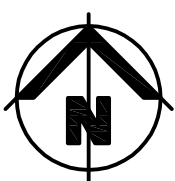
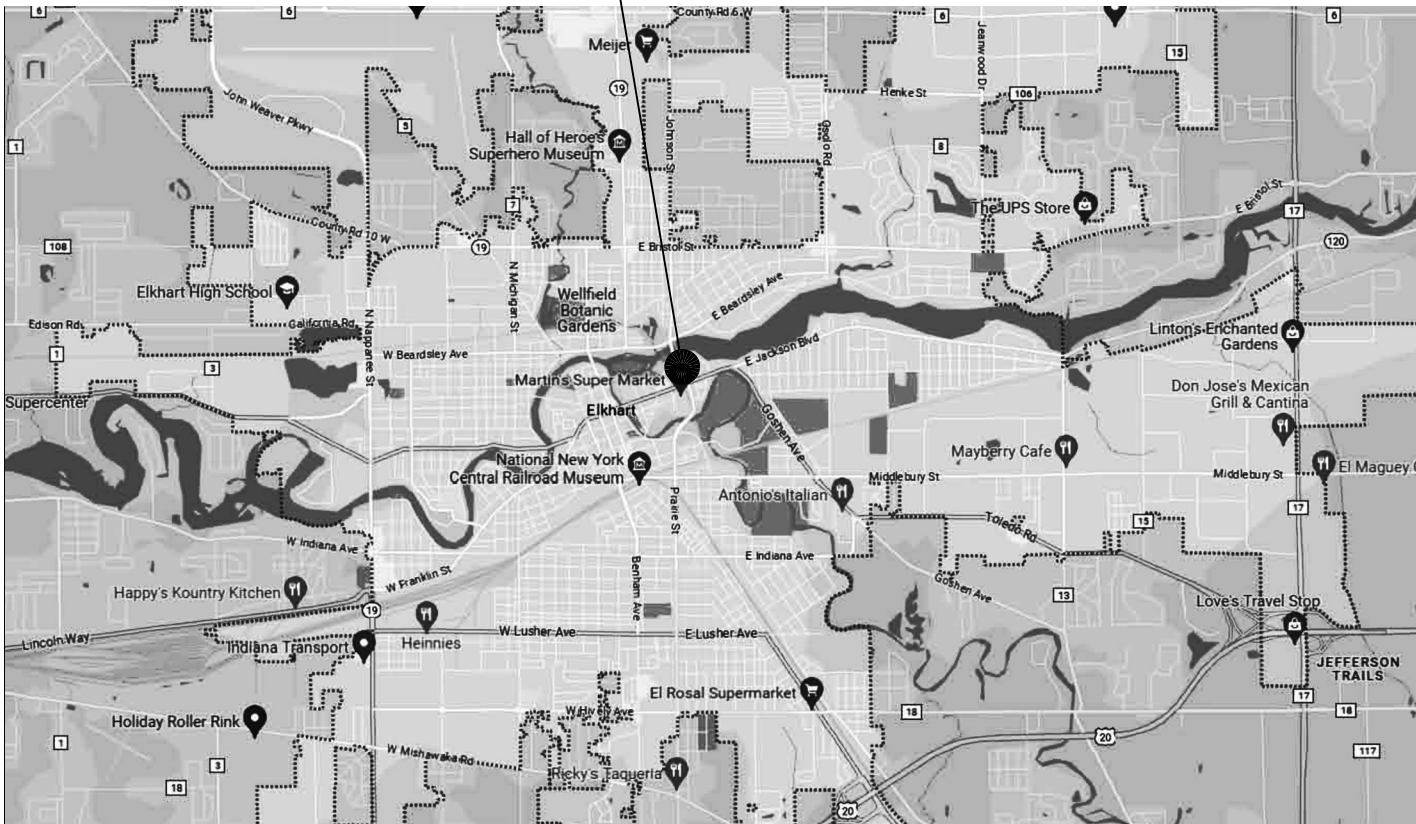


2023 CAPITAL FUND PROJECT
MAKEUP AIR UNIT REPLACEMENT for
RIVERSIDE TERRACE APARTMENTS
IN0267-23-2

THE HOUSING AUTHORITY OF THE CITY OF ELKHART INDIANA
1396 Benham Avenue Elkhart, Indiana 46516

VICINITY MAP

RIVERSIDE HIGH RISE



GOVERNING CODES

INDIANA BUILDING CODE 2014 2012 IBC
INDIANA PLUMBING CODE 2012 2006 IPC
INDIANA MECHANICAL CODE 2014 2012 IMC
INDIANA ELECTRICAL CODE 2009 2008 NFPA 70
INDIANA FIRE CODE 2014 INDIANA ENERGY 2012 IFC
CONSERVATION CODE 2010 ASHRAE 90.1 2007

WITH ALL LOCAL AND STATE AMENDMENTS

SHEET INDEX

TITLE SHEET

ME101 MECHANICAL ELECTRICAL PLANS
ME102 MECHANICAL PLANS
ME103 MECHANICAL ELECTRICAL SCHEDULES & DETAILS
ME204 MECHANICAL SPECIFICATIONS
ME205 ELECTRICAL SPECIFICATIONS

BOARD OF COMMISSIONERS

Willie Brown Commissioner
Dan Boecher Commissioner
Kristen Smole Commissioner
Helenia Robinson Commissioner
Cynthia Billings Commissioner

Angelia M. Washington Executive Director

ABBREVIATIONS

A/C	AIR CONDITIONING	FD	FLOOR DRAIN	PC	PLUMBING CONTRACTOR
AC	ACOUSTIC	FE	FIRE EXTINGUISHER	PERF	PERFORATED
ADJ	ADJUSTABLE	FEC	FIRE EXTINGUISHER CABINET	R	PLATE
AFF	ABOVE FINISHED FLOOR	FHC	FIRE HOSE CABINET	PLAS	PLASTIC
AL	ALUMINUM	FIN	FINISH	PLBG	PLUMBING
AP	ACCESS PANEL	FL	FLASHING	PREFAB	PREFABRICATED
ANGLE	ANGLE	FLR	FLOOR	PSF	POUNDS PER SQUARE FOOT
APPX	APPROXIMATE	FLUOR	FLUORESCENT	PSI	POUNDS PER SQUARE INCH
ARCH	ARCHITECTURAL	FNDN	FOUNDATION	PT	PAINT
ASPH	ASPHALT	FRP	FIBERGLASS REINF. PANEL	QT	QUARRY TILE
		FT	FOOT (FEET)		
		FTG	FOOTING		
B MK	BENCH MARK			RA	RETURN AIR
BD	BOARD			RD	ROOF DRAIN
BIT	BITUMINOUS	GA	GAUGE	RE	REFER TO
BLDG	BUILDING	GALV	GALVANIZED	REINF	REINFORCING (REINFORCED)
BLK	BLOCK	GC	GENERAL CONTRACTOR	Ø	ROUND
BLKG	BLOCKING	GL	GLASS		
BM	BEAM	GPH	GALLONS PER HOUR		
BRG	BEARING	GPM	GALLONS PER MINUTE		
BTM	BOTTOM	GYP BD	GYPSONUM BOARD	S TO S	STUD TO STUD
				SAT	SUSPENDED ACOUSTICAL TILE
CAB	CABINET	HB	HOSE BIBB	SC	STAINED CONCRETE
CB	CONCRETE BLOCK	HC	HOLLOW CORE	SCHED	SCHEDULE
CC	CENTER TO CENTER	HDCP	HANDICAP	SCW	SOLID CORE WOOD
CF	CUBIC FEET	HDWR	HARDWARE	SECT	SECTION
CFM	CUBIC FEET PER MINUTE	HM	HOLLOW METAL	SF	SQUARE FOOT
CHB	CHALK BOARD	HR	HORIZONTAL	SGL	SINGLE
CI	CAST IRON	HORZ	HORIZONTAL	SGT	STRUCTURAL GLAZED TILE
CJ	CONTROL JOINT	HR	HOUR	SHT	SHEET
C	CENTER LINE	HT	HEIGHT	SI	SQUARE INCH
CLG	CEILING	HTR	HEATER	SIM	SIMILAR
CM	CONSTRUCTION MANAGER	HW	HOT WATER	SJ	STEEL JOIST
CMU	CONCRETE MASONRY UNIT			SPEC	SPECIFICATIONS
CO	CLEAN OUT	ID	INSIDE DIAMETER	SS	STAINLESS STEEL
COL	COLUMN	INSUL	INSULATION (INSULATED)	STL	STEEL
CONC	CONCRETE	INT	INTERIOR	STOR	STORAGE
CONT	CONTINUOUS	ISO JT	ISOLATION JOINT	SUSP	SUSPENDED
CONTR	CONTRACTOR			SV	STAINED AND VARNISHED
CPT	CARPET				
CT	CERAMIC TILE	JT	JOINT	T	TREAD
CTR	CENTER			T&G	TONGUE & GROOVE
CW	COLD WATER	LAV	LAVATORY	TB	TACK BOARD
CY	CUBIC YARD			TEL	TELEPHONE
				TERR	TERRAZZO
DBL	DOUBLE	MATL	MATERIAL	THK	THICK
DF	DRINKING FOUNTAIN	MAX	MAXIMUM	TLT	TOILET
DI	DIAMETER	MC	MECHANICAL CONTRACTOR	TOB	TOP OF BEARING
DIM	DIMENSION	MECH	MECHANICAL	TYP	TYPICAL
DN	DOWN	MFR	MANUFACTURER		
DR	DOOR	MIN	MINIMUM		
DS	DOWN SPOUT	MISC	MISCELLANEOUS	V	VINYL
DTL	DETAIL	MINTG HT	MOUNTING HEIGHT	VAN	VANITY
DW	DRYWALL	MO	MASONRY OPENING	VCT	VINYL COMPOSITION TILE
DWG	DRAWING	MSRY	MASONRY	VERT	VERTICAL
		MT	MOSAIC TILE	VEST	VESTIBULE
		MTD	MOUNTED	VF	VINYL FABRIC
		MTL	METAL	VT	VINYL TILE
EA	EACH			VTR	VENT THRU ROOF
EC	ELECTRICAL CONTRACTOR			VWC	VINYL WALL COVERING
EL	ELEVATION				
ELEC	ELECTRIC (ELECTRICAL)	NIC	NOT IN CONTRACT	WC	WATER CLOSET
EP	EPOXY PAINT	NO	NUMBER	WD	WOOD
EPNL	ELECTRICAL PANEL			WDW	WINDOW
ER	EMERGENCY	OAI	OUTSIDE AIR INTAKE	WH	WATER HEATER
EW	ELECTRIC WATER COOLER	OC	ON CENTER	WP	WEATHER PROOF
EXST	EXISTING	OD	OUTSIDE DIAMETER		
EXT	EXTERIOR	OPNG	OPENING		



SET NUMBER

SEAL / SIGN

ISSUED FOR: CONSTRUCTION
DATE: FEBRUARY 9, 2024

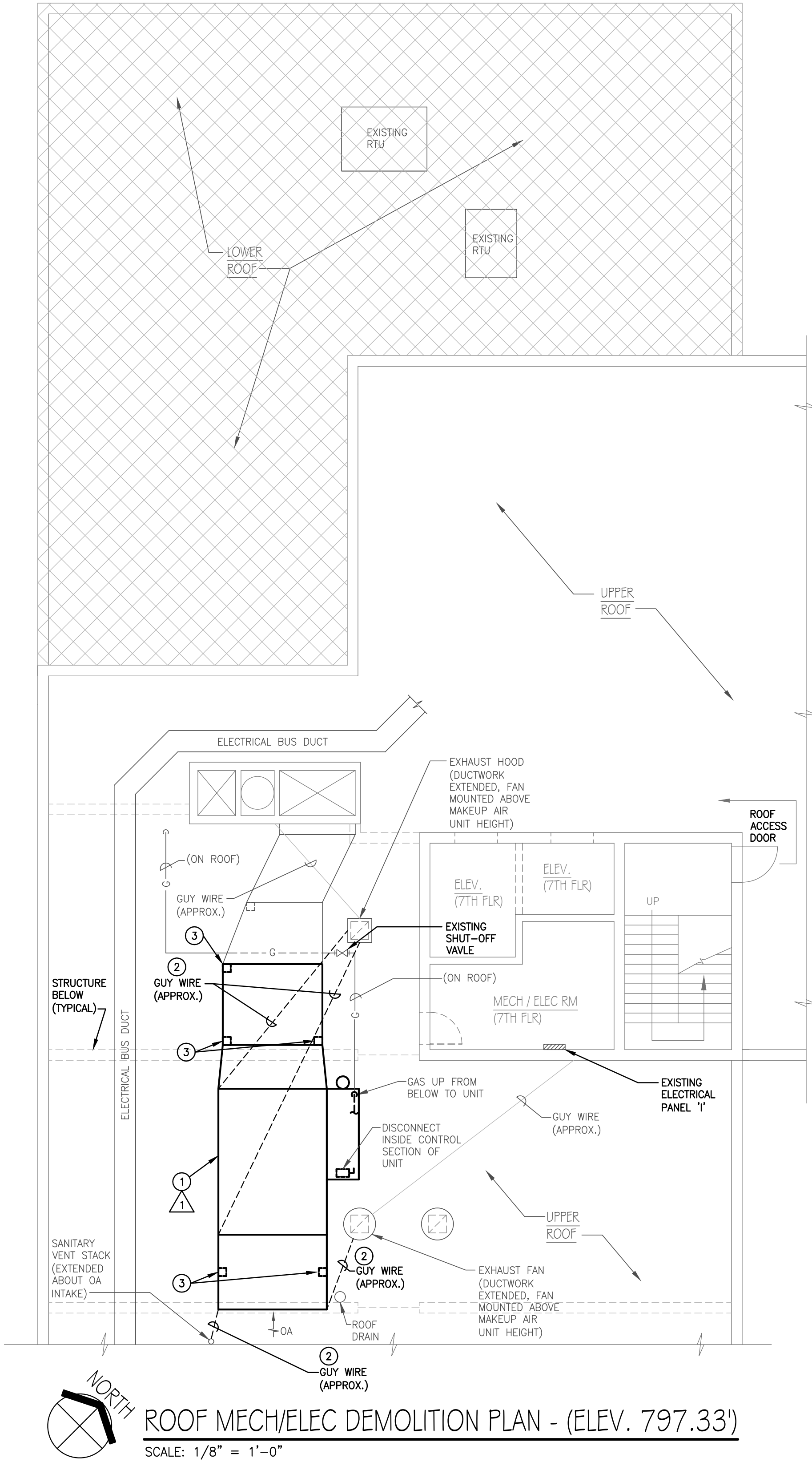
FORUM ARCHITECTS, LLC
415 Lincolnway East Mishawaka, Indiana
Phone: 574-233-2119
email: Info@forumarchitectsllc.com

- MECHANICAL DEMOLITION NOTES
- 1

DISCONNECT AND REMOVE MAKE-UP AIR UNIT IN IT'S ENTIRETY. PORTIONS OF ASSOCIATED DUCTWORK AND GAS PIPING ARE TO REMAIN FOR REUSE. COORDINATE WITH NEW CONSTRUCTION AS REQUIRED. FIELD VERIFY FRAMING REQUIREMENTS, DUCTWORK, ETC. CUT AND PATCH ROOF AS REQUIRED TO MAINTAIN WARRANTY.
- 2

DISCONNECT, REMOVE AND RELOCATE GUY WIRE. NOTE, NOT ALL LOCATIONS SHOWN, FIELD VERIFY AS REQUIRED. COORDINATE EXTENSION/REWORK WITH NEW CONSTRUCTION.
- 3

REMOVE AND/OR REWORK EQUIPMENT (OA INTAKE HOOD / SA DUCTWORK) SUPPORTS AS REQUIRED FOR NEW CONSTRUCTION. CUT AND PATCH ROOF AS REQUIRED TO MAINTAIN ROOF WARRANTY.

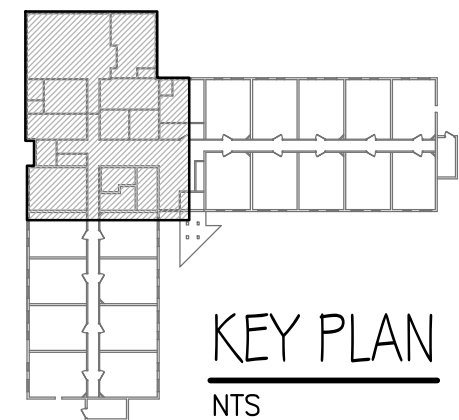


- ELECTRICAL DEMOLITION NOTES
- 1

MECHANICAL ITEM TO BE REMOVED. DISCONNECT FEED. COORDINATE POTENTIAL REUSE OF WIRE AND/OR CONDUIT WITH NEW CONSTRUCTION.



NOTE:
THIS PLAN IS SHOWN PRIMARILY FOR REFERENCE



M/E DESIGN SERVICES
MECHANICAL/ELECTRICAL CONSULTING ENGINEERS
120 South Hill Street
Mishawaka, Indiana 46544
(574) 256-1914
JOB NO. 5995.03

DATE:	FEBRUARY 6, 2023
FILE:	
DRAWN BY:	MEDS
CHECKED BY:	TC
REVISIONS:	



FORUM ARCHITECTS, LLC
415 Lincolnway East
Mishawaka, Indiana
Phone: 574-233-2119
email: Info@forumarchitectsllc.com

INDIANA

ELKHART

MAKEUP AIR UNIT REPLACEMENT
ELKHART HOUSING AUTHORITY
RIVERSIDE HIGH RISE

MECH/ELEC PLANS

ME101



DATE:	FEBRUARY 6, 2023
FILE:	
DRAWN BY:	MEDS
CHECKED BY:	TC
REVISIONS:	



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Mishawaka, Indiana
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MAKEUP AIR UNIT REPLACEMENT
ELKHART HOUSING AUTHORITY
RIVERSIDE HIGH RISE

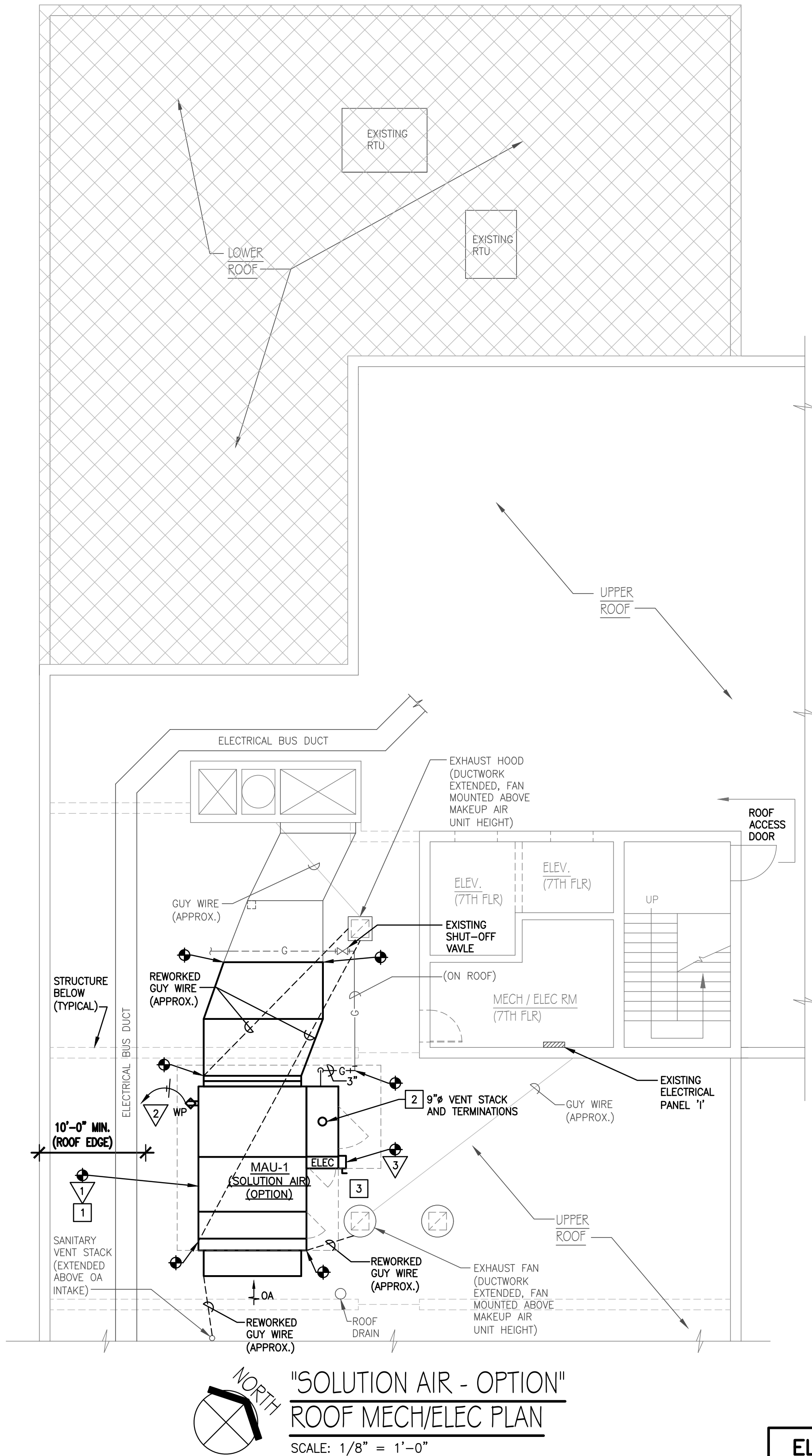
MECH/ELEC PLANS

ME102



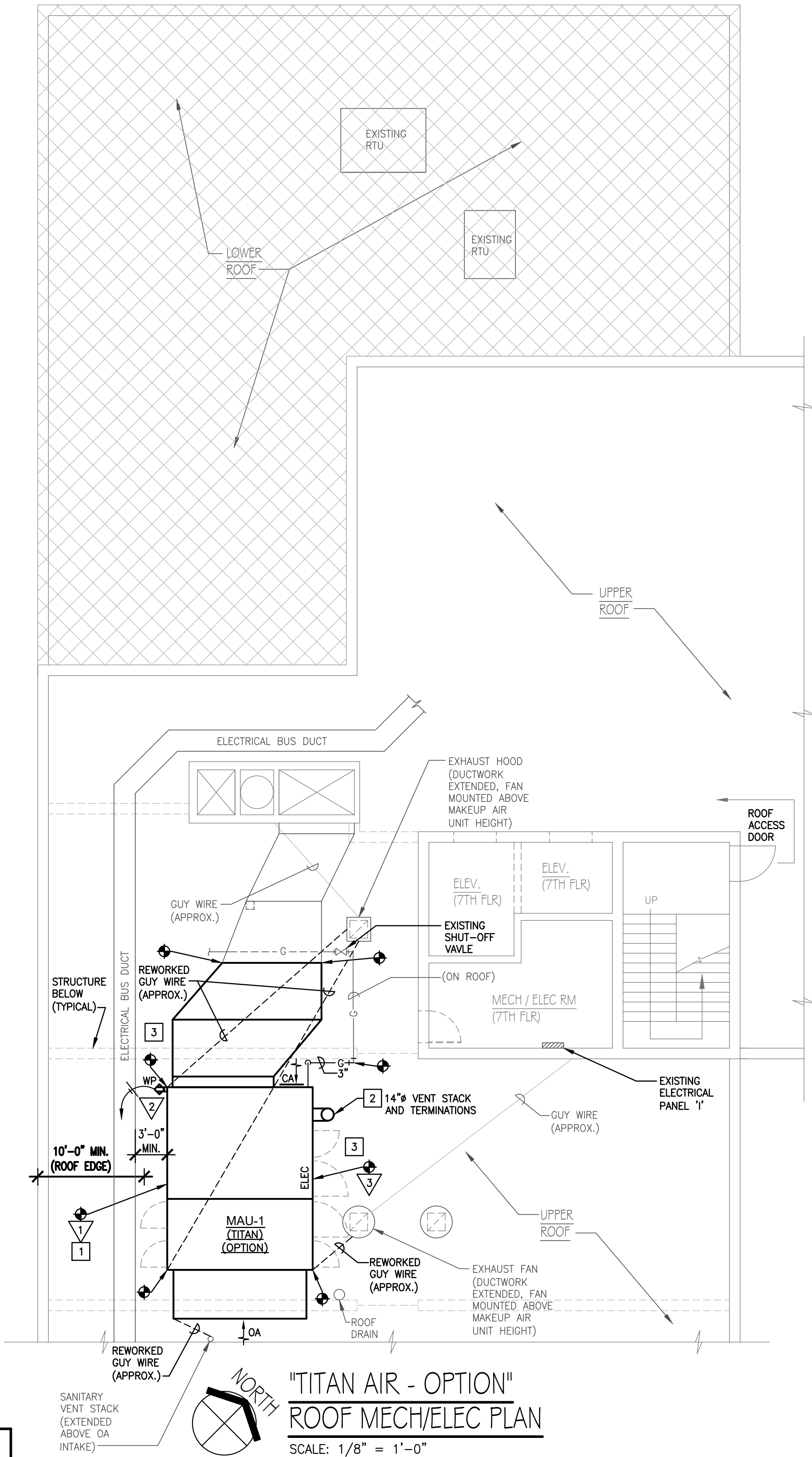
MECHANICAL NOTES

- 1 NEW MAKE-UP AIR UNIT. REWORK ASSOCIATED DUCTWORK AND GAS PIPING AS REQUIRED.
- 2 VERIFY EXACT SIZE, MATERIAL TYPE AND HEIGHT REQUIREMENTS WITH MANUFACTURER.
- 3 REWORK EXISTING ROOF MOUNTED WALKING PADS AS REQUIRED FOR ACTUAL EQUIPMENT SELECTED (ALL SIDES).



ELECTRICAL NOTES

- 1 NEW MECHANICAL ITEM RECONNECT AS REQUIRED. COORDINATE, AS REQUIRED, WITH ACTUAL EQUIPMENT PROVIDED.
- 2 SERVICE RECEPTABLE PROVIDED WITH ROOF TOP UNIT. CONDUIT AND WIRE BY E.C. PROVIDE NEW 20 AMP 1-POLE C.B. AND INSTALL IN AVAILABLE SPACE IN EXISTING ELECTRICAL PANEL '1', 7TH FLOOR MECH/ELEC ROOM. CIRCUITING SHOWN IS FOR CLARITY. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CIRCUIT REQUIREMENTS WITH EXISTING FIELD CONDITIONS.
- 3 COORDINATE REUSE OR REFEED OF EXISTING CIRCUIT WITH ACTUAL EQUIPMENT SELECTED. PROVIDE NEW 40A OR 50A BREAKER AT MDP AS REQUIRED BY UNIT MANUFACTURER. REMOVE #10 WIRE AND REFEED WITH #8 IN EXISTING CONDUIT.





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GENERAL MECHANICAL DEMOLITION NOTES

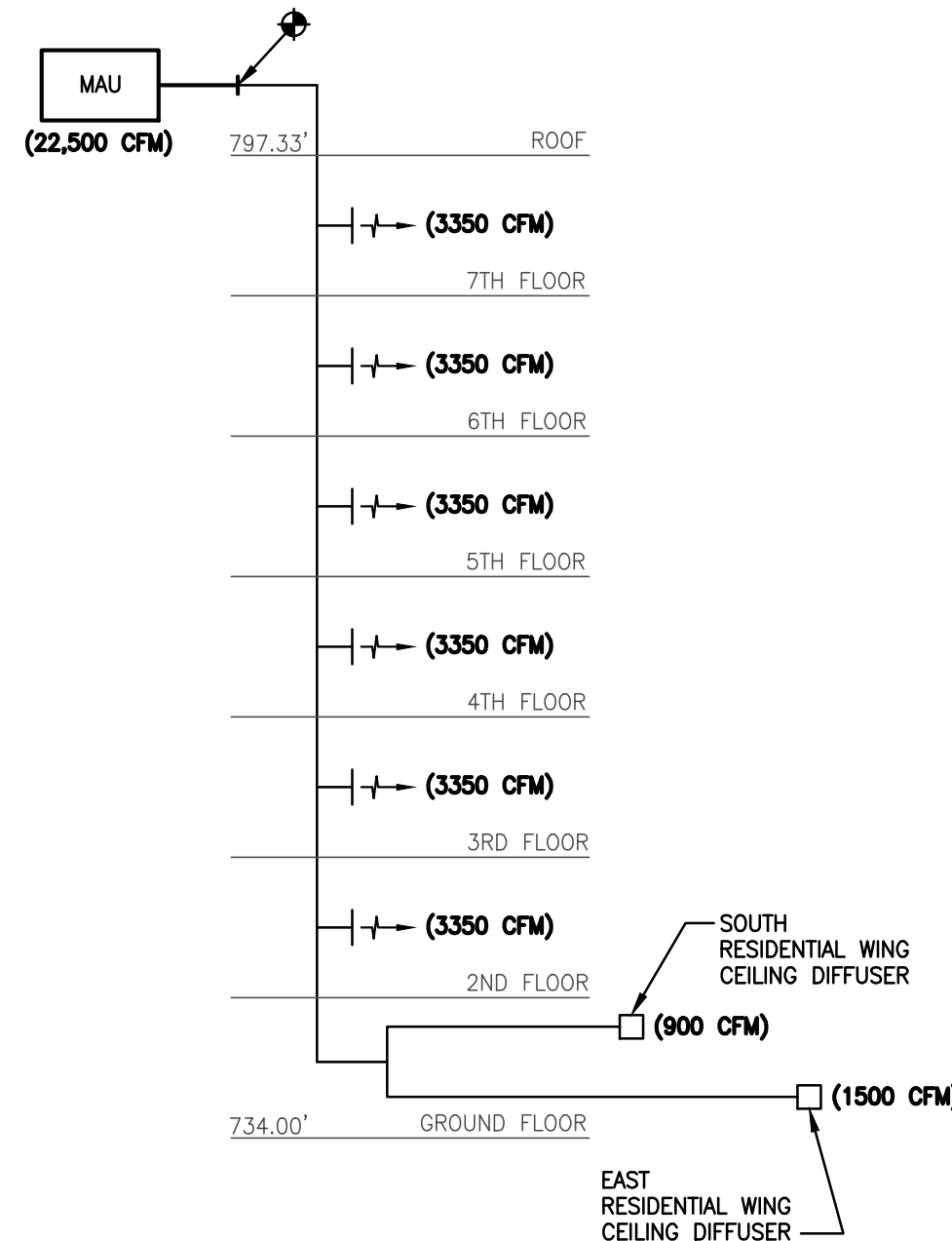
- ITEMS SHOWN ON THE DEMOLITION DRAWINGS IN BOLD LINE WEIGHT ARE TO BE EITHER REMOVED OR RELOCATED. ITEMS SHOWN LIGHT ARE TO REMAIN.
- DEMOLITION PLANS ARE INTENDED SOLELY TO INDICATE KEY EXISTING ITEMS TO REMAIN AND TO PROVIDE A GENERAL IDEA OF EXISTING SYSTEM TYPES. NOT ALL EQUIPMENT, PIPING AND DUCTWORK ARE SHOWN.
- THE SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS FAMILIARIZED HIMSELF WITH THE PLANS AND BUILDING SITE. CLAIMS MADE SUBSEQUENT TO THE PROPOSAL FOR MATERIALS AND LABOR BECAUSE OF DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED IF THEY COULD HAVE BEEN FORESEEN HAD PROPER EXAMINATION BEEN MADE.
- THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROTECTION OF ALL EXISTING BUILDING COMPONENTS DURING DEMOLITION/CONSTRUCTION. ALL COSTS FOR LOCATING, REMOVING, REPLACING, OR RELOCATING SHALL BE INCIDENTAL TO DEMOLITION/CONSTRUCTION. ALL DAMAGES WHICH OCCUR DURING DEMOLITION/CONSTRUCTION SHALL BE REPAIRED WITH LIKE MATERIAL AT NO ADDITIONAL COST TO THE OWNER.
- COORDINATE SHUTDOWN OF ALL SERVICES WITH OWNER.
- WHERE REMOVAL OF PIPING, EQUIPMENT, ETC. IS NOTED, IT SHALL INCLUDE REMOVAL OF ALL ASSOCIATED APPURTENANCES, HANGERS, INSULATION, ETC. REMOVAL OF PIPING SHALL BE COMPLETE BACK TO THE NEAREST ACTIVE MAIN OR RISER, WHERE THE BRANCH CONNECTION SHALL BE CAPPED OR PLUGGED. COORDINATE EXACT EXTENTS WITH NEW CONSTRUCTION.
- COORDINATE SCHEDULE OF DEMOLITION WORK WITH OWNER. COORDINATE SHUTDOWN OF MAIN SERVICES WITH OWNER (I.E. GAS, ETC.).
- ANY ITEMS TO REMAIN THAT ARE DAMAGED SHALL BE REPAIRED AT NO ADDITIONAL COST.
- PIPING AND EQUIPMENT SHOWN ON DRAWINGS IS INTENDED TO INDICATE GENERAL PIPING EXTENT AND LAYOUT OF MAJOR COMPONENTS ONLY. FIELD VERIFY ACTUAL CONDITIONS, LOCATIONS, ARRANGEMENT, SIZES, LENGTHS, ETC.

GENERAL MECHANICAL NOTES

- ITEMS SHOWN ON FLOOR PLANS IN LIGHT LINE WEIGHT ARE EXISTING. ITEMS SHOWN ON FLOOR PLANS IN BOLDER LINE WEIGHT ARE NEW.
- THE SUBMISSION OF A PROPOSAL WILL BE CONSIDERED AS EVIDENCE THAT THE CONTRACTOR HAS FAMILIARIZED HIMSELF WITH THE PLANS AND BUILDING SITE. CLAIMS MADE SUBSEQUENT TO THE PROPOSAL FOR MATERIALS AND LABOR BECAUSE OF DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED IF THEY COULD HAVE BEEN FORESEEN HAD PROPER EXAMINATION BEEN MADE.
- THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROTECTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION. ALL COSTS FOR LOCATING, REMOVING, REPLACING OR RELOCATING THESE UTILITIES SHALL BE INCIDENTAL TO CONSTRUCTION. ALL UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED WITH LIKE MATERIAL AT NO ADDITIONAL COST TO THE OWNER.
- MECHANICAL TRADE SHALL COORDINATE ROOF AND WALL FLASHING AND EXACT PENETRATION LOCATIONS.
- DRAWINGS ARE DIAGRAMMATIC AND GENERALLY INDICATIVE OF THE WORK. PIPING AND SYSTEMS SHALL FOLLOW ARRANGEMENT AS MUCH AS POSSIBLE, HOWEVER, ACTUAL FIELD CONDITIONS SHALL DICTATE. PROVIDE NECESSARY MODIFICATIONS TO MEET FIELD CONDITIONS AND AVOID CONFLICT WITH OTHER TRADES. IF RESOLUTION CANNOT BE REACHED WITHOUT COMPROMISING THE DESIGN, THESE CONFLICTS SHALL BE PRESENTED TO THE ENGINEER/ARCHITECT FOR RESOLUTION. IN CONFLICT AREAS, COMPLETE ONLY WORK NOT AFFECTED BY THE CONFLICT PRIOR TO RESOLUTION.
- THE FLOOR PLANS DO NOT SHOW ALL VALVES, FITTINGS, APPURTENANCES, DUCT TRANSITIONS, ACCESS PANELS, ELEVATION CHANGES, AND VARIOUS OTHER ITEMS CALLED FOR BY DETAILS AND SPECIFICATIONS. REFER TO DETAILS AND SPECIFICATIONS AND WHERE REQUIRED, THESE ITEMS SHALL BE PROVIDED WITHOUT ADDITIONAL COST FOR A COMPLETE AND OPERATING SYSTEM.
- CONTRACTOR SHALL VERIFY SIZE AND LOCATION OF ALL EXISTING UTILITIES IN FIELD BEFORE STARTING WORK.
- CONNECTIONS TO EQUIPMENT SHALL CONFORM TO MANUFACTURER'S SPECIFICATIONS.
- ALL HANGER SYSTEMS FOR PIPING AND EQUIPMENT SHALL BE SECURED TO BUILDING STRUCTURAL SYSTEM.
- PRIOR TO REMOVAL, NOTIFY THE OWNER AND ARCHITECT IF ANY HAZARDOUS MATERIALS ARE ENCOUNTERED.
- VERIFY VOLTAGE AND PHASE CHARACTERISTICS OF THE ELECTRICAL SERVICE AND COORDINATE WITH MECHANICAL EQUIPMENT AS REQUIRED.
- CONTRACTOR SHALL VERIFY CIRCUIT AMPACITY AND OVER CURRENT PROTECTION REQUIREMENTS WITH ACTUAL EQUIPMENT PROVIDED PRIOR TO ROUGH-IN.
- ALL WORK AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE ORDINANCES AND REGULATIONS HAVING JURISDICTION. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL APPROVALS.

MECHANICAL AND PLUMBING LEGEND

CA	COMBUSTION AIR
EXT'G	EXISTING
G	GAS
OA	OUTSIDE AIR
SA	SUPPLY AIR
	GAS STOP COCK
	PIPING DOWN
	PIPING UP
	THERMOSTAT
	SUPPLY AIR DUCT
	CONNECT TO EXISTING AT POINT INDICATED



EXISTING MAKE-UP AIR DUCT SYSTEM

NOT TO SCALE

GENERAL ELECTRICAL DEMOLITION NOTES

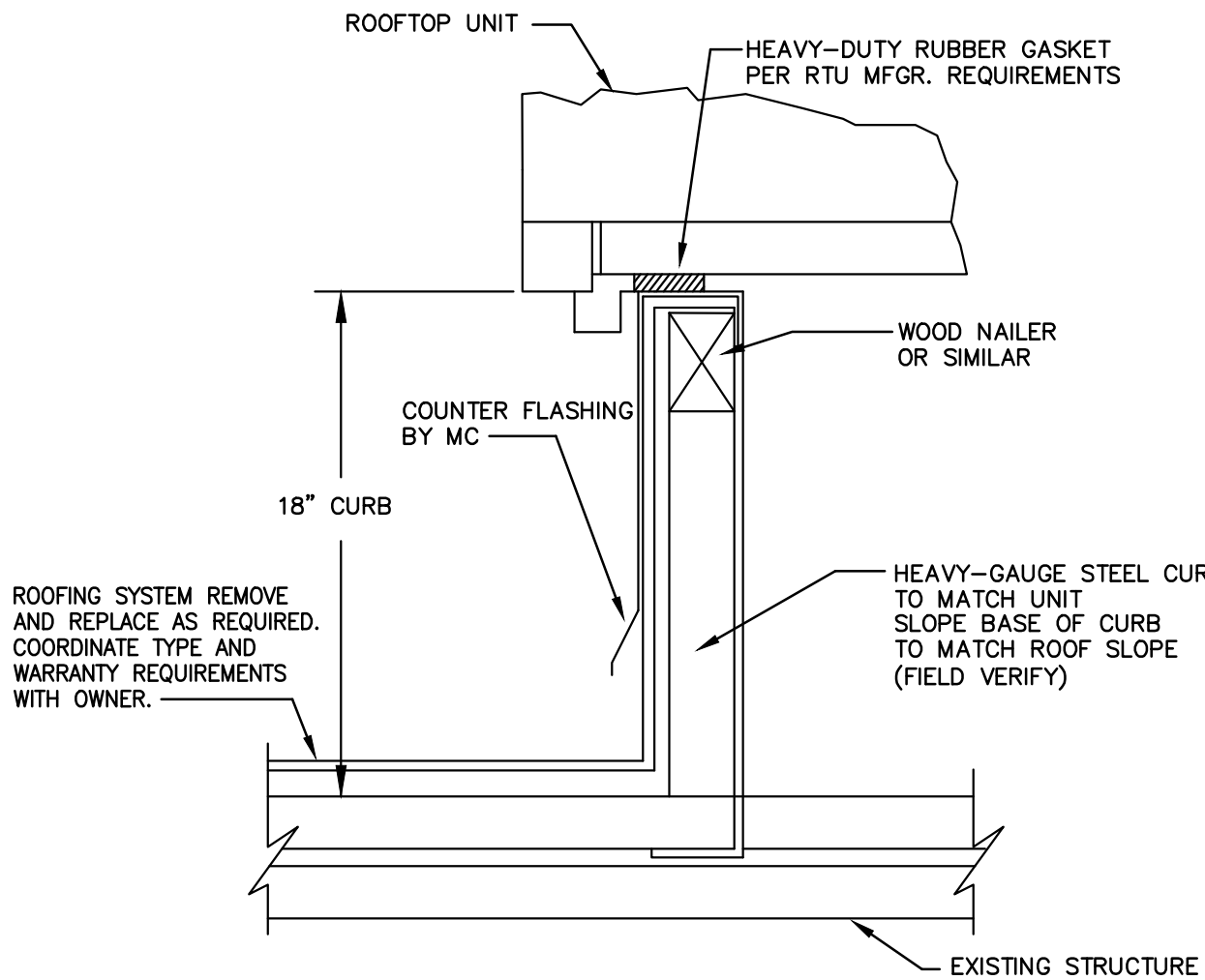
- THE DEMOLITION DRAWINGS INDICATE MAJOR ELECTRICAL ITEMS TO BE REMOVED. THE DRAWINGS ARE INTENDED TO INDICATE THE GENERAL SCOPE OF ELECTRICAL DEMOLITION WORK REQUIRED AND DO NOT INDICATE EVERY LIGHT FIXTURE, ELECTRICAL OUTLET, CONDUIT, WIRE OR OTHER ELECTRICAL DEVICE THAT MUST BE REMOVED, RELOCATED OR OTHERWISE MODIFIED TO FACILITATE NEW CONSTRUCTION. THE ELECTRICAL CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING A BID AND DETERMINE THE EXACT SCOPE OF DEMOLITION WORK.
- WHERE THE MECHANICAL CONTRACTOR IS REMOVING EXISTING MECHANICAL EQUIPMENT, THIS CONTRACTOR SHALL ALSO REMOVE ALL ASSOCIATED CONDUIT, WIRE, DISCONNECT SWITCHES, MOTOR STARTERS, ETC. COORDINATE WITH NEW WORK.
- IF EXISTING CIRCUITS TO REMAIN ARE DISRUPTED DURING DEMOLITION OR CONSTRUCTION REPAIR AND REROUTE AS REQUIRED.

GENERAL ELECTRICAL NOTES

- ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL, STATE, AND LOCAL CODES IN FORCE AT THE TIME OF BIDDING, INCLUDING, BUT NOT LIMITED TO, THE INDIANA CONSTRUCTION RULES AND NATIONAL ELECTRICAL CODE WITH INDIANA AMENDMENTS.
- DRAWINGS ARE DIAGRAMMATIC AND GENERALLY INDICATIVE OF WORK REQUIRED. THIS CONTRACTOR SHALL VERIFY IN FIELD ACTUAL DIMENSIONS AND LOCATIONS AND COORDINATE ELECTRICAL EQUIPMENT LOCATIONS WITH ACTUAL FIELD DIMENSIONS, WHERE REQUIRED. ELECTRICAL ITEM LOCATIONS, MOUNTING HEIGHTS, ETC. SHALL BE REVISED AS REQUIRED TO ACCOMMODATE EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER.
- MAINTAIN ACCURATE RECORDS OF ALL CHANGES MADE DURING CONSTRUCTION. PROVIDE A NEATLY MARKED SET OF BLUEPRINTS TO THE ENGINEER AT COMPLETION OF THE PROJECT, INDICATING ALL FIELD CHANGES.
- ALL DEVICES, EQUIPMENT, FIXTURES, ETC., MUST BE GROUNDED BY USE OF A PROPERLY SIZED GROUNDING CONDUCTOR. MECHANICAL/ELECTRICAL BONDS OF THE METALLIC RACEWAY SYSTEM SHALL ALSO BE MAINTAINED.
- REFER TO MECHANICAL SPECIFICATIONS FOR ADDITIONAL ELECTRICAL WORK AND INCLUDE ALL COST IN BASE BID.
- INCLUDE ADDITIONAL WIRING AND CONDUIT TO EXTEND EXISTING FEEDS TO NEW EQUIPMENT. COORDINATE ALL ELECTRICAL WORK WITH WORK OF OTHER TRADES AND EXISTING FIELD CONDITIONS AS REQUIRED.

ELECTRICAL LEGEND

C	CONDUIT
C.B.	CIRCUIT BREAKER
E.C.	ELECTRICAL CONTRACTOR/TRADE
	JUNCTION BOX
	CONTROL/POWER CONNECTION
	BOX COVER FUSED SWITCH
	DISCONNECT SWITCH
	MOTOR LOCATION
	SURFACE MOUNTED PANELBOARD
	RECESSED PANELBOARD
	WIRE AND CONDUIT SIZE OTHER THAN MINIMUM SPECIFIED.
	CONDUIT SIZE
	WIRE SIZE
	NUMBER OF WIRES
	CONDUIT AND WIRE
	CONDUIT AND WIRE RUN TO BE CONTINUED ON THE DRAWING OF ADJACENT AREAS.
	HOME RUN TO PANELBOARD. A1.3 = PANELBOARD "A", CIRCUITS 1 AND 3, THREE CROSS LINES = 3 WIRES. UNLESS OTHERWISE NOTED, THE CONDUIT AND WIRE SIZES ARE THE MINIMUM AS REQUIRED BY THE SPECIFICATIONS. LONG CROSS LINE = NEUTRAL.

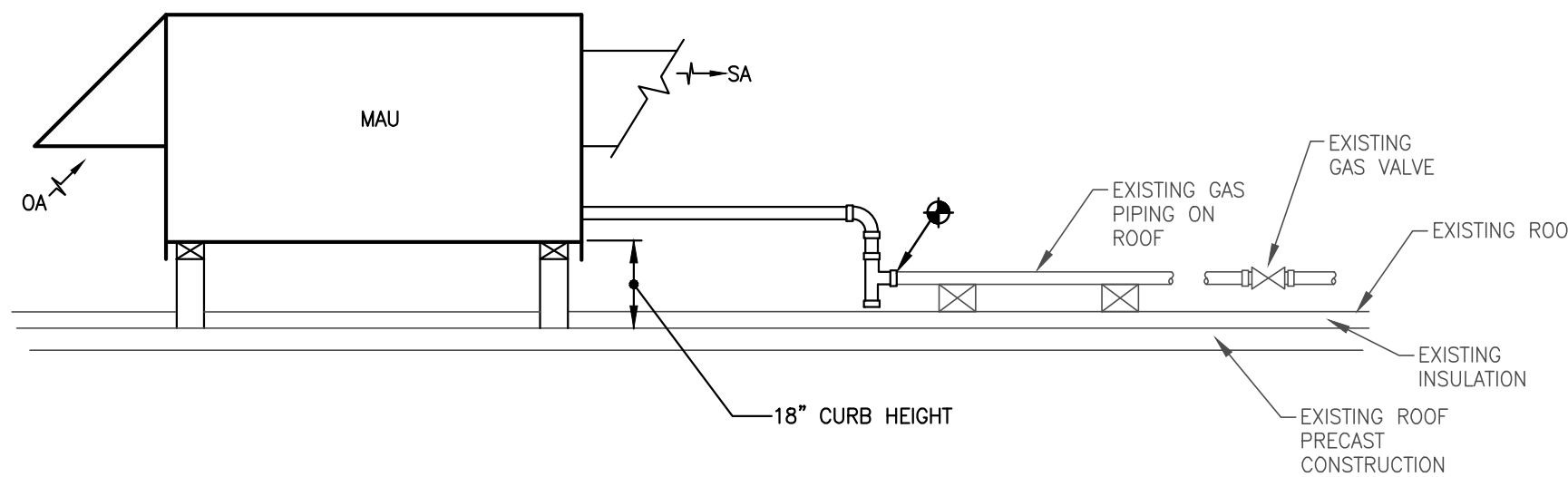


ROOFTOP UNIT CURB DETAIL

NOT TO SCALE

MECHANICAL EQUIPMENT SCHEDULE

MARK	DESCRIPTION
MAU-1	MAKE-UP AIR UNIT (ROOF MOUNTED) INDIRECT NATURAL GAS FIRED, HORIZONTAL DISCHARGE, MODULATING BURNER, 22,500 CFM @ 0.8" E.S.P., 2500 MBH HEAT INPUT, 2000 MBH HEAT OUTPUT, STAINLESS STEEL HEAT EXCHANGER/BURNER, GAS PRESSURE: 14" W.C. MAX, 8" W.C. MIN, MOTOR: 15 OR 20 HP AS REQUIRED BY THE MANUFACTURER, 480V/3P/60HZ, SOLUTION AIR AW-I-4-200, TITAN TAH-220 OR PRE-APPROVED EQUAL. COMPLETE WITH 18" CURB. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.



MAU UNIT DETAIL

NOT TO SCALE

SECTION 22000
MECHANICAL

PART 1: GENERAL

1.1 SCOPE

- A. THE WORK INDICATED IN THIS DIVISION AND ON THE MECHANICAL DRAWINGS IS SUBJECT TO THE REQUIREMENTS OF THE INSTRUCTIONS TO BIDDERS. THESE ARE HEREBY INCLUDED BY REFERENCE. THE CONTRACTOR IS DIRECTED TO EXAMINE ALL PORTIONS OF THE BID DOCUMENTS AS THEY PERTAIN TO THE WORK COVERED BY THIS DIVISION OF THE SPECIFICATIONS AND TO INCLUDE ALL COSTS IN BID FOR ALL MECHANICAL WORK AS CALLED FOR BY THE COMPLETE BID DOCUMENTS.
- B. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR SERVICES NECESSARY FOR THE COMPLETE INSTALLATION OF EQUIPMENT INDICATED HEREIN AND ON THE DRAWINGS, COMPLETE WITH ALL RELATED SERVICES. REVIEW ALL EXISTING BUILDING CONDITIONS AS THEY RELATE TO MECHANICAL WORK AND INCLUDE COSTS IN BID. COORDINATE REQUIREMENTS WITH ELECTRICAL TRADES AS REQUIRED.
- C. ALL WORK SHALL BE PERFORMED BY EXPERIENCED PERSONNEL QUALIFIED TO CARRY OUT THE WORK IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, LOCAL CODES AND AS SPECIFIED HEREIN. THE CONTRACTOR SHALL PROVIDE APPROPRIATE QUALIFICATIONS AND RECORDS OF PAST EXPERIENCE FOR PERSONNEL AND SUBCONTRACTORS WHEN REQUESTED BY THE OWNER OR ENGINEER FOR REVIEW AND APPROVAL.

1.2 CONTRACT DOCUMENTS

- A. THE MECHANICAL DRAWINGS LISTED IN THE DRAWING INDEX, TOGETHER WITH THESE SPECIFICATIONS, ARE AN INTEGRAL PART OF THE MECHANICAL CONTRACT. WHAT IS CALLED FOR IN ONE IS AS BINDING AS IF CALLED FOR IN BOTH. IN CASE OF CONFLICT, THE GREATER QUANTITY OR BETTER QUALITY IS TO PREVAIL, SUBJECT TO THE APPROVAL OF THE ENGINEER/ARCHITECT.
- B. AFTER INSTALLATION, BUT PRIOR TO UNIT START-UP, THE LOCAL MANUFACTURER'S REPRESENTATIVE SHALL REVIEW AND APPROVE THE INSTALLATION.
- C. THE MECHANICAL AND ELECTRICAL DRAWINGS ARE DIAGRAMMATIC ONLY, BUT ARE TO BE FOLLOWED AS CLOSELY AS ACTUAL CONSTRUCTION OF THE PROJECT AND WORK OF OTHER TRADES WILL PERMIT. MINOR CHANGES FROM THESE DRAWINGS, NECESSARY TO COORDINATE WITH THE WORK OF OTHER TRADES AND TO MAKE THE WORK OF THIS CONTRACTOR CONFORM TO THE PROJECT AS CONSTRUCTED, ARE TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.
- D. MECHANICAL AND ELECTRICAL DRAWINGS ARE NOT TO BE SCALED FOR THE PURPOSE OF EQUIPMENT INSTALLATION. ALL MEASUREMENTS TO BE DERIVED FROM ARCHITECTURAL AND SHOP DRAWINGS AND COORDINATED WITH FIELD CONDITIONS. ALL MEASUREMENTS MUST BE VERIFIED. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK FITTING INTO PLACE IN A SATISFACTORY AND WORKMANLIKE MANNER.
- E. INCREASED COST OF WIRING RESULTING FROM INCREASED ELECTRICAL RATINGS, OVER THAT SHOWN ON THE MECHANICAL DRAWINGS, IS TO BE BORNE BY THE CONTRACTOR FURNISHING THE EQUIPMENT.

1.3 MATERIALS AND EQUIPMENT

- A. WHERE "OR APPROVED EQUAL" CLAUSE IS INDICATED, IT MEANS MATERIAL, APPARATUS, EQUIPMENT AND SUPPLIES HAVING RECOGNIZED STANDARDS OF QUALITY AND PERFORMANCE WHICH, IN THE JUDGMENT OF THE ENGINEER/ARCHITECT, WILL MEET THE DESIGN AND SPECIFICATION REQUIREMENTS. MATERIAL AND EQUIPMENT BY MANUFACTURERS, OTHER THAN THOSE LISTED IN THE PLANS OR SPECIFICATIONS, MUST BE SUBMITTED FOR APPROVAL AS OUTLINED IN THE INSTRUCTION TO BIDDERS.
- B. WHERE "OR EQUAL" CLAUSE IS INDICATED, IT MEANS MATERIAL AND EQUIPMENT OF EQUAL OR BETTER QUALITY AND PERFORMANCE THAN THAT LISTED IN THE PLANS AND SPECIFICATIONS, EXCEPT THAT NO APPROVAL PRIOR TO BIDDING IS REQUIRED.

1.4 SHOP DRAWINGS AND SUBMITTALS

- A. PROVIDE ALL SUBMITTALS AS CALLED FOR IN THE SPECIFICATIONS AND AS REQUIRED BY THE ARCHITECT, INCLUDING SHOP DRAWINGS, SAMPLES, MATERIAL LISTS, SCHEDULE OF VALUE, ETC. SHOP DRAWINGS SHALL BE COMPLETELY REVIEWED AND APPROVED BY THE CONTRACTOR AND TRADE FURNISHING THE EQUIPMENT (INDICATED BY THE CONTRACTORS APPROVAL STAMP) PRIOR TO SUBMITTING TO THE ENGINEER/ARCHITECT.
- B. WHERE SHOP DRAWING SUBMITTALS ARE ASSEMBLED IN A FOLDER OR BOUND SETS, ALL FOLDERS OR SETS ARE TO BE IDENTICAL AND EACH SET MUST CONTAIN AN INDEX OF THE ITEMS ENCLOSED IN THE SET OR FOLDER. QUANTITY OF ORIGINAL COLOR SAMPLES REQUIRED SHALL BE COORDINATED WITH THE ARCHITECT.
- C. REVIEW AND APPROVAL OF SHOP DRAWINGS BY THE ENGINEER/ARCHITECT IS FOR GENERAL CONFORMITY TO DESIGN INTENT ONLY. THIS REVIEW DOES NOT AUTHORIZE CHANGES TO THE CONTRACT SUM OR RELIEVE THE CONTRACTOR IN ANY WAY OF HIS CONTRACT OBLIGATIONS.
- D. PROVIDE SUBMITTALS FOR THE FOLLOWING:
1. MAKE-UP AIR UNIT
 2. INSULATION
 3. VALVES AND REGULATORS

1.5 GUARANTEES AND WARRANTIES

- A. ALL LABOR, MATERIALS AND EQUIPMENT SHALL BE GUARANTEED BY THE CONTRACTOR AND WARRANTED BY THE MANUFACTURER FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER, UNLESS LONGER PERIOD IS SPECIFIED FOR SPECIFIC EQUIPMENT.
- B. THE CONTRACTOR SHALL MAKE ALL NECESSARY REPAIRS AND ALTERATIONS DURING THE GUARANTEE PERIOD AS MAY BE REQUIRED BY THE OWNER OR ARCHITECT FOR CORRECT SYSTEM OPERATION AND TO COMPLY WITH THE DRAWINGS AND SPECIFICATIONS. THESE REPAIRS AND ALTERATIONS SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
- C. THE OWNER RESERVES THE RIGHT TO MAKE EMERGENCY SYSTEM REPAIRS WITHOUT VOIDING THE CONTRACTOR'S GUARANTEE.

1.6 DEMOLITION

- A. BEFORE STARTING DEMOLITION WORK, REVIEW ALL REQUIREMENTS FOR FINAL REMODELING WORK SO THAT USABLE EXISTING SYSTEM COMPONENTS, AS REQUIRED FOR COMPLETION OF THE NEW WORK, ARE NOT DESTROYED. COORDINATE ALL WORK WITH THE OTHER CONTRACTORS.
- B. PROVIDE ALL LABOR, MATERIALS AND NECESSARY COORDINATION FOR DEMOLITION WORK AS CALLED FOR BY THE CONTRACT DOCUMENTS. REMOVAL SHALL BE PARTIAL OR COMPLETE AS CALLED FOR AND SHALL BE COORDINATED WITH OTHER TRADES AND NEW CONSTRUCTION. WORK SHALL ALSO INCLUDE MISCELLANEOUS ITEMS RELATED TO WORK INDICATED WHERE NOT REUSED FOR NEW CONSTRUCTION.
- C. CONTRACTOR SHALL NOT CUT ANY BEAMS OR COLUMNS OR ANY PORTION OF STRUCTURAL SYSTEM WITHOUT SPECIFIC PERMISSION. CONTRACTOR SHALL COORDINATE WITH OWNER/ARCHITECT/ENGINEER.
- D. THE CONDITION OF THE SITE, BUILDINGS AND SURROUNDINGS SHALL BE ACCEPTED AS FOUND. RESPONSIBILITY FOR CONDITIONS ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
- E. VERIFY WORK TO BE PERFORMED BEFORE PROCEEDING. WORK TO REMAIN SHALL BE PROTECTED AND, IF DAMAGED, SHALL BE RESTORED TO LIKE NEW CONDITION. COORDINATE DEMOLITION WITH OTHER TRADES AS REQUIRED. ITEMS INDICATED FOR DEMOLITION SHALL BE COMPLETELY REMOVED, HAULED OFF-SITE AND DISPOSED OF PROPERLY AT NO ADDITIONAL COST TO THE OWNER.
- F. WORK PRACTICES AND JOB CONDITIONS SHALL MEET ALL STATE, FEDERAL AND LOCAL REQUIREMENTS TO PROTECT LIFE AND PROPERTY.

1.7 CODES, STANDARDS AND PERMITS

- A. ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL, STATE AND LOCAL CODES IN FORCE AT TIME OF BIDDING, INCLUDING BUT NOT LIMITED TO THE NATIONAL ELECTRICAL CODE. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSPECTION APPROVALS AS THE WORK PROGRESSES. ANY WORK WHICH IS COMPLETED WITHOUT THESE APPROVALS AND FOUND TO BE UNACCEPTABLE SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYMENT OF ALL FEES ASSOCIATED WITH INSPECTIONS, PERMITS AND UTILITY CONNECTIONS UNLESS OTHERWISE INDICATED.

1.8 ELECTRICAL

- A. COORDINATE ALL WORK REQUIRING ELECTRICAL CONNECTION WITH THE CONTRACTOR PROVIDING THE EQUIPMENT. EXCEPT AS OTHERWISE INDICATED, ADDITIONAL INTERNAL WIRING, AUTOMATIC CONTROL WIRING, PROTECTIVE DEVICES, ETC. ASSOCIATED WITH WORK FURNISHED BY THE OTHER TRADES SHALL BE FURNISHED BY THE TRADE SUPPLYING THE EQUIPMENT.
- B. VERIFY VOLTAGE AND PHASE CHARACTERISTICS OF THE ELECTRICAL SERVICE AND COORDINATE WITH MECHANICAL EQUIPMENT AS REQUIRED.
- C. WHERE ELECTRICAL RATINGS OF EQUIPMENT INCREASE OVER THOSE INDICATED ON THE APPROVED CONSTRUCTION DOCUMENTS, THE CONTRACTOR PROVIDING THE EQUIPMENT SHALL PAY ADDITIONAL COSTS OF WIRING AND ELECTRICAL EQUIPMENT FOR PROPER ELECTRICAL SERVICE TO THE EQUIPMENT.

SECTION 22000
MECHANICAL

PART 2: PRODUCTS

2.1 PIPING

- A. NATURAL GAS
1. BLACK STEEL, ASTM A53 OR A106 GRADE B, SCHEDULE 40, FURNACE WELDED OR SEAMLESS.
 2. EQUIVALENT GALVANIZED IS ALSO ALLOWED IF PERMITTED BY THE LOCAL BUILDING OFFICIAL.

2.2 INSULATION

- A. EXTERIOR DUCTWORK -- INSULATE DUCTWORK, THAT IS OUTSIDE, EXPOSED TO THE WEATHER PER THE FOLLOWING METHOD:

1. TWO INCH (2") CLOSED-CELL ELASTOMERIC FOAM INSULATION NOTCHED TO FIT TIGHTLY BETWEEN STANDING SEAMS (AP ARMAFLEX FS). SECURE INSULATION TO DUCT WITH INSULATION BONDING ADHESIVE. CLEAN AND DEGREASE DUCT BEFORE BONDING. TOP PANELS SHALL BE TAPERED OR CROWNED TO ALLOW RAIN RUNOFF.
2. ON EXTERIOR DUCT, FINISH ENTIRE SURFACES WITH A SELF ADHERING JACKETING SYSTEM OVER THE INSULATION, VENTURECLAD 1577CW-WM AS MANUFACTURED BY VENTURETAPE OR APPROVED EQUAL. MATERIAL SHALL BE MINIMUM 8 MIL THICKNESS. ALL JOINTS SHALL BE AS RECOMMENDED BY MANUFACTURER. TURN UP JACKET AT EXTERIOR WALL AND AT UNIT CONNECTION TO PROVIDE A WATER TIGHT CONNECTION TO THE SURFACES. LAPPING ALL JOINTS SHALL BE AS RECOMMENDED BY MANUFACTURER. COLOR TO BE WHITE. COORDINATE WALL TERMINATION WITH ARCHITECT.

2.4 DUCTWORK

- A. ALL DUCTWORK SHALL BE RIGID GALVANIZED STEEL UNLESS OTHERWISE NOTED, IN ACCORDANCE WITH SMACNA REQUIREMENTS. DUCTWORK SHALL BE SMACNA SEAL CLASS B UNLESS SPECIFICALLY APPROVED OTHERWISE.

2.5 MAKE-UP AIR UNIT

- A. ROOF MOUNTED, INDIRECT GAS FIRE UNIT, COMPLETE WITH 18" CURB, CONTROLS AND NOTED ACCESSORIES. CAPACITY SHALL NOT BE LESS THAN AS INDICATED ON PLANS. UNIT TO BE TITAN, SOLUTIONAIR OR APPROVED EQUAL. ANY SUBMISSION FOR APPROVAL SHALL INCLUDE THE LEVEL OF DETAIL SIMILAR TO AN ACTUAL CONSTRUCTION SUBMITTAL.
- B. PROVIDE COMPLETE SUBMITTALS PRIOR TO ORDERING UNIT. PROVIDE INSTALLATION MANUALS AND OPERATING MANUALS (INCLUDING ACCURATE WIRING DIAGRAMS) TO THE CONTRACTOR AT THE APPROPRIATE TIMES.
- C. MODULATING BURNER WITH UNIT MOUNTED ELECTRONIC CONTROLS BASED ON ADJUSTABLE DISCHARGE AIR TEMPERATURE.
- D. UNIT(S) SHALL BE FACTORY ASSEMBLED, TESTED AND SHIPPED AS A COMPLETE PACKAGED ASSEMBLY AND SHALL INCLUDE THE FOLLOWING:
1. INDIRECT-FIRED MODULATING GAS BURNER (AT LEAST 10:1 TURNDOWN) WITH LOW FIRE START
 2. GAS TRAIN TO MEET ETL REQUIREMENTS AND BE SET UP TO OPERATE ON LOW PRESSURE GAS (7-12" WC) COMPLETE WITH REGULATOR
 3. CENTRIFUGAL BLOWER
 4. VFD SOFT START WITH THERMAL OVERLOAD PROTECTION
 5. REQUIRED UL/ETL SAFETY CONTROLS
 6. UNIT MOUNTED CONTROLS AND CONTROL PANEL (INTERFACE)
 7. AUTOMATIC MODULATING BURNER PROFILE DAMPER
 8. INTEGRAL FUSED DISCONNECT SWITCH
 9. CONVENIENCE RECEPTACLE
 10. LOW FIRE START

- E. UNIT CASING SHALL BE CONSTRUCTED 18 GAUGE G-90 GALVANIZED STEEL OR HAVE A SIMILAR LEVEL OF CORROSION PROTECTION. EXTERIOR PANELS AND FLOOR SHALL BE INSULATED DOUBLE WALL. IF THE UNIT IS DELIVERED IN SECTIONS COORDINATE REQUIRED INSTALLATION WITH CONTRACTOR AND INCLUDE ALL REQUIRED FIELD ASSEMBLY MATERIALS AND ACCESSORIES.

- F. ALL CONTROLS, GAS VALVES, MODULATING CONTROLS AND ELECTRICAL COMPONENTS SHALL BE MOUNTED WITHIN THE CONTROL VESTIBULE, WHICH SHALL BE AN INTEGRAL PART OF THE UNIT.

- G. PROVIDE ACCESS DOORS FOR OBSERVATION AND MAINTENANCE OF MAJOR COMPONENTS. DOORS SHALL BE HINGED UNLESS OTHERWISE REQUIRED FOR LIMITED ACCESS SPACE AT THE UNIT LOCATION.

- H. BLOWER SHALL HAVE A SOLID STEEL SHAFT SUPPORTED ON PILLOW BLOCK BEARINGS, WITH A MINIMUM LIFE EXPECTANCY OF 200,000 HOURS.

- I. BLOWER MOTOR SHALL BE AN OPEN DRIP PROOF, PREMIUM EFFICIENCY. MOTOR SHALL HAVE AN ADJUSTABLE DRIVE OR FIXED DRIVE, AND WILL HAVE A 1.15 SERVICE FACTOR. BLOWER MOTOR SHALL HAVE AN ADJUSTABLE MOUNT, MADE OF HEAVY GAUGE STEEL.

- J. THE GAS BURNER SHALL BE A INDIRECT FIRED SIZED AT AN INLET-SUPPLY PRESSURE TO THE UNIT OF 7 TO 12 INCHES WATER COLUMN. THE BURNER SHALL BURN OVER ITS ENTIRE LENGTH AT ALL TIMES WHEN THE SYSTEM IS IN OPERATION. BURNER AND TUBES SHALL 409 OR 304 STAINLESS STEEL.

- K. THE GAS BURNER SHALL BE FURNISHED WITH A PILOT PACKAGE ARRANGED SO THAT THE PILOT FLAME LIGHTS THE BURNER WITH INSTANTANEOUS IGNITION. PILOT ASSEMBLY INCLUDES A FLAME ROD, A SPARK ROD AND A PILOT INLET. A FLAME ROD RECTIFICATION SYSTEM SHALL BE USED TO PROVE PILOT AND MAIN FLAME. A PILOT ACCESS PANEL SHALL BE PROVIDED. ALL GAS MANIFOLD COMPONENTS SHALL BE PIPED AND WIRED AT THE FACTORY.

- L. SAFETY CONTROLS:
1. AIRFLOW SAFETY SWITCH
 2. ELECTRONIC FLAME SAFETY RELAY
 3. HIGH TEMPERATURE LIMIT SWITCH
 4. LOW GAS PRESSURE SWITCH TO OPEN CIRCUIT TO ELECTRONIC FLAME SAFETY RELAY
 5. LOW DISCHARGE AIR TEMPERATURE SHUTDOWN CONTROL
 6. PRE-PURGE TIMER TO PURGE ANY GAS RESIDUE IN THE UNIT, BEFORE BURNER CIRCUIT IS ALLOWED TO ENERGIZE.
 7. DISCHARGE SMOKE DETECTOR AND SAMPLING TUBE TO STOP UNIT OPERATION WHEN SMOKE IS DETECTED.

- M. INLET HOOD:
1. HOOD SHALL BE WIND DRIVEN RAIN RESISTANCE AND SELF SUPPORTING OR PROVIDED WITH SUPPLEMENTAL SUPPORT SYSTEM IF REQUIRED.
 2. PROVIDE A TWO-POSITION, MOTOR OPERATED DAMPER WITH INTERNAL END SWITCH TO ENERGIZE THE BLOWER STARTER CIRCUIT WHEN DAMPER IS AT LEAST 70% OPEN.
 3. HOOD SHALL INCLUDE A REMOVABLE INLET MESH PRE-FILTER

- N. MAIN FILTER SECTION:
1. STEEL HOUSING WITH V-BANK FILTERS SUPPORTED BY INTERNAL SLIDES AND WITH ACCESS DOORS.

- O. CURB: 18" CURB SHALL BE CONSTRUCTED OF 12 GA G-90 GALVANIZED STEEL.

- P. CASING INSULATION: UNIT CASING SHALL BE DOUBLE WALL AND HAVE AT LEAST 1 INCH OF 1- 1/2# DENSITY INSULATION MOLD RESISTANT FIBERGLASS INSULATION OR FACTORY INSTALLED/INJECTED EXPANDING FOAM INSULATION.

- Q. CONTROLS:
1. DISCHARGE AIR TEMPERATURE CONTROL FOR BUILDING EXHAUST-AIR REPLACEMENT TO MAINTAIN A CONSTANT DISCHARGE TEMPERATURE OF SUPPLY AIR (ADJUSTABLE THROUGH CONTROL INTERFACE).
 2. PROVIDE OPERATING LIGHTS IN CONTROL SECTION TO INDICATE: FLAME FAILURE, LOW TEMPERATURE SHUTDOWN, BURNER ON AND BLOWER ON.
 3. IF AVAILABLE PROVIDE A CLOGGED FILTER SWITCH TO SIGNAL WHEN FILTERS ARE DIRTY AND REQUIRE SERVICE.
 4. THE CONTROL CIRCUIT VOLTAGE SHALL BE 115 VOLTS. A CONTROL TRANSFORMER SHALL BE PROVIDED, WHEN REQUIRED. THE CONTROL WIRING SHALL BE CARRIED IN WIRE CHANNEL OR CONDUIT.
 5. UNIT(S) SHALL BE COMPLETE WITH ALL ITEMS SUCH AS RELAYS, STARTERS, SWITCHES, SAFETY CONTROLS, CONDUIT AND WIRE AS PREVIOUSLY MENTIONED, AND AS REQUIRED FOR PROPER OPERATION. ALL FACTORY MOUNTED CONTROLS SHALL BE FACTORY PREWIRED TO THE UNIT CONTROL PANEL.

- R. EXTENDED GREASE LINES SHALL RUN FROM THE BLOWER BEARINGS TO A COMMON POINT ON THE EXTERIOR OF THE UNIT.

- S. UNIT SHALL BE OPERATED, TESTED AND SET AT THE FACTORY. ALL OPERATING AND SAFETY CONTROLS SHALL BE TESTED AND SET AT THE FACTORY. ADJUSTABLE OR FIXED SHEAVES SHALL BE SET FOR PROPER RPM AT SPECIFIED CONDITIONS. GAS PRESSURE REGULATOR SHALL BE SET FOR SPECIFIED BURNING RATE AT SPECIFIED INLET PRESSURE.

- T. UNIT SHALL BE FULLY WARRANTED FOR 1 YEAR FROM DATE OF SUBSTANTIAL COMPLETION. ALSO INCLUDE AN EXTENDED 5 YEAR PARTS WARRANTY.

- U. UNIT COST SHALL INCLUDE START-UP BY FACTORY APPROVED PERSONNEL AND SEPARATE OPERATION AND MAINTENANCE TRAINING TO BE SCHEDULED WITH OWNER.

SECTION 22000
MECHANICAL

PART 3: EXECUTION

3.1 CODES, RULES AND REGULATIONS

- A. ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL, STATE AND LOCAL CODES IN FORCE AT TIME OF BIDDING, INCLUDING BUT NOT LIMITED TO THE INDIANA CONSTRUCTION RULES. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSPECTION APPROVALS AS THE WORK PROGRESSES. ANY WORK WHICH IS COMPLETED WITHOUT THESE APPROVALS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST OR INCONVENIENCE TO THE OWNER TO THE SATISFACTION OF THE BUILDING OFFICIALS AND OWNER'S REPRESENTATIVES.

3.2 COORDINATION

- A. COORDINATE ROUTING OF PIPING, DUCTWORK, ETC. PRIOR TO STARTING INSTALLATION.
- B. COORDINATE EXACT PLACEMENT OF UNIT, PIPING AND VENTING WITH ARCHITECTURAL AND ELECTRICAL ITEMS BEFORE INSTALLATION.
- C. MECHANICAL TRADE SHALL COORDINATE ROOF AND WALL FLASHING.
- D. MECHANICAL TRADE SHALL PROVIDE ALL WALL AND ROOF OPENINGS.
- E. ALL WIRING TO PROVIDE THE COMPLETE SYSTEM OF TEMPERATURE REGULATION SHALL BE PROVIDED BY THE MECHANICAL TRADE. PROVIDE ALL NECESSARY DRAWINGS FOR DETERMINING CONNECTION POINTS, WIRE COUNTS, ETC. VERIFY REQUIREMENTS FOR NEW, EXISTING AND RELOCATED EQUIPMENT.

3.3 INSTALLATION

- A. FIELD VERIFY EXISTING CONDITIONS BEFORE ORDERING OR SETTING EQUIPMENT OR PIPING.
- B. ALL DUCTWORK SHALL COMPLY WITH SMACNA STANDARDS.
- C. PROVIDE SHUT-OFF VALVES ON SUPPLY PIPING TO EACH FIXTURE.
- D. INSTALL ALL EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS. NOTIFY ENGINEER/ARCHITECT IF THIS INFORMATION APPEARS TO CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS PRIOR TO INSTALLATION.

3.4 ACCESSIBILITY

- A. MAINTAIN ACCESSIBILITY TO ALL EQUIPMENT FOR OPERATION, MAINTENANCE AND REPAIR. REFER TO MANUFACTURER'S REQUIREMENTS.

3.5 CUTTING AND PATCHING

- A. LAY OUT WORK CAREFULLY IN ADVANCE FOR THE PROPER INSTALLATION, SUPPORT, OR ANCHORAGE OF MECHANICAL EQUIPMENT, THE WORK IS TO BE CAREFULLY DONE AND ANY DAMAGE TO THE BUILDING, PIPING, OR EQUIPMENT REPAIRED BY SKILLED MECHANICS OF THE TRADES INVOLVED, AT NO ADDITIONAL COST TO THE OWNER. THIS CONTRACTOR/TRADE SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING RELATED TO THE WORK OF THIS DIVISION OF THE SPECIFICATIONS.

3.6 RECORD DRAWINGS

- A. MAINTAIN ACCURATE RECORDS OF ALL CHANGES MADE DURING CONSTRUCTION. PROVIDE A NEATLY MARKED SET OF PRINTS TO THE ENGINEER/ARCHITECT AT COMPLETION OF THE PROJECT INDICATING ALL FIELD CHANGES.

3.7 WORKMANSHIP

- A. INSTALL ALL MATERIALS AND EQUIPMENT IN A NEAT AND WORKMANLIKE MANNER AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AS APPROVED BY THE ENGINEER/ARCHITECT TO CONFORM WITH THE CONTRACT DOCUMENTS.

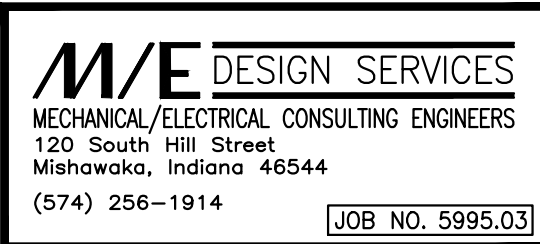
3.8 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTION

- A. PROVIDE TWO (2) BOUND SETS OF COMPLETE INSTALLATION, OPERATING, AND MAINTENANCE INSTRUCTIONS. MANUALS SHALL ALSO INCLUDE COMPLETE PARTS LISTS, OPERATING INSTRUCTIONS, COPIES OF ORIGINAL SHOP DRAWINGS, SUBCONTRACTOR LISTS, WARRANTIES, WARNINGS, ETC. GENERIC INSTRUCTIONS SHALL HIGHLIGHT APPLICABLE SECTIONS WHEN NEEDED TO DIFFERENTIATE FROM NON-RELEVANT EQUIPMENT.
- B. UPON COMPLETION OF THE WORK AND AT A DESIGNATED TIME, PROVIDE INSTRUCTIONS TO THE OWNER'S REPRESENTATIVE ON OPERATION AND MAINTENANCE OF ALL MECHANICAL EQUIPMENT. NOTIFY ENGINEER/ARCHITECT OF SCHEDULED TIME AND PLACE.
- C. TURN OVER TO OWNER ALL TOOLS SUPPLIED WITH EQUIPMENT.

3.9 TESTING AND BALANCING

- A. PROVIDE COMPLETE TESTING AND BALANCING FOR THE MAKEUP AIR UNIT SYSTEM IN ACCORDANCE WITH THE GUIDELINES OF AABC OR NEBB. SUBMIT 3 COPIES OF COMPLETED REPORT FOR APPROVAL. RE-BALANCE IF REQUIRED TO ACHIEVE SPECIFIED CONDITIONS. SUBSTANTIAL COMPLETION MAY BE DENIED IF TESTING AND BALANCING WORK IS NOT COMPLETED AND APPROVED.

END OF SECTION



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MAKEUP AIR UNIT REPLACEMENT
ELKHART HOUSING AUTHORITY
RIVERSIDE HIGH RISE
ELKHART
INDIANA

MECHANICAL
SPECIFICATIONS

ME104





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MAKEUP AIR UNIT REPLACEMENT
ELKHART HOUSING AUTHORITY
RIVERSIDE HIGH RISE

ELECTRICAL
SPECIFICATIONS

ME105



SECTION 260000 ELECTRICAL

PART 1: GENERAL

1.1 GENERAL

- A. THE WORK INDICATED IN THIS DIVISION AND ON THE ELECTRICAL DRAWINGS IS SUBJECT TO THE REQUIREMENTS OF THE INSTRUCTIONS TO BIDDERS AND ANY PURCHASE ORDER OR GENERAL CONDITIONS. THESE ARE HEREBY INCLUDED BY REFERENCE. THE CONTRACTOR IS DIRECTED TO EXAMINE ALL PORTIONS OF THE BID DOCUMENTS AS THEY PERTAIN TO THE WORK COVERED BY THIS DIVISION OF THE SPECIFICATIONS AND TO INCLUDE ALL COSTS IN BID FOR ALL ELECTRICAL WORK AS CALLED FOR BY THE COMPLETE BID DOCUMENTS.
- B. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR SERVICES NECESSARY FOR THE COMPLETE INSTALLATION OF EQUIPMENT INDICATED HEREIN AND ON THE DRAWINGS, COMPLETE WITH ALL RELATED SERVICES. REVIEW ALL EXISTING BUILDING CONDITIONS AS THEY RELATE TO ELECTRICAL WORK AND INCLUDE COSTS IN BID. COORDINATE REQUIREMENTS WITH OTHER TRADES AS REQUIRED.
- C. ALL WORK SHALL BE PERFORMED BY EXPERIENCED PERSONNEL QUALIFIED TO CARRY OUT THE WORK IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, LOCAL CODES AND AS SPECIFIED HEREIN. THE CONTRACTOR SHALL PROVIDE APPROPRIATE QUALIFICATIONS AND RECORDS OF PAST EXPERIENCE FOR PERSONNEL AND SUBCONTRACTORS WHEN REQUESTED BY THE ENGINEER/ARCHITECT FOR REVIEW AND APPROVAL.
- D. THE ELECTRICAL DRAWINGS LISTED IN THE DRAWING INDEX, TOGETHER WITH THESE SPECIFICATIONS, ARE AN INTEGRAL PART OF THE ELECTRICAL CONTRACT. WHAT IS CALLED FOR IN ONE IS AS BINDING AS IF CALLED FOR IN BOTH. IN CASE OF CONFLICT, THE GREATER QUANTITY OR BETTER QUALITY IS TO PREVAIL, SUBJECT TO THE APPROVAL OF THE OWNER

1.3 CODES, STANDARDS AND PERMITS

- A. ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL, STATE AND LOCAL CODES IN FORCE AT TIME OF BIDDING, INCLUDING BUT NOT LIMITED TO THE NATIONAL ELECTRICAL CODE. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSPECTION APPROVALS AS THE WORK PROGRESSES. ANY WORK WHICH IS COMPLETED WITHOUT THESE APPROVALS AND FOUND TO BE UNACCEPTABLE SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYMENT OF ALL FEES ASSOCIATED WITH INSPECTIONS, PERMITS AND UTILITY CONNECTIONS UNLESS OTHERWISE INDICATED.
- 1.4 ELECTRICAL
- A. COORDINATE ALL WORK REQUIRING ELECTRICAL CONNECTION WITH THE CONTRACTOR PROVIDING THE EQUIPMENT. EXCEPT AS OTHERWISE INDICATED, ADDITIONAL INTERNAL WIRING, AUTOMATIC CONTROL WIRING, PROTECTIVE DEVICES, ETC. ASSOCIATED WITH WORK FURNISHED BY THE OTHER TRADES SHALL BE FURNISHED BY THE TRADE SUPPLYING THE EQUIPMENT.
- B. VERIFY VOLTAGE AND PHASE CHARACTERISTICS OF THE ELECTRICAL SERVICE AND COORDINATE WITH MECHANICAL EQUIPMENT AS REQUIRED.
- C. WHERE ELECTRICAL RATINGS OF EQUIPMENT INCREASE OVER THOSE INDICATED ON THE APPROVED CONSTRUCTION DOCUMENTS, THE CONTRACTOR PROVIDING THE EQUIPMENT SHALL PAY ADDITIONAL COSTS OF WIRING AND ELECTRICAL EQUIPMENT FOR PROPER ELECTRICAL SERVICE TO THE EQUIPMENT.

1.5 DEMOLITION

- A. BEFORE STARTING DEMOLITION WORK, REVIEW ALL REQUIREMENTS FOR FINAL REMODELING WORK SO THAT USABLE EXISTING SYSTEM COMPONENTS, AS REQUIRED FOR COMPLETION OF THE NEW WORK, ARE NOT DESTROYED. COORDINATE ALL WORK WITH THE OTHER CONTRACTORS.
- B. ALL ELECTRICAL EQUIPMENT AND CIRCUITS THAT ARE DAMAGED OR DESTROYED DURING DEMOLITION, AND ARE NOT CALLED OUT TO BE REMOVED ON THE DRAWINGS, MUST BE RESTORED TO ORIGINAL CONDITION.
- C. THE CONDITION OF THE SITE, BUILDINGS AND SURROUNDINGS SHALL BE ACCEPTED AS FOUND. RESPONSIBILITY FOR CONDITIONS ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
- D. WORK PRACTICES AND JOB CONDITIONS SHALL MEET ALL STATE, FEDERAL AND LOCAL REQUIREMENTS TO PROTECT LIFE AND PROPERTY.
- E. VERIFY WORK TO BE PERFORMED BEFORE PROCEEDING. WORK TO REMAIN SHALL BE PROTECTED AND, IF DAMAGED, SHALL BE RESTORED TO LIKE NEW CONDITION. COORDINATE DEMOLITION WITH OTHER TRADES AS REQUIRED. ITEMS INDICATED FOR DEMOLITION SHALL BE COMPLETELY REMOVED, HAULED OFF-SITE AND DISPOSED OF PROPERLY AT NO ADDITIONAL COST TO THE OWNER.

1.6 RECORD DRAWING

- A. PROVIDE ELECTRICAL RECORD DRAWINGS AS CALLED FOR IN DIVISION 1 AND INCLUDE ALL PERTINENT INFORMATION NOT SHOWN AND ALL CHANGES FROM THE ORIGINAL PLANS: ROUTE OF ALL UNDERGROUND AND OVERHEAD FEED CONDUITS FROM THE MAIN SWITCHBOARD TO THE VARIOUS PANELS AND EQUIPMENT; INTERCONNECTING CONDUITS BETWEEN BRANCH CIRCUIT, JUNCTION BOXES, AND PANELS (ACTUAL ROUTE OF CONDUIT IS NOT REQUIRED, EXCEPT FOR CONCEALED PANEL AND MAJOR EQUIPMENT FEEDERS, ONLY HOW THE VARIOUS BRANCH ITEMS ARE INTERCONNECTED WITH CONDUIT AND NUMBER OF WIRES); CIRCUIT NUMBERS FOR ALL ITEMS WHERE THEY DO NOT AGREE WITH THE PLANS. CIRCUIT NUMBERS ON RECORD DRAWINGS AND PANELBOARD DIRECTORIES MUST AGREE.

1.7 GUARANTEES AND WARRANTIES

- A. ALL LABOR, MATERIALS AND EQUIPMENT SHALL BE GUARANTEED BY THE CONTRACTOR AND WARRANTED BY THE MANUFACTURER FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER, UNLESS LONGER PERIOD IS SPECIFIED FOR SPECIFIC EQUIPMENT. LAMP GUARANTEE IS LIMITED TO REPLACING ALL DEFECTIVE OR NON-OPERATING LAMPS INSTALLED UNDER THIS CONTRACT AT TIME OF SUBSTANTIAL COMPLETION.
- B. THE CONTRACTOR SHALL MAKE ALL NECESSARY REPAIRS AND ALTERATIONS DURING THE GUARANTEE PERIOD AS MAY BE REQUIRED BY THE OWNER OR ARCHITECT FOR CORRECT SYSTEM OPERATION AND TO COMPLY WITH THE DRAWINGS AND SPECIFICATIONS. THESE REPAIRS AND ALTERATIONS SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
- C. THE OWNER RESERVES THE RIGHT TO MAKE EMERGENCY SYSTEM REPAIRS WITHOUT VOIDING THE CONTRACTOR'S GUARANTEE.

SECTION 260000 ELECTRICAL CONT.

PART 2: PRODUCTS

2.1 RACEWAYS

- A. PROVIDE AND INSTALL RACEWAYS AS REQUIRED FOR THE NEW WORK. RACEWAYS WILL BE RIGID METAL CONDUIT (RMC) OR INTERMEDIATE METALLIC CONDUIT (IMC). MINIMUM RACEWAY SIZE WILL BE THREE-QUARTER (3/4) INCH. LIQUID TIGHT FLEXIBLE CONDUIT MAY BE USED FOR FAN CONNECTIONS TO EQUIPMENT.

2.2 CONDUCTORS

- A. CONDUCTORS WILL BE THHN, THWN, OR XHHW, SIZED AS INDICATED AND INSTALLED IN ACCORDANCE WITH THE NEC. NO. 12 AWG WILL BE THE MINIMUM CONDUCTOR SIZE ALLOWED FOR BRANCH CIRCUIT WIRING. BRANCH CIRCUIT LENGTHS EXCEEDING ONE HUNDRED FEET (100') FOR 120-VOLT CIRCUITS WILL HAVE A MINIMUM WIRE SIZE OF NO. 10 AWG. COLOR CODE SHALL MATCH EXISTING BUILDING WIRING.
- B. CLASS 1 REMOTE-CONTROL AND SIGNAL CIRCUIT CONDUCTORS WILL NOT BE LESS THAN NO. 14 AWG. CLASS 2 LOW-ENERGY REMOTE-CONTROL AND SIGNAL CIRCUIT CONDUCTORS WILL NOT BE LESS THAN NO. 16 AWG.

2.3 GROUNDING:

- A. PROVIDE GROUNDING FOR ALL EQUIPMENT IN ACCORDANCE WITH THE NEC. PROVIDE GROUNDING CONDUCTORS IN ALL METALLIC AND NONMETALLIC RACEWAYS. NOTE THAT GROUNDING CONDUCTORS ARE NOT INDICATED ON THE DRAWINGS (WHERE WIRE COUNTS ARE SHOWN) BUT ARE REQUIRED TO BE PROVIDED IN ALL RACEWAYS.
- B. GROUNDING CONDUCTORS TO BE COPPER WIRE, OF THE SIZE REQUIRED BY THE NATIONAL ELECTRIC CODE OR AS SHOWN ON THE CONTRACT DRAWINGS. MAKE ALL CONNECTIONS AND SPLICES IN THE GROUNDING SYSTEM BY MEANS OF SOLDERLESS CONNECTORS.
- C. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, ABOVE-GRADE GROUNDING CONNECTIONS SHALL BE MECHANICAL COMPRESSION TYPE.
- D. GROUNDING BUSHINGS SHALL BE INSULATED TYPE. INSTALL GROUND BUSHINGS ON ALL FEEDERS ENTERING EXISTING PANELS, WHERE PANELS DO NOT HAVE A SEPARATE GROUND BUS.
- E. PROVIDE GROUNDING EQUIPMENT BY ANDERSON, BURNDY, ERICO, HARGER OR APPROVED EQUAL.

PART 3: EXECUTION

3.1 COORDINATION

- A. TO AVOID CONFLICTS, COORDINATE EXACT PLACEMENT OF ELECTRICAL ITEMS AND ELEVATION OF CONDUIT ROUTES WITH OTHER TRADES PRIOR TO INSTALLATION. ANY CONFLICTS THAT CANNOT BE RESOLVED BETWEEN TRADES MUST BE BROUGHT TO THE ATTENTION OF THE OWNER IN WRITING AND RESOLVED BEFORE PROCEEDING.
- B. PROVIDE APPROPRIATE FIRESTOPPING MATERIAL AROUND ALL PENETRATIONS THROUGH FIRE-RATED WALLS.
- C. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, UL LISTING REQUIREMENTS AND ACCEPTED PRACTICES.

END OF SECTION