Robert W. Depke - Juvenile Justice Complex
RTU Replacement

24647 N MILWAUKEE AVE, VERNON HILLS, IL 60061

ISSUED FOR BID
JUNE 18TH, 2018

EXP US SERVICES PROJECT NUMBER: CHI-00240054-A1

FOR:
LAKE COUNTY FACILITIES

BY:
EXP U.S. SERVICES
ENGINEERS/ ARCHITECTS/ PLANNERS
205 NORTH MICHIGAN AVENUE
CHICAGO, IL 60601
312.616.000

STATE LOCATION MAP
NTS

Robert W. Depke - Juvenile Justice Complex
24647 N MILWAUKEE AVE, VERNON HILLS, IL 60061

PROJECT SITE MAP
NTS

DRAWING INDEX

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• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
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No.	Revision	Date
1	ADDENDUM #1	06-29-2018

ISSUED FOR BID

Professional Seal(s)

Drawn By:	AJJ
Checked By:	JFR
Approved By:	JFR
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File Name:	CHI-00240054-A1.rfa

Project Title
Robert W. Depke
Juvenile Justice Complex
RTU Replacement
24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title
COVER SHEET, SITE MAP AND DRAWING LIST

Project No.
CHI-00240054-A1

Dwg. No.
G001

Rev. No.
1

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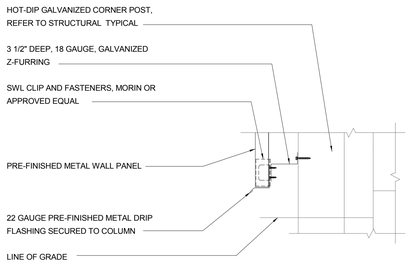
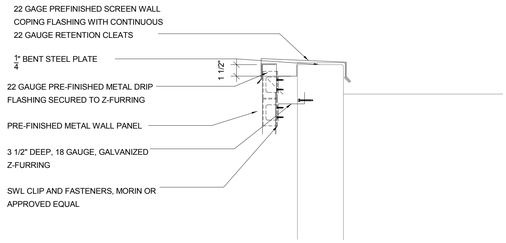


3 PANEL DETAIL

1 1/2" = 1'-0"



4 PANEL DETAIL

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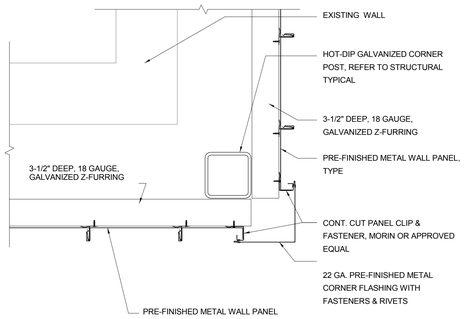

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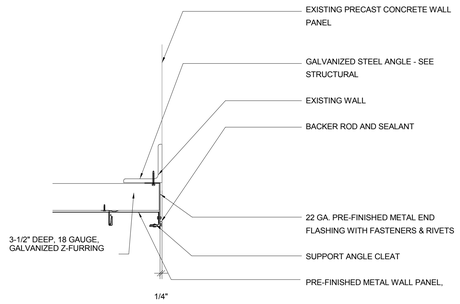
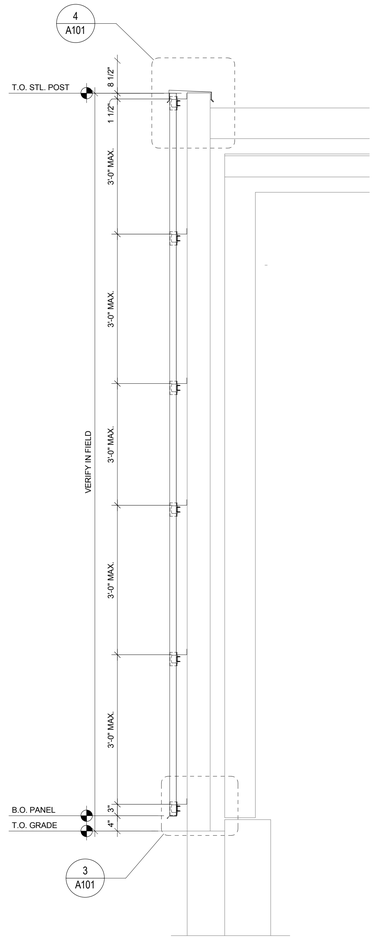


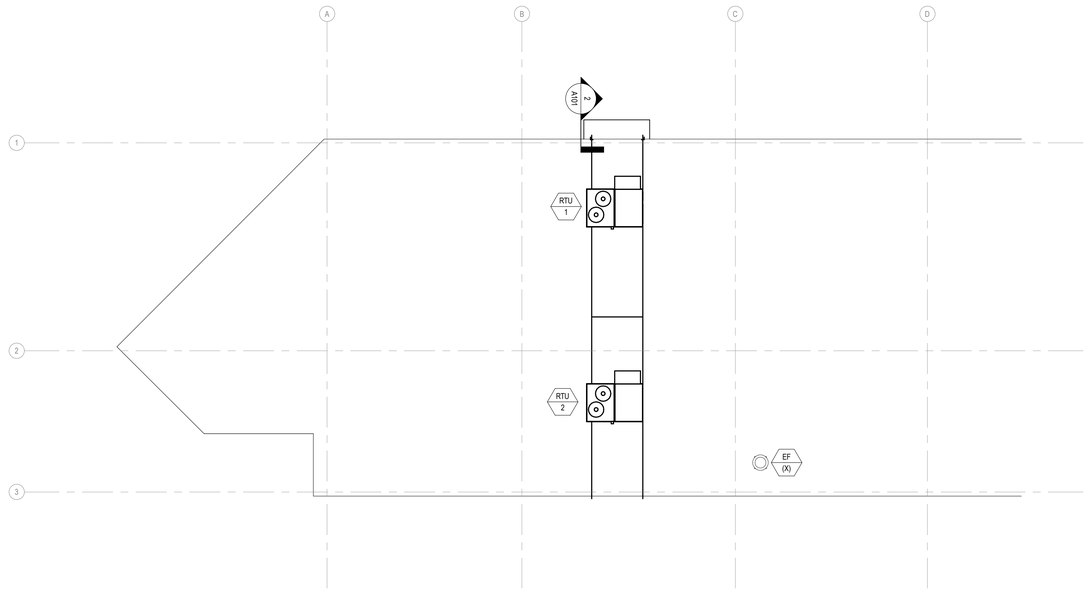
6 PANEL DETAIL

1 1/2" = 1'-0"



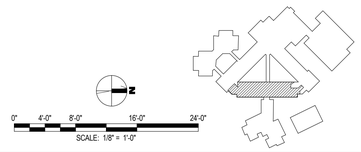
2 VERTICAL PANEL SECTION VIEW

3/4" = 1'-0"



1 PARTIAL ROOF PLAN

1/8" = 1'-0"



GENERAL SHEET NOTES

1. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND COORDINATE WITH STRUCTURAL FOR ANY ADDITIONAL REQUIREMENT.

SHEET KEYNOTES

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ARCHITECTURAL FLOOR PLAN AND DETAILS

Project No. CHI-00240054-A1

Dwg. No. **A101** Rev. No. **1**

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ELECTRICAL NOTES:

1. DEFINITIONS

"FURNISH" MEANS TO SUPPLY AND DELIVER OF AN ITEM OF EQUIPMENT TO THE PROJECT SITE, READY FOR INSTALLATION.

"INSTALL" MEANS TO SET IN PLACE, CONNECT AND PLACE IN FULL OPERATIONAL ORDER.

"PROVIDE" MEANS TO "FURNISH" AND "INSTALL".

"EQUIVALENT" MEANS TO MEET THE SPECIFICATIONS OF THE REFERENCED PRODUCT OR ITEM ON ALL SIGNIFICANT ASPECTS, WHERE SIGNIFICANT ASPECTS SHALL BE DETERMINED BY THE ENGINEER.

"FUTURE", "REFER (DISCIPLINE) DIVISION" AND SIMILAR EXPRESSIONS INDICATE WORK THAT MAY BE PERFORMED UNDER THE CONTRACT DOCUMENTS BUT, NOT NECESSARILY UNDER THE DIVISION OR DISCIPLINE ON WHICH THE NOTE APPEARS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK WITH SUPPLIERS, SUBCONTRACTORS, EMPLOYEES, ETC. SHOULD CLARIFICATION OF ANY PORTION OF THE WORK BE REQUIRED, CONTACT THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING BID.

2. CODES

THE WORK SHALL COMPLY WITH ALL APPLICABLE LOCAL, MUNICIPAL, AND NATIONAL CODES. THIS WOULD INCLUDE, BUT IS NOT LIMITED TO, THE CURRENT CITY BUILDING CODE, NFPA, ANSI, OSHA, AND ALL OTHER LOCAL OR MUNICIPAL BUREAUS AND DEPARTMENTS WHICH HAVE AUTHORITY OVER THE PROJECT; ANYTHING IN THESE CONTRACT DOCUMENTS NOT WITHSTANDING. THIS SHALL NOT BE CONSTRUED AS WAIVING COMPLIANCE WITH ANY REQUIREMENTS OF THE PLANS AND SPECIFICATIONS WHICH MAY BE IN EXCESS OF ANY REQUIREMENTS OF THESE CODES.

3. INTERPRETATION OF THE DOCUMENTS

THE CONTRACTOR SHALL CAREFULLY COMPARE THE DRAWINGS AND SPECIFICATIONS, CHECKING THE MEASUREMENTS AND CONDITIONS UNDER WHICH CONSTRUCTION IS TO BE IMPLEMENTED. FOR CLARIFICATION BETWEEN VARIOUS DRAWINGS AND/OR SPECIFICATIONS, THE DISPUTED ISSUES SHALL BE REFERRED TO THE ENGINEER BEFORE ANY WORK IS EXECUTED. THE CONTRACTOR SHALL STATE IN THEIR PROPOSAL ANY EXCEPTIONS NECESSARY TO MAKE THIS WORK A COMPLETE AND READY-TO-USE INSTALLATION. IF NOT SO-STATED IN THE CONTRACTOR'S PROPOSAL, ANY SUCH WORK WILL NOT BE CONSIDERED ADDITIONAL.

4. COORDINATION

THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND SHALL NOT BE SCALED. TO THIS EXTENT. THE CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF ALL REQUIRED WORK AND EQUIPMENT WITH THAT OF THE OTHER TRADES. WHERE THERE ARE POTENTIAL CONFLICTS, THE CONTRACTOR SHALL OBTAIN AND VERIFY EXACT LOCATIONS, MEASUREMENTS, LEVELS, SPACE REQUIREMENTS, ETC. AT THE SITE AND SHALL SATISFACTORILY ADAPT HIS WORK TO ACTUAL FIELD CONDITIONS.

REFER TO ARCHITECTURAL/MECHANICAL DRAWINGS FOR PLANS, ELEVATIONS AND DETAILS INDICATING THE LOCATIONS OF CEILING ELEMENTS (E.G., LIGHTS, SPRINKLERS, DIFFUSERS, ETC.) AND WALL ELEMENTS. CEILING MOUNTED ITEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE ARCHITECTURAL REFLECTIVE CEILING PLANS. IF LOCATION FOR AN ITEM IS NOT SHOWN ON THE ARCHITECTURAL DRAWINGS, VERIFY THE EXACT LOCATION OF THE ITEM WITH THE ARCHITECT PRIOR TO INSTALLATION. THESE REQUIREMENTS APPLY TO ALL CEILING TYPES IN ALL AREAS.

5. SITE EXAMINATION

THE CONTRACTOR SHALL VISIT THE SITE, EXAMINE THE PREMISES, AND MAKE A THOROUGH SURVEY OF THE CONDITIONS UNDER WHICH CONSTRUCTION WILL BE IMPLEMENTED. THE SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND, ANY LATER CLAIMS FOR LABOR, EQUIPMENT, OR MATERIALS REQUIRED FOR DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE, WILL NOT BE RECOGNIZED.

6. PERMITS

THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, INSPECTIONS, AND FEES REQUIRED FOR THE EXECUTION OF THIS WORK. SCHEDULING OF ALL REQUIRED INSPECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

7. SAFETY

THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO ENSURE THE SAFETY OF THE CLIENT'S EMPLOYEES, BUILDING EMPLOYEES AND GUESTS AS WELL AS THEIR OWN FORCES, BY ADEQUATELY PROTECTING ANY EXPOSED LIVE CABLE, EQUIPMENT, OR DEVICES THROUGHOUT THE COURSE OF THIS WORK.

8. FIRESAFING / FIRE ALARM

ALL PENETRATIONS IN WALLS, FLOORS, OR CEILINGS SHALL BE SUITABLY CLOSED UP AND SEALED WITH HILTI CAULK. ALL MECHANICAL/ELECTRICAL EQUIPMENT INSTALLED SHALL BE INTEGRATED INTO OWNERS FIRE ALARM SYSTEM AS REQUIRED.

9. CABLING

UNLESS NOTED OTHERWISE, ALL WIRE AND CABLE SHALL BE 600-VOLT COPPER CONDUCTORS WITH TYPE "THHN/THWN" INSULATION. MINIMUM WIRE SIZE SHALL BE #12 AWG FOR LIGHTING AND POWER CIRCUITS AND #14 AWG FOR CONTROL CIRCUITS. PROVIDE GROUNDING FOR CIRCUITS PER THE NEC. UNLESS SPECIFICALLY NOTED OTHERWISE IN THE PLANS, ALL CABLING SHALL BE (2) #12 AND (1) #12 G IN 3/4" C.

10. CABLE SIZING

BRANCH CIRCUIT CABLE SIZE SHALL BE ADJUSTED BASED ON THE CONDUCTOR LENGTH, AS INDICATED BELOW:

A. 120/208V CABLING FROM PANEL TO ELECTRICAL LOAD SHALL BE AS FOLLOWS, UNLESS OTHERWISE INDICATED:

LESS THAN 100 FEET, USE #12 AWG MINIMUM
FROM 100 TO 200 FEET, USE #10 AWG MINIMUM
FROM 200 TO 250 FEET, USE #8 AWG MINIMUM

B. 277/480V CABLING FROM PANEL TO ELECTRICAL LOAD SHALL BE AS FOLLOWS, UNLESS OTHERWISE INDICATED:

FROM 0 TO 150 FEET, USE #12 AWG MINIMUM
FROM 150 TO 250 FEET, USE #10 AWG MINIMUM
FROM 250 TO 300 FEET, USE #8 AWG MINIMUM

11. CONDUIT/RACEWAY SYSTEMS

THE CONDUIT ROUTINGS INDICATED ARE ONLY DIAGRAMMATIC IN NATURE. FIELD CONDITIONS SHALL DICTATE THE CONTRACTOR'S EXACT CONDUIT ROUTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING AND LOCATING PULL BOXES PER THE NEC AND FOR COORDINATION WITH OTHER DISCIPLINES. ALL EXPOSED RACEWAYS SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO WALLS OR STRUCTURAL MEMBERS, SUCH AS TO FOLLOW STRUCTURAL SURFACE CONTOURS AND NOT OBSTRUCT PASSAGEWAYS. MULTIPLE RACEWAYS SHALL BE RUN TOGETHER, IN GROUPING. ALL CONTROLS WIRING SHALL BE IN BLUE CONDUIT. ALL EXPOSED CONDUIT SHALL BE ROUTED PERPENDICULAR, PARALLEL AND TIGHT TO COLUMNS AND BEAMS. ALL EXPOSED CONDUIT SHALL BE COORDINATED WITH THE ARCHITECT/ENGINEER PRIOR TO INSTALLATION. EXTRA TIME SHOULD BE ALLOWED FOR THIS REVIEW AND APPROVAL. NO ADDITIONAL COST TO OWNER WILL BE ALLOWED DUE TO LACK OF COORDINATION.

UNLESS NOTED OTHERWISE, ALL CONDUIT SHALL BE ELECTRICAL METALLIC TUBING (EMT). MINIMUM SIZE SHALL BE 3/4" C. CONNECTORS AND COUPLINGS SHALL BE INSULATED-THROAT COMPRESSION TYPE ONLY. RIGID GALVANIZED-STEEL (RGS) CONDUIT SHALL BE USED WHEN CONDUIT IS INSTALLED IN OUTDOOR AREAS OR WHERE OTHERWISE EXPOSED TO PHYSICAL DAMAGE.

EMERGENCY SYSTEMS SHALL BE RUN IN SEPARATE RACEWAY/CONDUIT SYSTEM(S).

A SEPARATE INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE PULLED WITH THE CIRCUIT CONDUCTORS, WHETHER OR NOT INDICATED ON THE DRAWINGS. METAL RACEWAY OR CABLE ARMOR/SHEATH SHALL NOT BE USED AS THE PRIMARY EQUIPMENT GROUNDING CONDUCTOR. RACEWAY SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONTINUOUS AND SHALL BE BONDED AT ALL POINTS TO THE INSULATED EQUIPMENT GROUNDING CONDUCTOR IN ACCORDANCE WITH THE APPLICABLE PROVISIONS IN ARTICLE 250 OF THE NEC.

REFER TO THE ARCHITECTURAL DRAWINGS FOR PAINTING OF RACEWAY.

13. EQUIPMENT

ALL MATERIALS AND EQUIPMENT PROVIDED IN THIS WORK SHALL BE NEW AND SHALL HAVE THE APPROPRIATE UL LISTING AND/OR FM APPROVAL. UNLESS NOTED OTHERWISE, DISCONNECT/SAFETY SWITCHES SHALL BE NON-FUSED HEAVY-DUTY 240-VOLT TYPE. INDOOR ENCLOSURES SHALL BE NEMA 1 AND OUTDOOR ENCLOSURES SHALL BE NEMA 3R.

14. DEVICE BOXES AND RECEPTACLES

UNLESS SPECIFICALLY NOTED OTHERWISE IN THE PLANS, DEVICE BOXES SHALL BE 4-INCH SQURE GALVANIZED-STEEL, PROVIDED BLANK COVERS, PLASTER RINGS AND DEVICE COVER PLATES AS REQUIRED.

WEATHERPROOF RECEPTACLE BOXES SHALL BE CAST FERALOY TYPE "FS" OR "FD". TYPE "FD" CAST BOXES SHALL BE USED WHEN DEVICE DEPTH EXCEEDS 1 5/8". ALL COVERS AND PLATES FOR "FS" AND "FD" BOXES SHALL BE PROVIDED WITH LIP AND PROPER GASKETS. ALL WEATHERPROOF RECEPTACLES SHALL BE COMPLETE WITH CAST OUTLET BOX, DUPLEX GFI RECEPTACLE (20A-125V-3 WIRE) AND CORROSION RESISTANT PLATE.

15. PANELBOARDS

ALL PANELBOARDS IN WHICH WORK OCCURS PER THESE DOCUMENTS, SHALL BE PROVIDED WITH UPDATED-TYPEWRITTEN DIRECTORIES. GIVEN ONLY FOR CLARITY AND QUANTITY, CIRCUIT NUMBERS SHOWN IN THE PLANS MAY NOT NECESSARILLY REPRESENT ACTUAL CIRCUIT NUMBERS IN PANELBOARD.

ELECTRICAL COMPONENTS, DEVICES AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY QUALIFY TESTING AGENCY AND MARKED FOR INTENDED LOCATION AND APPLICATION.

16. MECHANICAL EQUIPMENT

ALL MECHANICAL EQUIPMENT WILL BE INSTALLED BY THE DIVISION 15 CONTRACTOR. COORDINATE THE EXACT LOCATION AND NATURE OF ANY REQUIRED ELECTRICAL CONNECTION TO BE PROVIDED FOR MECHANICAL EQUIPMENT PRIOR TO ROUGH-IN.

VERIFY THE ELECTRICAL SERVICE REQUIRED FOR EACH ITEM OF MECHANICAL EQUIPMENT WITH THE MECHANICAL CONTRACTOR PRIOR TO FURNISHING SUCH POWER. REFER MECHANICAL DRAWING FOR MECHANICAL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS. MAKE CONNECTION AND PROVIDE APPROPRIATE WIRE, CONDUIT AND OVERCURRENT PROTECTION FOR EQUIPMENT. THE DISCONNECTING MEANS FOR ALL MECHANICAL EQUIPMENT SHALL BE ACCESSIBLE AND HAVE CLEARANCES AS REQUIRED BY THE NEC.

MOTORS SHALL BE FURNISHED AND INSTALLED UNDER DIVISION 23 WORK, WITH POWER CONNECTED UNDER DIVISION 26 WORK. FINAL CONNECTION SHALL BE MADE WITH SUITABLE LENGTH OF LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT. ALL MOTOR BRANCH CIRCUITS, ETC., SHALL BE FIELD-VERIFIED FOR PROPER SEQUENCE AND MOTOR ROTATION. PHASE SEQUENCE SHALL BE A-B-C (VIEWED FROM FRONT: LEFT TO RIGHT, TOP TO BOTTOM, FRONT TO REAR). REFER TO MECHANICAL DRAWINGS FOR MOTORS THAT ARE TO BE INTERLOCKED.

PROVIDE ALL NECESSARY ELECTRICAL EQUIPMENT AND CONNECTIONS REQUIRED FOR HVAC SHUTDOWN DURING A FIRE ALARM CONDITION. COORDINATION FOR THE EXACT CONNECTION AND EQUIPMENT REQUIRED TO BE PROVIDED BEFORE ROUGH-IN.

17. MISCELLANEOUS SUPPORTING MEMBERS

ALL ANGLES, CHANNELS, AND OTHER MISCELLANEOUS STEEL, BOLTS, THREADED RODS, ETC., REQUIRED TO SUPPORT LIGHT FIXTURES, LADDER TRAY OR OTHER ELECTRICAL EQUIPMENT OR DEVICES SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. ALL THREADED RODS SHALL BE A MINIMUM OF 5/8" IN DIAMETER.

19. DEMOLITION, RELOCATION AND ALTERATION

PROVIDE REMOVAL, RELOCATION, REROUTING AND RECONNECTION OF EXISTING ELECTRICAL SYSTEMS, AS REQUIRED TO ACCOMPLISH ALTERATION, RESTORATION AND NEW WORK. VERIFY THAT ALL REUSED EQUIPMENT IS IN GOOD WORKING ORDER.

ALL MATERIAL AND/OR EQUIPMENT INDICATED FOR SALVAGE SHALL BE DELIVERED TO THE LOCATION DIRECTED BY THE OWNER. ALL LIGHTING FIXTURES TO BE DEMOLISHED SHAL HAVE THEIR BALLAST AND LAMPS REMOVED AND DELIVERED TO THE LOCATION DIRECTED BY THE OWNER. ALL OTHER DEMOLITION MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY REMOVED FROM THE SITE.

ALL ELECTRICAL OPENINGS NOT USED SHALL BE CAPPED AND SEALED.

EXISTING CONDITIONS WERE OBTAINED FROM AVAILABLE DRAWINGS AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. THE CONTRACTOR SHALL SURVEY AND VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTING BID AND STARTING WORK.

20. CONTRACTOR'S DRAWING REVIEW

ALL CONTRACTORS/BIDDERS SHALL HAVE RECEIVED A COMPLETE SET OF CONSTRUCTION DOCUMENTS FOR REVIEW AND REFERENCE TO WORK INDICATED. CONDUIT LOCATE SERVICES SHALL BE REQUESTED AND COMPLETED BEFORE DISTURBANCE OF ANY EXISTING GRADE OR ON-GRADE CONSTRUCTION, SLAB DEMOLITION, OR OTHER ACTIVITIES THAT MAY IMPACT BURIED UTILITIES OR COMMUNICATION CONDUITS. THE CONTRACTOR SHALL CONFIRM THAT CONDUIT LOCATE SERVICES HAVE BEEN COMPLETED AND THAT NO POTENTIAL CONFLICTS EXIST BEFORE EXISTING GRADE IS EXCAVATED OR EXISTING FLOORING DEMOLISHED, REGARDLESS OF THE LOCATION ON THE PROPERTY. THIS SHALL BE REVIEWED WITH THE OWNER'S PROJECT REPRESENTATIVE.

21. WORK PERFORMANCE REQUIREMENTS

ANY PENETRATIONS OR OPENINGS IN FIRE-RATED PARTITIONS (WALLS OR FLOORS) SHALL BE CLOSED AT THE END OF EACH WORK DAY, OR WHENEVER IT IS ANTICIPATED THAT NO FURTHER WORK WILL OCCUR IN THAT OPENING DURING THE DAY. THIS INCLUDES ALL TEMPORARY OPENINGS. CLOSURE SHALL BE IN COMPLIANCE WITH 3M FIREPROOFING PRODUCT SPECIFICATIONS. REFER TO THE "G" SHEETS FOR GENERAL FIRESAFING DETAILS.

ALL ROOF PENETRATIONS SHALL BE SEALED WATER-TIGHT AT THE END OF EACH WORK DAY. ALL TEMPORARY WALL AND FLOOR OPENINGS SHALL BE PROTECTED AND MARKED AT ALL TIMES.

PAINTING SHALL BE SCHEDULED SUCH THAT DRYING TIME OCCURS DURING NON-WORKING HOURS FOR OPERATIONS PERSONNEL COMFORT.

NO WELDING SHALL TAKE PLACE INSIDE OF OPERATING FACILITY WITHOUT THE WRITTEN AUTHORIZATION OF THE OWNER'S PROJECT REPRESENTATIVE. WELDING SHALL NOT TAKE PLACE WITHIN 5 FEET OF ANY TELECOM EQUIPMENT RACK WITHOUT ADEQUATE PROTECTIVE MEASURES, AS DEEMED APPROPRIATE BY THE OWNER'S PROJECT REPRESENTATIVE.

THE CONTRACTOR SHALL CHECK, VERIFY AND LABEL PHASE ROTATION ANY TIME LEADS ARE CONNECTED TO A NEW OR EXISTING AC SERVICE, GENSET, RECTIFIER OR ANY MOTOR-EQUIPPED, 3-PHASE EQUIPMENT.

ALL THREE-PHASE PANELS SERVING SINGLE-PHASE LOADS SHALL BE BALANCED WITHIN 10 PERCENT, USING AMMETER READINGS. MEASUREMENTS SHALL BE TAKEN AT THE END OF CONSTRUCTION AND AGAIN AFTER 30 DAYS IN SERVICE. ALSO REFER TO THE "G" SHEETS FOR ADDITIONAL GENERAL REQUIREMENTS.

22. MATERIAL AND EQUIPMENT REQUIREMENTS

AC DISTRIBUTION BREAKERS SHALL BE LABELED TO IDENTIFY SUBSYSTEM BREAKERS, PANELS, SYSTEMS, OR CHARGERS SERVED. ALL DISTRIBUTION CIRCUIT BREAKERS SHALL BE CLEARLY LABELED INDICATING THE CIRCUIT SERVED. ALL PANELBOARDS SHALL BE PROVIDED WITH TYPED DIRECTORIES. ALL PANEL BOARDS AND ENCLOSURE CONTAINING LIVE POWER DEVICES SHALL BE PROVIDED WITH COMPLETE LABELING INFORMATION, INCLUDING THE SOURCE OF SUPPLY POWER.

23. STATEMENT OF WORK

THE CONTRACTOR SHALL PROVIDE THE COMPLETE ELECTRICAL INSTALLATION OF WORK AS INDICATED IN THE CONSTRUCTION DOCUMENTS. PRIOR TO COMMENCEMENT, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL, ANY SEQUENCE OF WORK, MOP'S AND/OR COORDINATION SHOP DRAWINGS FOR THE INTENDED WORK.

24. LOSS OF AC

EQUIPMENT IN THIS BUILDING SHALL NOT HAVE ITS AC SERVICE INTERRUPTED, EVEN MOMENTARILY, WITHOUT PRIOR WRITTEN APROVAL OF AND COORDINATION WITH THE OWNER'S MANAGER. ALL DISRUPTIONS SHALL OCCUR AT TIMES AND OR DURATIONS ACCEPTABLE TO THE OWNER'S MANAGER. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO MITIGATE THE LENGTH OF THE DISRUPTION.

25. LUG REQUIREMENTS

ALL LUGS SHALL BE 2 BOLT LONG BARREL TYPE WITH INSPECTION HOLES PRODUCED WITH NON-FLASHING DYES AS MANUFACTURED BY THOMAS BETTS, MINIMUM 10 TONS HYPRESS COMPRESSION. USE OF HEAT SHRINK TUBING IS NOT PERMITTED. ANY EXISTING CABLE/WIRE DISCONNECTED AS PART OF THE PROJECT SHALL BE RECONNECTED TO EQUIPMENT USING LUG MEETING THIS REQUIREMENT.

ABBREVIATIONS

A	AMPERES	IG	ISOLATED GROUND
AAC	ABOVE ACCESSIBLE CEILING	INC	INCANDESCENT
AC	ALTERNATING CURRENT	JB	JUNCTION BOX
ADA	AMERICANS WITH DISABILITIES ACT	KCMIL	THOUSAND CIRCULAR MILS
AF	AMPERE FRAME	KVA	KILOVOLT-AMPERES
AFCI	ARC FAULT CIRCUIT INTERRUPTOR	KVAR	KILOVOLT-AMPERES, REACTIVE
AFF	ABOVE FINISHED FLOOR	KW	KILOWATTS
AFG	ABOVE FINISHED GRADE	LCP	LIGHTING CONTROL PANEL
AFU	AMPERE FUSE	LPS	LOW PRESSURE SODIUM
AIC	AMPERES INTERRUPTING CAPACITY, SYMMETRICAL	LTG	LIGHTING
		MAX	MAXIMUM
AL	ALUMINUM	MCB	MAIN CIRCUIT BREAKER
ARCH	ARCHITECT	MCC	MOTOR CONTROL CENTER
AS	AMP SWITCH	MECH	MECHANICAL
AT	AMP TRIP	MFR	MANUFACTURER
ATS	AUTOMATIC TRANSFER SWITCH	MH	MANHOLE/METAL HALIDE
AWG	AMERICAN WIRE GAUGE	MIN	MINIMUM
BFG	BELOW FINISHED GRADE	MLO	MAIN LUGS ONLY
BKBD	BACKBOARD	MTD	MOUNTED
C	CONDUIT	MTG	MOUNTING
CAT	CATALOG	MVA	MEGAVOLT-AMPERES
CB	CIRCUIT BREAKER	N	NEUTRAL
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTALLED	NA	NOT APPLICABLE
		NC	NORMALLY CLOSED
CKT	CIRCUIT	NEC	NATIONAL ELECTRICAL CODE
CLG	CEILING	NF	NON FUSED
CO	CONDUIT ONLY	NO	NORMALLY OPEN
CONC	CONCRETE	NTS	NOT TO SCALE
CONT	CONTINUATION	OC	ON CENTER
CU	COPPER	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
CT	CURRENT TRANSFORMER	OFOI	OWNER FURNISHED OWNER INSTALLED
∆	DELTA	Ø, PH	PHASE
DIV	DIVISION	PC	PHOTOCELL
DIA	DIAMETER	PIR	PASSIVE INFRARED
DMM	DIGITAL MULTIMETER	POC	POINT OF CONNECTION
DWG	DRAWING	POS	POINT OF SALE
EA	EACH	PLBG	PLUMBING
EC	EMPTY CONDUIT	PT	POTENTIAL TRANSFORMER
ELEC	ELECTRICAL	PVC	POLYVINYL CHLORIDE
EM	EMERGENCY	PWR	POWER
EMT	ELECTRICAL METALLIC TUBING	QTY	QUANTITY
EP	EXPLOSION PROOF	REC	RECESSED
EPO	EMERGENCY POWER OFF	RECPT	RECEPTACLE
EQUIP	EQUIPMENT	REF	REFRIGERATOR
EWC	ELECTRIC WATER COOLER	RGS	RIGID GALVANIZED STEEL
EXIST	EXISTING	SPST	SINGLE POLE, SINGLE THROW
EXT	EXTERIOR	SPDT	SINGLE POLE, DOUBLE THROW
FA	FIRE ALARM	SPD	SURGE PROTECTIVE DEVICE
FAA	FIRE ALARM ANNUNCIATOR PANEL	ST	SHUNT TRIP
FIXT	FIXTURE	SURF	SURFACE
FLUOR	FLUORESCENT	SWBD	SWITCHBOARD
FT	FEET OR FOOT	SWGR	SWITCHGEAR
FU	FUSE	TBD	TO BE DETERMINED
G	GROUND	TELECOM	TELECOMMUNICATIONS
GEN	GENERATOR	TYP	TYPICAL
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	UG	UNDERGROUND
GFI	GROUND FAULT INTERRUPTER	UNO	UNLESS NOTED OTHERWISE
GFP	GROUND FAULT PROTECTION	V	VOLTS
HPRS	HORSEPOWER RATED SWITCH	VFD	VARIABLE FREQUENCY DRIVE
HOA	HAND OFF AUTOMATIC	W	WATTS
HP	HORSEPOWER	WP	WEATHER PROOF
HPS	HIGH PRESSURE SODIUM	XFMR	TRANSFORMER
HZ	HERTZ	Y	WYE

GROUNDING AND LIGHTNING PROTECTION

	BONDING CONNECTION	—M—	MAIN CONDUCTOR CABLE
	DOWN CONDUCTOR	—G—	COUNTERPOISE CONDUCTOR CABLE
	UP CONDUCTOR	—B—	BONDING CONDUCTOR CABLE
	TEE CONNECTOR		GROUND ROD
	GROUND BUS BAR		
# X	AIR TERMINAL, "#" INDICATES TERMINAL LENGTH IF GREATER THAN 18", SUBSCRIPT 'X' INDICATES: A - FLAT SURFACE BASE B - FLAT WALL MOUNTED PARAPET BASE C - SWIVEL BASE D - RIDGE SADDLE BASE (EXPOSED) E - RIDGE SADDLE BASE (CONCEALED) F - CONCEALED AIR TERMINAL BASE ASSEMBLY		

TAGS AND CALL OUT SYMBOLS

1 / E3.1	SECTION CALLOUT SECTION DESIGNATION SHEET NUMBER		POINT OF CONNECTION
			POINT OF DEMARCATION
A / E3.1	DETAIL CALLOUT DETAIL DESIGNATION SHEET NUMBER	#	REVISION CALLOUT
		1	KEYNOTE CALLOUT

DISTRIBUTION EQUIPMENT

DISTRIBUTION SWITCHBOARD

D | I

HOUSEKEEPING PAD (TYPICAL)
INCOMING SECTION
DISTRIBUTION SECTION

MOTOR CONTROL CENTER

I | D | D | D | F

FUTURE SECTION
DISTRIBUTION SECTION
INCOMING SECTION
HOUSEKEEPING PAD (TYPICAL)

PANELBOARD

NAME
FRONT OF PANEL
WALL
RECESSED MOUNTED
SURFACE MOUNTED

PANELBOARD DESIGNATION

BLDG-E1MDPHA

A,B,C... DISTINGUISHES PANELS ON THE SAME FLOOR WITH THE SAME VOLTAGE (IF REQUIRED)

H - 480Y/277V
L - 208Y/120V

NOTHING INDICATES LIGHTING/RECEPTACLE PANEL
AV - AUDIO VISUAL PANEL
DP - DISTRIBUTION PANEL
GDP - GENERATOR DISTRIBUTION PANEL
GSB - GENERATOR SWITCHBOARD
K - KITCHEN PANEL
LC - LOAD CENTER
LCP - LIGHTING CONTROL PANEL
MCC - MOTOR CONTROL CENTER
MDP - MAIN DISTRIBUTION PANEL (SERVICE ENTRANCE)
MSB - MAIN SWITCHBOARD (SERVICE ENTRANCE)
PDU - POWER DISTRIBUTION UNIT
SB - SWITCHBOARD
ST - SHUNT TRIP PANEL
T - TENANT PANEL
TC - TELECOMMUNICATIONS PANEL
SC - SHOW CONTROL PANEL
R - RIDE POWER PANEL
RPP - REMOTE POWER PANEL

INDICATES WHICH FLOOR PANEL IS LOCATED ON (IF REQUIRED)

NOTHING INDICATES NORMAL
LS - EMERGENCY / LIFE SAFETY (NEC ARTICLE 700 LOADS)
E - LEGALLY REQUIRED STANDBY (NEC ARTICLE 701 LOADS)
S - OPTIONAL STANDBY (NEC ARTICLE 702 LOADS)
Q - EQUIPMENT (HEALTHCARE)
C - CRITCAL (HEALTHCARE)
N - NORMAL (HEALTHCARE)

INDICATES WHICH BUILDING/AREA PANEL IS LOCATED IN (IF REQUIRED)

TRANSFORMER

NAME
T45 — FLOOR MOUNTED TRANSFORMER, NUMBER INDICATES KVA RATING
HOUSEKEEPING PAD (TYPICAL)
T45 — INDICATES TRANSFORMER IS SUSPENDED

TRANSFORMER DESIGNATION

BLDG-TE1DPHA
INDICATES PANEL SERVED
INDICATES TRANSFORMER
INDICATES WHICH BUILDING/AREA TRANSFORMER IS LOCATED IN (IF REQUIRED)

NAME
ATS
AUTOMATIC TRANSFER SWITCH

AUTOMATIC TRANSFER SWITCH DESIGNATION

BLDG-ATSE1HA
INDICATES PANEL SERVED
INDICATES AUTOMATIC TRANSFER SWITCH
INDICATES WHICH BUILDING/AREA AUTOMATIC TRANSFER SWITCH IS LOCATED IN (IF REQUIRED)

CIRCUITING

BLDG-E1MDPHA-1
CIRCUIT NUMBER
PANEL DESIGNATION

3#12,#12G,3/4"C
CONDUIT SIZE
GROUND CONDUCTOR QUANTITY AND SIZE
CIRCUIT CONDUCTOR QUANTITY AND SIZE

RECEPTACLES

	DUPLEX RECEPTACLE, WALL MOUNTED		DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED
	DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK		DOUBLE DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK
	DUPLEX RECEPTACLE, FLUSH MTD IN CEILING		DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
	HALF SWITCHED DUPLEX RECEPTACLE, WALL MOUNTED		SIMPLEX RECEPTACLE, WALL MOUNTED
TYPE	SPECIAL PURPOSE RECEPTACLE, WALL MOUNTED. NEMA CONFIGURATION AS NOTED ON PLANS	TYPE	SPECIAL PURPOSE RECEPTACLE, CEILING MOUNTED NEMA CONFIGURATION AS NOTED ON PLANS
	OCCUPANCY CONTROLLED/SWITCHED DUPLEX RECEPTACLE, WALL MOUNTED		OCCUPANCY CONTROLLED/SWITCHED DUPLEX RECEPTACLE, ABOVE BACKSPLASH OF CABINET, COUNTERTOP OR SINK

X — RECEPTACLE TYPE
12 — NUMBER INDICATES BRANCH CIRCUIT NUMBER

NOTE: FOR ABOVE DEVICES, SUBSCRIPT 'X' INDICATES:

CK - CLOCK HANGER	D - DEDICATED CIRCUIT
EP - EXPLOSION PROOF	EQ - EQUIPMENT MOUNTED
EWC - ELECTRIC WATER COOLER	F - FURNITURE OR MILLWORK MOUNTED
GFI - GROUND FAULT INTERRUPTER	H - HORIZONTALLY MOUNTED
IG - ISOLATED GROUND	SS - SURGE SUPPRESSION
T - TAMPER PROOF	WP - WEATHER PROOF

MA-X	MULTI-OUTLET ASSEMBLY, "X" INDICATES TYPE	F	FURNITURE OUTLET, WALL MOUNTED

RECEPTACLE BRANCH CIRCUIT SHADING

* SEE RECEPTACLE TYPES ABOVE FOR CONFIGURATION

	SHADING REPRESENTS RECEPTACLE ON EMERGENCY/LIFE SAFETY BRANCH		SHADING REPRESENTS RECEPTACLE ON CRITICAL BRANCH
	SHADING REPRESENTS RECEPTACLE ON STANDBY/EQUIPMENT BRANCH		DSHADING REPRESENTS RECEPTACLE ON UPS BRANCH

FLOOR OUTLETS

X	FLOOR BOX, DUPLEX RECEPTACLE	X	FLOOR BOX, DOUBLE DUPLEX RECEPT
X	FLOOR BOX, COMBINATION DUPLEX/COMMUNICATIONS OUTLET	X	FLOOR BOX, COMBINATION DOUBLE DUPLEX/COMMUNICATIONS OUTLET
X	POKE THRU, DUPLEX RECEPTACLE	X	POKE THRU, DOUBLE DUPLEX RECEPT
X	POKE THRU, COMBINATION POWER/COMMUNICATIONS OUTLET	X	POKE THRU, COMBINATION DOUBLE DUPLEX/COMMUNICATIONS OUTLET
FB#	SPECIAL FLOORBOX, "#" INDICATES UNIQUE FLOOR BOX TYPE		

X — TYPE
12 — NUMBER INDICATES BRANCH CIRCUIT NUMBER

FLOOR BOX, CONFIGURATION AS INDICATED, FLUSH MOUNTED, UNLESS OTHERWISE NOTED.

NOTE: FOR ABOVE DEVICES, SUBSCRIPT 'X' INDICATES:
P- PEDESTAL MOUNTED

F	FURNITURE OUTLET, FLUSH MOUNTED IN FLOOR	F	FURNITURE OUTLET, MOUNTED IN A FLUSH POKE-THRU.
J	JUNCTION BOX, FLUSH MTD IN FLOOR		

POWER CONNECTIONS

	JUNCTION BOX, WALL MOUNTED		DISCONNECT SWITCH, REFER TO EQUIPMENT CONNECTION SCHEDULE FOR DISCONNECT TYPE, UNO
J	JUNCTION BOX, CEILING MOUNTED		COMBINATION MOTOR STARTER DISCONNECT
X	SPECIAL EQUIPMENT CONNECTION, WALL MOUNTED. SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER, REFER TO EQUIPMENT CONNECTION SCHEDULE.		MOTOR STARTER
			VARIABLE FREQUENCY DRIVE
E X	SPECIAL EQUIPMENT CONNECTION, CEILING MOUNTED. SUBSCRIPT 'X' INDICATES UNIQUE IDENTIFIER, REFER TO EQUIPMENT CONNECTION SCHEDULE.	X	MOTOR, SUBSCRIPT 'X' DENOTES MOTOR DESIGNATION, REFER TO EQUIPMENT CONNECTION SCHEDULE

SINGLE LINE SYMBOLS

###/#	CKT BREAKER, '###' INDICATES TRIP SETTING, '#' INDICATES NUMBER OF POLES	M	UTILITY METER
###/#	DRAW-OUT CKT BREAKER, '###' INDICATES TRIP SETTING, '#' INDICATES NUMBER OF POLES	E N L	AUTOMATIC TRANSFER SWITCH
###/#	FUSED SWITCH, '###' INDICATES TRIP SETTING, '#' INDICATES NUMBER OF POLES	BP IS ATS N E	AUTOMATIC TRANSFER SWITCH, WITH BYPASS ISOLATION
	ENCLOSED CIRCUIT BREAKER		TRANSFORMER
	ENCLOSED NON-FUSED SWITCH		ISOLATION TRANSFORMER
	ENCLOSED FUSED SWITCH		GENERATOR
K	KIRK KEY INTERLOCK		
SS	SOLID STATE, ELECTRONIC ADJUSTABLE TRIP	PANEL NAME	PANELBOARD
GFP	GROUND FAULT PROTECTION		
ST	SHUNT TRIP		PAD MOUNTED TRANSFORMER
SPD	SURGE PROTECTIVE DEVICE		GROUND
DMM	DIGITAL MULTIMETER		

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No.	Revision	Date

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Professional Seal(s)

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Checked By:	**HO**
Approved By:	**JFR**
Date Printed:	**06.18.2018**
File Name:	**CHI-00240054-A1.rfa**

Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

ELECTRICAL LEGEND
AND GENERAL NOTES

Project No. CHI-00240054-A1

Dwg. No. **E001**

Rev. No.

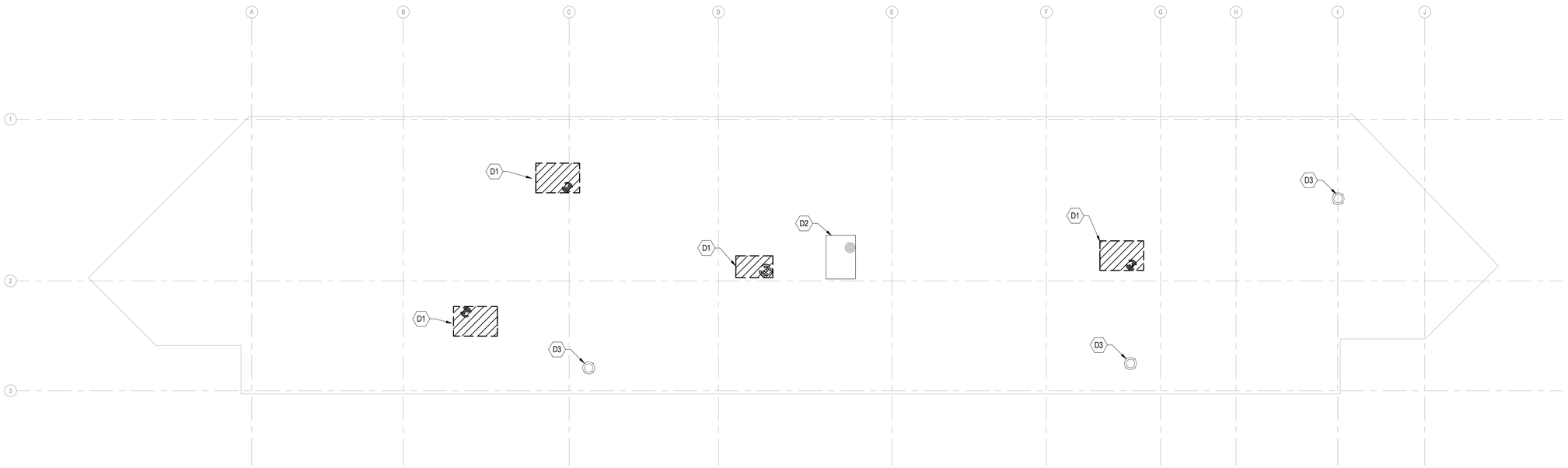
6/29/2018 8:53:32 AM F:\Doc_exp\CHI-00240054-A1\REVIT__This Project Uses Revit 2016 [To Be Confirmed]

GENERAL SHEET NOTES

1. CONTRACTOR TO TAKE EXTRA CAUTION IN DISCONNECTING POWER AND BRANCH CIRCUITS, FEEDER, CONDUIT AND WIRING AFFECTED BY DEMOLITION. RECONNECT ANY LOAD UNAFFECTED TO OTHER PANEL AS REQUIRED.

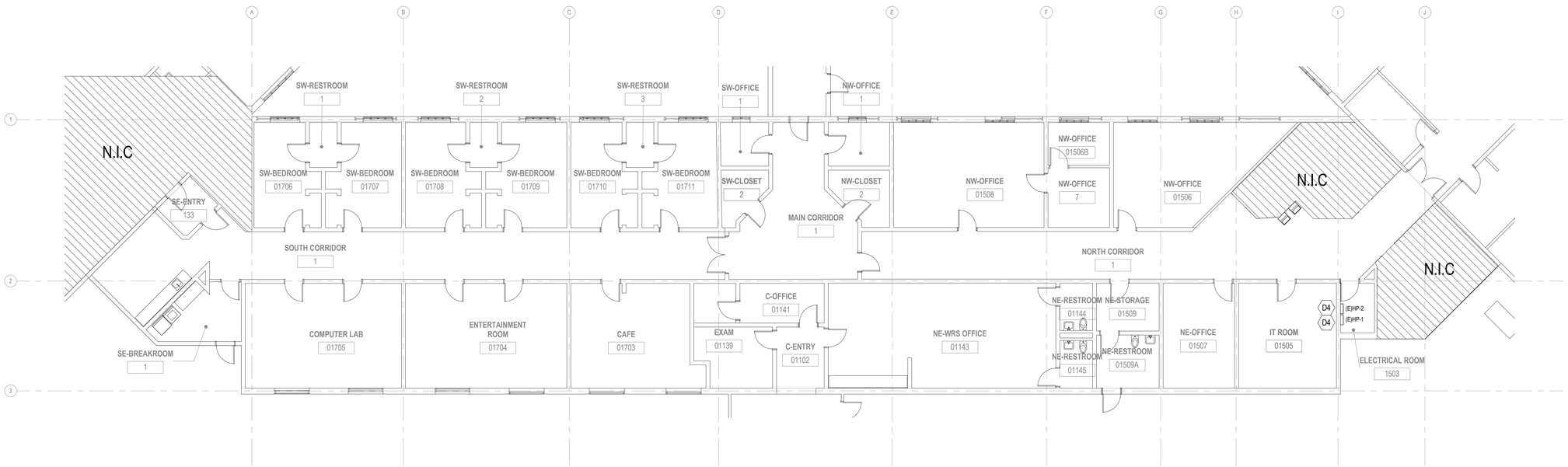
SHEET KEYNOTES

D1 DISCONNECT AND REMOVE EXISTING ROOFTOP UNIT AND DISCONNECT SWITCH. REMOVE ASSOCIATED CONDUCTOR AND UNUSED CONDUIT.
D2 EXISTING ROOFTOP UNIT TO REMAIN.
D3 EXISTING EXHAUST FAN TO REMAIN.
D4 EXISTING PANEL TO REMAIN.



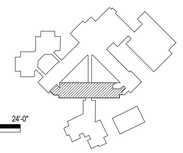
2 ROOF DEMOLITION PLAN

1/8" = 1'-0"



1 FIRST FLOOR DEMOLITION PLAN

1/8" = 1'-0"



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No.	Revision	Date

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Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

FIRST FLOOR POWER DEMOLITION PLAN

Project No. CHI-00240054-A1

Dwg. No. **ED101**

Rev. No.

GENERAL SHEET NOTES

1. CIRCUIT NUMBERS SHOWN IN THE PANEL SCHEDULE AND ON THE DRAWINGS ARE FOR CLARITY OF DESIGN INTENT. ELECTRICAL CONTRACTOR SHALL CONFIRM SWITCH/FUSE OR CIRCUIT BREAKER LOCATION PRIOR TO DEMOLITION/ INSTALLATION.

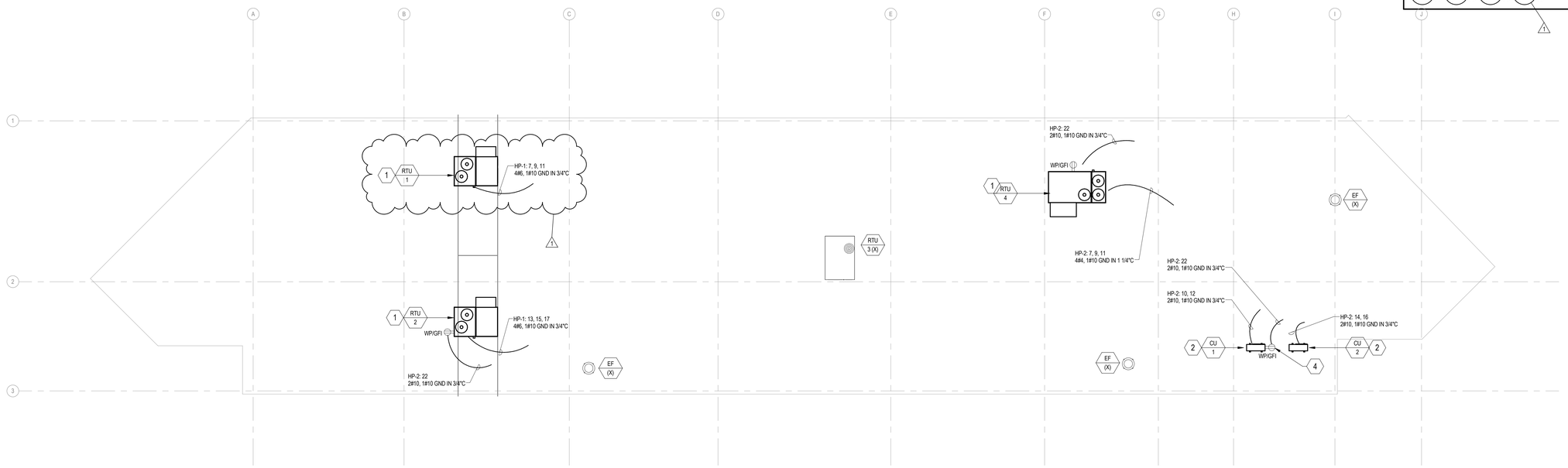
SHEET KEYNOTES

1 NEW ROOFTOP UNIT. ROUTE NEW FEEDERS ABOVE CEILING THROUGH UNIT BASE TO PREWIRED DISCONNECT SWITCH. REFER TO MECHANICAL DRAWING M101.

2 NEW AIR CONDITIONING OUTDOOR UNIT. ROUTE NEW FEEDERS ABOVING CEILING THROUGH UNIT BASE TO PREWIRED DISCONNECT SWITCH. REFER TO MECHANICAL DRAWING M101.

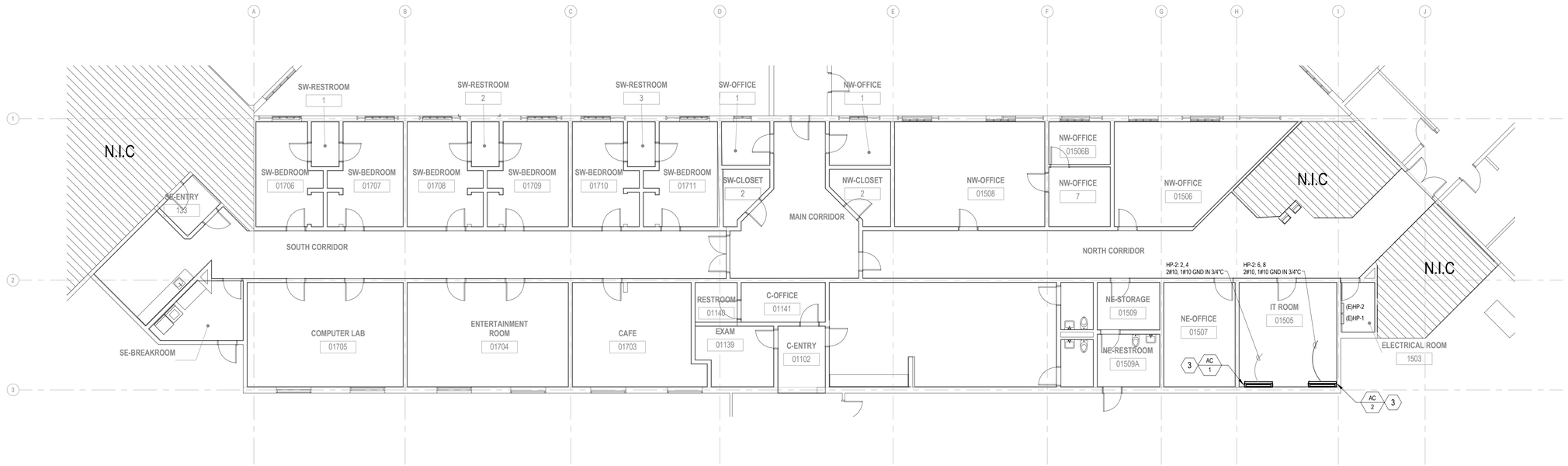
3 NEW AIR CONDITIONING INDOOR UNIT. REFER TO MECHANICAL DRAWING M101.Y

4 PENETRATE THE CONDUIT THROUTH ROOF.



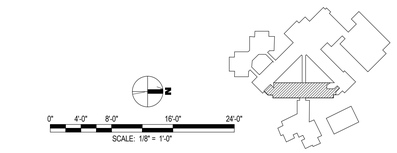
2 ROOF PLAN

1/8" = 1'-0"



1 FIRST FLOOR PLAN

1/8" = 1'-0"



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No.	Revision	Date
1	ADDENDUM #1	06-29-2018

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Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

POWER FIRST FLOOR PLAN

Project No. CHI-00240054-A1

Dwg. No. **E101** Rev. No. **1**

GENERAL SHEET NOTES

1. CIRCUIT NUMBERS SHOWN IN THE PANEL SCHEDULE AND ON THE DRAWINGS ARE FOR CLARITY OF DESIGN INTENT. ELECTRICAL CONTRACTOR SHALL CONFIRM SWITCH/FUSE OR CIRCUIT BREAKER LOCATION PRIOR TO DEMOLITION/ INSTALLATION.

SHEET KEYNOTES

1 DISCONNECT AND REMOVE EXISTING CIRCUIT BREAKER.
2 PROVIDE NEW 60A, 3P BREAKER MATCH EXISTING PANEL MANUFACTURER AND STYLE.
3 PROVIDE NEW 20A, 3P BREAKER MATCH EXISTING PANEL MANUFACTURER AND STYLE.

PANEL NAME	LOCATION	MOUNTING	SUPPLIED FROM	VOLTAGE	BUS	MAIN
(E)HP-1	ELECTRICAL ROOM	SURFACE		120/208		400A

CKT NO	LOAD DESCRIPTION	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	CB CODE	CB P	CB TR	BUS A	BUS B	BUS C	CB TR	CB P	VA LOAD CODE	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	LOAD DESCRIPTION	CKT NO
1								X			30	2					EXISTING	2
3	EXISTING					3	100		X									4
5										X	30	2					EXISTING	6
7		4407						X										8
9	(E)RT-1		4407			3	50		X		30	2					EXISTING	10
11				4407						X								12
13		4407						X			30	2					SPARE	14
15	(E)RT-2		4407			3	50		X									16
17				4407						X							EXISTING	18
19	SPACE					1		X										20
21	EXISTING					2	30		X		30	2					SPARE	22
23										X								24
25		1585						X			30	2					EXISTING	26
27	(E)RT-3		1585			3	30		X									28
29				1585						X		1					SPACE	30

LOAD DESCRIPTION	CONNECTED (KVA)	D.F.	DEMAND (KVA)
LIGHTING	0.0	1.00	0.0
RECEPT (FIRST 10 KW)	0.0	1.00	0.0
RECEPT (REMAINDER)	0.0	0.50	0.0
MOTORS	0.0	1.00	0.0
LARGEST MOTOR	0.0	1.25	0.0
EQUIPMENT	0.0	1.00	0.0
HEATING	0.0	1.00	0.0
TOTAL	0.0		0.0

SUBFED LOADS	(KVA)
LIGHTING	0.0
RECEPT	0.0
MOTORS	0.0
EQUIP	0.0
HEATING	0.0
TRANSFMR	0.0

CONNECTED	VA	
PH A	10,399	
PH B	10,399	
PH C	10,399	
TOTAL	KVA	AMPS
CONNECTED	31.2	86.6
DEMAND	0.0	0.0
DESIGN		

GROUND BUS | 100% NEUTRAL BUS | INTEGRAL TVSS ISC = 22,000

L - LIGHITNG, R - RECEPTACLE, M - MOTORS, LM - LARGEST MOTOR, E - EQUIPMENT, H - HEATING, SL - SUBFED LTG, SR - SUBFED RECEPT., SM - SUBFED MOTORS, SE - SUBFED EQUIPMENT, SH - SUBFED HEATING, T - TRANSFORMER

PANEL NAME	LOCATION	MOUNTING	SUPPLIED FROM	VOLTAGE	BUS	MAIN
HP-1	ELECTRICAL ROOM	SURFACE		120/208		400A

CKT NO	LOAD DESCRIPTION	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	CB CODE	CB P	CB TR	BUS A	BUS B	BUS C	CB TR	CB P	VA LOAD CODE	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	LOAD DESCRIPTION	CKT NO
1								X			30	2					EXISTING	2
3	EXISTING					3	100		X									4
5										X	30	2					EXISTING	6
7		4684			E			X										8
9	(N)RTU-1		4684		E	3	50		X		30	2					EXISTING	10
11				4684	E					X								12
13		4684			E			X			30	2					SPARE	14
15	(N)RTU-2		4684		E	3	50		X									16
17				4684	E					X							EXISTING	18
19	SPACE				E	1		X										20
21	EXISTING				E	2	30		X		30	2					SPARE	22
23										X								24
25					E			X										26
27	SPARE				E	3	40		X		30	2					EXISTING	28
29					E					X		1					SPACE	30

LOAD DESCRIPTION	CONNECTED (KVA)	D.F.	DEMAND (KVA)
LIGHTING	0.0	1.00	0.0
RECEPT (FIRST 10 KW)	0.0	1.00	0.0
RECEPT (REMAINDER)	0.0	0.50	0.0
MOTORS	0.0	1.00	0.0
LARGEST MOTOR	0.0	1.25	0.0
EQUIPMENT	28.1	1.00	28.1
HEATING	0.0	1.00	0.0
TOTAL	28.1		28.1

SUBFED LOADS	(KVA)
LIGHTING	0.0
RECEPT	0.0
MOTORS	0.0
EQUIP	0.0
HEATING	0.0
TRANSFMR	0.0

CONNECTED	VA	
PH A	9,368	
PH B	9,368	
PH C	9,368	
TOTAL	KVA	AMPS
CONNECTED	28.1	78.0
DEMAND	28.1	78.0
DESIGN		

GROUND BUS | 100% NEUTRAL BUS | INTEGRAL TVSS ISC = 22,000

L - LIGHITNG, R - RECEPTACLE, M - MOTORS, LM - LARGEST MOTOR, E - EQUIPMENT, H - HEATING, SL - SUBFED LTG, SR - SUBFED RECEPT., SM - SUBFED MOTORS, SE - SUBFED EQUIPMENT, SH - SUBFED HEATING, T - TRANSFORMER

LOAD CALCULATION

PANEL NAME HP-1

REMOVED LOAD	AMPS	POWER(KW)	ADDED LOAD	AMPS	POWER(KW)
RT-1	36.7	13.22	RTU-1	39	14.05
RT-2	36.7	13.22	RTU-2	39	14.05
RT-3	13.2	4.76			
TOTAL		**31.20**	TOTAL		**28.10**
NET LOAD	**-3.10 KW**				

PANEL NAME	LOCATION	MOUNTING	SUPPLIED FROM	VOLTAGE	BUS	MAIN
(E)HP-2	ELECTRICAL ROOM	SURFACE		120/208		400A

CKT NO	LOAD DESCRIPTION	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	CB CODE	CB P	CB TR	BUS A	BUS B	BUS C	CB TR	CB P	VA LOAD CODE	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	LOAD DESCRIPTION	CKT NO
1		9606.83			E			X			30	2					SPARE	2
3	EXISTING		9606.83		E	3	100		X									4
5				9606.83	E					X	30	2					SPARE	6
7	SPACE					1	20	X										8
9	SPARE					2	70		X		30	2					SPARE	10
11										X								12
13	EXISTING	5824			E	2	70	X			30	2					SPARE	14
15			5824		E				X									16
17	EXISTING			1664	E	2	20			X	20	1	E			1920	EXISTING	18
19		1664			E			X			20	1	E	1920			EXISTING	20
21	EXISTING		1920		E	1	20		X		30	2					SPARE	22
23	EXISTING			1920	E	1	20			X								24
25	EXISTING	1920			E	1	20	X					E	3842.73				26
27	EXISTING		1664		E	2	20		X		40	3	E		3842.73		EXISTING	28
29				1664	E					X			E			3842.73		30

LOAD DESCRIPTION	CONNECTED (KVA)	D.F.	DEMAND (KVA)
LIGHTING	0.0	1.00	0.0
RECEPT (FIRST 10 KW)	0.0	1.00	0.0
RECEPT (REMAINDER)	0.0	0.50	0.0
MOTORS	0.0	1.00	0.0
LARGEST MOTOR	0.0	1.25	0.0
EQUIPMENT	68.3	1.00	68.3
HEATING	0.0	1.00	0.0
TOTAL	68.3		68.3

SUBFED LOADS	(KVA)
LIGHTING	0.0
RECEPT	0.0
MOTORS	0.0
EQUIP	0.0
HEATING	0.0
TRANSFMR	0.0

CONNECTED	VA	
PH A	24,778	
PH B	22,858	
PH C	20,618	
TOTAL	KVA	AMPS
CONNECTED	68.3	189.5
DEMAND	68.3	189.5
DESIGN		

GROUND BUS | 100% NEUTRAL BUS | INTEGRAL TVSS ISC = 22,000

L - LIGHITNG, R - RECEPTACLE, M - MOTORS, LM - LARGEST MOTOR, E - EQUIPMENT, H - HEATING, SL - SUBFED LTG, SR - SUBFED RECEPT., SM - SUBFED MOTORS, SE - SUBFED EQUIPMENT, SH - SUBFED HEATING, T - TRANSFORMER

PANEL NOTES:
EXISTING LOADS ARE BASED ON 80% OF BREAKERS AMPS.

PANEL NAME	LOCATION	MOUNTING	SUPPLIED FROM	VOLTAGE	BUS	MAIN
HP-2	ELECTRICAL ROOM	SURFACE		120/208		400A

CKT NO	LOAD DESCRIPTION	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	CB CODE	CB P	CB TR	BUS A	BUS B	BUS C	CB TR	CB P	VA LOAD CODE	VA LOAD PH A	VA LOAD PH B	VA LOAD PH C	LOAD DESCRIPTION	CKT NO
1		9607			E			X			**20**	2	E	104			AC-1	2
3	EXISTING		9607		E	3	100		X				E		104			4
5				9607	E					X	**20**	2	E			104	AC-2	6
7		5764			E			X					E	104				8
9	(N)RTU-4		5764		E	3	**60**		X		30	2	E		2080		CU-1	10
11				5764	E					X			E			2080		12
13	EXISTING	5824			E			X			30	2	E	2080			CU-2	14
15			5824		E	2	70		X				E		2080			16
17	EXISTING			1664	E					X	20	1	E			1920	EXISTING	18
19		1664			E	2	20	X			20	1	E	1920			EXISTING	20
21	EXISTING		1920		E	1	20		X		20	1	R		500		RTU SERVICE RECEPTACLE	22
23	EXISTING			1920	E	1	20			X	20	1					SPARE	24
25	EXISTING	1920			E	1	20	X					E	3842.73				26
27	EXISTING		1664		E	2	20		X		40	3	E		3842.73		EXISTING	28
29				1664	E					X			E			3842.73		30

LOAD DESCRIPTION	CONNECTED (KVA)	D.F.	DEMAND (KVA)
LIGHTING	0.0	1.00	0.0
RECEPT (FIRST 10 KW)	0.5	1.00	0.5
RECEPT (REMAINDER)	0.0	0.50	0.0
MOTORS	0.0	1.00	0.0
LARGEST MOTOR	0.0	1.25	0.0
EQUIPMENT	94.3	1.00	94.3
HEATING	0.0	1.00	0.0
TOTAL	94.8		94.8

SUBFED LOADS	(KVA)
LIGHTING	0.0
RECEPT	0.0
MOTORS	0.0
EQUIP	0.0
HEATING	0.0
TRANSFMR	0.0

CONNECTED	VA	
PH A	32,830	
PH B	33,386	
PH C	28,566	
TOTAL	KVA	AMPS
CONNECTED	94.8	263.1
DEMAND	94.8	263.1
DESIGN		

GROUND BUS | 100% NEUTRAL BUS | INTEGRAL TVSS ISC = 22,000

L - LIGHITNG, R - RECEPTACLE, M - MOTORS, LM - LARGEST MOTOR, E - EQUIPMENT, H - HEATING, SL - SUBFED LTG, SR - SUBFED RECEPT., SM - SUBFED MOTORS, SE - SUBFED EQUIPMENT, SH - SUBFED HEATING, T - TRANSFORMER

PANEL NOTES:
EXISTING LOADS ARE BASED ON 80% OF BREAKERS AMPS.

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No.	Revision	Date

ISSUED FOR BID

Professional Seal(s)

Drawn By:	**HL**
Checked By:	**HO**
Approved By:	**JFR**
Date Printed:	**06.18.2018**
File Name:	**CHI-00240054-A1.rfa**

Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

ELECTRICAL
SCHEDULES

Project No. CHI-00240054-A1

Dwg. No. **E601** Rev. No.

6/29/2018 8:53:32 AM F:\Doc_exp\CHI-00240054-A1\REVIT_This Project Uses Revit 2016 [To Be Confirmed]

SPECIFICATIONS

GENERAL

RELATED DOCUMENTS

1. THE GENERAL REQUIREMENTS OF THE ARCHITECTURAL SPECIFICATIONS ARE PART OF THESE SPECIFICATIONS. WHERE AN INCONSISTENCY EXISTS BETWEEN THE WORDING OR INTENT, THIS SECTION SHALL TAKE PRECEDENCE FOR THE MECHANCIAL AND ELECTRICAL SCOPE. THE STANDARD FORM OF "GENERAL CONDITIONS" ISSUED BY THE AMERICAN INSTITUTE OF ARCHITECTS DOCUMENT A201, LATEST EDITION, SHALL FORM PART OF THIS CONTRACT.
2. CONTRACT DOCUMENTS MAY INCLUDE, BUT NOT LIMITED TO THE FOLLOWING: ARCHITECTURAL, STRUCTURAL, ELECTRICAL, MECHANICAL, FIRE PROTECTION, AND CIVIL.

DEFINITIONS

1. "FURNISH" MEANS TO SUPPLY AND DELIVER OF AN ITEM OF EQUIPMENT TO THE PROJECT SITE, READY FOR INSTALLATION.
2. "INSTALL" MEANS TO SET IN PLACE, CONNECT AND PLACE IN FULL OPERATIONAL ORDER.
3. "PROVIDE" MEANS TO "FURNISH" AND "INSTALL".
4. "EQUIVALENT" MEANS TO MEET THE SPECIFICATIONS OF THE REFERENCED PRODUCT OR ITEM ON ALL SIGNIFICANT ASPECTS, WHERE SIGNIFICANT ASPECTS SHALL BE DETERMINED BY THE ENGINEER.
5. "FUTURE", "REFER (DISCIPLINE) DIVISION" AND SIMILAR EXPRESSIONS INDICATE WORK THAT MAY BE PERFORMED UNDER THE CONTRACT DOCUMENTS BUT, NOT NECESSARILY UNDER THE DIVISION OR DISCIPLINE ON WHICH THE NOTE APPEARS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK WITH SUPPLIERS, SUBCONTRACTORS, EMPLOYEES, ETC. SHOULD CLARIFICATION OF ANY PORTION OF THE WORK BE REQUIRED, CONTACT THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING BID.

SUBMITTALS

CONTRACTOR SHALL SUBMIT FOR REVIEW TO THE ARCHITECT/ENGINEER A COMPLETE LIST OF ITEMS TO BE FURNISHED AND INSTALLED UNDER THIS CONTRACT. INCLUDING, BUT NOT BE LIMITED TO THE FOLLOWING:

1. DIMENSIONED SHOP DRAWINGS OF MATERIALS, AND EQUIPMENT.
2. DIMENSIONED SHOP DRAWINGS OF EQUIPMENT AND PIPING PLAN LAYOUT(S)
3. PRODUCT DATA.
4. FIELD-QUALITY CONTROL INSPECTION AND TEST REPORTS
5. FIELD TEST CERTIFICATES.
6. OPERATION AND MAINTENANCE DATA.
7. EQUIPMENT MANUALS.

QUALITY ASSURANCE

FIRE TEST RESPONSE CHARACTERISTICS: INSULATION AND RELATED MATERIALS SHALL HAVE FIRE TEST RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. FACTORY LABEL INSULATION AND JACKET MATERIALS AND ADHESIVE, MASTIC, AND CEMENT MATERIAL CONTAINERS, WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY.

1. INSULATION INSTALLED INDOORS: FLAME SPREAD INDEX OF 25 OR LESS, AND SMOKE DEVELOPED INDEX OF 50 OR LESS.
2. INSULATION INSTALLED OUTDOORS: FLAME SPREAD INDEX OF 75 OR LESS, AND SMOKE DEVELOPED INDEX OF 150 OR LESS.

CONTRACT DOCUMENTS

1. CONTRACTOR SHALL REVIEW CONTRACT DOCUMENTS AND BECOME FAMILIAR WITH THE SITE AND LOCAL CONDITIONS RELATING TO WORK AS DESCRIBED HEREIN PRIOR TO SUBMITTING BID PROPOSAL. FAILURE TO DO SO SHALL NOT RELIEVE CONTRACTOR OF THE OBLIGATIONS OF THE CONTRACT. IDENTIFY ALL DISCREPANCIES AND NOTIFY ARCHITECT /ENGINEER, IN WRITING.
2. THE DRAWINGS INDICATE THE GENERAL LAYOUT OF THE VARIOUS SYSTEM(S) AND EQUIPMENT. THE LAYOUT OF THE SYSTEM(S) EQUIPMENT, ACCESSORIES AND OTHER COMPONENTS ARE DIAGRAMMATIC UNLESS SPECIFICALLY SHOWN OR DIMENSIONED.
3. CONTRACTOR SHALL BID ALL WORK AS SHOWN, AND MATERIAL AND EQUIPMENT AS SPECIFIED HEREIN. ANY SUBSTITUTION (NOT APPROVED) DURING THE BIDDING PROCESS TO SECURE AWARD OF THE CONTRACT WILL NOT BE ACKNOWLEDGED.
4. CONTRACTOR SHALL BE FINANCIALLY LIABLE FOR ANY REQUIRED ENGINEERING REVIEW DUE TO ANY PROPOSED PRODUCT CHANGE AND/OR VOLUNTARY "VALUE ENGINEERING" DURING THE BIDDING PROCEDURE AND THE SUBMITTAL PROCESS.
5. ANY CONFLICTING INFORMATION DEPICTED OR IMPLIED ON THE DRAWINGS IDENTIFIED DURING THE BIDDING PROCESS SHALL BE SUBMITTED FOR CLARIFICATION OF INTENT. FAILURE TO CLARIFY THE ARCHITECT/ENGINEER INTENT, MAY MAKE THE CONTRACTOR LIABLE FOR ANY ASSOCIATED COSTS RELATIVE TO CHANGES DURING THE CONSTRUCTION PROCESS.

SPECIFICATIONS AND DRAWINGS

1. SPECIFICATIONS AND DRAWINGS ARE INTENDED TO BE COOPERATIVE. WHAT IS CALLED FOR BY EITHER SHALL BE AS BINDING AS IF CALLED FOR BY BOTH. ANY WORK OR MATERIALS NOT SPECIFICALLY MENTIONED THOUGH REQUIRED TO MAKE THE JOB COMPLETE, SHALL BE FURNISHED AT THE CONTRACTOR'S EXPENSE.

VISITING THE SITE

1. PRIOR TO SUBMITTING BID PROPOSAL, CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE SITE AND EXISTING CONDITIONS FOR DOING WORK AS SHOWN ON DRAWINGS AND SPECIFIED HEREIN. FAILURE TO COMPLY SHALL NOT RELIEVE THE CONTRACTOR OF THE OBLIGATIONS OF THE CONTRACT. CONTRACTOR SHALL IDENTIFY ALL DISCREPANCIES AND NOTIFY ARCHITECT/ENGINEER, IN WRITING.

PERMITS, FEES & INSPECTIONS

- CONTRACTOR SHALL PREPARE AND SUBMIT ALL DATA, DRAWINGS AND DETAILS REQUIRED, SECURE AND PAY FOR ALL PERMITS, GOVERNMENTAL FEES, TAXES, INSPECTIONS AND LICENSES NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK.
- COUNTY SHALL PAY FOR ALL APPLICABLE FEES FOR TEST AND INSPECTIONS REQUIRED BY LOCAL AUTHORITIES HAVING JURISDICTION.
- WHERE REGULATIONS OF UTILITY COMPANIES APPLY, CONFORMANCE WITH THEIR REGULATIONS IS MANDATORY AND ANY COSTS INVOLVED SHALL BE INCLUDED IN THE CONTRACT.

LAWS AND ORDINANCES

1. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES AND REGULATIONS BEARING ON THE CONDUCT OF WORK AS SHOWN ON DRAWINGS AND SPECIFIED HEREIN. IF CONTRACTOR OBSERVES THAT THE DRAWINGS AND SPECIFICATIONS ARE AT VARIANCE THEREWITH, CONTRACTOR SHALL PROMPTLY NOTIFY ARCHITECT/ENGINEER IN WRITING WHEN SUBMITTING BID AND ANY NECESSARY CHANGES SHALL BE ADJUSTED AS PROVIDED IN THE CONTRACT FOR SUCH CHANGES IN WORK. IF CONTRACTOR PERFORMS ANY WORK, CONTRARY TO SUCH LAWS, ORDINANCES, RULES AND REGULATIONS, CONTRACTOR SHALL BEAR ALL COSTS FOR CORRECTING THE WORK.

TRADE JURISDICTION

1. WHEN IT BECOMES NECESSARY FOR THE COMPLETE FULFILLMENT OF THIS WORK FOR THIS CONTRACTOR TO FURNISH LABOR OR MATERIALS OTHER THAN THAT WHICH IS GENERALLY ACCEPTED BY THIS TRADE OR BRANCH OF WORK, THE CONTRACTOR SHALL SUBLET SAME TO A CONTRACTOR ENGAGED IN THE TRADE OR BRANCH OF WORK INVOLVED. THERE SHALL BE NO DELAY TO OR STOPPAGE OF WORK DUE TO THE INFRINGEMENT OR ALLEGED INFRINGEMENT TO TRADE AGREEMENTS AS TO THE JURISDICTION.

REQUESTS FOR INFORMATION (RFI'S)

1. ALL REQUESTS FOR INFORMATION (RFI'S) SHALL BE SUBMITTED IN WRITING TO THE GENERAL CONTRACTOR OR CONSTRUCTION MANAGER.
2. IF THERE IS NO CONSTRUCTION MANAGER OR GENERAL CONTRACTOR. SUBMIT RFI'S TO THE ARCHITECT/ENGINEER.
3. THERE WILL BE NO RESPONSE TO RFI'S THAT ARE NOT SUBMITTED IN WRITTEN FORM.
4. ANY FORMAL OR INFORMAL, OR PHONE CONVERSATION DO NOT CONSTITUTE THE AUTHORIZATION TO PROCEED.

WORKMANSHIP

1. ALL LABOR SHALL BE EXECUTED IN A NEAT, WORKMANLIKE MANNER AND SHALL BE PERFORMED BY PERSONS SKILLED IN THEIR RESPECTIVE TRADES. THE ENGINEER/OWNER SHALL DECIDE ALL MATTERS PERTAINING TO THE QUALITY OF WORKMANSHIP AND MATERIALS.

COORDINATION OF WORK

1. CONTRACTOR SHALL COORDINATE WITH ROOF CONSTRUCTION, OWNER'S OPERATIONS TEAM, ETC. TO AVOID INTERFERENCE BEFORE STARTING ANY INSTALLATION. ANY NEGLECT BY THE CONTRACTOR TO COORDINATE WITH OTHER CONSTRUCTION SHALL BE MADE AT THE CONTRACTOR'S OWN EXPENSE. CONTRACTOR IS REQUIRED TO PROVIDE 48 HRS NOTICE OF ANY WORK THAT IMPACTS OPERATIONAL SYSTEMS OR SPACES.

CUTTING AND PATCHING

1. CONTRACTOR SHALL INCLUDE ALL CUTTING AND PATCHING, AS REQUIRED. ALL CORES/PENETRATIONS THROUGH ROOF OR THROUGH SLABS AND FOUNDATION WALLS SHALL BE APPROVED IN WRITING BY THE ARCHITECT/ENGINEER. CONTRACTOR SHALL ASSUME ALL LIABILITIES FOR CORES WHICH HAVE NOT BEEN APPROVED. PATCH ALL DISTURBED WALL, FLOORS, PARTITIONS, CEILINGS, ETC., RESTORE TO ORIGINAL CONDITION.

OPERATING INSTRUCTIONS

1. CONTRACTOR SHALL PREPARE A WRITTEN LIST IN DUPLICATE, OF INSTRUCTIONS OF THE OPERATION OF ALL EQUIPMENT AND SHALL INSTRUCT IN ITS OPERATION. ALL DAMPERS AND EQUIPMENT SHALL BE MARKED WITH A METAL TAG AND A TYPEWRITTEN SCHEDULE SHALL BE GIVEN TO THE OWNER.

GUARANTEE

1. CONTRACTOR SHALL GUARANTEE WORK TO BE FREE FROM DEFECTIVE WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL CERTIFICATE. ANY REPAIRS OR REPLACEMENT DURING THIS PERIOD SHALL BE MADE WITHOUT COST TO THE OWNER, UPON OWNER'S REQUEST.

PRODUCTS & MATERIALS

MATERIALS:

1. ALL MATERIALS SHALL BE NEW AND OF FIRST CLASS PRODUCTS OF MANUFACTURERS SPECIFIED HEREIN AND OR AS APPROVED BY THE ARCHITECT/ENGINEER OF RECORD.
2. THE DESIGN INTENT, SPACE REQUIREMENTS, PERFORMANCE, ETC., ARE BASED ON PRODUCTS OF THE MANUFACTURER(S) INDICATED IN THESE SPECIFICATIONS. UNLESS NOTED OTHERWISE COMPARABLE PRODUCTS OF OTHER MANUFACTURER(S) MAY BE SUBMITTED FOR REVIEW TO THE ARCHITECT/ENGINEER OF RECORD. PRODUCTS INSTALLED WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

REFRIGERANT PIPING

ALL REFRIGERANT PIPING MATERIAL, INSTALLATION AND PIPING TO BE PER THE INDIVIDUAL MANUFACTURER'S INSTRUCTIONS AND INDUSTRY ACCEPTED PRACTICES.

PERFORMANCE REQUIREMENTS - LINE TEST PRESSURE FOR REFRIGERANT R-410A:
A. SUCTION LINES FOR AIR-CONDITIONING APPLICATIONS: 300 PSIG.
B. SUCTION LINES FOR HEAT-PUMP APPLICATIONS: 535 PSIG.
C. HOT-GAS AND LIQUID LINES: 535 PSIG.

COPPER TUBE AND FITTINGS:
A. COPPER TUBE: [ASTM B 88, TYPE K OR L] [ASTM B 280, TYPE ACR].
B. WROUGHT-COPPER FITTINGS: ASME B16.22.
C. WROUGHT-COPPER UNIONS: ASME B16.22.
D. SOLDER FILLER METALS: ASTM B 32. USE 95-5 TIN ANTIMONY OR ALLOY HB SOLDER TO JOIN COPPER SOCKET FITTINGS ON COPPER PIPE.
E. BRAZING FILLER METALS: AWS A5.8/A5.8M.

DUCTWORK

METAL DUCTS AND FITTINGS
A. GENERAL FABRICATION REQUIREMENTS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" BASED ON INDICATED STATIC-PRESSURE CLASS UNLESS OTHERWISE INDICATED.

SHEET METAL MATERIALS
A. GENERAL MATERIAL REQUIREMENTS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS UNLESS OTHERWISE INDICATED. SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.
B. GALVANIZED SHEET STEEL: COMPLY WITH ASTM A 653/A 653M.
C. GALVANIZED COATING DESIGNATION: G60 OR G90
D. FINISHES FOR SURFACES EXPOSED TO VIEW: MILL PHOSPHATIZED.

SEALANT AND GASKETS
A. GENERAL SEALANT AND GASKET REQUIREMENTS: SURFACE-BURNING CHARACTERISTICS FOR SEALANTS AND GASKETS SHALL BE A MAXIMUM FLAME-SPREAD INDEX OF 25 AND A MAXIMUM SMOKE-DEVELOPED INDEX OF 50 WHEN TESTED ACCORDING TO UL 723; CERTIFIED BY AN NRTL.
B. ALL DUCTWORK TO SEALED TO CLASS A
C. USE MASTIC TO SEAL ALL JOINTS AND SEAMS

HANGERS AND SUPPORTS
A. HANGER RODS FOR NONCORROSIVE ENVIRONMENTS: CADMIUM-PLATED STEEL RODS AND NUTS.
B. STRAP AND ROD SIZES: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," TABLE 5-1 "RECTANGULAR DUCT HANGERS MINIMUM SIZE," AND TABLE 5-2, "MINIMUM HANGER SIZES FOR ROUND DUCT."
C. STEEL CABLES FOR GALVANIZED-STEEL DUCTS: GALVANIZED STEEL COMPLYING WITH ASTM A 603.
D. STEEL CABLE END CONNECTIONS: CADMIUM-PLATED STEEL ASSEMBLIES WITH BRACKETS, SWIVEL, AND BOLTS DESIGNED FOR DUCT HANGER SERVICE; WITH AN AUTOMATIC-LOCKING AND CLAMPING DEVICE.
E. DUCT ATTACHMENTS: SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS; COMPATIBLE WITH DUCT MATERIALS.

FLEXIBLE DUCTS

NON-INSULATED, FLEXIBLE DUCT:
UL 181, CLASS 1, TWO-PLY VINYL FILM OR MULTIPLE LAYERS OF ALUMINUM LAMINATE SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE.
A. PRESSURE RATING: 10-INCH WG POSITIVE AND 1.0-INCH WG NEGATIVE.
B. MAXIMUM AIR VELOCITY: 4000 FPM.
C. TEMPERATURE RANGE: MINUS 10 TO PLUS 160 DEG F.
D. FLEXIBLE DUCTWORK TO BE NO LONGER THAN 5' MAXIMUM.

INSULATED, FLEXIBLE DUCT:
UL 181, CLASS 1, TWO-PLY VINYL OR MULTIPLE LAYERS OF ALUMINUM LAMINATE FILM SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; POLYETHYLENE OR ALUMINIZED VAPOR-BARRIER FILM.
A. PRESSURE RATING: 10-INCH WG POSITIVE AND 1.0-INCH WG NEGATIVE.
B. MAXIMUM AIR VELOCITY: 4000 FPM.
C. TEMPERATURE RANGE: MINUS 10 TO PLUS 160 DEG F.
D. INSULATION R-VALUE: COMPLY WITH ASHRAE/IES 90.1.
E. FLEXIBLE DUCTWORK TO BE NO LONGER THAN 5' MAXIMUM.

DUCT INSULATION

INDOOR DUCTS AND PLENUMS
A. CONCEALED, SUPPLY-AIR DUCT AND PLENUM INSULATION: MINERAL-FIBER BLANKET OR BOARD, 1-1/2 INCHES OR GREATER THICK AND 0.75-LB/CU. FT. NOMINAL DENSITY.

OUTDOOR DUCTS AND PLENUMS
A. ALL OUTDOOR EXPOSED DUCTWORK TO HAVE FIELD APPLIED JACKET INSTALLED OVER INSULATION AND FACTORY APPLIED JACKET AS REQUIRED. FIELD APPLIED JACKTED TO BE PAINTED ALUMINUM, SMOOTH: 0.024 INCH THICK.

1

DIFFUSERS

AIR TERMINAL DEVICES TO BE EITHER TITUS, NAILOR, PRICE OR METALAIRE. REFER TO DIFFUSER SCHEDULE FOR ADDITIONAL REQUIREMENTS.

DAMPERS

MANUAL VOLUME DAMPERS

TYPE STANDARD, STEEL:
A. STANDARD LEAKAGE RATING
B. SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS.

FRAMES:
A. FRAME: HAT-SHAPED, 0.094-INCH-THICK, GALVANIZED SHEET STEEL.
B. MITERED AND WELDED CORNERS.
C. FLANGES FOR ATTACHING TO WALLS AND FLANGELESS FRAMES FOR INSTALLING IN DUCTS.

BLADES:
A. MULTIPLE OR SINGLE BLADE.
B. PARALLEL- OR OPPOSED-BLADE DESIGN.
C. STIFFEN DAMPER BLADES FOR STABILITY.
D. GALVANIZED-STEEL, 0.064 INCH THICK.
E. BLADE AXLES: GALVANIZED STEEL.

BEARINGS:
A. OIL-IMPREGNATED BRONZE, MOLDED SYNTHETICOR OIL-IMPREGNATED STAINLESS-STEEL SLEEVE
B. DAMPERS IN DUCTS WITH PRESSURE CLASSES OF 3-INCH WG OR LESS SHALL HAVE AXLES FULL LENGTH OF DAMPER BLADES AND BEARINGS AT BOTH ENDS OF OPERATING SHAFT.
C. TIE BARS AND BRACKETS: GALVANIZED STEEL.

FIRE DAMPERS

A. TYPE: STATIC STATIC OR DYNAMIC; RATED AND LABELED ACCORDING TO UL 555 BY AN NRTL.
B. CLOSING RATING IN DUCTS UP TO 4-INCH WG STATIC PRESSURE CLASS AND MINIMUM 2000-FPM VELOCITY.
C. FIRE RATING: 1-1/2 OR 3 HOURS TO MATCH ASSEMBLY.
D. FRAME: CURTAIN TYPE WITH BLADES OUTSIDE AIRSTREAM EXCEPT WHEN LOCATED BEHIND GRILLE WHERE BLADES MAY BE INSIDE AIRSTREAM; FABRICATED WITH ROLL-FORMED, 0.034-INCH-THICK GALVANIZED STEEL; WITH MITERED AND INTERLOCKING CORNERS.
E. MOUNTING SLEEVE: FACTORY- OR FIELD-INSTALLED, GALVANIZED SHEET STEEL.
   1. MINIMUM THICKNESS: 0.05 0.138 INCH OR 0.39 INCH THICK, AS INDICATED, AND OF LENGTH TO SUIT APPLICATION.
   2. EXCEPTION: OMIT SLEEVE WHERE DAMPER-FRAME WIDTH PERMITS DIRECT ATTACHMENT OF PERIMETER MOUNTING ANGLES ON EACH SIDE OF WALL OR FLOOR; THICKNESS OF DAMPER FRAME MUST COMPLY WITH SLEEVE REQUIREMENTS.

ORIENTATION REQUIREMENTS:

A. MOUNTING ORIENTATION: VERTICAL OR HORIZONTAL AS INDICATED.
B. BLADES: ROLL-FORMED, INTERLOCKING, 0.024-INCH- OR 0.034-INCH- THICK, GALVANIZED SHEET STEEL. IN PLACE OF INTERLOCKING BLADES, USE FULL-LENGTH, 0.034-INCH-THICK, GALVANIZED-STEEL BLADE CONNECTORS.
C. HORIZONTAL DAMPERS: INCLUDE BLADE LOCK AND STAINLESS-STEEL CLOSURE SPRING.
D. HEAT-RESPONSIVE DEVICE: REPLACEABLE, 165 DEG F OR 212 DEG F RATED, FUSIBLE LINKS.
E. HEAT-RESPONSIVE DEVICE: , RESETTABLE OR REPLACEABLE LINK AND SWITCH PACKAGE, FACTORY INSTALLED, 165 DEG F OR 212 DEG F RATED.

MECHANICAL EQUIPMENT

ALL MECHANICAL EQUIPMENT UNDER THIS SCOPE OF WORK TO BE PROVIDED AS INDICATED ON EQUIPMENT SCHEDULE SHEET M601.

FIRESTOPPING:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FIRE STOPPING, FIRE CAULKING , FIRE DAMPERS AND INSTALLING ALL SYSTEMS WHERE MECHANICAL PIPING AND EQUIPMENT PENETRATE FIRE RATED SYSTEMS TO MAINTAIN THEIR EXISTING FIRE RATING, REFER TO EXISTING ARCHITECTURAL PLANS FOR LOCATIONS OF FIRE RATED WALLS, FLOORS AND STRUCTURES. MATERIAL SHALL STOP AND PREVENT FIRE AND SMOKE FROM PASSING/PENETRATING FIRE BARRIER.

EXECUTION

SCOPE OF WORK

1. PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, FACILITIES, TRANSPORTATION, FEES AND SERVICES NECESSARY FOR A COMPLETE MECHANICAL SYSTEM(S) AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. WORKMANSHIP SHALL BE COMPLETE IN EVERY ASPECT, TESTED, APPROVED AND SATISFACTORY TO THE ARCHITECT/ENGINEER/OWNER AND IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL LAWS HAVING JURISDICTION.
2. THE DRAWINGS INDICATE DIAGRAMMATICALLY THE EXTENT AND LOCATION OF THE WORK INCLUDED. WORK INDICATED, BUT HAVING MINOR DETAILS OBVIOUSLY OMITTED, SHALL BE PROVIDED, INCLUDING THESE DETAILS, WITHOUT EXTRA COST TO THE OWNER.
3. IT IS THE DECLARED AND ACKNOWLEDGED INTENT OF THESE SPECIFICATIONS TO PROVIDE A COMPLETE MECHANICAL SYSTEM(S), INCLUSIVE OF ALL REQUIRED PARTS AND ACCESSORIES COMPLETE AND READY FOR USE AS DESCRIBED, BUT NOT LIMITED TO THE FOLLOWING:

A. SUPPLY AIR.
B. EXHAUST AIR.
C. RETURN AIR.
D. CONTROLS SYSTEM
E. MECHANICAL EQUIPMENT
F. MECHANICAL SPECIALTIES

SUBMITTALS AND SHOP DRAWINGS:

1. SHOP DRAWING LAYOUT SUBMITTAL(S) SHALL BE A MINIMUM OF 1/8 INCH PER FOOT SCALE, SHOWING ALL PIPING TO BE INSTALLED. DETAILED LAYOUT(S) OF EQUIPMENT ROOMS SHALL BE NOT LESS THAN 1/4 INCH PER FOOT SCALE. THE DRAWING SHALL ALSO SHOW THE WORK COORDINATED WITH ALL OTHER TRADES, ALL DRAWINGS SHALL BE SUBMITTED PRIOR TO STARTING ANY WORK, AND IN ACCORDANCE WITH AN APPROVED SCHEDULE, PROVIDED BY THE GENERAL CONTRACTOR, TO AVOID ANY DELAY ON THE PROJECT.
2. EQUIPMENT, FIXTURES AND OTHER RELATED APPURTENANCES SHALL BE SUBMITTED IN BOUNDED BOOKLETS. ALL DATA MUST BE CLEARLY LEGIBLE. SUBMIT FOUR (4) COPIES MINIMUM OF EACH.
3. CONTRACTOR SHALL SUBMIT TO GOVERNMENTAL AGENCIES AND UTILITY COMPANIES, SHOP DRAWINGS WHICH ARE REQUIRED BY THESE AGENCIES FOR THEIR APPROVAL.
4. CONTRACTOR SHALL PREPARE AND FURNISH TO THE OWNER, TWO (2) BOUND BOOKLETS EACH CONTAINING A COMPLETE LIST OF ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT. EACH PIECE OF EQUIPMENT LISTED SHALL ALSO BE DESCRIBED BY MANUFACTURER(S) MODEL NUMBER, FIGURE NUMBER AND THE COMPONENTS THEREIN WHICH MAKE UP THE PART(S) LIST. ELECTRONIC VERSION OF SHOP DRAWINGS MAY ALSO BE SUBMITTED TO THE ARCHITECT/ENGINEER IN PDF FORM VIA EMAIL.
5. SHOP DRAWINGS SHALL INCLUDE CONTRACTOR'S NAME, JOB ADDRESS, MANUFACTURER'S NAME, CATALOG NUMBERS, CUTS, DIAGRAMS AND OTHER SUCH DESCRIPTIVE DATA AS REQUIRED TO IDENTIFY AND REVIEW THE EQUIPMENT.
6. ONE (1) WEEK PRIOR TO FINAL INSPECTION, DELIVER TO THE ARCHITECT/ENGINEER/OWNER TYPEWRITTEN COPIES OF EACH OF THE FOLLOWING:

- CERTIFICATION FROM CONTRACTOR THAT ALL EQUIPMENT AND SYSTEM(S) HAVE BEEN PROPERLY INSTALLED, COMMISSIONED, ADJUSTED AND TESTED.
- CERTIFICATION FROM RESPECTIVE MANUFACTURER(S) AUTHORIZED REPRESENTATIVE THAT EQUIPMENT AND SYSTEM(S) HAVE BEEN PROPERLY INSTALLED, COMMISSIONED, ADJUSTED AND TESTED.
- CERTIFICATION FROM AUTHORITY HAVING JURISDICTION THAT ALL EQUIPMENT AND SYSTEM(S) HAVE BEEN PROPERLY INSTALLED, COMMISSIONED, ADJUSTED, TESTED AND ACCEPTED FROM THE AUTHORITY HAVING JURISDICTION.

CLEANING, TESTS AND INSPECTIONS:

AIR DISTRIBUTION SYSTEM CLEANING

1. ALL EXISTING TO REMAIN AND NEW DUCTWORK AND EQUIPMENT TO BE CLEANED USING A SOURCE REMOVAL MECHANICAL CLEANING METHOD DESIGN TO SAFELY REMOVE CONTAMINANTS. CONTRACTOR TO VERIFY AGAOMST NADCA ACR, "VERIFICATION OF HVAC SYSTEM CLEANLINESS" SECTION. AND PREPARE WRITTEN CLEANLINESS VERIFICATION REPORT.

HVAC TESTING, ADJUSTING AND BALANCING

1. PRE AND POST TAB TO BE PROVIDED AS PART OF THIS SCOPE. PRE TEST TO INCLUDE AIRFLOW TESTING OF ALL EXISTING AIR HANDLING UNITS, EXHAUST FANS AND DAMPER FUNCTIONALITY FOR EQUIPMENT LOCATED WITHIN THE SCOPE OF WORK. TEST TO ALSO INCLUDE THE IDENTIFICATION OF EXISTING AIRFLOWS FOR ALL SUPPLY, RETURN AND EXHAUST DIFFUSERS. FINAL TAB OF AIRSIDE SYSTEM TO BE PERFORMED BY AN INDEPENDENT TEST AND BALANCE CONTRACTOR PER INDUSTRY STANDARDS. CONTRACTOR TO PROVIDE A PRETEST REPORT PRIOR TO THE DEMOLITION OF ANY EQUIPMENT FOR REVIEW BY OWNER/ENGINEER. FINAL TAB REPORT TO BE PROVIDED UPON COMPLETION OF WORK.

INSPECTION

1. ALL WORK COMPLETED UNDER THIS SCOPE TO BE SUBJECT TO FINAL INSPECTION PUNCH LIST BY OWNER AND/OR ENGINEER.

RECORD DRAWING SUBMITTALS:

1. AT PROJECT CLOSE-OUT, CONTRACTOR SHALL SUBMIT RECORD DRAWINGS (CERTIFIED OR APPROVED) ALSO KNOWN AS "AS-BUILT" DRAWINGS. LAYOUT SUBMITTALS SHALL BE SUBMITTED FOR RECORDS PRIOR TO FINAL ACCEPTANCE IN ELECTRONIC FORM ON COMPACT DISC(S), USING AUTOCAD VERSION 2013 "DWG" FORMAT OR ADOBE ACROBAT "PDF" FORMAT VIEWABLE FROM ADOBE. RECORD DATA EQUIPMENT, AND RELATED APPURTENANCES MAY BE SUBMITTED AS BOUND HARDCOPY OR ELECTRONIC ADOBE ACROBAT "PDF" FORMAT.

PROVIDE RECORD SUBMITTALS AS FOLLOWS:
A. OWNER: 1 COPY.
B. ARCHITECT OF RECORD: 1 COPY.
C. ENGINEER OF RECORD: 1 COPY.

- CONTRACTOR IS NOT ALLOWED TO USE THE CONTRACT DOCUMENTS FOR "AS-BUILT" DRAWINGS.

GENERAL NOTES

1. ALL PIPING, DUCTWORK OR MECHANICAL EQUIPMENT SHOWN IN LIGHT LINEWORK IS EXISTING AND TO REMAIN OR AS INDICATED BY KEYNOTES.
2. ALL PIPING, DUCTWORK OR MECHANICAL EQUIPMENT SHOWN IN DARK LINEWORK IS NEW OR AS INDICATED BY KEYNOTES.
3. ALL PIPING, DUCTWORK OR MECHANICAL EQUIPMENT SHOWN ON DEMOLITION DRAWINGS IN DASHED LINE WORK IS TO BE REMOVED OR AS INDICATED BY KEYNOTES AND GENERAL NOTES.
4. EXISTING DUCTWORK ON THESE DRAWINGS IS PER EXISTING AS-BUILT DRAWINGS AND ACTUAL CONDITION MIGHT VARY. CONTRACTOR SHALL FIELD VERIFY ALL DEMOLITION AND NEW WORK INSTALLATION PRIOR TO COMMENCEMENT OF WORK.
5. THE DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF NEW AND EXISTING PIPING, DUCTWORK AND MECHANICAL EQUIPMENT. THE CONTRACTORS SHALL FOLLOW THIS ARRANGEMENT WHEREVER FEASIBLE. HOWEVER, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTORS TO VERIFY EXISTING FIELD CONDITIONS AND TO MAKE MINOR MODIFICATIONS TO LOCATIONS, ELEVATIONS ETC., AS REQUIRED. IF A DIFFERENT ARRANGEMENT OTHER THAN THAT SHOWN OR A MINOR OFFSET, RISE OR DROP IS REQUIRED TO CLEAR AN OBSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND INSTALL SUCH WORK AS MAY BE REQUIRED WITHOUT ADDITIONAL COST TO THE OWNER.
6. PROVIDE ALL NEW SHEET METAL DUCTWORK, DAMPERS, DIFFUSERS, GRILLES, DUCTWORK INSULATION AND DUCTWORK APPURTENANCES AS INDICATED.
7. INSTALL ALL EQUIPMENT AND COMPONENTS IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS WITH RECOMMENDED LOCATIONS TO ENSURE THAT THE SPECIFIED PRODUCTS SERVE THE INTENDED FUNCTION. MAINTAIN PROPER CLEARANCES FOR SERVICE, INSPECTION AND MAINTENANCE OF EQUIPMENT.
8. TERMINATE DEMOLITION AT EXISTING CONSTRUCTION TO REMAIN IN A MANNER THAT SHALL LEAVE STRAIGHT AND CLEAN BREAK LINES. USE PRECAUTIONS AND METHODS NOT TO DAMAGE OR DEFACE EXISTING CONSTRUCTION.
9. ALL CONTRACTORS SHALL COORDINATE AND SCHEDULE THEIR WORK WITH OWNER AND ALL OTHER TRADES TO MINIMIZE THE INTERFERENCE WITH THE OPERATION OF THE BUILDING. ALL CONTRACTORS SHALL TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE OWNER BUILDING AND EQUIPMENT AT ALL TIMES DURING CONSTRUCTION.
10. UNDER NO CIRCUMSTANCES SHALL ANY OF THE EXISTING FAN, COOLING OR HEATING SYSTEMS BE SHUT DOWN WITHOUT PRIOR COORDINATION AND APPROVAL OF THE OWNER.
11. THE INSTALLATION OF OF ANTI-STATIC DUST BARRIERS IN THE CONSTRUCTION AREA IS TO BE COORDINATED WITH THE OWNERS REPRESENTATIVE, IF NECESSARY.
12. WHEN INSTALLING PIPING, OR MECHANICAL EQUIPMENT UNDER THIS CONTRACT, THE CONTRACTOR SHALL CONFER WITH OTHER CONTRACTORS TO AVOID ANY CONFLICTS BETWEEN THE TRADES. THE CONTRACTOR SHALL BE RESPONSIBLE, AT HIS OWN EXPENSE, FOR THE REMOVAL AND RE-INSTALLATION OF ANY PART OF HIS WORK IF SAME WAS INSTALLED WITHOUT CONSULTING THE OTHER TRADES.
13. SEAL ALL EDGES OF INSULATION ON DUCTWORK, PIPING OR DUCTWORK OR PLENUMS. REPAIR AND PATCH ALL INSULATION TO MATCH EXISTING AT AREAS WHERE NEW CONNECTIONS HAVE BEEN MADE TO EXISTING PIPING, DUCTWORK OR EQUIPMENT.
14. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL WORK TO BE COORDINATED WITH THESE DRAWINGS.
15. UNDER NO CONDITION, SHOULD ELECTRICAL CONDUITS, FEEDERS AND/OR ANY ON-LINE SERVICE BE DISTURBED, MOVED OR INTERRUPTED UNLESS SPECIFICALLY REQUIRED TO INSTALL NEW DUCTWORK/EQUIPMENT. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE THE RELOCATION OF EXISTING CONDUITS WHERE REQUIRED, WITH THE ELECTRICAL CONTRACTOR, TEMPERATURE CONTROLS CONTRACTOR AND THE OWNER'S REPRESENTATIVE. IF RELOCATION IS REQUIRED, IT SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.
16. PROVIDE MANUAL VOLUME DAMPERS AT ALL BRANCH TAKE-OFFS TO DIFFUSERS AND RETURN AIR/EXHAUST GRILLES.
17. THE CONTRACTOR SHALL CLEAN-UP ALL DEBRIS CAUSED BY HIS WORK AS IT ACCUMULATES, CONTRACTOR SHALL CLEAN AND DAMP MOP ALL WORK AREAS AND WORK TRAFFIC AREAS AT THE END OF EACH DAY. CONTRACTORS ARE TO CONFINE CONSTRUCTION TRAFFIC TO THE CONSTRUCTION AREA AS MUCH AS POSSIBLE TO MINIMIZE DUST.

CONTROLS CONTRACTOR SCOPE OF WORK

1. CONTROLS CONTRACTOR TO PROVIDE All COMPONENTS, WIRING, AND PROGRAMMING REQUIRED FOR INTEGRATION OF NEW CONTROL PANELS AND DEVICES PROVIDED WITH SPECIFIED MECHANICAL EQUIPMENT INTO EXISTING BMS. REFER TO OWNER'S CONTROL SPECIFICATIONS FOR ADDTIONAL REQUIREMENTS.

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Project Title
Robert W. Depke
Juvenile Justice Complex
RTU Replacement
24647 N Milwaukee Ave, Vernon Hills, IL 60061

Dwg. Title
MECHANICAL SHEET SPECIFICATIONS AND GENERAL NOTES

Project No. CHI-00240054-A1

Dwg. No. **M001** Rev. No. **1**

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GENERAL ABBREVIATIONS

°F	DEGREES FAHRENHEIT	MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
°C	DEGREES CELSIUS	MCA	MINIMUM CIRCUIT AMPS
ø	DIAMETER	MCC	MOTOR CONTROL CENTER
AD	ACCESS DOOR	ME	MOISTURE ELIMINATOR
ADJ	ADJUSTABLE	MECH	MECHANICAL
AFF	ABOVE FINISHED FLOOR	MEZZ	MEZZANINE
AFG	ABOVE FINISHED GRADE	MFR	MANUFACTURER
ARCH	ARCHITECT	MIN	MINIMUM
ATC	AUTOMATIC TEMPERATURE CONTROL	MOCP	MAXIMUM OVERCURRENT PROTECTION
ATV	ATMOSPHERIC VENT	MTD	MOUNTED
BFF	BELOW FINISHED FLOOR	N/A	NOT APPLICABLE
BHP	BRAKE HORSEPOWER	NC	NORMALLY CLOSED OR NOISE CRITERIA
BOD	BOTTOM OF DUCT	NIC	NOT IN CONTRACT
BMS	BUILDING MANAGEMENT CONTROL SYSTEM	NO	NORMALLY OPEN OR NUMBER
BOP	BOTTOM OF PIPE	NOM	NOMINAL
BTU	BRITISH THERMAL UNIT	NTS	NOT TO SCALE
BTUH	BRITISH THERMAL UNIT PER HOUR	OB	OCTAVE BAND
CLG	CEILING	OC	ON CENTER
CL	CENTERLINE	ODP	OPEN DRIP PROOF
COL	COLUMN	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
CONC	CONCRETE	OFOI	OWNER FURNISHED OWNER INSTALLED
CUF	CUBIC FEET	OV	OUTLET VELOCITY
CYL	CYLINDER	PCF	POUNDS PER CUBIC FOOT
DB	DRY BULB TEMPERATURE	PD	PRESSURE DROP
DDC	DIRECT DIGITAL CONTROL	PH	PHASE
DDCFP	DIRECT DIGITAL CONTROL FIELD PANEL	PLBG	PLUMBING
DIM	DIMENSION	POC	POINT OF CONNECTION
DN	DOWN	POD	POINT OF DEMARCATION
DP	DIFFERENTIAL PRESSURE	POS	POSITION OR POSITIVE
DWG	DRAWING	PSIA	POUNDS PER SQUARE INCH ABSOLUTE
EA	EACH	PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
EFF	EFFICIENCY	PSIG	POUNDS PER SQUARE INCH GAUGE
ELEC	ELECTRICAL	RC	ROOM CRITERIA (NOISE)
ELEV	ELEVATION	RET	RETURN
EMER	EMERGENCY	REQD	REQUIRED
ENT	ENTERING	RH	RELATIVE HUMIDITY
EQUIP	EQUIPMENT	RM	ROOM
EXH	EXHAUST	RPM	REVOLUTIONS PER MINUTE
EXP	EXPANSION	SC	SENSIBLE COOLING
(E)	EXISTING	SCH	SCHEDULE
EXTRM	EXISTING TO BE REMOVED	SH	SENSIBLE HEAT
ETR	EXISTING TO REMAIN	SHT	SHEET
FA	FIRE ALARM	SPEC	SPECIFICATION
FD	FLOOR DRAIN	SQ	SQUARE
FFOP	FIREFIGHTERS OVERRIDE PANEL	SQFT	SQUARE FEET
FLR	FLOOR	SS	STAINLESS STEEL
FP	FIRE PROTECTION	STD	STANDARD
FPM	FEET PER MINUTE	SUP	SUPPLY
FT	FEET	TAV	THERMOSTATIC AIR VENT
FT/SEC	FEET PER SECOND	TEFC	TOTALLY ENCLOSED FAN COOLED
FURN	FURNISHED	TEMP	TEMPERATURE
FVNR	FULL VOLTAGE NON-REVERSING	TOD	TOP OF DUCT
GA	GAUGE	TON	TONS OF REFRIGERATION
GAL	GALLONS	TOP	TOP OF PIPE
GALV	GALVANIZED	UNO	UNLESS NOTED OTHERWISE
GPH	GALLONS PER HOUR	UTR	UP THROUGH ROOF
GPM	GALLONS PER MINUTE	V	VENT
GYP	GYPSUM BOARD	VAV	VARIABLE AIR VOLUME
HP	HORSEPOWER	VEL	VELOCITY
HR	HOUR	VFD	VARIABLE FREQUENCY DRIVE
HZ	HERTZ	VTR	VENT THROUGH ROOF
ID	INSIDE DIAMETER	W	WIDTH
IN	INCHES	W/	WITH
KW	KILOWATT	W/O	WITHOUT
KVA	KILOVOLT AMPERE	WB	WET BULB TEMPERATURE
LB	POUND	WF	WIDE FLANGE
LF	LINEAR FEET	WG	WATER GAUGE
LVG	LEAVING	XFMR	TRANSFORMER
MAX	MAXIMUM		

AIR SIDE SYSTEM ABBREVIATIONS

AC	AIR CONDITIONING	LAT	COIL LEAVING AIR TEMPERATURE
ACD	AUTOMATIC CONTROL DAMPER	MA	MIXED AIR
AF	AIR FOIL	MAT	MIXED AIR TEMPERATURE
APD	AIR PRESSURE DROP	MAU	MAKE UP AIR
AT	AIR TERMINAL	OA	OUTSIDE AIR
AVS	AIR VOLUME TRAVERSE STATION	OAI	OUTSIDE AIR INTAKE
BI	BACKWARD INCLINE	OBD	OPPOSED BLADE DAMPER
BDD	BACKDRAFT DAMPER	OED	OPEN END DUCT
CD	CEILING DIFFUSER (SUPPLY)	P.E.	PNEUMATIC - ELECTRIC
CFM	CUBIC FEET PER MINUTE	R / RA	RETURN AIR
CV	CONSTANT VOLUME	RAT	RETURN AIR TEMPERATURE
DU / UC	DOOR LOUVER / UNDERCUT DOOR	RG	RETURN AIR GRILLE OR REGISTER
DWDI	DOUBLE WIDTH DOUBLE INLET	RLF	RELIEF
DWSI	DOUBLE WIDTH SINGLE INLET	RV	ROOF VENT
EA	EXHAUST AIR	S / SA	SUPPLY AIR
EAT	COIL ENTERING AIR OR EXHAUST AIR TEMP.	SAT	SUPPLY AIR TEMPERATURE
EG	EXHAUST AIR GRILLE OR REGISTER	SI	DUCT WITH LINING OR SOUND INSULATION
EP	ELECTRIC - PNEUMATIC	SP	STATIC PRESSURE
ESP	EXTERNAL STATIC PRESSURE	SS	STAINLESS STEEL DUCT
F&B	FACE AND BYPASS	SWDI	SINGLE WIDTH DOUBLE INLET
FC	FOWARD CURVE OR FLEXIBLE CONNECTION	SWSI	SINGLE WIDTH SINGLE INLET
FA	FREE AREA	TG	TRANSFER AIR GRILLE
FPI	FINS PER INCH	TSP	TOTAL STATIC PRESSURE
GE	GENERAL EXHAUST	VAV	VARIABLE AIR VOLUME
HEGA	HIGH EFFICIENCY GAS ABSORBER AIR FILTER	WMS	WIRE MESH SCREEN
HEPA	HIGH EFFICIENCY PARTICULATE AIR FILTER		

CONTROL DIAGRAM ABBREVIATIONS

AI	ANALOG INPUT CONTROL POINT	BO	BINARY OUTPUT CONTROL POINT
AO	ANALOG OUTPUT CONTROL POINT	EMS	ENERGY MANAGEMENT SYSTEM
ASD	ADJUSTABLE SPEED DRIVE	NC	NORMALLY CLOSED WHEN OFF
BAS	BUILDING AUTOMATION CONTROL SYSTEM	NO	NORMALLY OPEN WHEN OFF
BI	BINARY INPUT CONTROL POINT	VFD	VARIABLE FREQUENCY DRIVE

PIPING SYSTEM ABBREVIATIONS

AV	AUTOMATIC AIR VENT	MBFV	MOTORIZED BUTTERFLY VALVE
BBD	BOILER BLOW DOWN	NPSH	NET POSITIVE SUCTION HEAD
BF	BOILER FEEDWATER	NPSHA	NET POSITIVE SUCTION HEAD AVAILABLE
BFV	BUTTERFLY VALVE	NPSHR	NET POSITIVE SUCTION HEAD REQUIRED
BV	BALL VALVE	OS&Y	OUTSIDE STEM AND YOKE
CBST	COMBO. BALANCING/ SHUTOFF VALVE W/PRESS. TAPS	PG	PRESSURE GAUGE
		PRV	PRESSURE REDUCING VALVE
CHV	CHECK VALVE	RED	REDUCER
CO	CLEAN OUT	SOV	SHUT-OFF VALVE
CV	FLOW COEFFICIENT OR CONTROL VALVE	SRV	SAFETY RELIEF VALVE
DOV	DRAIN OFF VALVE	ST	STEAM TRAP
DX	DIRECT EXPANSION	STR	STRAINER
EWT	ENTERING WATER TEMPERATURE	SV	SOLENOID VALVE
FC	FLEXIBLE CONNECTION	S(XXX)	SECONDARY (SYSTEM DEPENDENT PREFIX)
FCV	FLOW CONTROL VALVE	TAV	THERMOSTATIC AIR VENT (STEAM ONLY)
FM	FLOW METER	TDH	TOTAL DYNAMIC HEAD
GLV	GLOBE VALVE	TH	THERMOMETER
GV	GATE VALVE	TW	TEST WELL (PETE'S PLUG)
HD	HEAD	T(XXX)	TERTIARY (SYSTEM DEPENDENT PREFIX)
ISV	ISOLATION VALVE	WPD	WATER PRESSURE DROP
LWT	LEAVING WATER TEMPERATURE		
MAV	MANUAL AIR VENT		

PIPING LEGEND

CHWS	CHILLED WATER SUPPLY		PIPE ANCHOR
CHWR	CHILLED WATER RETURN		PIPE GUIDE
CTBD	COOLING TOWER BLOW DOWN	EJ	EXPANSION JOINT
CTWS	COOLING TOWER WATER SUPPLY	SLOPE	PIPE SLOPE (REFER TO PLANS FOR SLOPE)
CTWR	COOLING TOWER WATER RETURN		AUTOMATIC AIR VENT
CWS	CONDENSER WATER SUPPLY		ANGLE VALVE - ELEVATION
CWR	CONDENSER WATER RETURN		ANGLE VALVE - PLAN
GWS	GEOTHERMAL WATER SUPPLY		BALL VALVE
GWR	GEOTHERMAL WATER RETURN		BALL VALVE W/ MEMORY STOP
GS	GLYCOL SUPPLY		BUTTERFLY VALVE
GR	GLYCOL RETURN		BUTTERFLY VALVE W/ MEMORY STOP
HWS	HEATING HOT WATER SUPPLY	M	MOTORIZED BUTTERFLY VALVE
HWR	HEATING HOT WATER RETURN		PRESSURE INDEPENDENT CONTROL VALVE
HPWS	HEAT PUMP WATER SUPPLY		COMBO. BALANCING/ SHUTOFF VALVE W/PRESS. TAPS
HPWR	HEAT PUMP WATER RETURN		CONTROL VALVE - 2 WAY
HCS	HOT OR COLD WATER SUPPLY (DUAL TEMP)		CONTROL VALVE - 3 WAY
HCR	HOT OR COLD WATER RETURN (DUAL TEMP)		CHECK VALVE
HTWS	HIGH TEMPERATURE WATER SUPPLY		DRAIN OFF VALVE (BALL VALVE W/ HOSE BIBB, CAP, & CHAIN)
HTWR	HIGH TEMPERATURE WATER RETURN		FLOAT OPERATED VALVE
MTWS	MEDIUM TEMPERATURE WATER SUPPLY		FLOW CONTROL VALVE
MTWR	MEDIUM TEMPERATURE WATER RETURN	FM	FLOW METER
MUW	MAKE UP WATER		FLOW METER - VENTURI
PCHWS	PROCESS CHILLED WATER SUPPLY		FLOW SWITCH
PCHWR	PROCESS CHILLED WATER RETURN		GATE VALVE
RD	REFRIGERANT DISCHARGE		GLOBE VALVE
RL	REFRIGERANT LIQUID		ISOLATION VALVE
RG	REFRIGERANT GAS		MANUAL AIR VENT
LPS	LOW PRESSURE STEAM		PRESSURE REDUCING VALVE
LPR	LOW PRESSURE CONDENSATE RETURN		PRESSURE SUSTAINING VALVE
HPS	HIGH PRESSURE STEAM		PRESSURE GAUGE
HPR	HIGH PRESSURE CONDENSATE RETURN		PRESSURE GAUGE W/ COIL SIPHON
G	NATURAL GAS		PUMP (TRIANGLE INDICATES FLOW DIRECTION)
	DOUBLE LINE PIPE RISE		QUICK CLOSING VALVE, FUSIBLE LINK
	SINGLE LINE PIPE RISE		QUICK OPENING VALVE
	DOUBLE LINE PIPE DROP		SAFETY RELIEF VALVE
	SINGLE LINE PIPE DROP	S	SOLENOID VALVE
	PIPE TEE OFF THE TOP		STRAINER - DUPLEX
	PIPE TEE OFF THE BOTTOM		STRAINER
	PIPE TEE OFF THE SIDE		STRAINER W/ DRAIN VALVE, HOSE BIBB, & CAP (USE GATE VALVE FOR STEAM)
	BLIND FLANGE		STRAINER - BASKET TYPE W/ DRAIN VALVE, HOSE BIBB, & CAP
	END CAP		STEAM TRAP
	PIPE BREAK		THERMOSTATIC AIR VENT (STEAM ONLY)
	DIRT LEG		THERMOMETER
CO	CLEAN OUT		TEST WELL (PETE'S PLUG)
	DIRECTION OF FLOW		TRIPLE DUTY VALVE
	REDUCER - CONCENTRIC		UNION
	REDUCER - ECCENTRIC	V	VACUUM BREAKER
	FLEXIBLE CONNECTION		

DEMOLITION

< C >	CAP EXISTING		DEMOLITION PIPING
< X >	EXISTING TO REMAIN		DEMOLITION EQUIPMENT OR DUCT
< R >	EXISTING TO BE REMOVED		
< RL >	EXISTING TO BE RELOCATED		
< NL >	EXISTING - NEW LOCATION		

CONTROL DIAGRAM LEGEND

2	MOTORIZED DAMPER - 2 POSITION	T	SERPENTINE TEMPERATURE SENSOR
M	MOTORIZED DAMPER - MODULATING	H	DUCT HUMIDITY SENSOR
xSC	MOTORIZED DAMPER - SPRING CLOSED	E	ENTHALPY SENSOR
xSO	MOTORIZED DAMPER - SPRING OPEN	EC	COMPARATIVE ENTHALPY SWITCH
xSM	MOTORIZED DAMPER - SMOKE DAMPER SPRING CLOSED UL-555S	HHL	HIGH LIMIT HUMIDITY - SWITCH
SF	MOTORIZED DAMPER - FIRE/ SMOKE DAMPER, 2 POSITION, SPRING CLOSED	TLL	LOW LIMIT THERMOSTAT - SWITCH
	3-WAY CONTROL VALVE	THL	HIGH LIMIT THERMOSTAT - SWITCH
	2-WAY CONTROL VALVE	SP	DIFFERENTIAL STATIC PRESSURE SENSOR
	BUTTERFLY CONTROL VALVE	DP	DIFFERENTIAL PRESSURE SENSOR (ANALOG)
2	2 POSITION	DPS	DIFFERENTIAL PRESSURE SWITCH
M	MODULATING	SHL	STATIC PRESSURE - HIGH LIMIT SWITCH
2SC	2 POSITION - SPRING CLOSED	SLL	STATIC PRESSURE - LOW LIMIT SWITCH
2SO	2 POSITION - SPRING OPEN	FM	FLOW METER
MSC	MODULATING - SPRING CLOSED	CT	CURRENT TRANSDUCER SENSOR (ANALOG)
MSO	MODULATING - SPRING OPEN	CTS	CURRENT TRANSDUCER SWITCH
F	FLOATING - 24VAC	R	RELAY
T	ROOM TEMPERATURE SENSOR	M	RELAY CONTACTOR - OPEN WITH NO CONTROL POWER
H	ROOM HUMIDITY SENSOR	M	RELAY CONTACTOR - CLOSED WITH NO CONTROL POWER
T	ROOM THERMOSTAT		TRANSFORMER
T	PIPE TEMPERATURE SENSOR		FUSE
T	DUCT TEMPERATURE SENSOR		TWISTED PAIR MULTI-SIGNAL CONTROL WIRING
		D S P	DUCT MOUNTED SMOKE DETECTOR (S) SUPPLY DUCT MOUNTED (R) RETURN DUCT MOUNTED (I) IONIZATION (P) PHOTOELECTRIC

AIR SYSTEM LEGEND

	RECTANGULAR SUPPLY/ OUTSIDE AIR DUCT UP	CFM	SPACE PRESSURIZATION ARROW
	RECTANGULAR SUPPLY/ OUTSIDE AIR DUCT DOWN	DL/ UC	DOOR LOUVER / UNDERCUT DOOR
	RECTANGULAR RETURN/ RELIEF AIR DUCT UP		SUPPLY AIRFLOW ARROW
	RECTANGULAR RETURN/ RELIEF AIR DUCT DOWN		RETURN OR EXHAUST AIRFLOW ARROW
	RECTANGULAR EXHAUST AIR DUCT UP		AIR VOLUME TRAVERSE STATION
	RECTANGULAR EXHAUST AIR DUCT DOWN		CEILING DIFFUSER (SUPPLY)
	ROUND SUPPLY/ OUTSIDE AIR DUCT UP		RETURN AIR GRILLE OR REGISTER
	ROUND SUPPLY/ OUTSIDE AIR DUCT DOWN		EXHAUST AIR GRILLE OR REGISTER
	ROUND RETURN/ RELIEF AIR DUCT UP		DIFFUSER WITH FLOW DIRECTION. NO FLOW ARROWS INDICATES STANDARD 4-WAY PATTERN.
	ROUND RETURN/ RELIEF AIR DUCT DOWN		
	ROUND EXHAUST AIR DUCT UP		SIDE WALL GRILLE
	ROUND EXHAUST AIR DUCT DOWN	H X	HUMIDITY SENSOR OR HUMIDISTAT AND NUMBER
	DUCT WITH LINING OR SOUND INSULATION	S X	SENSOR AND NUMBER
	STAINLESS STEEL DUCT	SW X	SWITCH AND NUMBER
	PVC COATED DUCT	T X	TEMPERATURE SENSOR OR THERMOSTAT & ZONE NUMBER
	DOUBLE WALL DUCT	T X	TEMPERATURE SENSOR OR THERMOSTAT W/ VANDAL GUARD & ZONE NUMBER
ACD	AUTOMATIC CONTROL DAMPER FOR ROUND AND RECTANGULAR DUCT	YM	REMOTE DAMPER OPERATOR
BDD	BACKDRAFT DAMPER FOR ROUND AND RECTANGULAR DUCT	DP	DIFFERENTIAL PRESSURE SENSOR
FD	FIRE DAMPER FOR ROUND AND RECTANGULAR DUCT	SD	DUCT SMOKE DETECTOR
SD	SMOKE DAMPER FOR ROUND AND RECTANGULAR DUCT	SP	STATIC PRESSURE SENSOR
SFD	COMBINATION SMOKE/FIRE DAMPER FOR ROUND AND RECTANGULAR DUCT	CO	CARBON MONOXIDE SENSOR
SGD	SLIDE GATE DAMPER FOR ROUND AND RECTANGULAR DUCT	CO2	CARBON DIOXIDE SENSOR
VD	MANUAL VOLUME DAMPER FOR ROUND AND RECTANGULAR DUCT		
	FLEXIBLE CONNECTION		

TAGS AND CALL OUT SYMBOLS

EQUIP #	EQUIPMENT REQUIRING ELECTRICAL SERVICE. REFER TO SCHEDULES FOR PERFORMANCE REQUIREMENTS.	#	REVISION CALLOUT
EQUIP #	EQUIPMENT NOT REQUIRING ELECTRICAL SERVICE. REFER TO SCHEDULES FOR PERFORMANCE REQUIREMENTS.	1	KEYNOTE CALLOUT
			POINT OF CONNECTION
			POINT OF DEMARCATION
	SECTION CALLOUT		
T / M3.1	SECTION DESIGNATION / SHEET NUMBER		
A / M3.1	DETAIL CALLOUT / DETAIL DESIGNATION / SHEET NUMBER		

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Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

MECHANICAL LEGEND AND SYMBOLS

Project No.
CHI-00240054-A1

Dwg. No.
M002

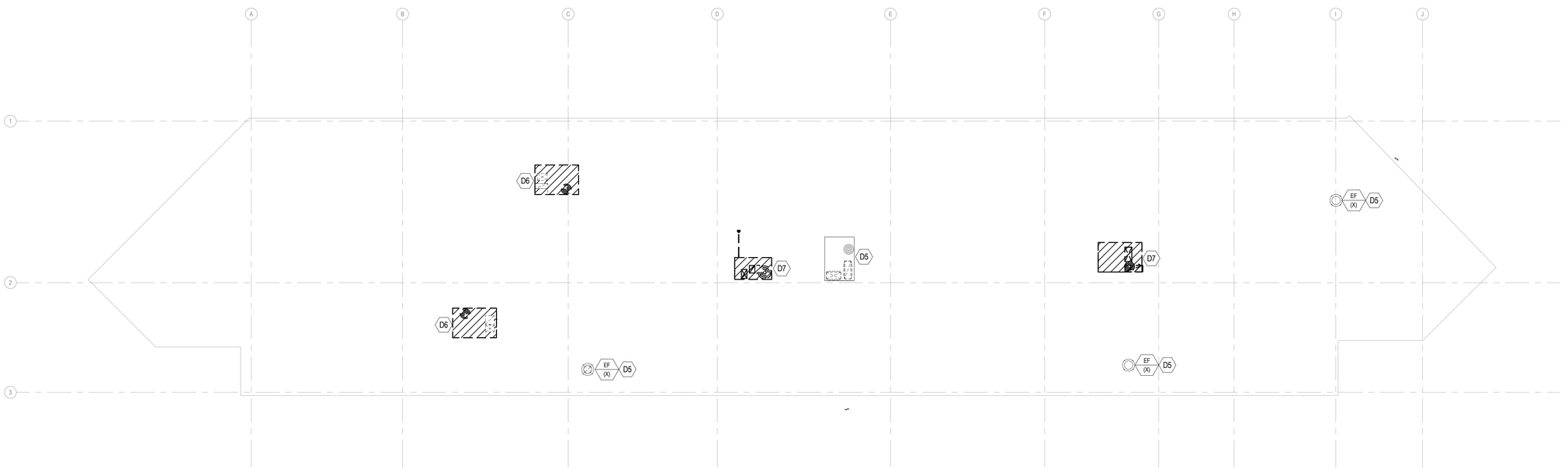
Rev. No.

GENERAL SHEET NOTES

1. PRIOR TO ANY DEMOLITION WORK, CONTRACTOR TO PERFORM AIRFLOW TEST OF EXISTING SYSTEM TO DETERMINE FLOWRATE AT EACH DIFFUSER. CONTRACTOR TO IDENTIFY ANY MISSING OR INOPERABLE MANUAL DAMPERS ON BOTH THE SUPPLY OR RETURN TO BE REPLACED. SUBMIT REPORT TO OWNER/ENGINEER FOR REVIEW.
2. ALL SUPPLY/RETURN & EXHAUST DIFFUSERS AND ASSOCIATED FLEXIBLE DUCTWORK LOCATED WITHIN THIS SCOPE OF WORK TO BE DEMOLISHED AND REPLACED IN-KIND.
3. ALL CEILINGS TO BE REMOVED AS REQUIRED AND PATCHED AFTER WORK HAS BEEN COMPLETED.
4. DEMOLISH DUCTWORK AS INDICATED AND PREPARE FOR NEW CONNECTIONS SHOWN ON M101.
5. CONTRACTOR RESPONSIBLE FOR ALL DISPOSAL OF RECLAIMED REFRIGERANT, EXISTING EQUIPMENT AND DUCTWORK DEMOLISHED UNDER THIS SCOPE.
6. CONTRACTOR TO COORDINATE WITH OWNER THE REMOVAL OF RTUS WITH ANY SCHEDULED ROOFING WORK. SEE SHEET M101 FOR PHASING INFORMATION.
7. ALL WORK TO BE SCHEDULED WITH OWNER TO LIMIT DOWNTIME AND DISRUPTION TO BUILDING FUNCTION.

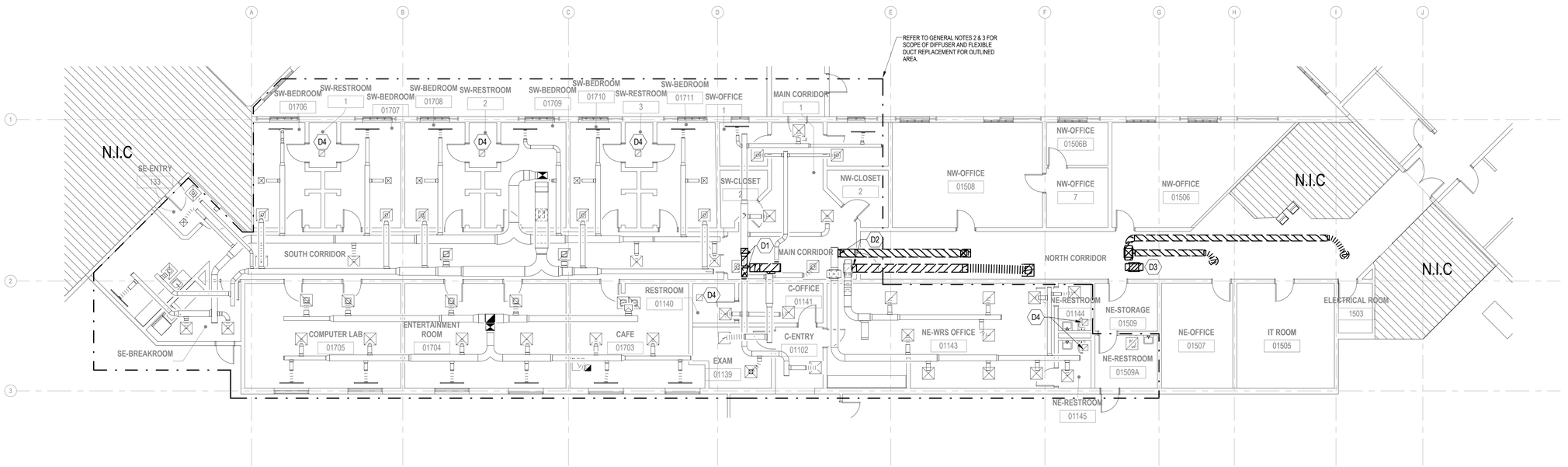
SHEET KEYNOTES

D1 DEMOLISH ALL DUCTWORK AS SHOWN INCLUDING VERTICAL CONNECTIONS TO RTU TO BE DEMOLISHED AND PREPARE FOR NEW CROSS CONNECTIONS.
D2 DEMOLISH ALL DUCTWORK SERVING NORTH CORRIDOR AND CAP AT EXISTING UNIT TO REMAIN.
D3 DEMOLISH ALL DUCTWORK CONNECTED TO ABANDONED ROOF TOP UNIT.
D4 EXISTING EXHAUST FAN AND FACE GRILLE TO REMAIN.
D5 EXISTING UNIT TO REMAIN.
D6 DEMOLISH EXISTING ROOF TOP UNIT, INCLUDING BUT NOT LIMITED TO: CURB AND ALL ASSOCIATED COMPONENTS. CONTRACTOR TO MODIFY EXISTING DUCTWORK AS REQUIRED TO MAKE CONNECTION TO NEW UNIT. REFER TO DLR DRAWINGS FOR NEW NATURAL GAS CONNECTIONS.
D7 DEMOLISH EXISTING ROOF TOP UNIT, CURB AND ALL ASSOCIATED COMPONENTS. REFER TO DLR DRAWINGS FOR ROOFING REQUIREMENTS FOR EXISTING UNUSED DUCTWORK PENETRATIONS.



2 ROOF DEMOLITION PLAN

1/8" = 1'-0"



1 FIRST FLOOR DEMOLITION PLAN

1/8" = 1'-0"

0" 4'-0" 8'-0" 16'-0" 24'-0"
SCALE: 1/8" = 1'-0"

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Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

FIRST FLOOR
MECHANICAL
DEMOLITION PLAN

Project No. CHI-00240054-A1

Dwg. No. **MD101**

Rev. No.

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COORDINATION & PHASING NOTES

1. CONTRACTOR TO COORDINATE WITH OWNER AND INSTALLING CONTRACTOR THE INSTALLATION OF NEW RTU AND ROOF CURBS WITH ROOF REPLACEMENT WORK TO MINIMIZE DISRUPTION TO AND DOWNTIME OF OCCUPIED SPACES BELOW.

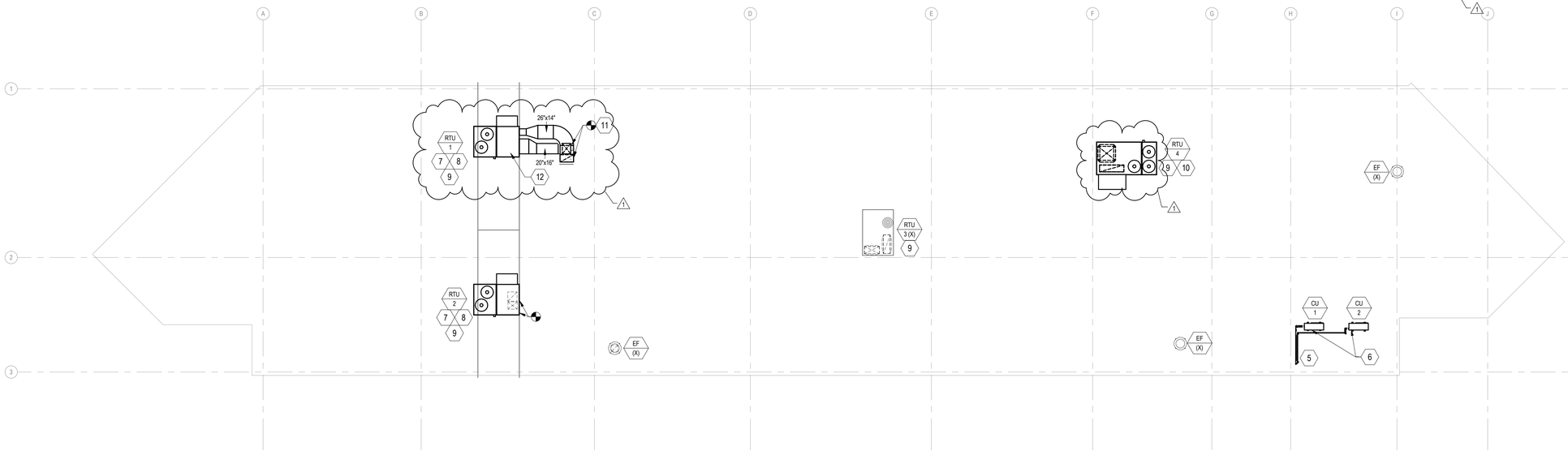
PRELIMINARY PHASING FOR THIS WORK IS AS INDICATED BELOW:
PHASE 1 - REWORK EXISTING CENTRAL COORIDOR UNIT, TAG RTU-3.
PHASE 2 - SOUTHEAST/SOUTHWEST UNITS, TAG RTU-1&2
PHASE 3 - NORTH CENTRAL UNIT, TAG RTU-4

GENERAL SHEET NOTES

1. ALL NEW DUCTWORK TO BE COORDINATED AND ROUTED TO AVOID EXISTING DUCTWORK, LIGHTING. NEW DUCTWORK AS REQUIRED WILL BE ROUTED THROUGH EXISTING JOIST SYSTEM. ASPECT RATIOS OF DIMENSIONED DUCTWORK BELOW TO BE FIELD VERIFIED BY CONTRACTOR TO ANY FABRICATION TO ENSURE VIABILITY.
2. CONTRACTOR TO PROVIDE ANY FIRE DAMPERS AS REQUIRED IN ADDITION TO THOSE SHOWN ON PLAN FOR NEW DUCTWORK RUNS PENETRATING FIRE RATED WALLS. DAMPER RATING TO MATCH THAT OF EXISTING FIRE DAMPERS.
3. ALL EXISTING DUCTWORK TO REMAIN TO BE THROUGHLY CLEANED AND ANY INSULATION & DUCTWORK PATCHED AND SEALED AS REQUIRED PRIOR TO ENERGIZING NEW SYSTEM.
4. FOR ALL DIFFUSERS AND GRILLES CONTRACTOR TO REBALANCE TO VALUES SHOWN ON PLANS. EXISTING MANUAL BALANCING DAMPERS FOR BOTH SUPPLY AND RETURN ASSUMED TO BE INSTALLED AND FUNCTIONING. CONTRACTOR TO REPLACE OR PROVIDE NEW WHERE INDICATED BY TAB CONTRACTOR TO ALLOW FOR A PROPERLY BALANCED SYSTEM.
5. CONTRACTOR TO PROPERLY SUPPORT ALL DUCTWORK EXISTING TO REMAIN UNDER THIS SCOPE IF FIELD CONDITION DEEMED TO BE INADEQUATELY SUPPORTED.
6. ALL DIFFUSERS SHOWN IN THIS PLAN TO BE NEW. FACE, TYPE AND SIZE TO BE COORDINATED TO MATCH EXISTING DIFFUSERS. REFER TO SCHEDULE FOR ADDTIONAL INFORMATION.
7. ALL EXISTING FLEX DUCT SERVING DIFFUSERS TO BE REPLACED AND NEW PROVIDED TO MAKE CONNECTION TO NEW DIFFUSERS. MAINTAIN A MAXIMUM DISTANCE OF 5'.

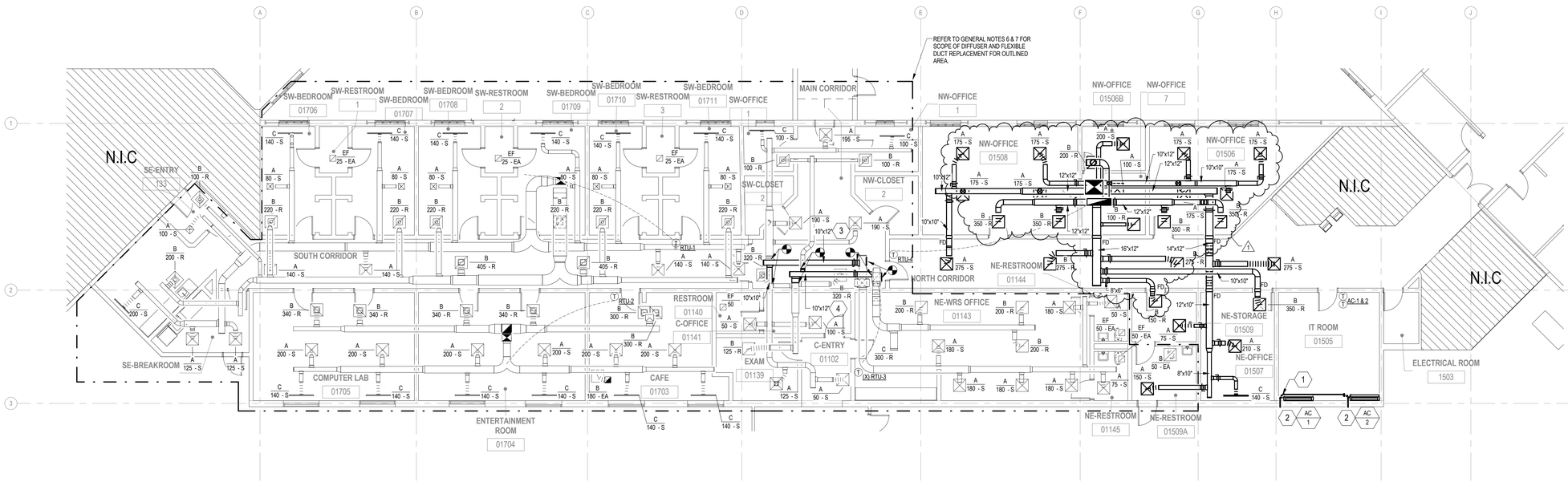
SHEET KEYNOTES

1. CONTRACTOR TO ROUTE AND SIZE REFRIGERANT LIQUID AND SUCTION LINES PER THE MANUFACTUERS RECCOMENDATION. BOTH SETS OF REFRIGERANT PIPING TO BE ROUTED TOGETHER UP TO CONDENSING UNITS ON THE ROOF.
2. PROVIDE CONDENSATE TRAP AND ROUTE THROUGH EXTERIOR WALL.
3. NEW CROSS CONNECT SUPPLY DUCT.
4. NEW CROSS CONNECT RETURN DUCT
5. CONTRACTOR TO ROUTE AND SIZE REFRIGERANT LIQUID AND SUCTION LINES PER THE MANUFACTUERS RECOMENDATION. REFER TO DLR PLAN DETAILS FOR TYPICAL PIPE PENETRATION AND ROOF SUPPORT DETAILS.
6. CONTRACTOR TO PROVIDE NEW 14" EQUIPMENT MOUNTING SUPPORT RAILS FOR NEW CONDENSING UNIT. LOCATE UNITS SUCH THAT THEY ARE ABOVE EXISTING BAR JOISTS.
7. UNIT TO BE MOUNTED ON STEEL BEAMS. SECURE UNIT PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ARCHITECTS ROOF PENETRATION DETAILS FOR DUCTWORK PENETRATIONS.
8. CONNECT NEW ROOFTOP UNIT TO EXISTING SUPPLY AND RETURN DUCTWORK. CONTRACTOR TO MODIFY EXISTING DUCTWORK AS REQUIRED TO MAKE CONNECTION TO NEW UNIT.
9. NEW NATURAL GAS CONNECTION TO RTU. REFER TO DLR ROOFING PLAN FOR GAS PIPING SIZE AND LOCATION.
10. UNIT TO BE MOUNTED ON STEEL PLATFORM ABOVE ROOF. SECURE UNIT TO PLATFORM PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ARCHITECTS ROOF PENETRATION DETAILS FOR DUCTWORK PENETRATIONS.
11. REFER TO ARCHITECT'S DRAWINGS FOR DUCTWORK SUPPORT DETAIL.
12. REWORK AND RELOCATE EXISTING VENT STACK TO A MINIMUM 10' FROM RTU OUTSIDE AIR INTAKE PER CODE.



2 ROOF PLAN

1/8" = 1'-0"



1 FIRST FLOOR PLAN

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Project Title

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Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

FIRST FLOOR
MECHANICAL PLAN

Project No. CHI-00240054-A1

Dwg. No. **M101**

Rev. No. **1**

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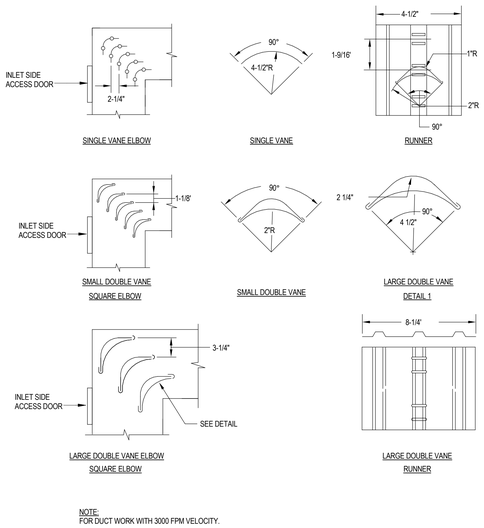
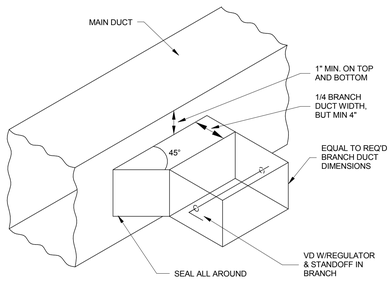
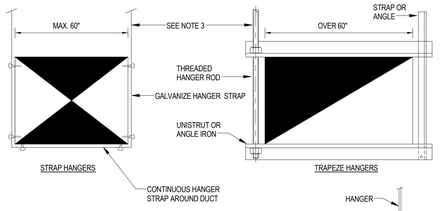


NOTE:
FOR DUCT WORK WITH 3000 FPM VELOCITY.

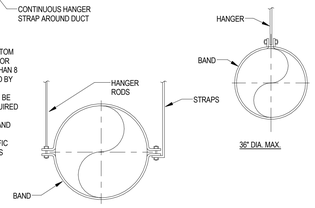
1 DOUBLE VANE ELBOW DETAIL
NTS



2 BRANCH DUCT TAKE-OFF FITTING DETAIL
NTS



NOTES:
1. ON DUCTS OVER 48" WIDE, BOTTOM SHALL BE BRACED BY ANGLE. FOR CROSS SECTION AREA MORE THAN 8 SQ. FT., DUCT SHALL BE BRACED BY ANGLES ON ALL FOUR SIDES.
2. CUTTING AND PATCHING SHALL BE LIMITED TO A MINIMUM AS REQUIRED FOR PROPER INSTALLATION.
3. SUPPORTS SHALL BE SPACED AND SIZED AS PER SMACNA.
4. REFER TO SMACNA FOR SPECIFIC RECOMMENDED HANGER TYPES NOTED ABOVE.



3 DUCT HANGER SUPPORT
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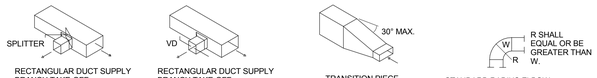
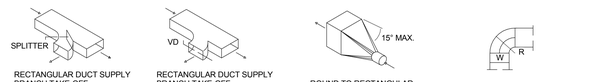




NOTES:
1. IF R IS LESS THAN W, THEN FULL ARC TURNING VANE(S) SHALL BE PROVIDED, SEE SCHEDULE BELOW.
2. INSIDE BEND MAY BE SQUARE FOR W > 12", NO SQUARE HEELS PERMITTED.

VANE SCHEDULE	
WIDTH	NO. OF VANES
≤ 12"	1
12"-24"	2
24"-36"	3
36"-60"	4
60"-84"	5
> 84"	6

NOTES:
1. PROVIDE STANDARD RADIUS ELBOWS WHEN POSSIBLE - SHORT RADIUS WHERE REQUIRED.
2. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED & FASTENED AS RECOMMENDED BY SMACNA.
3. NO SQUARE OR RECTANGULAR HEEL ELBOWS SHALL BE ALLOWED.
4. NO SPIN-IN CONNECTIONS SHALL BE ALLOWED.

4 TYPICAL DUCT DETAILS
NTS

NOTES:
1. ATTACH FLEXIBLE DUCT WITH DRAW BANDS TO SHEETMETAL DUCT AND COLLAR. MAINTAIN CONTINUOUS VAPOR BARRIER ON SUPPLY OUTLET.
2. MAXIMUM OFFSET IN HORIZONTAL & VERTICAL PLANE TO BE 6" FOR FLEXIBLE DUCT CONNECTION TO DIFFUSER BOOT COLLAR.

5 DROP CEILING DIFFUSER / RETURN GRILLE DETAIL
NTS

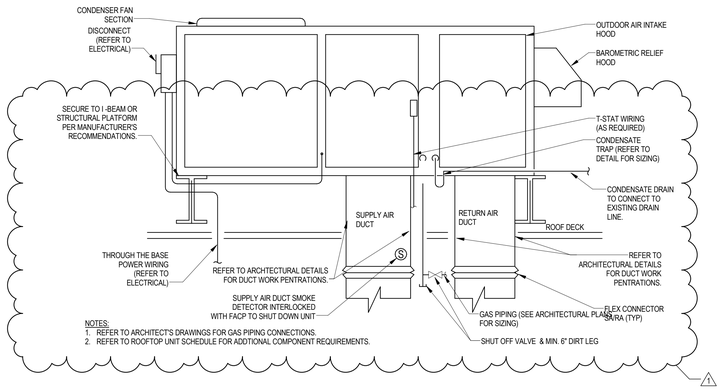
6 SIDEWALL REGISTER
NTS

NOTES:
1. INSTALL FIRE DAMPER STRICTLY ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
2. USE RUSKIN THIN WALL FIRE DAMPER OR APPROVED EQUAL WHERE RATE WALL IS SHEETROCK.

7 TYP. FIRE DAMPER INSTALLATION DETAIL
NTS

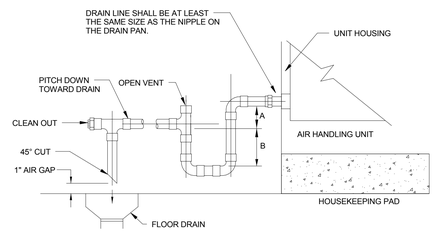
NOTES:
1. DIAGRAM INDICATES COMPONENTS INSTALLED IN MANUFACTUERED SYSTEM. COMPONENTS SUCH AS FANS, CONTROL PANEL, ELECTRICAL DEVICES AND EXTERNAL HOUSING ARE NOT SHOWN ABOVE FOR SIMPLICITY.
2. EQUIPMENT TO BE MOUNTED PER MANUFACTURERS' INSTRUCTIONS.
3. PIPING TO BE RIGID COPPER ONLY, SIZES & CONTROL EQUIPMENT AND TRAPS AS REQUIRED BY UNIT MANUFACTURER (SUBMIT IN SHOP DRAWING)
4. REFRIGERANT PIPING SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH AIR HANDLING UNIT AND CONDENSING UNIT MANUFACTURES RECOMMENDATIONS.
5. PIPING SHALL BE INSTALLED PARALLEL AND AT RIGHT ANGLES TO BUILDING CONSTRUCTION.
6. PROVIDE FILTER/DRYER(S) IN REFRIGERANT LIQUID LINE AT LOCATION(S) RECOMMENDED BY EQUIPMENT MANUFACTURER.

8 SPLIT-DX REFRIGERANT PIPING COMPONENT DIAGRAM
NTS



NOTES:
1. REFER TO ARCHITECT'S DRAWINGS FOR GAS PIPING CONNECTIONS.
2. REFER TO ROOFTOP UNIT SCHEDULE FOR ADDTIONAL COMPONENT REQUIREMENTS.

9 PACKAGED ROOFTOP UNIT
NTS



UNIT TYPE	A	B
DRAW THRU	≥ ("X")	≥ 1/2("X")
BLOW THRU	≥ 1/2("X")	≥ ("X")+1/2"

WHERE "X" = STATIC PRESS. IN COIL SECTION.

NOTES:
1. INSULATE WITH 1" FIBERGLASS INSULATION AND PVC JACKET.
2. PIPE SHALL BE 1 1/2" DIA. COPPER TUBE.

10 CONDENSATE TRAP DETAIL
NTS

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Dwg. Title
MECHANICAL DETAILS

Project No.
CHI-00240054-A1

Dwg. No. **M501**
Rev. No. **1**

ROOFTOP UNIT SCHEDULE

TAG	LOCATION	SERVING	SUPPLY FAN													FILTER	COOLING CAPACITY								HEATING CAPACITY				UNIT ELECTRICAL DATA								BASIS OF DESIGN	NOTES
			CONFIG	TYPE	NOM. TONS	TYPE	ARI EER	IEER	COOLING AIRFLOW (CFM)	HEATING AIRFLOW (CFM)	OUTSIDE AIRFLOW MIN (CFM)	OUTSIDE AIRFLOW MAX (CFM)	ESP (IN-WC)	FAN SPEED (RPM)	MOTOR DATA HP	MOTOR DATA BHP	MOTOR DATA DRIVE	SPECS	COMP TYPE	OAT (°F) DB	OAT (°F) WB	MAT (°F) DB	MAT (°F) WB	LAT (°F) DB	LAT (°F) WB	TOTAL (MBH)	SENSIBLE (MBH)	HEAT TYPE	1S/2S IN (MBH)	1S/2S OUT (MBH)	CONTROL	V/PH/HZ	FLA	MCA	MOCP	VFD (Y/N)	DISC. SWITCH (Y/N)	PRE-WIRED (Y/N)	UNIT WEIGHT (LB)		
RTU-1	ROOF	SW BEDROOMS	DOWNFLOW	SZVAV	6	DX	13	20.5	2450	2450	230	2450	1	833	1.5	1.29	BELT	NOTE 2	SCROLL	92.3	75.5	78.4	66.6	57.2	56.9	74.9	56.0	NG	90/125	73/103	STAGED	208/3/60	41	39	50	Y	Y	Y	1232	CARRIER - 48LCR	ALL
RTU-2	ROOF	SE AREA	DOWNFLOW	SZVAV	6	DX	13	20.5	2000	2000	300	2000	1	794	1.25	0.97	BELT	NOTE 2	SCROLL	92.3	75.5	79.2	68	56.3	56.3	74.5	49.5	NG	90/125	73/103	STAGED	208/3/60	41	39	50	Y	Y	Y	1232	CARRIER - 48LCR	ALL
RTU-3 (X)	ROOF	MAIN CORRIDOR	DOWNFLOW	SZVAV	5	DX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NG	-	-	-	208/3/60	-	-	-	-	-	-	-	EXISTING UNIT TO REMAIN (SHOWN FOR REFERENCE)	NONE
RTU-4	ROOF	NW AREA	DOWNFLOW	SZVAV	7.5	DX	12.8	19.4	2825	2825	210	2825	1	717	2	1.70	BELT	NOTE 2	SCROLL	92.3	75.5	78.1	65.1	55.7	54.5	90.6	68.2	NG	120/150	96/120	STAGED	208/3/60	51	48	60	Y	Y	Y	1854	CARRIER - 48LCR	ALL

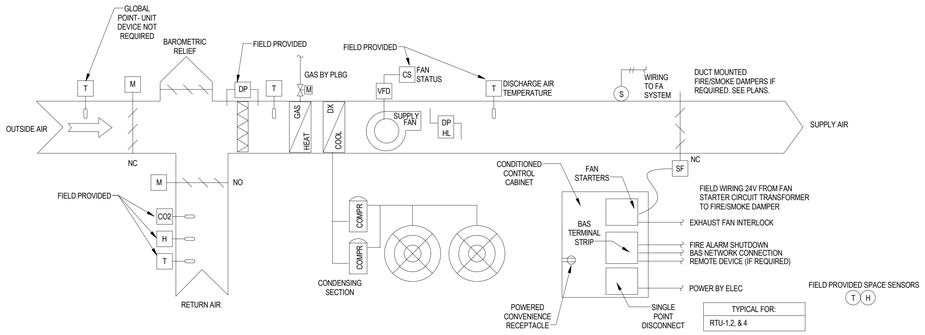
NOTES:
1. UNIT TO BE IECC 2015 COMPLIANT.
2. PROVIDE UNIT WITH MERV 8 FILTERS.
3. PROVIDE THRU THE BASE ELECTRICAL FACTORY MOUNTED DISCONNECT SWITCH AND POWERED CONVENIENCE OUTLET WITH UNIT.
4. PROVIDE NEW 14" MOUNTING CURB AS REQUIRED PER MANUFACTURER'S RECOMMENDATION TO SUPPORT UNIT STRUCTURAL ON NEW I- BEAM OR STRUCTURAL PLATFORM. (1)
5. GAS CONNECTION TO BE AT ROOF LEVEL.
6. PROVIDE STAINLESS STEEL HX AND POLYMER DRAIN PAN.
7. PROVIDE SUPPLY SMOKE DETECTOR (COORDINATE WITH SIMPLEX) AND HAIL GUARDS.
8. PROVIDE WITH ENTHALPY CONTROLLED ECONOMIZER, BAROMETRIC RELIEF, LOW LEAK DAMPERS.
9. PROVIDED FACTORY INSTALLED ALC SE6104A (OR APPROVED EQUAL) IN LIEU OF CARRIER RTU OPEN CARD PROVIDED THAT THE SCOPE OF WORK IN THESE DRAWINGS NOTES AND THE SEQUENCE OF OPERATIONS IS FULLY MET BY USING AN ALC BACNET MS/TP CONTROLLER.

CONTROLS NOTES TO BE COORDINATED BETWEEN EQUIPMENT MANUFACTURER AND CONTROLS CONTRACTOR AS REQUIRED.
ALC CONTROLLER TO PROVIDED IN LIEU OF CARRIER RTU OPEN CARD REFERENCED BELOW. FUNCTIONALITY TO REMAIN THE SAME.
1. CONTROLS CONTRACTOR TO PROVIDE THE FOLLOWING DEVICES IN ADDITION TO REQUIREMENTS LISTED BELOW:
UNIT CONTROLLER, WALL MOUNTED SPACE TEMP SENSOR, CO2, AND HUMIDITY SENSOR, DISCHARGE AIR TEMP SENSOR , DIRTY FILTER, AND FAN STATUS.
2. CONFIGURE INPUT 2 AS THE IAQ SENSOR. PROVIDE 24 VDC POWER FOR SENSOR. PROVIDE THE SENSOR THAT SUPPORTS DEMAND CONTROL VENTILATION.
3. CONFIGURE INPUT 3 AS THE COMPRESSOR SAFETY.
4. PROVIDE INPUT 4 AS THE SAFETY CHAIN ALARM.
5. PROVIDE INPUT 5 AS FIRE ALARM SHUTDOWN. CO-ORDINATE WITH SIMPLEX. ARRANGE WITH SIMPLEX TO PROVIDE FIRE ALARM SHUTDOWN TO THE EXISTING FIRE ALARM CONTROL PANEL.
6. PROVIDE INPUT 9 AS THE ENTHALPY SWITCH.
7. PROVIDE INPUT 9 AS THE ICG OVERRIDE AS THIS IS REQUIRED FOR A GAS-FIRED RTU.
8.PROVIDE THE SPACE SENSOR AS THE COMMUNICATING RNET TYPE SENSOR. PROVIDE THE ZS PRO SENSOR.
9. PROVIDE FAN STATUS AS A SEPARATE POINT TIED TO AN ALC BAS PANEL AS THERE ARE NO FREE INPUTS ON THE RTU OPEN BOARD. PROVIDE AS AN INTRINSIC INPUT IF SUPPORTED BY RTU OPEN CONTROLLER.
10. PROVIDE FILTER STATUS AS A SEPARATE POINT TIED TO AN ALC BAS PANEL AS THERE ARE NO FREE INPUTS ON THE RTU OPEN BOARD. PROVIDE AS AN INTRINSIC INPUT IF SUPPORTED BY RTU OPEN CONTROLLER.
11. PROVIDE A SPACE RH SENSOR AS A SEPARATE POINT TIED TO AN ALC BAS PANEL AS THERE ARE NO FREE INPUTS ON THE RTU OPEN BOARD. PROVIDE AS AN INTRINSIC INPUT IF SUPPORTED BY RTU OPEN CONTROLLER. ALC SHALL DETERMINE WHEN DEHUMIDIFICATION IS REQUIRED AND SHALL WRITE TO THE SYSTEM MODE MSV TO PUT THE UNIT INTO DEHUMIDIFICATION MODE. DEHUMIDIFICATION MODE IS ALLOWED WHEN OAT > 80 AND RH IS ABOVE 50%.
12.CONFIGURE MINIMUM DAMPER POSITION SO IT CAN BE OVERRIDDEN BY THE IAQ ROUTINE.
13. PROVIDE THE ECONOMIZER OPTION.
14. CONFIGURE THE OPTIMAL START OPTION.
15. PROVIDE DEMAND CONTROL VENTILATION CONTROL OPTION.
16. CONFIGURE NIGHT TIME FREE COOLING OPTION.
17. CONFIGURE THE COMPRESSOR RUNTIME ALARM.
18. PROVIDE THE WALL MOUNTED SYSTEM TOUCH DISPLAY. CONNECT THE DISPLAY TO THE BACNET MS/TP NETWORK.
18.PROVIDE AND CONFIGURE THE FDD OPTION.
19. ALC SHALL PROVIDE A DWYER A-306 OR APPROVED EQUAL OUTDOOR STATIC AIR PRESSURE SENSOR TO READ BUILDING STATIC PRESSURE. STATIC PRESSURE CONTROL IS NOT PART OF THE WORK BASED ON THE DRAWINGS.
20. ALC SHALL ALLOW FOR PROVIDING ALL THE TYPICAL ALARMS SHOWN IN RTU OPEN PROTOCOL TABLE 4 THAT COME WITH THE UNIT.
21.ALC SHALL ALLOW FOR 50 TRENDS PER RTU CONFIGURED AS 15 MINUTE TRENDS THAT ARE STORED ON THE LAKE COUNTY SERVER FOR 90 DAYS. ALLOW FOR 5 LONG TERM CRITICAL 15 MINUTE TRENDS THAT HAVE NO EXPIRY.
22. ALC SHALL PROVIDE A CURRENT TRANSDUCER TO MEASURE THE KWH FOR EACH RTU. CREATE A 24 TREND OF THE TOTAL KWH CONSUMED. EXPOSE THIS TREND VIA BACNET SO THIS VALUE CAN BE ADDED TO THE ENERGY MONITORING SYSTEM.
23. LAKE COUNTY WILL PROVIDE BACNET CONFIGURATION INFORMATION SUCH AS DEVICE OBJECT NAME AND INSTANCE.
24. COMPLETE THE STARTUP SHEET TESTS AS PART OF THE COMMISSION WORK WITH THE LAKE COUNTY BAS CONSULTANT.
25. PROVIDE THE SERVICE TEST FUNCTION AS PART OF THE RTU FIELD STARTUP. PROVIDE REPORT TO OWNER.

PACKAGED AIR CONDITIONING UNIT SCHEDULE (DX SPLIT)

TAG	LOCATION	FAN			MODE	COOLING CAPACITY	REFRIGERANT	INDOOR EQUIPMENT (AC-1 & 2)			OUTDOOR EQUIPMENT (CU-1 & 2)		PRE-WIRED	MOTOR STARTER	DISC. SWITCH	REMOTE CONTROL DEVICES	AC-01 UNIT WEIGHT (LBS.)	CU-01 UNIT WEIGHT (LBS.)	MANUFACTURER AND MODEL	REMARKS
		CFM	ESP (IN)	HP		MBH	TYPE	V/PH/HZ	FLA	MCA	V/PH/HZ	MCA	MOCP	Y/N	Y/N	Y/N					
AC-1 & 2 CU-1 & 2	IT ROOM	775	N/A	N/A	COOLING ONLY	24,000	R-410A	208/1/60	1	1	208/1/60	20	30	Y	Y	Y	T-STAT	53	151	INDOOR - MITSUBISHI -PKA-A24KA7 HIGH WALL DISCHARGE OUTDOOR - MITSUBISHI- PUY-A24NHA7- COOLING ONLY	ALL

NOTES:
1. PROVIDE INDOOR UNIT WITH REMOTE MOUNTED THERMOSTAT, DISCONNECT SWITCH AND CEILING MOUNTING HARDWARE.
2. PROVIDE OUTDOOR UNIT WITH MOUNTING BASE, BRACKETS, WIND BAFFLE/ LOW AMBIENT KIT AND DISCONNECT SWITCH. (1)
3. PROVIDE UNITS WITH BACNET/IP AND ONE BACNET MASTER GATEWAY AS REQUIRED TO INTERFACE TO BOTH UNITS AND EXISTING BAS. OWNER WILL PROVIDE NECESSARY IP DROP(S). LOCATE DEVICE WITHIN THE IT ROOM.
4. ALLOW FOR 2 HOURS OF ON-SITE COMMISSIONING. (1)



Run Conditions - Scheduled:
The unit will run according to a user definable time schedule in the following modes:
Occupied Mode: The unit will maintain :
- A 74°F (adj.) cooling setpoint
- A 70°F (adj.) heating setpoint.

Unoccupied Mode (night setback): The unit will maintain
- A 85°F (adj.) cooling setpoint.
- A 55°F (adj.) heating setpoint.

Alarms will be provided as follows:
- High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
- Low Zone Temp: If the zone temperature is lees than the heating setpoint by a user definable amount (adj.).

Demand Limiting - Zone Setpoint Optimization:
To lower power consumption, the zone setpoints will automatically relax when the facility power consumption exceeds definable thresholds. The amount of relaxation will be individually configurable for each zone. The zone setpoints will automatically return to their previous settings when the facility power consumption drops below the thresholds.
Zone Setpoint Adjust:
The occupant will be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
Zone Optimal Start:
The unit will use an optimal start algorithm for morning start-up. This algorithm will minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
Zone Unoccupied Override:
A timed local override control will allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit will automatically return to the schedule.
Freeze Protection:
The unit will shut down and generate an alarm upon receiving a freezestat status.
Supply Fan:
The supply fan will run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan will have a user definable (adj.) minimum runtime.
Alarms will be provided as follows:
- Supply Fan Failure: Commanded on, but the status is of.
- Supply Fan in Hand: Commanded of, but the status is on.
- Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).

Cooling Stages:
The controller will measure the zone temperature and stage the cooling to maintain its cooling setpoint. To prevent short cycling, there will be a user definable (adj.) delay between stages, and each stage will have a user definable (adj.) minimum runtime.
The cooling will be enabled whenever:
- Outside air temperature is greater than 60°F (adj.).
- AND the economizer (if present) is disabled or fully open.
- AND the zone temperature is above cooling setpoint.
- AND the supply fan status is on.
- AND the heating is not active.

Gas Heating Stages:
The controller will measure the zone temperature and stage the heating to maintain its heating setpoint. To prevent short cycling, there will be a user definable (adj.) delay between stages, and each stage will have a user definable (adj.) minimum runtime.
The heating will be enabled whenever:
- Outside air temperature is less than 65°F (adj.).
- AND the zone temperature is below heating setpoint.
- AND the supply fan status is on.
- AND the cooling is not active.

Economizer:
The controller will measure the zone temperature and modulate the economizer dampers in sequence to maintain a setpoint 2°F less than the zone cooling setpoint. The outside air dampers will maintain a minimum adjustable position of 20% (adj.) open whenever occupied.
The economizer will be enabled whenever:
- Outside air temperature is less than 65°F (adj.).
- AND the outside air enthalpy is less than 2% (adj.).
- AND the outside air temperature is less than the return air temperature.
- AND the outside air enthalpy is less than the return air enthalpy.
- AND the supply fan status is on.

The economizer will close whenever:
- Mixed air temperature drops from 45°F to 40°F (adj.).
- OR on loss of supply fan status.
- OR freezestat (if present) is on.

The outside and exhaust air dampers will close and the return air damper will open when the unit is of. If Optimal Start Up is available, the mixed air damper will operate as described in the occupied mode except that the outside air damper will modulate to fully closed.
Minimum Outside Air Ventilation - Carbon Dioxide (CO2) Control:
When in the occupied mode, the controller will measure the return air CO2 levels and modulate the outside air dampers open on rising CO2 concentrations, overriding normal damper operation to maintain a CO2 setpoint of 750ppm (adj.).
Dehumidification:
The controller will measure the return air humidity and override the cooling sequence to maintain return air humidity at or below 60% rh (adj.). Dehumidification will be enabled whenever the supply fan status is on.
Final Filter Status:
The controller will monitor the final filter status.
Alarms will be provided as follows:
- Final Filter Change Required: Final filter differential pressure exceeds a user definable limit (adj.).

Mixed Air Temperature:
The controller will monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).
Alarms will be provided as follows:
- High Mixed Air Temp: If the mixed air temperature is greater than 90°F (adj.).
- Low Mixed Air Temp: If the mixed air temperature is lees than 45°F (adj.).

Return Air Carbon Dioxide (CO2) Concentration Monitoring:
The controller will measure the return air CO2 levels.
Alarms will be provided as follows:
- High Return Air Carbon Dioxide Concentration: If the return air CO2 concentration is greater than 1000ppm (adj.) when in the occupied mode.

Return Air Humidity:
The controller will monitor the return air humidity and use as required for economizer control (if present) or humidity control (if present).
Alarms will be provided as follows:
- High Return Air Humidity: If the return air humidity is greater than 70% (adj.).
- Low Return Air Humidity: If the return air humidity is lees than 35% (adj.).

Return Air Temperature:
The controller will monitor the return air temperature and use as required for economizer control (if present).
Alarms will be provided as follows:
- High Return Air Temp: If the return air temperature is greater than 90°F (adj.).
- Low Return Air Temp: If the return air temperature is lees than 45°F (adj.).

Supply Air Temperature:
The controller will monitor the supply air temperature.
Alarms will be provided as follows:
- High Supply Air Temp: If the supply air temperature is greater than 120°F (adj.).
- Low Supply Air Temp: If the supply air temperature is lees than 45°F (adj.).

1 DX PACKAGED ROOFTOP UNIT SCHEMATIC - SINGLE-ZONE VAV - GAS HEAT
NTS

AIR DEVICE SCHEDULE

TAG	SERVICE	TYPE	MOUNT.	CFM	MODULE SIZE	NECK SIZE	OBD (Y/N)	MATERIAL	BASIS OF DESIGN	NOTES
A	SUPPLY	DIFFUSER	CEILING	1-120	24"x24"	Ø6"	Y	STEEL	TITUS TMS	1-6
				125-250		Ø8"				
				255-450		Ø10"				
				455-550		Ø12"				
				555-700		Ø14"				
A	SUPPLY	DIFFUSER	CEILING	1-120	12"x12"*	Ø6"	Y	STEEL	TITUS TMS	1-6
				125-250		Ø8"				
B	RETURN/ EXHAUST/ TRANSFER	DIFFUSER	CEILING	1-100	12"x12"*	Ø6"	Y	STEEL	TITUS PAR	2-6
				105-350		10"X10"				
B	RETURN/ EXHAUST/ TRANSFER	DIFFUSER	CEILING	1-100	24"x24"*	Ø6"	Y	STEEL	TITUS PAR	2-6
				105-190		Ø8"				
				195-300		Ø10"				
				305-450		Ø12"				
C	SUPPLY	DIFFUSER	SIDEWALL	SEE PLANS	MATCH EXISTING	N/A	Y	STEEL	TITUS 350RL	2-6

1. PROVIDE WITH FOIL BACKED INSULATION OPTION FOR ALL SUPPLY DIFFUSERS AS AVAILABLE.
2. COORDINATE DIFFUSER MODULE SIZE. 3 OR 4 WAY WITH EXISTING SUPPLY/RETURN DIFFUSERS. MATCH EXISTING FOR FINISH AND COLOR UNLESS DIRECTED OTHERWISE. ALL EXISTING DIFFUSERS IN SCOPE OF WORK TO BE REPLACED IN KIND.
3. TOTAL STATIC PRESSURE SHALL NOT EXCEED 0.10" WG FOR ALL DIFFUSERS, GRILLES AND REGISTERS, 0.05" WG FOR ALL TRANSFER GRILLES AND LOUVERS.
4. PROVIDE INTEGRAL BALANCING DEVICE FOR ALL REGISTERS, DIFFUSERS, GRILLES UNLESS NOTED OTHERWISE.
5. UNLESS OTHERWISE INDICATED, DUCTS CONNECTING AIR DEVICES SHALL MATCH AIR DEVICE NECK.
6. CONTRACTOR TO COORDINATE FRAME, BORDER AND MOUNTING HARDWARE TO INSTALL IN EXISTING CEILING OR NEW CEILING AS REQUIRED. (1)

VENTILATION SCHEDULE

ZONE			AREA (SF)	OUTSIDE AIRFLOW RATE (CFM/PERSON)	OUTSIDE AIRFLOW RATE (CFM/SF)	DEFAULT OCC. DENSITY (#/1000 SF)	DEFAULT # OF OCC.	# OF OCC.	OUTSIDE AIRFLOW REQUIRED (CFM)	OUTSIDE AIRFLOW PROVIDED (CFM)	SUPPLY AIRFLOW PROVIDED (CFM)	EXHAUST AIRFLOW RATE (CFM/TOILET)	EXHAUST AIRFLOW REQUIRED (CFM)	EXHAUST AIRFLOW PROVIDED (CFM)	SYSTEM	NOTES
ROOM NAME	ROOM NUMBER	ROOM FUNCTION														
S CORRIDOR		CORRIDOR	905	0	0.06	0	0	0	54	55	780				RTU-1	
SE-BREAKROOM		BREAK ROOMS (GENERAL)	125	5	0.06	25	3	2	18	20	250				RTU-1	
SW-BEDROOM	01706	DWELLING UNIT	175	5	0.06	2	0	2	21	25	220				RTU-1	
SW-RESTROOM	1	TOILETS	35	0	0.00	0	0	0	0	0	0	25	25	25	EF-(X)	
SW-BEDROOM	01707	DWELLING UNIT	201	5	0.06	2	0	2	22	25	220				RTU-1	
SW-BEDROOM	01708	DWELLING UNIT	201	5	0.06	2	0	2	22	25	220				RTU-1	
SW-RESTROOM	2	TOILETS	35	0	0.00	0	0	0	0	0	0	25	25	25	EF-(X)	
SW-BEDROOM	01709	DWELLING UNIT	216	5	0.06	2	0	2	23	25	220				RTU-1	
SW-BEDROOM	01710	DWELLING UNIT	175	5	0.06	2	0	2	21	25	220				RTU-1	
SW-RESTROOM	3	TOILETS	35	0	0.00	0	0	0	0	0	0	25	25	25	EF-(X)	
SW-BEDROOM	01711	DWELLING UNIT	195	5	0.06	2	0	2	22	25	220				RTU-1	
SE-ENTRY	1	CORRIDOR	55	0	0.06	0	0	0	3	5	100				RTU-1	
COMPUTER LAB	01705	COMPUTER LAB	470	5	0.06	4	2	14	98	100	680				RTU-2	
ENTERTAINMENT ROOM	01704	MULTI-PURPOSE	470	5	0.06	120	56	14	98	100	680				RTU-2	
CAFÉ	01703	DAY ROOM	360	5	0.06	30	11	14	92	100	680				RTU-2	
SW-OFFICE	1	OFFICE SPACE	77	5	0.06	5	1	1	10	10	100				RTU-3 (X)	
SW-CLOSET	2	ELEC/ MECH EQPT ROOM	76	5	0.00	0	1	0	0	0	0				EF-(X)	
C-OFFICE	01141	OFFICE SPACE	95	5	0.06	5	1	1	11	15	100				RTU-3 (X)	
MAIN CORRIDOR		CORRIDOR	380	0	0.06	0	2	0	23	25	575				RTU-3 (X)	
NW-OFFICE	1	OFFICE SPACE	76	5	0.06	5	1	1	10	10	100				RTU-3 (X)	
NW-CLOSET	2	ELEC/ MECH EQPT ROOM	77	5	0.00	0	1	0	0	0	0				EF-(X)	
RESTROOM	01140	TOILETS	48	0	0.00	0	0	1	0	0	50	50	50	50	EF-(X)/RTU-3 (X)	
EXAM ROOM	01139	OFFICE SPACE	122	5	0.06	5	1	1	12	15	125				RTU-3 (X)	
C-ENTRY	01102	CORRIDOR	90	0	0.06	0	0	0	5	5	50				RTU-3 (X)	
NE-WRS OFFFICE	01143	OFFICE SPACE	662	5	0.06	5	3	4	60	55	900				RTU-3 (X)	
NE-RESTROOM	01144	TOILETS	44	0	0.00	0	0	0	0	0	50	50	50	50	EF-(X)	
NE-RESTROOM	01145	TOILETS	45	0	0.00	0	0	0	0	0	75	50	50	50	RTU-4/EF-(X)	
NORTH CORRIDOR		CORRIDOR	865	0	0.06	0	0	0	52	55	550				RTU-4	
NW OFFICE	01508	OFFICE SPACE	444	5	0.06	5	2	4	47	50	700				RTU-4	
NW OFFICE	01506B	OFFICE SPACE	74	5	0.06	5	0	1	9	10	200				RTU-4	
NW OFFICE	7	OFFICE SPACE	104	5	0.06	5	1	1	11	15	100				RTU-4	
NW OFFICE	01506	OFFICE SPACE	388	5	0.06	5	2	4	43	45	700				RTU-4	
NE-RESTROOM	01509A	TOILETS	93	0	0.00	0	0	0	0	0	150	50	50	75	RTU-4/EF-(X)	
NE-STORAGE	01509	STORAGE ROOM	84	0	0.12	0	0	0	10	10	75				RTU-4	
NE-OFFICE	01507	OFFICE SPACE	210	5	0.06	5	1	2	23	25	350				RTU-4	
IT ROOM	1505	ELEC/ MECH EQPT ROOM	290	5	0.00	0	0	0	0	0	0				AC 1 & 2	

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No.	Revision	Date
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Drawn By:	AJJ
Checked By:	AJW
Approved By:	MLB
Date Printed:	06.18.2018
File Name:	CHI-00240054-A1.rfa

Project Title
Robert W. Depke
Juvenile Justice Complex
RTU Replacement
24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title
MECHANICAL SCHEDULES

Project No. CHI-00240054-A1

Dwg. No. **M601** Rev. No. **1**

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STRUCTURAL GENERAL NOTES

GENERAL:

1. THE PRIMARY PURPOSE OF THE CONTRACT DRAWINGS IS FOR BIDDING AND PERMITTING. THE CONTRACTOR SHALL FOLLOW THE CONTRACT DRAWINGS, THE CONTRACT SPECIFICATONS, AND THE REQUIRED PROJECT SUBMITTALS FOR COMPLETION OF THE PROJECT.
2. DETAILS AND SECTIONS NOTED AS TYPICAL SHALL BE CONSTRUED TO APPLY TO TYPICAL CONDITIONS ELSEWHERE.
3. DETAILS AND SECTIONS NOTED AS SIMILAR SHALL BE CONSTRUED AS SIMILAR TO THE REFERENCE DETAIL/SECTION AT THE LOCATION INDICATED.
4. THE CONTRACTOR SHALL FIELD CHECK AND VERIFY ALL EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE BEFORE PROCEEDING WITH THE WORK.
5. DO NOT SCALE THE DRAWINGS, USE DIMENSIONS.
6. NO CHANGE IN SIZE OR DIMENSION OF ANY STRUCTURAL ELEMENT SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
7. NO OPENINGS SHALL BE MADE IN ANY STRUCTURAL ELEMENT UNLESS SPECIFICALLY INDICATED ON THE CONTRACT DRAWINGS OR IF PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER HAS BEEN PROVIDED.
8. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. AS A RESULT OF THE CONSTRUCTION MEANS, METHODS, AND/OR SEQUENCES OF CONSTRUCTION CHOSEN BY THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING AND FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED TO MAINTAIN STRUCTURAL INTEGRITY DURING CONSTRUCTION.
9. THE CONTRACTOR SHALL INFORM THE CONSTRUCTION MANAGER OR THE OWNER'S ON-SITE REPRESENTATIVE IN WRITING OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT BE RELIEVE OF THE RESPONSIBILITY FOR SUCH DEVIATION BASED UPON THE REVIEW OF PROJECT SUBMITTALS UNLESS THE CONTRACTOR SPECIFICALLY INFORMED THE CONSTRUCTION MANAGER OR OWNER'S ON-SITE REPRESENTATIVE OF SUCH DEVIATION AT THE TIME OF SUBMISSION, AND THE CONSTRUCTION MANAGER HAS GIVEN WRITTEN APPROVAL FOR THE SPECIFIC DEVIATION.

STRUCTURAL STEEL:

1. ALL DETAILING, FABRICATION, AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES, 2010 EDITION (AISC 303-10).
2. ALL BOLTED CONNECTIONS FOR STRUCTURAL STEEL FRAMING SHALL CONFORM TO THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DATED DECEMBER 21, 2009.
3. UNLESS OTHERWISE NOTED, ALL BOLTED CONNECTIONS SHALL BE MADE WITH 0.75 INCH DIAMETER HIGH STRENGTH BOLTS, BEARING TYPE, SNUG TIGHTENED, WITH THREADS ALLOWED TO BE INCLUDED IN THE SHEAR PLANE, CONFORMING TO ASTM A325-N.
4. ALL WELDED CONNECTIONS FOR STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AWS STRUCTURAL WELDING CODE D.1.1. UNLESS OTHERWISE NOTED, ALL WELDED CONNECTIONS SHALL BE MADE WITH E70 ELECTRODES.
5. STRUCTURAL STEEL CONNECTION DETAILS INDICATED ON THE DRAWINGS SHALL NOT BE USED FOR FABRICATION. THE FABRICATOR SHALL VERIFY THE GEOMETRY AND INCLUDE THE DETAILS IN THE STRUCTURAL STEEL SUBMITTAL ACCORDING TO THE PROJECT SPECIFICATIONS.
6. ALL STRUCTURAL STEEL TO BE HOT DIPPED GALVANIZED.

CONCRETE AND CONCRETE ACCESSERIES:

1. MINIMUM CONCRETE COMPRESSIVE STRENGTH (f'c) AT 28 DAYS SHALL BE:

   FOOTINGS, FOUNDATION WALLS, AND GRADE BEAMS 4000 PSI
2. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE VERIFIED BY FIELD QUALITY CONTROL IN ACCORDANCE WITH THE CAST-IN-PLACE CONCRETE SPECIFICATION.
3. ALL CONCRETE SHALL BE READY MIXED, JOB MIXED CONCRETE IS NOT PERMITTED.
4. ALL CONCRETE SHALL BE NORMAL WEIGHT UNLESS NOTED OTHERWISE.
5. SEE SPECIFICATIONS FOR ENTRAINED AIR REQUIREMENTS.
6. SEE SPECIFICATIONS AND ARCHITECTURAL DRAWINGS FOR CONCRETE FINISH REQUIREMENTS INCLUDING SURFACE HARDNERS AND SEALERS.
7. THE MINIMUM YIELD STRENGTH (fy) OF BOTH DEFORMED BAR AND PLAIN WIRE REINFORCEMENT SHALL BE 60,000 PSI.
8. UNLESS OTHERWISE NOTED ON THE DRAWINGS, THE PROTECTION OF CONCRETE REINFORCEMENT (NON-PRESTRESSED) SHALL ADHERE TO SECTION 7.7.1 OF ACI 318. THE FOLLOWING DIMENSIONS ARE IN INCHES.

   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3

   CONCRETE EXPOSED TO EARTH OR WEATHER
   - NO. 6 BAR THROUGH NO. 18 BAR 2
   - NO. 5 BAR, W31 OR D31 WIRE, AND SMALLER 1-1/2

   CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND
   - NO. 14 AND NO. 18 BARS 1-1/2
   - NO. 11 BAR AND SMALLER 3/4
9. WHEN THE DRAWINGS GRAPHICALLY INDICATE A 90 OR 180 DEGREE HOOK, PROVIDE A STANDARD HOOK IN ACCORDANCE WITH SECTION 7.1 OF ACI 318.
10. WHEN THE DRAWINGS GRAPHICALLY INDICATE TENSION REINFORCMENT AS LAPPED, USE A CLASS B TENSION SPLICE IN ACCORDANCE WITH SECTION 12.15 OF ACI 318. MECHANICAL SPLICES ARE PERMITTED AND SHALL DEVELOPED A MINIMUM OF 1.25(fy) OF THE BAR.
11. WHEN THE DRAWINGS INDICATE A BOND BREAKER, PROVIDE A 30LB ASPHALT SATURATED FELT, TYPE II, CONFORMING TO ASTM D226.

FOUNDATIONS:

1. FOUNDATION DESIGN: ALLOWABLE BERAING PRESSURE FOR CONTINUOUS AND SPREAD FOOTINGS = 2000 PSF
2. FOUNDATION DESIGNS ARE BASED UPON CODE PERMITTED PRESUPTIVE SOIL LOAD BEARING VALUES. BOTTOM OF ALL FOUNDATION SHALL BE INSPECTED BY A REGISTERED SOILS ENGINEER AND DESIGN BEARING CAPACITY VERFIED BEFORE PLACING ANY CONCRETE.
3. BACKFILL FOR FOUNDATION ELEMENTS SHALL BE MADE OF SOIL THAT IS FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, COBBLES, AND BOULDERS. IN LIEU OF SOIL, CONTROLLED LOW STRENGTH MATERIAL (CLSM) CAN BE USED IF A WRITTEN REQUEST IS SUBMITTED TO THE CONSTRUCTION MANAGER OR ON-SITE OWNER'S REPRESENTATIVE AND APPROVED BY BOTH THE STRUCTURAL ENGINEER AND THE OWNER.

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No.	Revision	Date
1	ADDENDUM #1	06-29-2018

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Professional Seal(s)

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File Name:	CHI-00240054-A1.rfa

Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

STRUCTURAL GENERAL NOTES

Project No. CHI-00240054-A1

Dwg. No. **S001** Rev. No. **1**

ROOFTOP MECHANICAL UNIT WEIGHTS

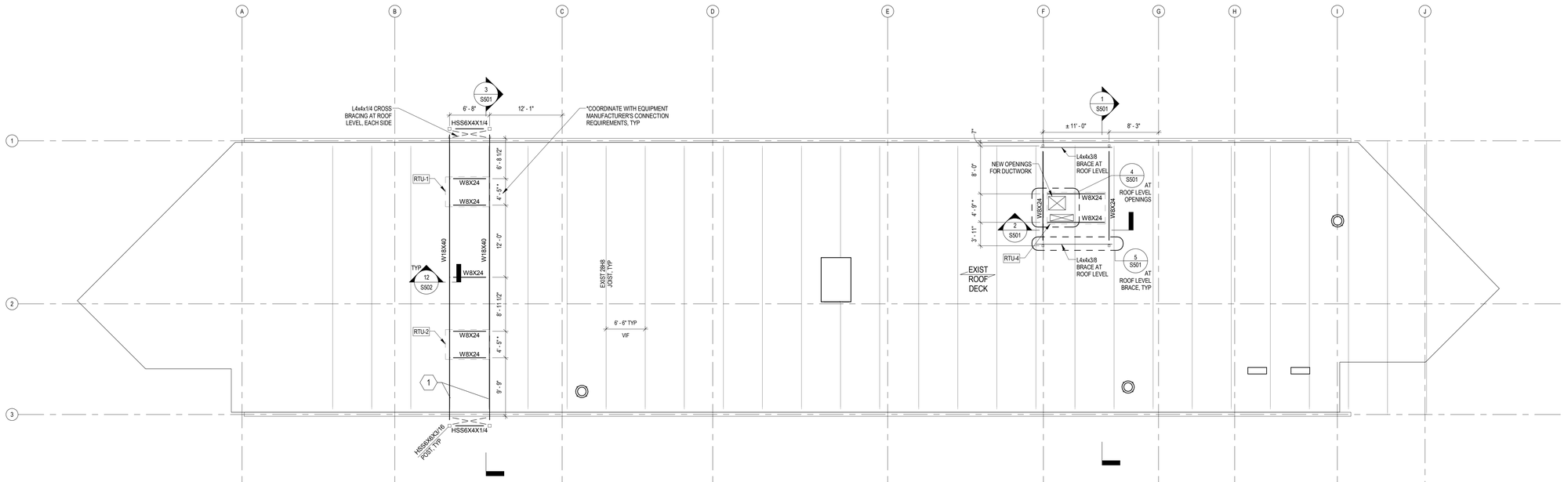
UNIT #	OPERATING WEIGHT (LBS)
RTU-1	1230
RTU-2	1230
RTU-4	1854

GENERAL SHEET NOTES

1. REFER TO S-001 FOR GENERAL NOTES.
2. COORDINATE MECH. EQUIPMENT LOCATIONS WITH MECHANICAL.
3. COORDINATE OPENINGS WITH MECHANICAL CONTRACTOR.
4. ALL ATTACHMENT OF EQUIPMENT TO STRUCTURE PER MANUFACTURER.
5. ALL STRUCTURAL STEEL TO BE HOT DIPPED GALVANIZED.
6. EXISTING STRUCTURE IS OBTAINED FROM HISTORICAL DOCUMENTS AND FIELD OBSERVATIONS AND MUST BE VERIFIED ON SITE BEFORE CONSTRUCTION. BRING TO THE ATTENTION OF THE ENGINEER ANY DISCREPANCIES FROM THE EXISTING CONDITIONS SHOWN IN THE DRAWINGS BEFORE PROCEEDING.

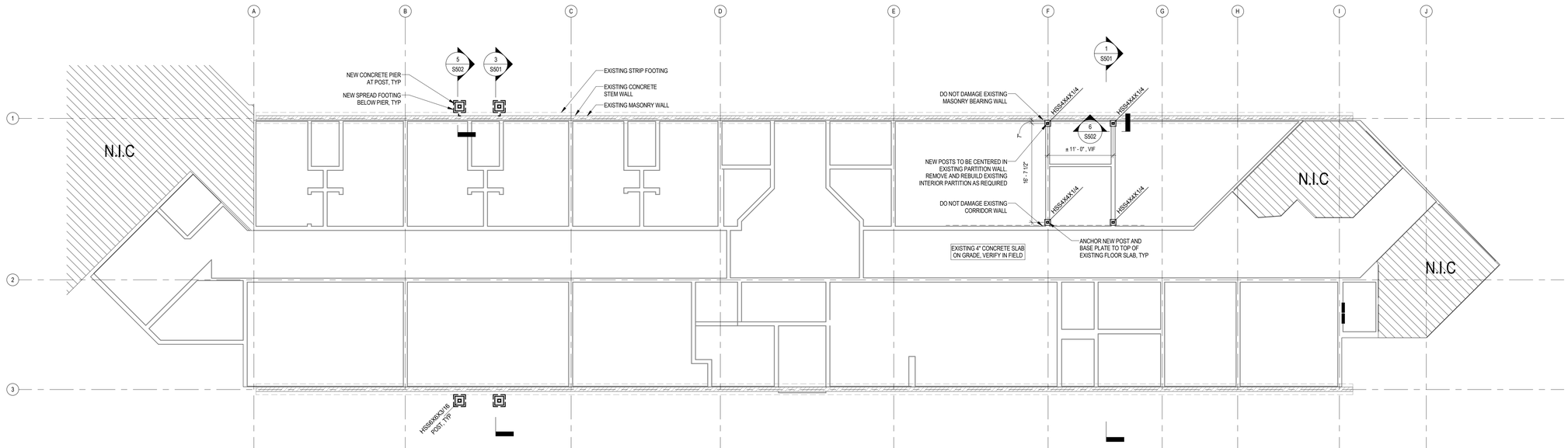
SHEET KEYNOTES

1 BEAM LOCATION TO BE COORDINATED WITH EXISTING CONDITION TO ALLOW THE REUSE OF EXISTING ROOF OPENINGS FOR RTU-2.



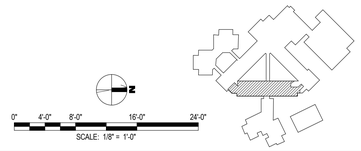
2 ROOF FRAMING PLAN

1/8" = 1'-0"



1 DEPKE FIRST FLOOR & FOUNDATION PLAN

1/8" = 1'-0"



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Juvenile Justice Complex
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24647 N Milwaukee Ave,
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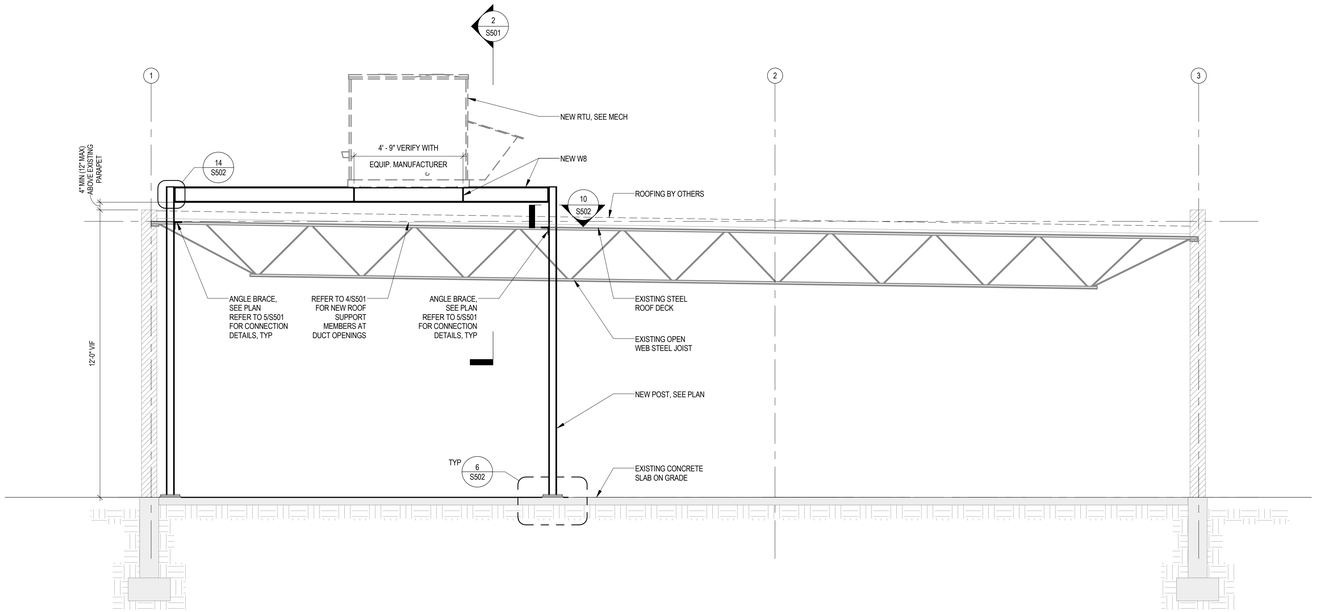
Dwg. Title

ROOF STRUCTURAL PLAN

Project No. CHI-00240054-A1

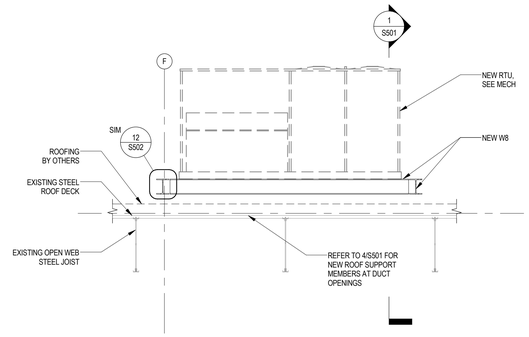
Dwg. No. **S101** Rev. No. **1**

6/29/2018 8:53:40 AM F:\Doc_exp\CHI-00240054-A1\REVIT_This Project Uses Revit 2016 [To Be Confirmed]



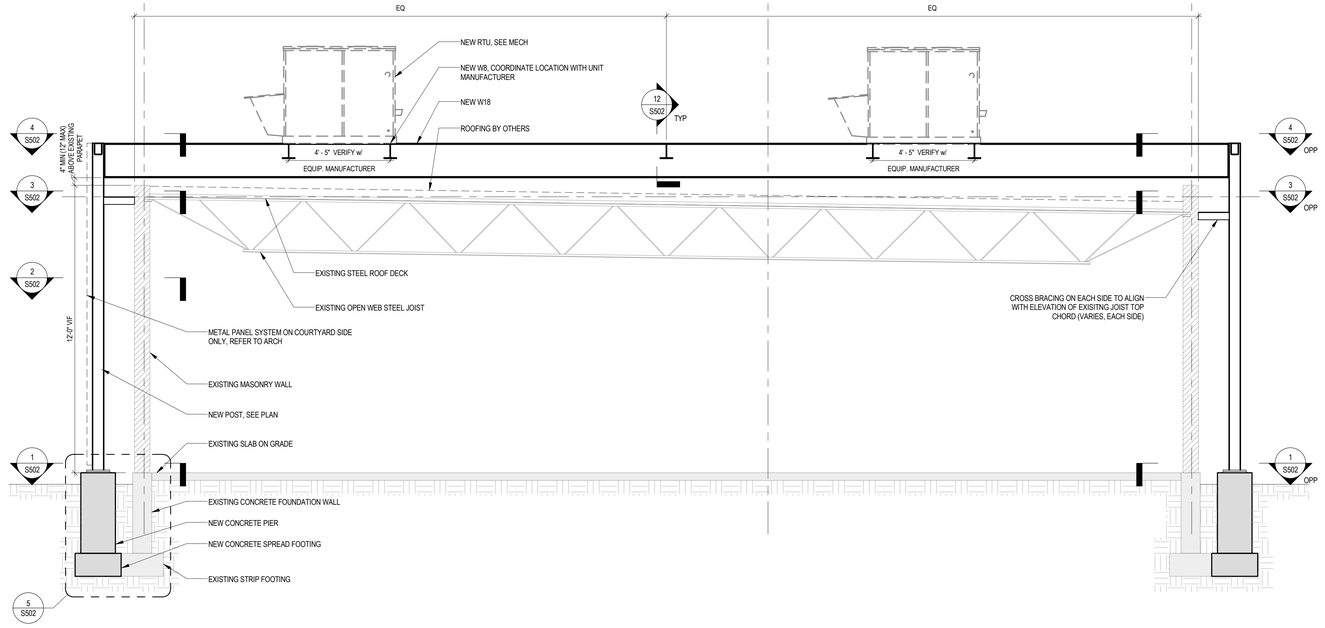
1 EQUIPMENT PLATFORM & ROOF SECTION

3/8" = 1'-0"



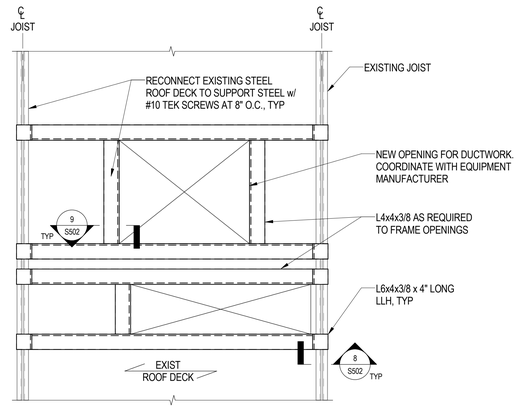
2 EQUIPMENT PLATFORM SECTION

3/8" = 1'-0"



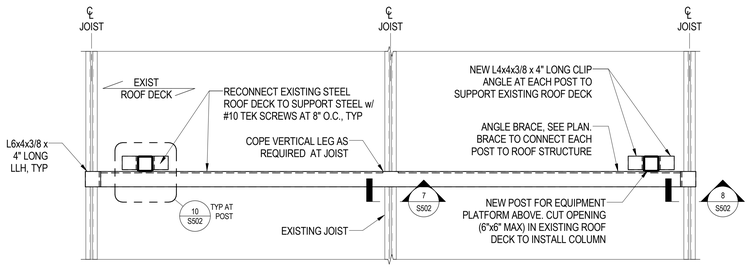
3 EQUIPMENT PLATFORM & ROOF SECTION

3/8" = 1'-0"



4 TYP FRAMING AROUND DUCT OPENING

3/4" = 1'-0"



5 CONNECTION DETAIL AT POST BRACE

3/4" = 1'-0"

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No.	Revision	Date
1	ADDENDUM #1	06-29-2018

ISSUED FOR BID

Professional Seal(s)

Drawn By:	Author
Checked By:	Checker
Approved By:	Approver
Date Printed:	06.18.2018
File Name:	CHI-00240054-A1.rfa

Project Title

Robert W. Depke
Juvenile Justice Complex
RTU Replacement

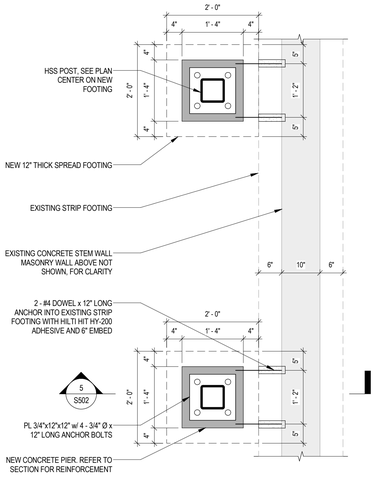
24647 N Milwaukee Ave,
Vernon Hills, IL 60061

Dwg. Title

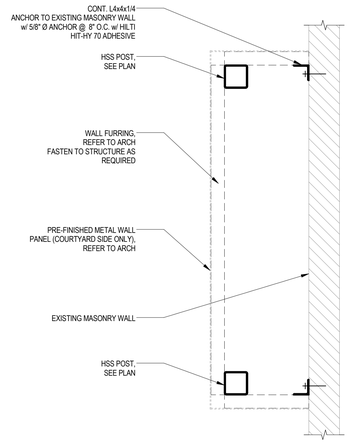
STRUCUTRAL SECTION
AND DETAILS

Project No. CHI-00240054-A1

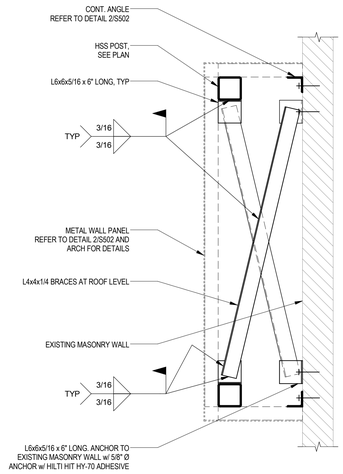
Dwg. No. **S501** Rev. No. **1**



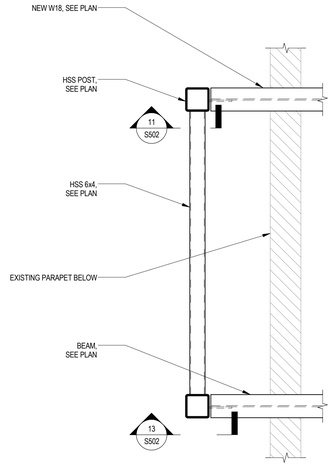
1 NEW COLUMN FOUNDATIONS
3/4" = 1'-0"



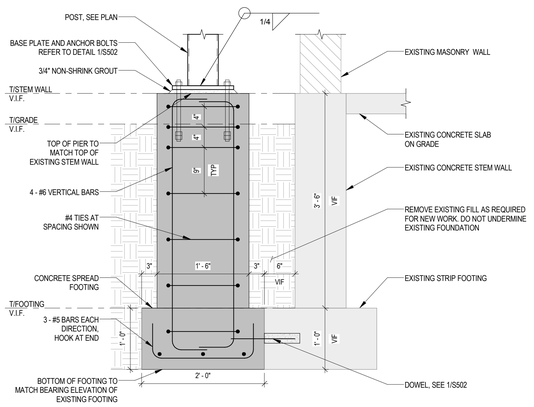
2 WALL PANEL SUPPORT
3/4" = 1'-0"



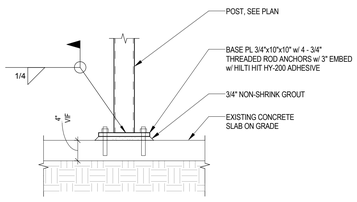
3 FRAME BRACING
3/4" = 1'-0"



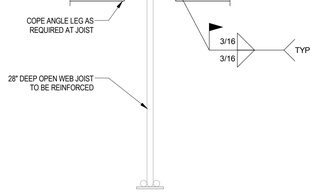
4 TOP OF FRAME
3/4" = 1'-0"



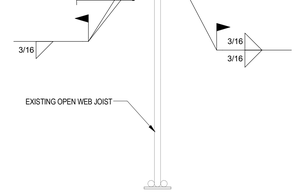
5 FOOTING DETAIL
1" = 1'-0"



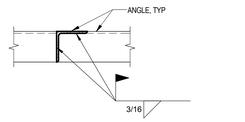
6 INTERIOR POST ANCHORAGE
1" = 1'-0"



7 SECTION
1 1/2" = 1'-0"



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



9 SECTION
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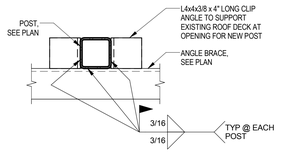
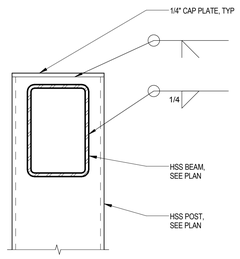
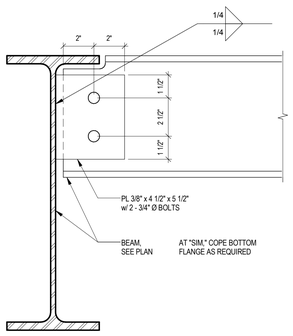


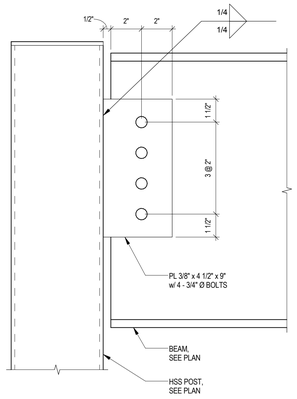
10 SECTION
1 1/2" = 1'-0"



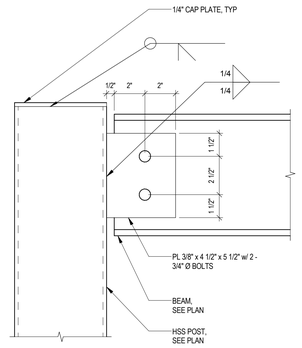
11 SECTION
3" = 1'-0"



12 SECTION
3" = 1'-0"



13 SECTION
3" = 1'-0"



14 SECTION
3" = 1'-0"

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Dwg. Title

STRUCTURAL SECTIONS AND DETAILS

Project No.
CHI-00240054-A1

Dwg. No. **S502**

Rev. No. **1**

6/29/2018 8:53:42 AM F:\Doc_exp\CHI-00240054-A1\REVIT_This Project Uses Revit 2016 [To Be Confirmed]