

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT**

INVITATION TO BID NO. ITB 21-DES-ITB-287

ADDENDUM NO. 1

Arlington County Invitation to Bid Number 21-DES-ITB-287 for ACDF Air Handler Replacement is **amended** as follows:

Question #1:

During the pre-bid meeting, it was mentioned that the ceiling is a special type of ceiling and that it will need to be taken down at the beginning of and put back up at the end of each shift. Do you know the name brand and model of this ceiling so that we may try to estimate how much work this will be?

Response #1:

The existing ceiling tiles installed in the kitchen are similar to the ceiling tiles manufactured by Armstrong, model # 5488P4WH.

Question #2:

Can the special ceiling be taken down and some sort of temporary covering be put up at the end of each shift, such as fire-retardant poly until the work is completed in that section?

Response #2:

Temporary covering can be installed.

Question #3:

Is Arlington County paying for the Commissioning? How many hours are you estimating for each trade, (Mechanical, Electrical, TAB, Controls) to be spent with the Commissioning?

Response #3:

The Commissioning agent will be paid by Arlington County. The contractor must be present during the commissioning of the equipment. Specification Section 230800 specifies all the requirements for the commissioning.

Question #4:

Can work in the mechanical room be done during normal daytime work hours?

Response #4:

Work in the mechanical room can be done during regular hours.

Question #5:

Can a Mechanical Contractor with a Class A HVAC license bid this as the Prime Contractor?

Response #5:

Prime contractor must have all the licenses listed on the ITB requirements. Arlington County Special Inspections allows only contractors with a Commercial Virginia Construction License with CBC or CIC certifications to hold a Building Permit.

DRAWINGS

1. Sheet M-401 Enlarged Plan Demolition: **Added Demolition Note 14**. Remove existing floor drain and miscellaneous piping penetrating the floor where housekeeping pad is widened for new AHU-2. Temporarily cap existing pipe under the floor for connection to new floor drain.
2. Sheet M-402 Enlarged Plan New Work: Construction Note 1 is **deleted** in its entirety and **replaced** with the following: Provide new AHU-2 with housekeeping pad. Unit shall have freeze-proof preheat and cooling coils with drain pans and full-size piping connections with p-traps to the new floor drain.
3. The Kitchen Air Handler Unit Schedule in Sheet M-601 has been revised. Refer to the attached revised Kitchen Air Handler Unit Schedule.
4. Sheet M-601 Adjustable Frequency Drive Schedule: **Delete** AFD-1 - 30 HP and **replace** with two AFDs. **Add** AFD-1 at 15 HP and AFD-2 at 15 HP with a single-point power connection for AHU-2.
5. Sheet E-101 has been **revised** as follows:
 - a. Sketch 1 of 4 – Motor Control Center (MCC-2) – New Work has been **deleted** and **replaced** with the attached Sketch 1.
 - b. Sketch 2 of 4 – Construction Note 4 has been **deleted** and **replaced** with the attached Sketch 2.
 - c. Sketch 3 of 4 – Power Plan circuit has been **modified to include change as indicated by the clouded area in** the attached Sketch 3.
 - d. Sketch 4 of 4 – Panel Schedule “NG1” power circuit has been **deleted** and **replaced** with the attached Sketch 4.
6. Sheet E-601: Eliminate AHU-2 connection to MCC-2. Provide instead a 60 amp 3-pole circuit breaker and power circuit for AHU-2 single point connection from existing 277/480 volt Panel NG1. Remove (3) 20 amp circuit breakers in space 26, 28 & 30 for the new 3-pole breaker. Add one 20 amp 1-pole breaker and power circuit in Panel NGB and a unit mounted toggle switch at AHU-2 for the lighting circuit in AHU-2.

SPECIFICATIONS

1. Specification Section 05 5000 Metal Fabrications is **deleted** in its entirety and **replaced** with the attached Specification Section 05 5000 Metal Fabrication to include three details in the Specification Section.
2. Specification Section 23 2690 - Adjustable Frequency Drives: Paragraph 3.15 **Replace** word "Pump" with "Fan" and **replace** (1) 30HP AFD with (2) 15 HP AFDs.
3. Specification Section 23 - 6400 Air Handling Unit (AHU-2) is **revised** as follows:

- a. Paragraph 1.1.B **add** Note 7. The Air Handler shall be provided with marine lights in the fan section;
- b. Paragraph 1.1.B **add** Note 8. The parallel supply air fans shall be set up with factory fabricated built-in back-draft dampers so if one fan fails the remaining fan will remain operational. This control shall be programmed into the BAS logic by the BAS contractor;
- c. Paragraph 2.6.B is **deleted** in its entirety and **replaced** with the following two sentences:

Hot water coil: Provide ARI Standard 410 rated coil constructed with minimum 0.060 inch thick wall headers and 0.0075-inch thick aluminum fins, 5/8-inch outside diameter (OD), 0.049 inch wall seamless copper tubes, and galvanized casing, tested and guaranteed for 200 psi working pressure. Stub coil connections through unit casing with cleanable coil header inside unit casing with removable coil access panel for ease of maintenance. Freeze protection coils shall be installed in Factory by manufacturer. Leak detection alarm shall be provided by the BAS contractor.

1. Basis of Design: Cooney Engineered Solutions

The balance of the solicitation remains unchanged.

Arlington County, Virginia

Sy Gezachew
Procurement Officer

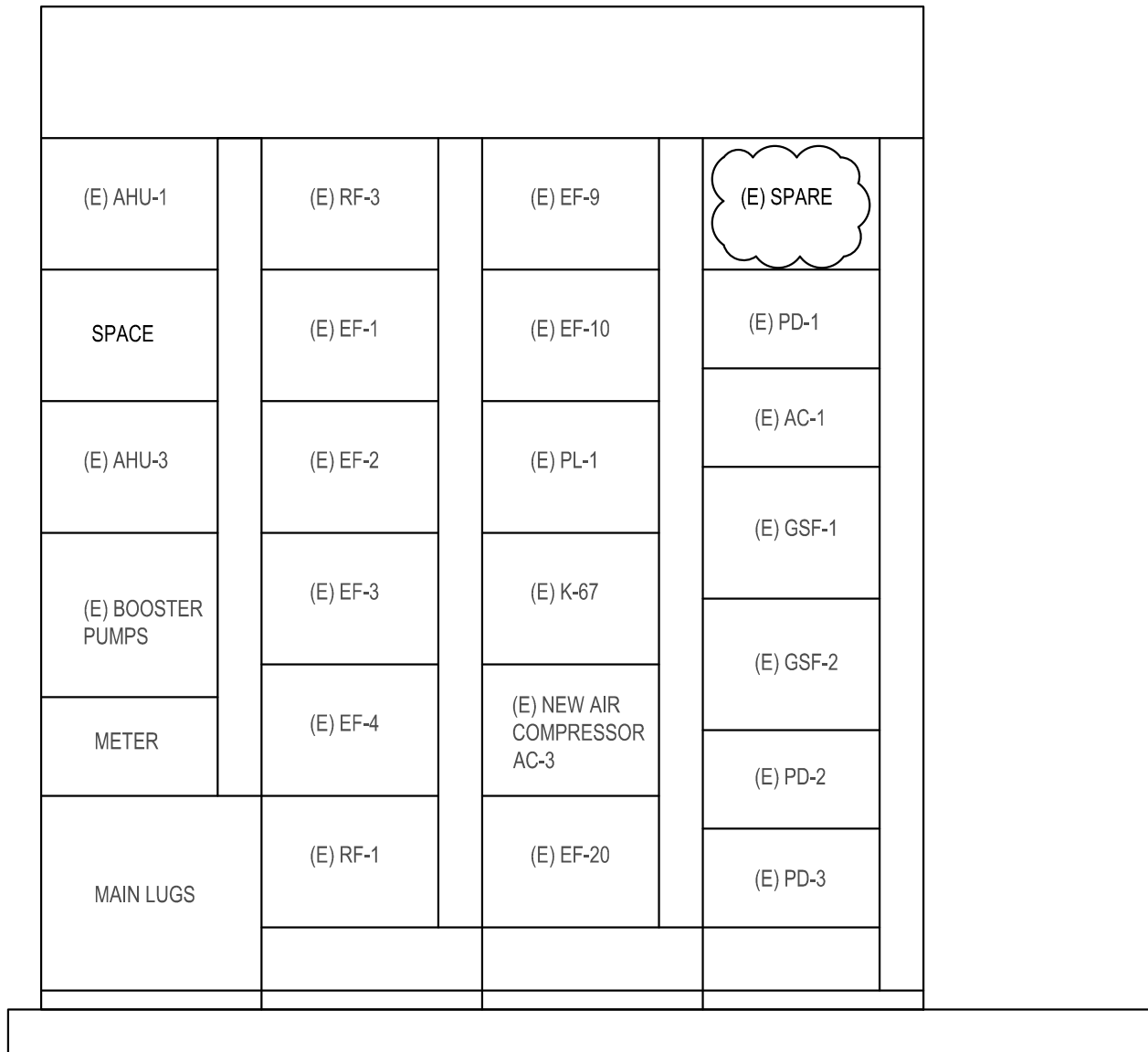
RETURN THIS PAGE, FULLY COMPLETED AND SIGNED, WITH YOUR BID:

BIDDER ACKNOWLEDGES RECEIPT OF ADDENDUM NUMBER 1.

FIRM NAME: _____

AUTHORIZED SIGNATURE: _____ **DATE:** _____

SKETCH 1

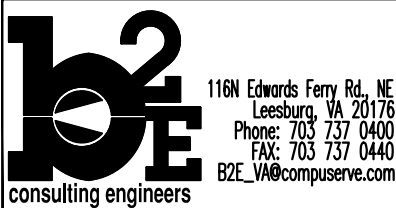


1 LABEL AS SPACE.

DETENTION CENTER MECHANICAL ROOM
 EXISTING MOTOR
 CONTROL CENTER (MCC-2) – NEW WORK

4

3/4" = 1'-0"



PROJECT ARLINGTON COUNTY KITCHEN AHU-2 REPLACEMENT			
B2E JOB No.	18608	BY:	AEG
DATE:	12-08-2020		
DRAWING No.	E-101	SKETCH No.	1 of 4
		ADDENDUM NO.	1

SKETCH 2

CONSTRUCTION NOTES #

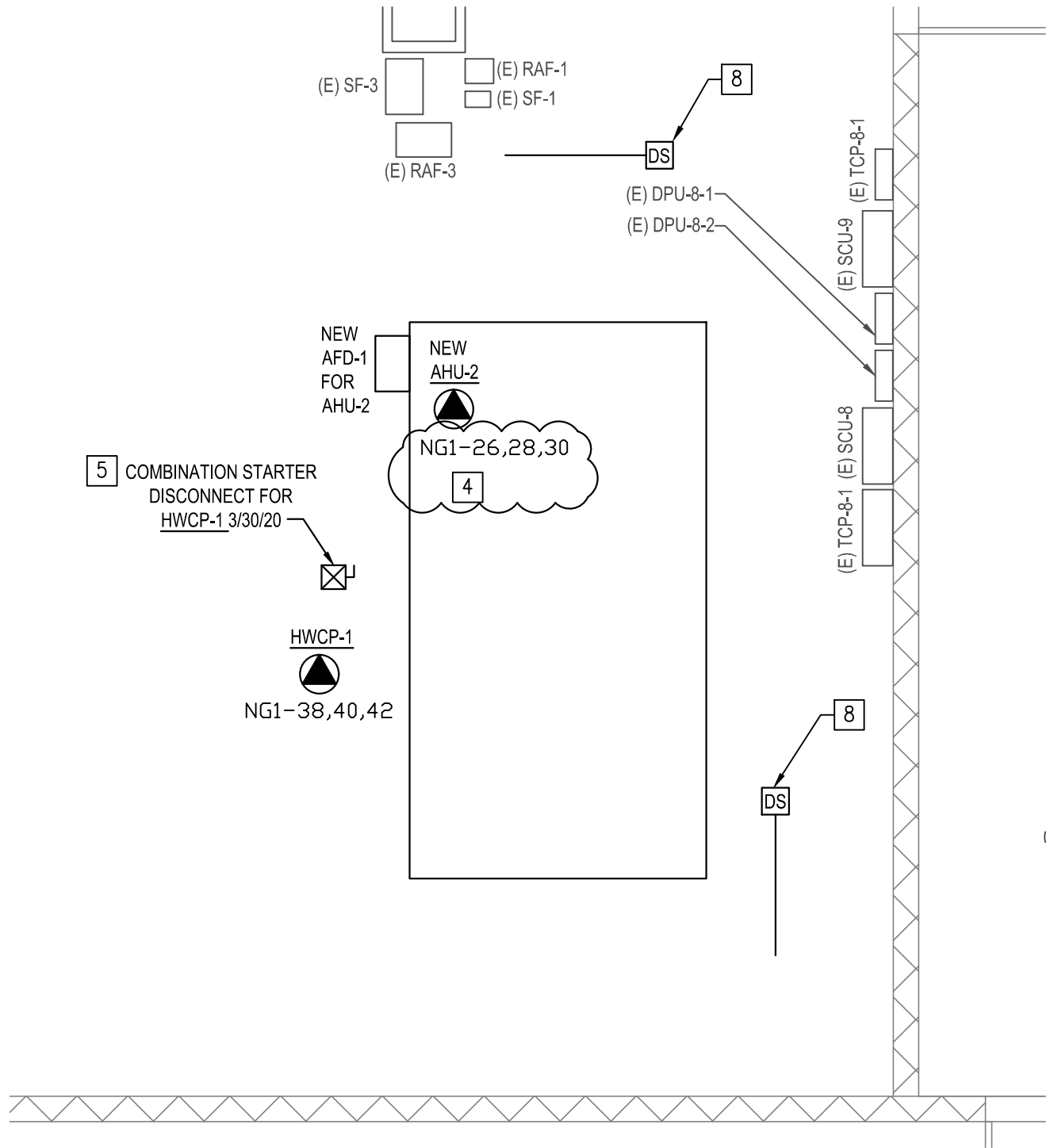
1. EXISTING AHU-2: REMOVE AND MAKE SAFE FOR DEMOLITION AHU-2 AND ALL ASSOCIATED CIRCUITS, CONDUITS, AND DISCONNECT SWITCHES BACK TO SOURCE.
2. EXISTING RAF-3 VFD SHALL REMAIN.
3. EXISTING MCC-2: REFER TO DETAILS 3 & 4 ON THIS SHEET FOR DEMO AND NEW WORK RESPECTIVELY.
4. NEW AHU-2: PROVIDE NEW AHU-2 WHERE INDICATED. PROVIDE POWER CONNECTION FROM EXISTING 277/480V PANEL NG1. REFER TO PANEL SCHEDULE NG1 ON SHEET E-601 FOR BREAKER SIZES, FEEDER SIZES, AND CONDUIT SIZE
 - PROVIDE (1) 20A 120V/1Ø POWER CONNECTION FOR THE AHU-2 LIGHTS FROM THE AVAILABLE SPACES IN PANEL "NGB".
5. PROVIDE COMBINATION STARTER WITH FUSED DISCONNECT SWITCH FOR HWCP-1.
6. EXISTING 208V PANELS NGA, NGB, AND NGC SHALL REMAIN. PROVIDE (2) 20A 120V/1Ø POWER CONNECTION FOR THE AUTO TEMP CONTROL AND PROVIDE (2) 20A 120V/1Ø POWER CONNECTIONS FOR THE BAS CONTROL PANELS FROM THE AVAILABLE SPACES IN PANEL "NGB".
7. EXISTING 480V PANEL NG1 SHALL REMAIN. PROVIDE A 480V/3Ø POWER CONNECTION FOR THE FREEZE PROTECTION PUMP (HWCP-1) FROM THE PANEL'S AVAILABLE SPACES.
8. PROVIDE NEW DUCT SMOKE DETECTORS. INTERLOCK TO THE EXISTING FIRE ALARM SYSTEM TO SHUT DOWN THE AIR HANDLER AND INITIATE A TROUBLE ALARM UPON DETECTING PRODUCTS OF COMBUSTION.
 - PROVIDE DUCT SMOKE DETECTORS THAT ARE COMPATIBLE WITH THE EXISTING FIRE ALARM SYSTEM.



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PROJECT ARLINGTON COUNTY KITCHEN AHU-2 REPLACEMENT		
B2E JOB No. 18608	BY: AEG	DATE: 12-08-2020
DRAWING No. E-101	SKETCH No. 2 of 4	ADDENDUM NO. 1

SKETCH 3



DETENTION CENTER MECHANICAL ROOM – ELECTRICAL NEW WORK

2

1/4" = 1'-0"



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PROJECT ARLINGTON COUNTY KITCHEN AHU-2 REPLACEMENT			
B2E JOB No.	18608	BY:	AEG
DRAWING No.	E-101	SKETCH No.	3 of 4
		DATE:	12-08-2020
		ADDENDUM NO.	1

SKETCH 4

EXISTING PANEL "NG1"

BUS NUMBER: EXISTING PANEL ED-1
 SERVED FROM: SURFACE/RECESSED
 MOUNTING:
 LOCATION: UPPER LEVEL MECHANICAL ROOM

AMPERE RATING: 255A BUSS
 MAIN TYPE: 255A MAIN CIRCUIT BREAKER (MCB)
 LUG OPTIONS: -

VOLTAGE (L-L): 480
 VOLTAGE (L-N): 277

PHASE: 3
 WIRE: 4
 MINIMUM KVAIC RATING: 35

CIRCUIT NO.	CIRCUIT BREAKER	LOAD DESCRIPTION	LOAD KVA			BRANCH CIRCUIT A			BRANCH CIRCUIT B			LOAD KVA			LOAD DESCRIPTION	CIRCUIT BREAKER		CIRCUIT NO.
			A	B	C	SETS	PHASE/NEUT. NO.	MIN. COND. SIZE	PHASE/NEUT. NO.	MIN. COND. SIZE	A	B	C	TRIP		P		
1	20	1 LEG HOLDING/INTRIC (EXISTING)	L	0.50										L LEG HOLDING N-W (EXISTING)	20	1	1	2
3	20	1 LEG HOLDING/INTRIC (EXISTING)	L	0.50										L LIGHTING CORR N-W (EXISTING)	20	1	1	4
5	20	1 LEG INMT STOS GRH (EXISTING)	L	0.50										L LIGHTING RECORDS & R.R. (S) (EXISTING)	20	1	1	6
7	20	1 LEG C STORE & LAUNDRY (EXISTING)	L	0.50										L LIGHTING OFFICE/STORE S-W (EXISTING)	20	1	1	8
9	20	1 LIGHTING CORR/SHP/INITE (EXISTING)	L	0.50										L LEG STAIR #12-G-11 (EXISTING)	20	1	1	10
11	20	1 LIGHTING CORR/SHP/INITE (EXISTING)	L	0.50										L LEG CENTER MECH ROOM (EXISTING)	20	1	1	12
13	20	1 LIGHTING STAIRS #3-15-G-12 (EXISTING)	L	0.50										L LIGHTING STAIR #2-15-G-11 (EXISTING)	20	1	1	14
15	20	1 LIGHTING VLS/LOBY/OTR/FILE (EXISTING)	L	0.50										L LIGHTING STAIR #4-15-G-12 (EXISTING)	20	1	1	16
17	20	1 LIGHTING WLS/TRMEST/FILE (EXISTING)	L	0.50										L LIGHTING KITCHEN E./BIR STOR (EXISTING)	20	1	1	18
19	20	1 LEG ELEV/ETHR/1 DUCT (EXISTING)	L	0.50										L LIGHTING KITCH C/CULY/RR (EXISTING)	20	1	1	20
21	20	1 LIGHTING LDG DDC/RAMP ENTR. (EXISTING)	L	0.50										L LIGHTING KITCH W/M OFF. (EXISTING)	20	1	1	22
23	20	3 ACCT 2HP (EXISTING)	M	0.94										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	24
25	20	3 ACCT 2HP (EXISTING)	M	0.94										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	26
27	20	3 ACCT 2HP (EXISTING)	M	0.94										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	28
29	20	3 ACCT 2HP (EXISTING)	M	0.94										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	30
31	20	3 ACCT 2HP (EXISTING)	M	0.94										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	32
33	20	3 ACCT 2HP (EXISTING)	M	0.94										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	34
35	3	TRASH COMPACTOR (EXISTING)	M	6.90										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	36
37	3	TRASH COMPACTOR (EXISTING)	M	6.90										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	38
39	3	TRASH COMPACTOR (EXISTING)	M	6.90										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	40
41	20	1 ELCC DUCT HEATER 1KW KITCHEN OFFICE	H	10.78										L LIGHTING CENTER OFFICE (EXISTING)	20	1	1	42

LOAD CATEGORY	NEC ART. 220 LOAD (KVA)	NEC ART. 220 TOTAL CONNECTED LOAD (KVA)	NEC ART. 220 BRAND FACTOR	NEC ART. 215 PANEL LOAD (KVA)
A HOSPITAL LIGHTING	0.00	0.00	0.40 ⁽¹⁾	0.00
B HOTEL/MOTEL LIGHTING	0.00	0.00	0.5 ⁽²⁾	0.00
C SPACE COOLING*	0.00	0.00	1.25	0.00
D OTHER HVAC LOADS	0.00	0.00	1.25	0.00
H SPACE HEATING	2.50	2.50	1.25	3.13
K KITCHEN APPLIANCES	0.00	0.00	1.00	0.00
L GENERAL LIGHTING	11.00	11.00	1.25	13.75
M MISC. CONTINUOUS	62.94	62.94	1.25	78.68
N MISC. NONCONTINUOUS	0.00	0.00	1.00	0.00
R RECEPTACLES	0.00	0.00	1.00 ⁽³⁾	0.00
W WAREHOUSE LIGHTING	0.00	0.00	1.00 ⁽³⁾	0.00
X ** LARGEST CONTINUOUS LOAD	0.00	0.00	1.25	0.00
TOTAL:	76.44	76.44		95.55

NEC ART. 220 BRAND FACTOR

NEC ART. 215 PANEL LOAD (KVA)

PANEL PHASE TOTALS: 24.98 24.98 26.48
 PHASE BALANCE (% OF 3 PHASE LOAD): 98.04 98.04 103.92

NEC ART. 220 LOAD (KVA)

NEC ART. 220 TOTAL CONNECTED LOAD (KVA)

NEC ART. 215 PANEL LOAD (KVA)

NEC ART. 220 BRAND FACTOR

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NEC ART. 220 TOTAL CONNECTED LOAD (KVA)

NEC ART. 215 PANEL LOAD (KVA)

PROJECT ARLINGTON COUNTY KITCHEN AHU-2 REPLACEMENT

B2E JOB No. 18608

DRAWING No. E-601

BY: AEG

SKETCH No. 4 of 4

DATE: 12-08-2020

ADDENDUM No. 1



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 Leesburg, VA 20176
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REVISED KITCHEN AIR HANDLING UNIT SCHEDULE

KITCHEN AIR HANDLING UNIT SCHEDULE																																																			
(A) GENERAL			(B) AIR FLOW										(C) PREHEAT COIL										(D) COOLING COIL							(E) FILTERS		(F) ELECTRICAL				(G) DIMENSIONS		(H) BASIS OF DESIGN													
AHU TAG	TYPE	AHU CONST. LOCATION AND/OR SERVICE	AIR FLOW [CFM]			TOT. SP [IN W.G.]				WHEEL TYPE	FAN SPEED [RPM]	MOTOR HP	AFD CONTROLLER	MOTOR V/Ø	CAP. [MBH]	MAX. FACE VELOCITY [FPM]	MAX. FIN SPACING [FPI]	MIN. ROWS	HOT WATER FLOW				CAPACITY [MBH]		MAX. FACE VEL [FPM]	MAX. FIN SPACING [FPI]	MIN. ROWS	ENT. AIR				LVG. AIR				MERV 8	MERV 8	VOLT / Ø	FLA	MCA	MOCP	WEIGHT [LBS]	DIMENSIONS LxWxH [IN.]	MANUFACTURER	MODEL NUMBER	REMARKS [H]					
			SA [CFM]	RA [CFM]	MIN. OA [CFM]	MIN. OA [%]	SA	RA	SA										RA	EAT [°F]	LAT [°F]	EWT [°F]	LWT [°F]	GPM				WPD [FT H2O]	MEDIUM	TOTAL	SENS.	DB [°F]	WB [°F]	DB [°F]	WB [°F]												EWT [°F]	LWT [°F]	GPM	WPD [FT H2O]	MEDIUM
AHU-2	VAV	INDOOR MECHANICAL ROOM	15000	2500	12500	83.3	PER MFGR	N/A	3	N/A	DUAL PLENUM	1800	(2) 15	YES	460/3	730.4	522	7	2	20	65	150	120	50	1	WATER	1056	608	502	8.25	8	91.6	75.4	55.1	54.9	44	56	180	13.3	WATER	493	0.56	460 / 3	42	47.25	60	7895	176 x 93.5 x 61.8	TRANE	CSAA030	1 THRU 13
			AHU LIGHTS																																																
			120 / 1 2.61 3.26 15																																																

NOTES:

(A) GENERAL:

- AHU TAG: AIR HANDLER DESIGNATION
- TYPE: CV= CONSTANT VOLUME, SINGLE ZONE, HORIZONTAL DRAW-THRU ARRANGEMENT; VAV= MULTIPLE ZONE, VARIABLE AIR VOLUME, DISCHARGE AIR CONTROL, OA FLOW MEASURING STATION, HORIZONTAL DRAW THRU ARRANGEMENT.
- AHU CONST. = AHU CONSTRUCTION: INDOOR = INDOOR MODULAR AIR HANDLING UNIT; OUTDOOR = OUTDOOR ROOFTOP WEATHERPROOF CONSTRUCTION AIR HANDLER WITH FACTORY INSULATED CURB. SHIP CURBS PRIOR TO AHU'S AS NECESSARY TO MEET THE CONSTRUCTION MILESTONE DEADLINES AND CONSTRUCTION COMPLETION SCHEDULES.
- LOCATION/SERVICE: LOCATION = PHYSICAL LOCATION OF AHU IN BUILDING; SERVICE = SPACE SERVED.

(B) AIRFLOW:

- AIRFLOW (CFM): DESIGN AIRFLOW THRU UNIT AT MAXIMUM OPERATING CONDITIONS.
- MINIMUM OUTSIDE AIR (CFM): MINIMUM DESIGN OUTSIDE AIR FLOW BALANCED AT TRAQ/MIXING BOX. UNIT SHALL BE PROVIDED WITH AN ECONOMIZER CAPABLE OF A MIN. OF QUANTITY = 85% OF SUPPLY AIRFLOW.
- TOTAL STATIC PRESSURE (IN. WG.): MAX ALLOWABLE T.S.P. SHALL BE PROVIDED BY THE MANUFACTURER FOR ACTUAL UNIT PURCHASED. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE VENDOR THE TOTAL SYSTEM STATIC PRESSURE DROP AND THE REQUIRED FAN MOTOR HORSEPOWER NECESSARY TO MEET THE DESIGN AIRFLOW RATES SCHEDULED PRIOR TO SUBMITTING BID PRICE. WHERE THE STATIC PRESSURE REQUIRES AN INCREASE IN THE SCHEDULED FAN MOTOR HORSEPOWER, THE CONTRACTOR SHALL PROVIDE ELECTRICAL SERVICE SIZE (SUCH AS WIRE, CONDUIT, MOTOR STARTER, CIRCUIT BREAKERS, ETC.) TO MATCH THE OVERCURRENT PROTECTION FOR THE ACTUAL UNITS PURCHASED. THE INSTALLATION SHALL BE IN COMPLIANCE WITH ALL APPLICABLE ARTICLES OF THE NATIONAL ELECTRIC CODE (NEC) NFPA 70.
- EXTERNAL STATIC PRESSURE (IN. WG.): INCLUDES DUCT MOUNTED SOUND ABSORBERS, DUCTWORK AND AIR OUTLETS; IT DOES NOT INCLUDE UNIT DAMPERS, MIXING BOX, PRE-FILTERS, FINAL FILTERS, HEATING COIL, COOLING COIL AND CASING LOSSES.
- WHEEL TYPE: WHEEL SHALL BE DOUBLE WIDTH/DOUBLE INLET; FC = FORWARD CURVED, BI = BACKWARD INCLINED, AF = AIR FOIL TYPE FAN, PL = PLENUM TYPE BACKWARD INCLINED; FAN SHALL BE DIRECT DRIVE, BELTS NOT ALLOWED.
- FAN SPEED: PROVIDE MIN. CLASS II FAN CONSTRUCTION; RPM = MAXIMUM REVOLUTIONS PER MINUTE; SA = SUPPLY AIR FAN; EA = EXHAUST AIR FAN.
- MOTOR HORSEPOWER: MINIMUM ALLOWABLE NOMINAL MOTOR HORSEPOWER. PROVIDE PREMIUM MOTOR EFFICIENCY AND TOTALLY ENCLOSED FAN-COOLED (TEFC) MOTORS. REFER TO SECTION 230513 FOR MINIMUM ALLOWABLE MOTOR EFFICIENCY; SA = SUPPLY AIR, EA = EXHAUST AIR, V/Ø = VOLTAGE AND PHASE.
- AFD CONTROLLER: ADJUSTABLE FREQUENCY DRIVE MOTOR CONTROLLER. REFER TO SECTION 232690 FOR TECHNICAL SPECIFICATIONS; YES = PROVIDE AFD MOTOR CONTROLLER, NO = PROVIDE CONSTANT SPEED STARTER WITH HAND OFF-AUTO-ON SWITCH.
- FAN MOTOR: PROVIDE OPEN DRIP-PROOF (ODP).

(C) PREHEAT COIL:

- CAPACITY (MBH): HOT WATER COIL SIZED BASED ON 10°F DB AMBIENT OUTDOOR TEMPERATURE.
- MAX. FACE VELOCITY (FPM): SELECT UNIT CASING SIZE NOT TO EXCEED 550 FPM FACE VELOCITY ACROSS COIL.
- MAX. FIN SPACING (FPI): MINIMUM ADJUSTABLE FIN SPACING.
- MIN. ROWS: MINIMUM ALLOWABLE NUMBER OF COIL ROWS.
- ENT. AIR: ENTERING AIR TEMPERATURE (DEG F); DB = DRYBULB.
- LVG. AIR: LEAVING AIR TEMPERATURE (DEG F); DB = DRYBULB.
- HOT WATER FLOW: EWT = ENTERING WATER TEMPERATURE (DEG F); LWT = LEAVING WATER TEMPERATURE (DEG F); GPM = FLOW RATE IN (GALLONS PER MINUTE); WPD = MAXIMUM ALLOWABLE WATER PRESSURE DROP THRU COIL (FT. WG.).
- MEDIUM: WATER = WATER WITH CORROSION INHIBITOR AND BIOCIDIC ADDITIVES REFER TO "HVAC CHEMICAL TREATMENT SECTION 232500".

(D) COOLING COIL:

- CAPACITY (MBH): CHILLED WATER COILS SIZED BASED ON 92°F DB/76°F WB AMBIENT OUTDOOR TEMPERATURE.
- MAX. FACE VELOCITY (FPM): SELECT UNIT CASING SIZE NOT TO EXCEED 550 FPM FACE VELOCITY ACROSS COOLING COIL.
- MAX. FIN SPACING (FPI): MINIMUM ADJUSTABLE FIN SPACING.
- MIN. ROWS: MINIMUM ALLOWABLE NUMBER OF COIL ROWS.
- ENT. AIR: ENTERING AIR TEMPERATURE (°F); DB = DRY BULB; WB = WET BULB.
- LVG. AIR: LEAVING AIR TEMPERATURE (°F); DB = DRY BULB; WB = WET BULB.
- CHILLED WATER FLOW: ENTERING WATER TEMPERATURE (°F); LWT = LEAVING WATER TEMPERATURE (°F); GPM = FLOW RATE IN (GALLONS PER MINUTE); WPD = WATER PRESSURE DROP THRU COIL (FT. WG.).
- MEDIUM: WATER = WATER WITH CORROSION INHIBITOR AND BIOCIDIC ADDITIVES TO PROTECT PIPING SYSTEM IN ACCORDANCE WITH SECTION 232500 "HVAC CHEMICAL TREATMENT".

- (E) FILTERS: PROVIDE TRACK FOR 4 INCH THICK PLEATED MEDIA FRAME MERV 8 (50% EFFICIENT) FILTER.
- PRESSURE LOSS INDICATED IN SCHEDULE IS WITH MID-LIFE FILTERS AT FACE VELOCITY INDICATED.
- FILTER SIZE FOR TOTAL STATIC PRESSURE DROP FOR DIRTY FILTERS AT 0.5 IN. WG.
- EXAMPLE: EXT. SP + INT. SP = TOT. SP.
- FPM: MAXIMUM ALLOWABLE AIRFLOW RATE ACROSS FILTER IN FEET PER MINUTE.
- SPD: MAXIMUM ALLOWABLE STATIC PRESSURE LOSS ACROSS FILTER IN INCHES WATER COLUMN AT DESIGN FACE VELOCITY.

- (F) ELECTRICAL**
- VOLTAGE / Ø: NOMINAL POWER VOLTAGE AND PHASE (SINGLE POINT POWER).
 - FLA: FULL LOAD AMPERAGE.
 - MLA: MINIMUM CIRCUIT AMPACITY.
 - MOCP: MAXIMUM OVERCURRENT PROTECTION AMPERAGE.

- (G) DIMENSIONS**
- WEIGHT [LBS]: MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE UNIT IN POUNDS.
 - DIMENSIONS LxWxH [IN.]: MAXIMUM ALLOWABLE LENGTH WIDTH AND HEIGHT OF THE UNIT IN INCHES.

- (H) REMARKS: AHU FEATURES AND ACCESSORIES.**
- 1) INTERNAL VIBRATION ISOLATION: FAN ASSEMBLY ASHRAE TYPE 3 SPRING VIBRATION ISOLATORS.
 - 2) DOUBLE WALL, 2-INCH THICK INSULATED WITH SOLID METAL INNER WALL.
 - 3) FIELD INSTALLED DDC BAS SENSORS, TRANSDUCERS, ETC.
 - 4) STAINLESS STEEL 2-WAY SLOPING IAQ DRAIN PAN WITH ACCESS FOR CLEANING
 - 5) COIL SECTIONS WITH REMOVABLE ACCESS PANELS FOR ACCESS TO COIL BURST/RELIEF SENSOR.
 - 6) ACCESS DOORS SIDES WITH WINDOWS, FAN SECTION QUANTITY 3, ACCESS SECTIONS QUANTITY 2, MIXING SECTION QUANTITY 2 (NO WINDOW)
 - 7) PIPING & ACCESS: INDOOR UNITS: PROVIDE ACCESS FROM BOTH SIDES. AUTHORITIES HAVING JURISDICTION, OWNER, AND ARCHITECT.
 - 8) UNIT DISASSEMBLY: COMPLETELY DISASSEMBLE AND REASSEMBLE UNIT INSIDE MECHANICAL ROOM.
 - 9) SUPPLY AIR FAN: PROVIDE FAN WITH BUILT-IN AIRFLOW MONITORING PITOT AND TRANSDUCER FOR UNIT SUPPLY AIR (TYP OF 2) AND INTERLOCK TO BAS FOR FAN AIRFLOW RATE MONITORING AT THE BAS GRAPHICS.
 - 10) OUTDOOR AIR FLOW MONITORING STATION: PROVIDE OA FLOW STATION FACTORY INSTALLED IN END OF MIXING BOX. INTERLOCK TO BAS FOR OA FLOW RATE MONITORING AND CONTROL AT THE BAS GRAPHICS.
 - 11) PROVIDE INTERNAL OA AND RA DAMPERS. INTERLOCK TO BAS TO AFFECT THE SEQUENCE OF OPERATION SPECIFIED REFER TO SCHEDULE ON THIS SHEET.
 - 12) POWER: PROVIDE TWO POINT POWER CONNECTIONS. ONE 460/3 CONNECTION FOR THE FANS/VFD AND ONE 120/1 FOR THE MARINE LIGHTS.
 - 13) COONEY COIL: BURST PROOF HEATING AND COOLING COIL WITH FREEZE BLOCK TECHNOLOGY BLEED PORT, CONDUCTIVITY SENSOR (LEAK DETECTOR) AND BAS INTERFACE FOR ALARM.
 - 14) UNIT DISASSEMBLY: THE UNIT SHALL BE DISASSEMBLED AND RIGGED INTO THE MECH. ROOM AND REASSEMBLED.
 - 15) DUAL DIRECT DRIVE PLENUM FANS WITH BACKDRAFT DAMPER PER FAN.
 - 16) FACTORY INSTALLED VFD PER FAN WITH SINGLE POINT POWER CONNECTION.
 - 17) FACTORY LIGHT SWITCH, MARINE LIGHTS IN THE FAN, COOLING COIL ACCESS SECTION AND IN THE MIXING BOX.
 - 18) 65KA SHORT CIRCUIT PROTECTION.
 - 19) FAN INVERTER BALANCE WITH SHAFT GROUNDING RINGS PER MOTOR.
 - 20) COPLANAR SEPARATION SILENCER.
 - 21) PERFORATED ACOUSTICAL PANELS IN FAN SECTION.
 - 22) INLET BELL SILENCER.
 - 23) 12 BLADE 22.5 INCH DIRECT DRIVE FULL WIDTH FANS.
 - 24) 2.5 INCH BASE RAIL.
 - 25) HEATING AND COOLING COIL REMOVEABLE SERVICE PANEL FOR ACCESS TO BURST PROOF COIL BLEED VALVES AND EMS INTERFACE.
 - 26) 5 YEAR PARTS AND LABOR WARRANTY.

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Provide steel piping supports for CHW and HW piping and piping assemblies. All metal fabrication shall be ASTM A125 hot dipped galvanized or high performance TNEMEC coated.
- C. Provide steel angles for side beam brackets with cross member to hang piping between concrete joists.
 - 1. Hot Water Piping less than 4-inches shall be hung using one side beam bracket at the spacing specified in Section 23 21 13. Refer to detail in this section.
 - 2. Chilled Water Piping 4-inch and greater shall be hung using two side beam brackets and a cross member at the spacing specified in Section 23 21 13. Refer to detail in this section.
- D. Pipe Stands: Provide pipe stands where necessary to support pipe. Do not block service access to existing or new equipment. Refer to detail in this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Steel strengthening for slab openings.
 - 2. Steel framing for slab mounted pipe supports.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Post-install adhesive anchors, expansion bolt anchors and wedge-type inserts indicated to be embedded into concrete.
- C. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.

1.3 PERFORMANCE REQUIREMENTS

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Sprayed-on Fire Protection.

2. Paint products.
 3. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 2. Provide templates for anchors and bolts specified for installation under other Sections.
 3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.
- D. Welding certificates.
- E. Qualification Data: For professional engineer.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
 2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- D. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction.

2.3 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- B. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- C. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- D. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- E. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
- F. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- G. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- D. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3500 psi, unless otherwise indicated.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm), unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

2.8 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Prime plates with zinc-rich primer.

2.9 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

2.10 STEEL AND IRON FINISHES

- A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- B. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. The ductwork penetrations through walls shall have steel frames with security bars that are bolted through the walls. Refer to detail 3, Sheet M502. The frames shall be prefabricated and ready for installation on the same day the opening is cut to minimize the Arlington County Sheriffs time guarding the location where the walls are cut open. Only one opening will be allowed to be cut per day.
 - 1. Coordinate with Section 23 33 07.2.7 and 23 33.07.3.1.T.

3.2 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

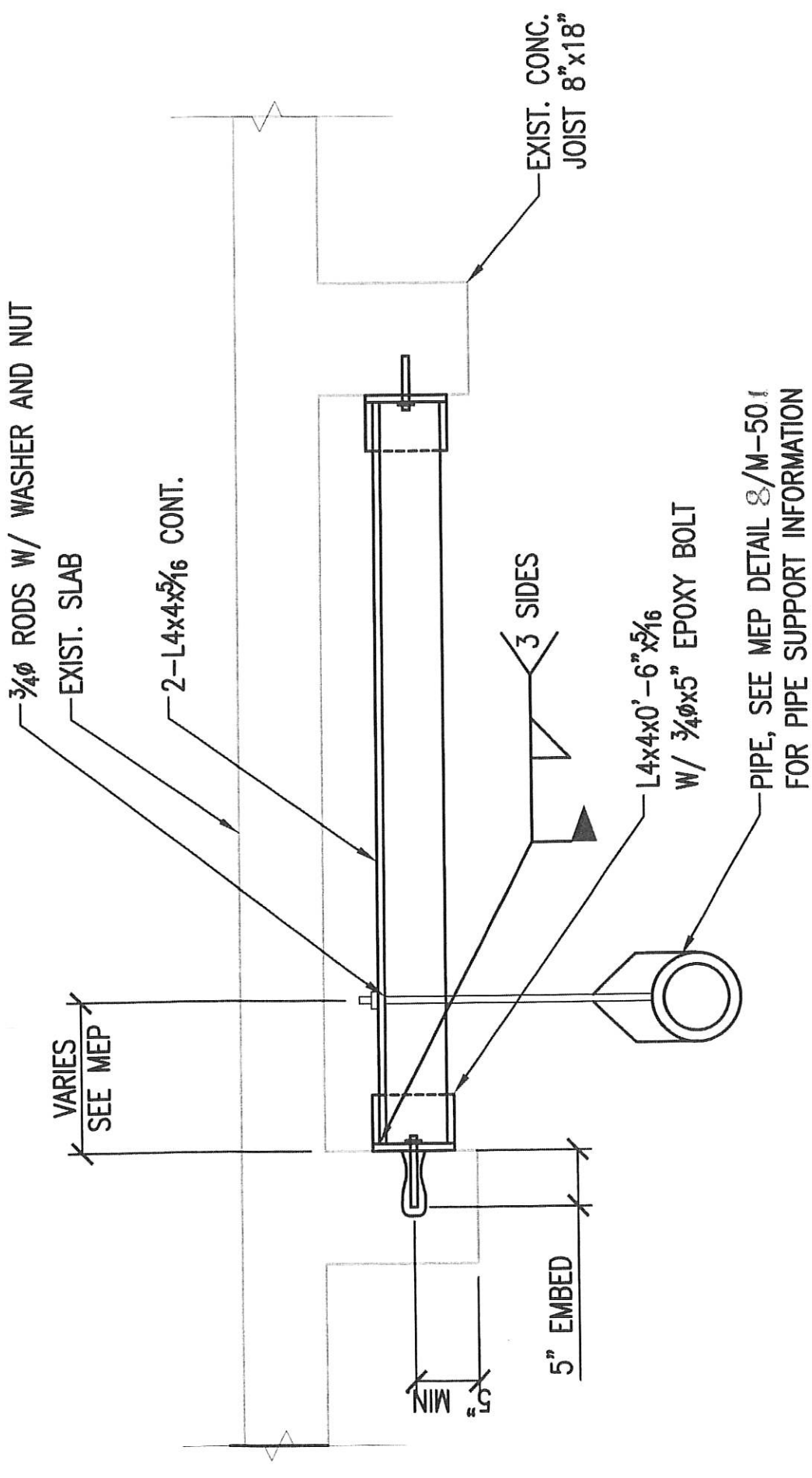
3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

3.4 FIELD QUALITY CONTROL

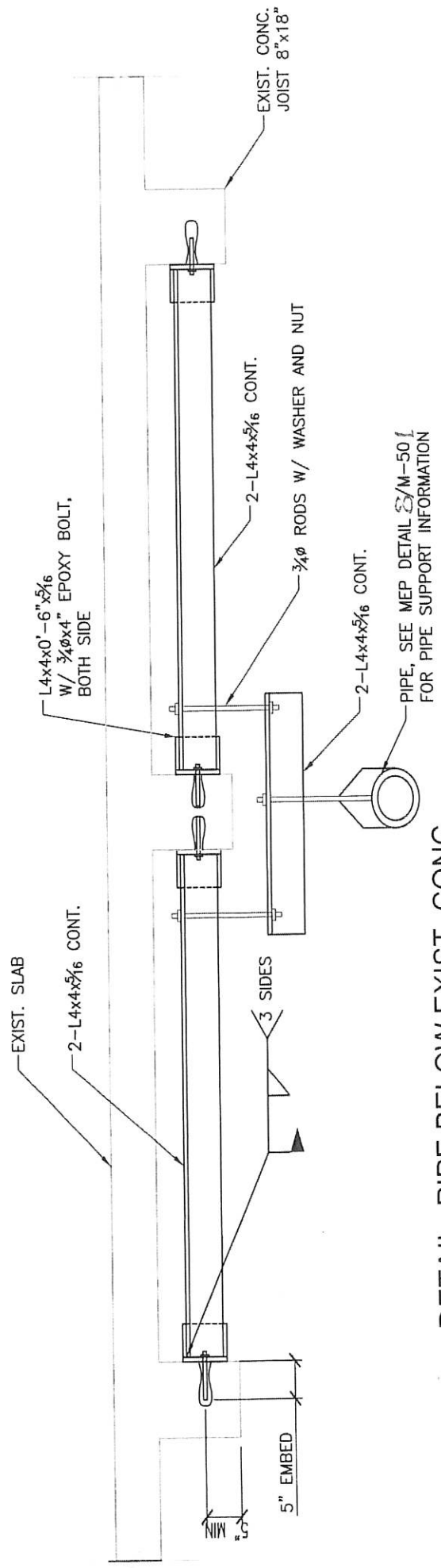
- A. Testing and Inspecting: Engage a qualified, independent, testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 05 50 00



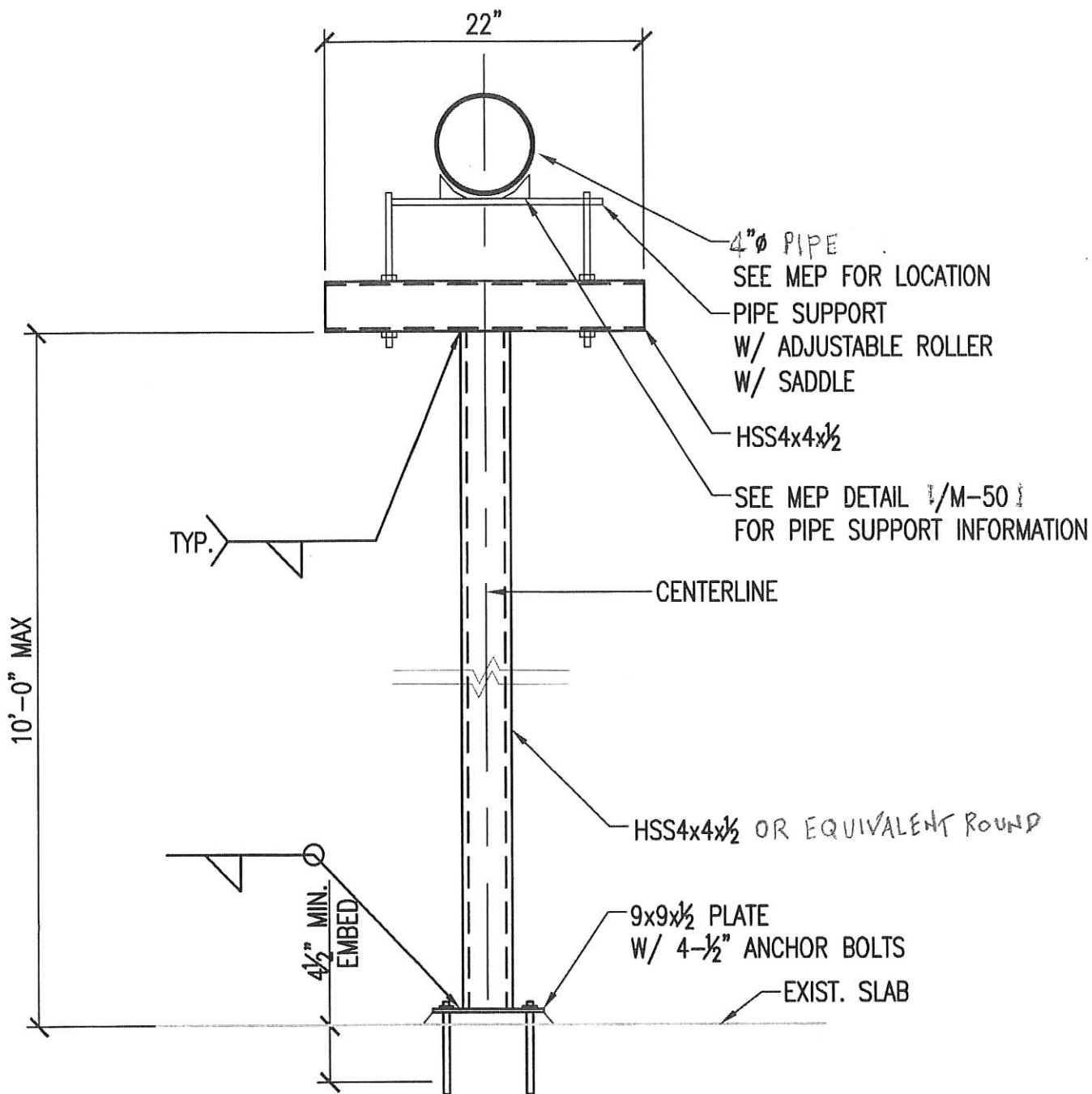
DETAIL - PIPE BETWEEN EXIST. CONC.

NTS



DETAIL- PIPE BELOW EXIST. CONC.

NTS



DETAIL - PIPE SUPPORT INTERIOR

NTS

NOTE

1. GBR SCANS OF CONCRETE FLOOR SLAB IS REQUIRED AT ALL LOCATIONS TO BE CUT, DRILLED OR CHIPPED FOR PURPOSE OF PREVENTING DAMAGE TO EMBEDDED POST TENSIONED CABLES.