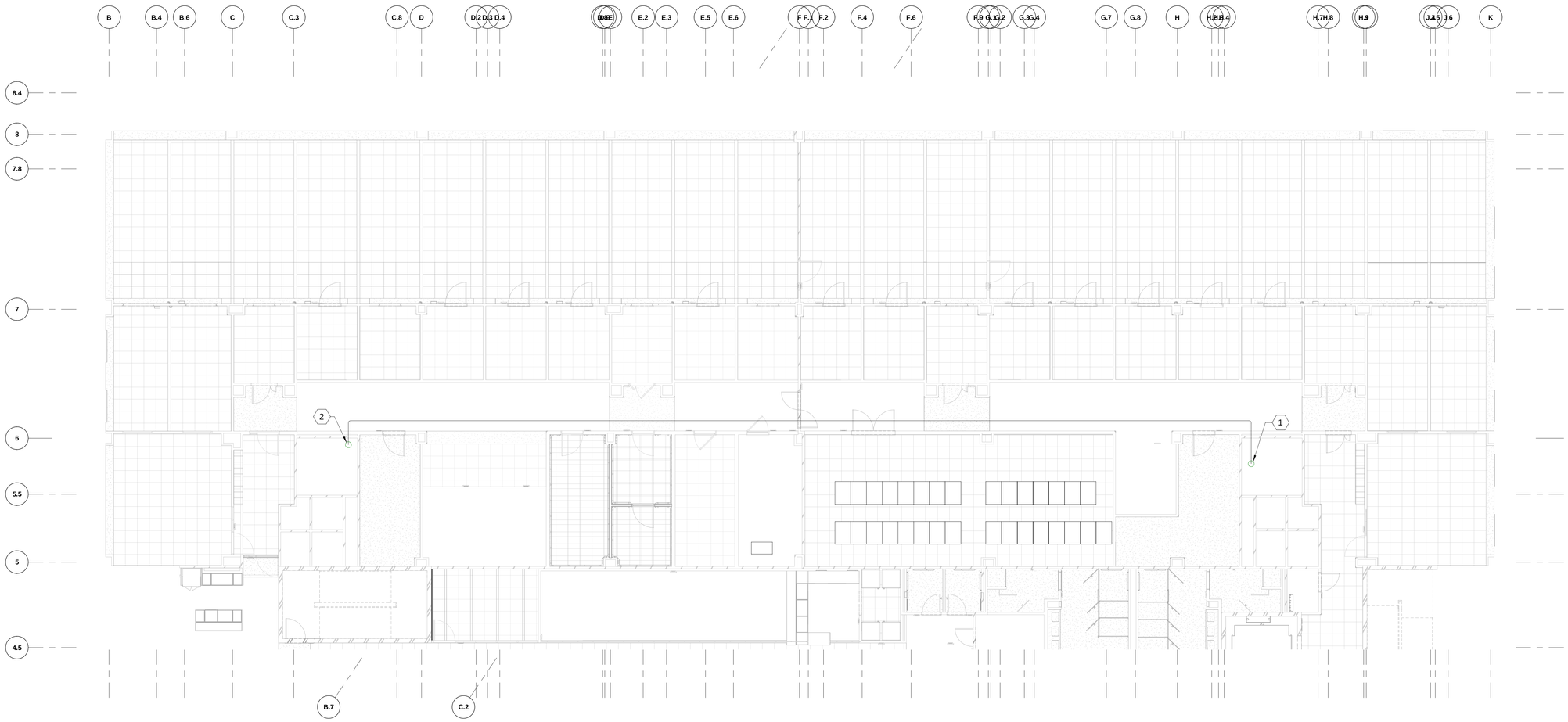
60738913

SHEET TITLE

GROUND FLOOR CHILLER ADDITION

SHEET NUMBER

EP603



SHEET KEYNOTES

1 NEW CONDUIT DOWN MECHANICAL SHAFT.
2 NEW CONDUIT UP MECHANICAL SHAFT.

FIRST FLOOR PLAN

1/8" = 1'-0"

PN
TN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

UBO APPROVAL STAMP

AECOM

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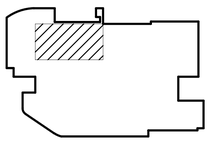


PROJECT NUMBER

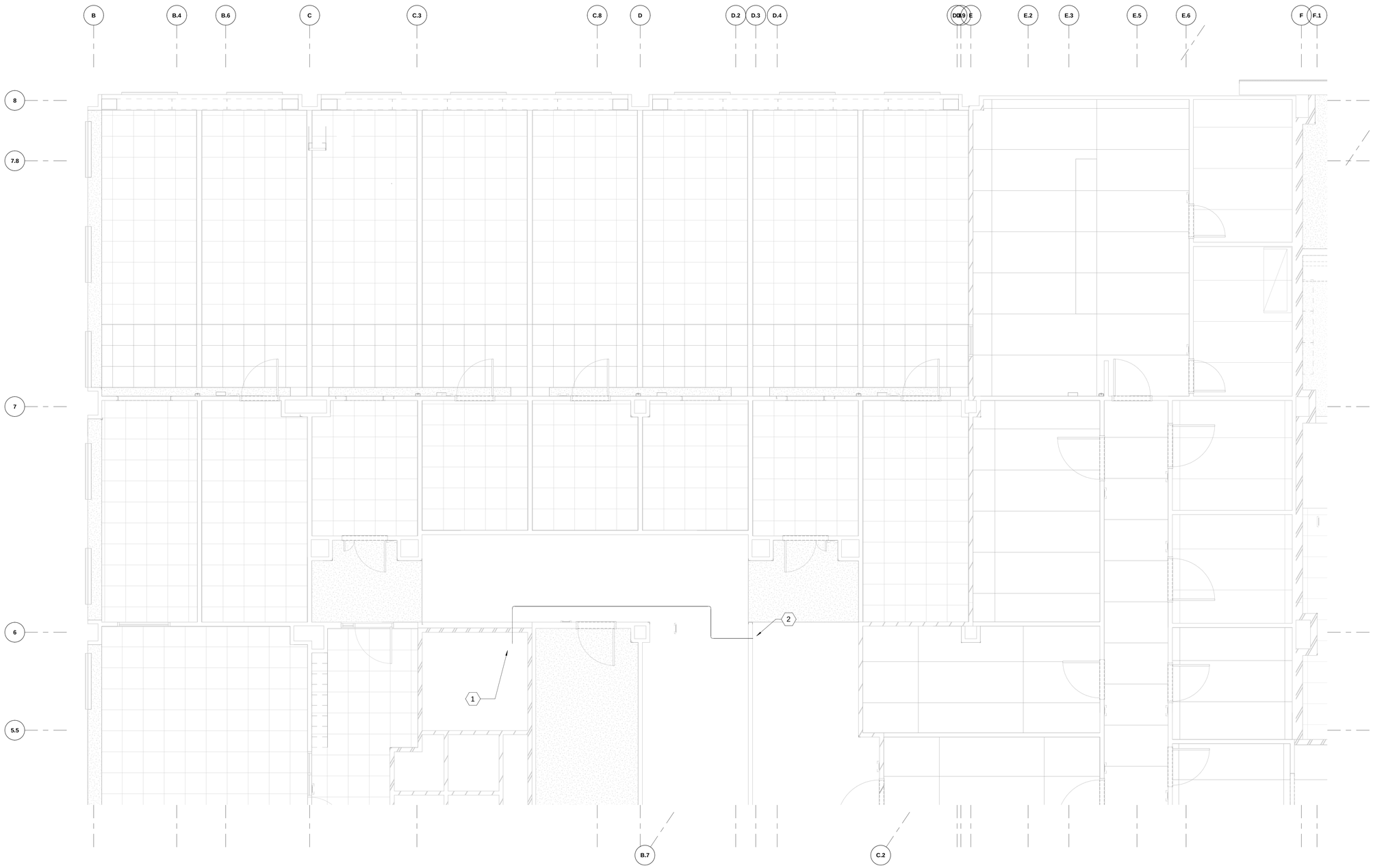
60738913

SHEET TITLE

FIRST FLOOR CHILLER ADDITION

SHEET NUMBER

EP604



SHEET KEYNOTES

1 NEW CONDUIT DOWN MECHANICAL SHAFT.

THIRD FLOOR PLAN

1/4" = 1'-0"

PN

TN

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALES

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

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KEY PLAN

PROJECT NUMBER

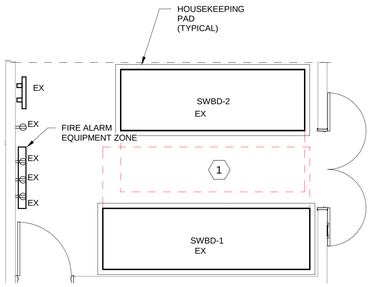
60738913

SHEET TITLE

THIRD FLOOR CHILLER ADDITION

SHEET NUMBER

EP605



1
E-404

SWITCHBOARD ROOM G005 PART PLAN

1/4" = 1'-0"

SHEET KEYNOTES

1 REFER TO SHEET EP603 FOR THE LOCATION OF THIS SPACE ON THE GROUND FLOOR OF THE BUILDING

UBO APPROVAL STAMP

PN

TN

4' 2' 0 4' 8'

1/4"=1'-0"

GRAPHIC SCALES

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

4 RIVERSIDE CIRCLE, ROANOKE, 24016

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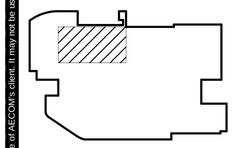


PROJECT NUMBER

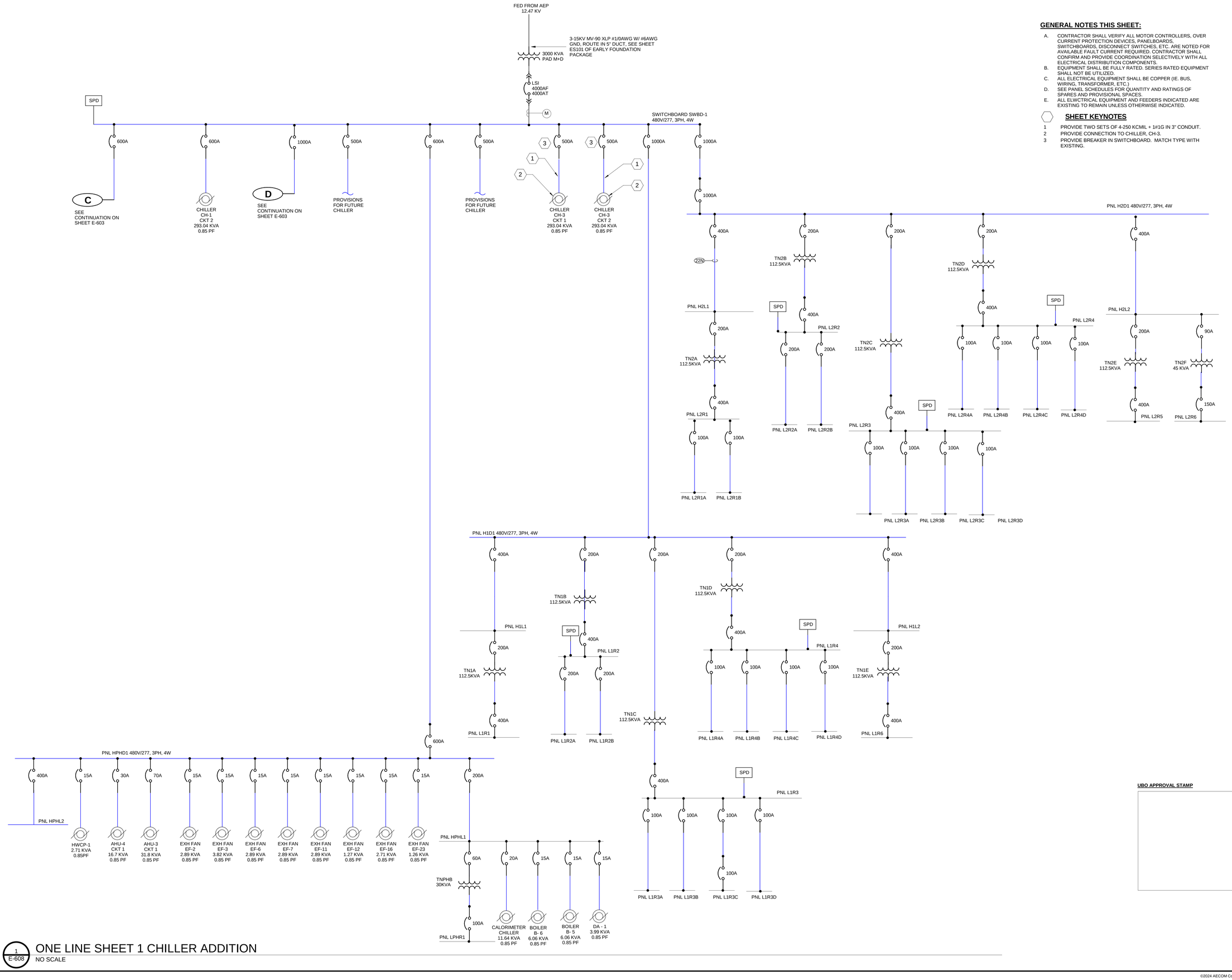
60738913

SHEET TITLE

ELECTRICAL ENLARGED PLANS

SHEET NUMBER

E-404



GENERAL NOTES THIS SHEET:

A. CONTRACTOR SHALL VERIFY ALL MOTOR CONTROLLERS, OVER CURRENT PROTECTION DEVICES, PANELBOARDS, SWITCHBOARDS, DISCONNECT SWITCHES, ETC. ARE NOTED FOR AVAILABLE FAULT CURRENT REQUIRED. CONTRACTOR SHALL CONFIRM AND PROVIDE COORDINATION SELECTIVELY WITH ALL ELECTRICAL DISTRIBUTION COMPONENTS.
B. EQUIPMENT SHALL BE FULLY RATED. SERIES RATED EQUIPMENT SHALL NOT BE UTILIZED.
C. ALL ELECTRICAL EQUIPMENT SHALL BE COPPER (IE. BUS, WIRING, TRANSFORMER, ETC.)
D. SEE PANEL SCHEDULES FOR QUANTITY AND RATINGS OF SPARES AND PROVISIONAL SPACES.
E. ALL ELWCTRICAL EQUIPMENT AND FEEDERS INDICATED ARE EXISTING TO REMAIN UNLESS OTHERWISE INDICATED.

SHEET KEYNOTES

1 PROVIDE TWO SETS OF 4-250 KCMIL + 1#1G IN 3" CONDUIT.
2 PROVIDE CONNECTION TO CHILLER, CH-3.
3 PROVIDE BREAKER IN SWITCHBOARD. MATCH TYPE WITH EXISTING.

1
E-608

ONE LINE SHEET 1 CHILLER ADDITION

NO SCALE

UBO APPROVAL STAMP

AECOM

PROJECT

VTC FBRI CHILLER PROJECT

4 RIVERSIDE CIRCLE, ROANOKE, 24016

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KEY PLAN

PROJECT NUMBER

60738913

SHEET TITLE

ELECTRICAL NORMAL ONELINE

SHEET NUMBER

E-608

SWITCHBOARD: SWBD-1

EXISTING

LOCATION: SWITCHBOARD ROOM G005
MAIN DEVICE: 4000 A
BUS AMPS: 4000
VOLTAGE: 480/277 Wye V. 3 ø 4 W.
A.I.C. RATING: 65k
SPECIAL: GFP PROTECTION

SECTION No. 1

CKT	FRAME	POLES	RATING	KVA	DESCRIPTION/NAMEPLATE	NOTES
1	1000 A	3	1000 A	610.5 kVA	ATS #4	
2	1000 A	3	1000 A	772.8 kVA	ATS #5	
3	1000 A	3	1000 A	368.9 kVA	H1D1	
4	600 A	3	600 A	293.0 kVA	CHILLER 1 CIRCUIT #1	
5	600 A	3	600 A	293.0 kVA	ATSH2	
6	600 A	3	600 A	332.8 kVA	HPHD1	
7	1000 A	3	1000 A	394.1 kVA	H2D1	
8	600 A	3	400 A	0.0 kVA	PROVISIONAL SPACE	
9	600 A	3	400 A	0.0 kVA	PROVISIONAL SPACE	
10	400 A	3	100 A	0.0 kVA	SPARE	
11	400 A	3	200 A	0.0 kVA	SPARE	
12	400 A	3	200 A	0.0 kVA	SPARE	
13	400 A	3	400 A	0.0 kVA	SPARE	
14	**600 A**	3	**500 A**	293.0 kVA	**CHILLER #3 CIRCUIT #2**	
15	**600 A**	3	**500 A**	293.0 kVA	**CHILLER 3 CIRCUIT #1**	
16	400 A	3	20 A	0.0 kVA	SPARE	
17	400 A	3	20 A	0.0 kVA	SPARE	
18	400 A	3	20 A	0.0 kVA	SPARE	
19	400 A	3	20 A	0.0 kVA	SPARE	
20	400 A	3	20 A	0.0 kVA	SPARE	
21	400 A	3	20 A	0.0 kVA	SPARE	
22	400 A	3	20 A	0.0 kVA	SPARE	
23						
24						
25						
26						

LOAD CLASSIFICATION	CONNECTED	DEMAND	ESTIMATED	SWITCHBOARD TOTALS	
Lighting	43743 VA	125.00%	54678 VA		
Other	1 VA	100.00%	1 VA		
Continuous	21380 VA	125.00%	26725 VA		
Receptacle - General Purpose	284884 VA	51.76%	147442 VA		
Receptacle - Lab Equipment	452054 VA	100.00%	452054 VA	**CONN. LOAD:**	3648829 VA
Lab Equipment	125523 VA	100.00%	125523 VA	**EST. DEMAND LOAD:**	2643290 VA
Receptacle - Data Center	124800 VA	75.00%	93600 VA	**CONN. CURRENT:**	4389 A
Receptacle - Computer	7920 VA	100.00%	7920 VA	**EST. DEMAND CURRENT:**	3179 A
Receptacle - Office Equipment	41653 VA	100.00%	41653 VA		
Mechanical	2381520 VA	65.00%	1547988 VA		
Receptacle - Telecommunications	16500 VA	75.00%	12375 VA		
NonContinuous	86690 VA	100.00%	86690 VA		

NOTES:

PANEL: ELPHR1

BUS AMPS: 100 A

EXISTING

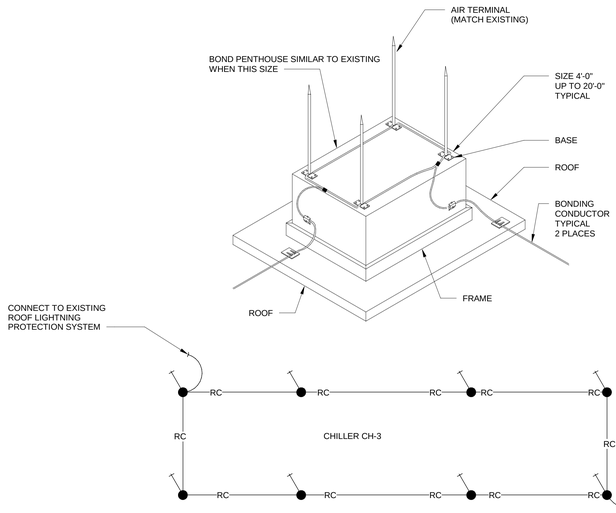
LOCATION: PENTHOUSE - BSL3 PH403
SUPPLY FROM: TEPHA
MOUNTING SURFACE
ENCLOSURE: NEMA 1
DISTRIBUTION: 208/120 Wye
NEUTRAL RATING: 100%
SHUNT TRIP MAIN: No
SUB-FEED LUGS: No
FEED-THRU LUGS: No
MAINS TYPE: MCB
MCB RATING: 60 A
A.I.C. RATING
ISOLATED GROUND: No
SPD: No

NOTES:

CKT	DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	DESCRIPTION	CKT
1	FIRE CONTROL PANEL RM 303	20 A	1	0.18	0.50					1	20 A	MECHANICAL PENTHOUSE	2
3	MECHANICAL PENTHOUSE	20 A	1			0.50	0.50			1	20 A	MECHANICAL PENTHOUSE	4
5	MECHANICAL PENTHOUSE	20 A	1					0.86	0.69	2	20 A	BP-1 PENTHOUSE	6
7	**HEAT TRACE PANEL PH403**	20 A	1	0.50	0.69								8
9	SPARE	20 A	1			0.00	0.00			1	20 A	SPARE	10
11	SPACE	--	1					--	0.00	1	20 A	SPARE	12
13	SPACE	--	1	--	--					1	--	SPACE	14
15	SPACE	--	1			--	--			1	--	SPACE	16
17	SPACE	--	1					--	--	1	--	SPACE	18
19	SPACE	--	1	--	--					1	--	SPACE	20
21	SPACE	--	1			--	--			1	--	SPACE	22
23	SPACE	--	1					--	--	1	--	SPACE	24
25	SPACE	--	1	--	--					1	--	SPACE	26
27	SPACE	--	1			--	--			1	--	SPACE	28
29	SPACE	--	1					--	--	1	--	SPACE	30
31	SPACE	--	1	--	--					1	--	SPACE	32
33	SPACE	--	1			--	--			1	--	SPACE	34
35	SPACE	--	1					--	--	1	--	SPACE	36
37	SPACE	--	1	--	--					1	--	SPACE	38
39	SPACE	--	1			--	--			1	--	SPACE	40
41	SPACE	--	1					--	--	1	--	SPACE	42
		PHASE LOAD:		1.9 kVA		1.0 kVA		1.5 kVA					
		PHASE AMPS:		16.3 A		8.3 A		13.6 A					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	DEMAND LOAD	PANEL TOTALS	
RECEPTACLE	360 VA	100.00%	360 VA		
Continuous	180 VA	125.00%	225 VA	**CONNECTED LOAD (kVA):**	4
Receptacle - General Purpose	2000 VA	100.00%	2000 VA	**DEMAND LOAD (kVA):**	4
Mechanical	1873 VA	65.00%	1217 VA	**CONNECTED AMPS:**	12 A
				DEMAND AMPS:	11 A

EXISTING



NOTES:

1. THE LIGHTNING PROTECTION SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH UL96 & NFPA 780 LIGHTNING PROTECTION SYSTEM STANDARDS.
2. CONDUCTORS SHALL MAINTAIN A HORIZONTAL OR DOWNWARD COURSE, FREE FROM "U" OR "V" (DOWN AND UP) POCKETS.
3. NO BEND OF CONDUCTORS SHALL FORM AN ANGLE OF LESS THE 90 DEGREES, NOR SHALL HAVE A RADIUS OF BEND LESS THAN 8 DEGREES.
4. AIR TERMINALS SHALL BE SPACED EVERY 20' - 0" MAXIMUM AROUND THE ROOF PERIMETER AND/OR ALONG THE ROOF RIDGES. AIR TERMINALS SHALL BE LOCATED WITHIN 2'-0" OF OUTSIDE CORNERS.
5. BARE COPPER MATERIALS SHALL NOT BE INSTALLED ON ALUMINUM OR GALVALUM SURFACES, AND ALUMINUM MATERIALS SHALL NOT BE INSTALLED ON COPPER SURFACES.
6. ALL LIGHTNING PROTECTION CONDUCTORS SHALL BE FASTENED EVERY 3'-0" MAX..
7. ALL BOLTS ON BOLT-PRESSURE CONNECTORS SHALL BE TORQUED AT 150 POUND-INCHES (17N-m).
8. ALL CONNECTIONS MUST BE USED WITH UL LISTED CLASS I OR CLASS II CABLE OF SAME METAL TYPE.
9. METALIC BODIES OF INDUCTANCE SITUATED WITHIN 6'-0" OF A LIGHTNING CONDUCTOR OR ANOTHER BONDED METAL BODY SHALL BE INTERCONNECTED TO THE LIGHTNING CONDUCTOR SYSTEM, UNLESS INHERENTLY GROUNDED.
10. BOND TO ALL METAL BODIES OF CONDUCTANCE WITHIN 6'-0" OF THE MAIN LIGHTNING CONDUCTOR SUCH AS EXHAUST FANS, ROOF VENTS, METAL COOLING TOWERS, HVAC UNITS, LADDERS, RAILINGS, ANTENNAS, SKYLIGHTS, METAL STACKS AND OTHER LARGE METAL BODIES WHOSE HEIGHT EXCEEDS THAT OF AIR TERMINAL IN USE, UNLESS PROTECTED BY HIGHER ROOF ELEVATIONS.
11. THE INSTALLATION SHALL MEET THE REQUIREMENTS OF NFPA-780 STANDARD. ARL CERTIFICATION SHALL BE PROVIDED UPON COMPLETION OF INSTALLATION.
12. MAINTAIN INTEGRITY OF THE UL LIGHTNING PROTECTION MASTER LABEL
13. THE LIGHTNING PROTECTION SYSTEM SHALL BE INSTALLED IN A NEAT AND INCONSPICUOUS MANNER SO THAT ALL COMPONENTS WILL BLEND WITH THE APPEARANCE OF THE BUILDING.
14. THE INSTALLATION SHALL BE MADE UNDER THE SUPERVISION OF A CERTIFIED LIGHTNING PROTECTION SYSTEM INSTALLER.
15. PERIMETER AND MID ROOF AIR TERMINALS SHALL BE 2'-0" HIGH COPPER.
16. MATCH MATERIALS AND CONNECTIONS UTILIZED TO EXISTING.
17. PROVIDE CONDUCTORS AS #4/0 COPPER

1 / E-718 LIGHTNING PROTECTION BONDING TO EQUIPMENT DETAIL

NO SCALE

UBO APPROVAL STAMP

AECOM

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SHEET TITLE

PANEL SCHEDULES AND DETAILS

SHEET NUMBER

E-718