

LOCATION MAP (NTS)

M & T BANK STADIUM

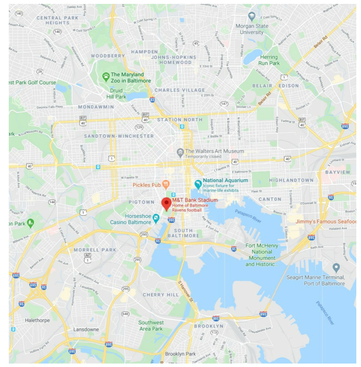
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

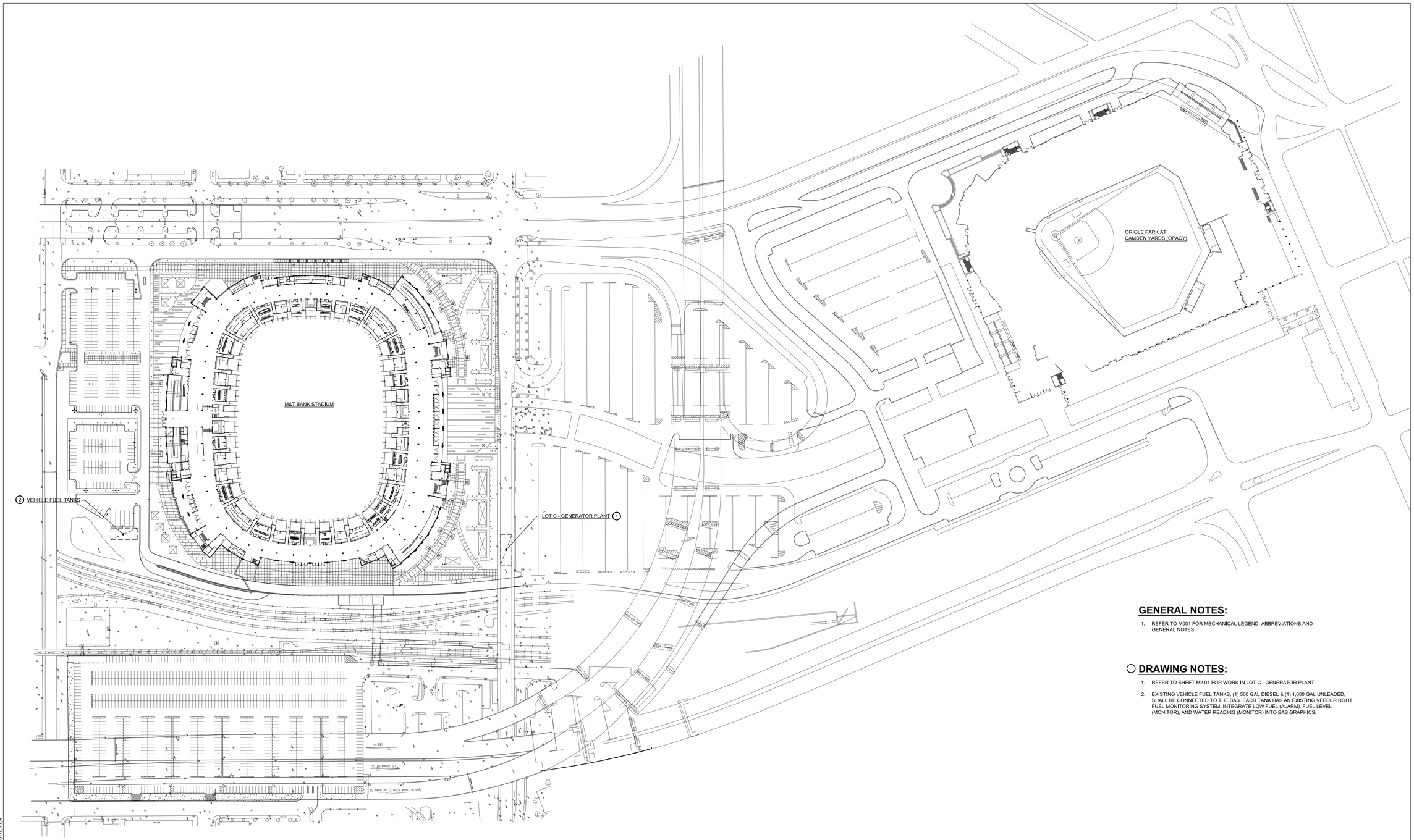
MSA PROJECT NO. 20-071

BKM PROJECT NO. 20092.01

BID SET
FEBRUARY 12, 2021

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201


Pickles Pub
M&T Bank Stadium
Horseshoe Casino Baltimore
National Aquarium
The Maryland Zoo in Baltimore
The Walters Art Museum
Fort McHenry National Monument and Historic
Seagirt Marine Terminal Port of Baltimore
Jimmy's Famous Seafood
Hollins Market
Lazarus Park
Hollins Park
Hollins Play Lot
Hollins Alley
Hollins Street
Hollins Market
Hollins Market Alley
Hollins Market Lot
Hollins Market Parking
Hollins Market Parking Lot
Hollins Market Parking Lot
Hollins Market Parking Lot



1 SITE PLAN - MECHANICAL - NEW WORK

SCALE: 1" = 100'

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.

○ DRAWING NOTES:

1. REFER TO SHEET M2.01 FOR WORK IN LOT C - GENERATOR PLANT.
2. EXISTING VEHICLE FUEL TANKS, (1) 500 GAL DIESEL & (1) 1,000 GAL UNLEADED, SHALL BE CONNECTED TO THE BAS. EACH TANK HAS AN EXISTING VEEDER ROOT FUEL MONITORING SYSTEM, INTEGRATE LOW FUEL (ALARM), FUEL LEVEL (MONITOR), AND WATER READING (MONITOR) INTO BAS GRAPHICS.

N

0 20' 60' 100' 150' 200' 300'

SCALE: 1" = 100'

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

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M&T BANK STADIUM
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LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

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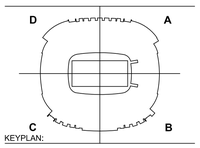
CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. _____,
EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **CMP**

CHECKED BY: **MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
PROJECT SITE PLAN
MECHANICAL
NEW WORK

DRAWING NO:

MS.01

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:37 PM
ARL: G:\20092.01\Drawings\Acad\M\MS01 SITE PLN

MECHANICAL GENERAL NOTES

1. THE MECHANICAL CONTRACT DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO INDICATE SCOPE AND THE GENERAL ARRANGEMENT OF THE SYSTEMS. WHERE APPLICABLE THE FOLLOWING NOTES SHALL APPLY TO ALL MECHANICAL SYSTEMS.
2. PROVIDE ACCESS PANELS (MIN. 12x12, UON) WHERE REQUIRED FOR ADEQUATE ACCESS TO ALL CONCEALED EQUIPMENT, VALVES, DAMPERS AND CONTROLS. PROVIDE LABEL ON ACCESS PANELS INDICATING CONCEALED EQUIPMENT.
3. PATCH AND SEAL ALL OPENINGS THROUGH FLOORS, CEILINGS, WALLS, AND ROOF RESULTING FROM DEMOLITION OR NEW WORK WITH MATERIALS AND FINISHES TO MATCH EXISTING CONSTRUCTION AND FIRE RATING.
4. AS AN INTEGRAL PART OF THESE DOCUMENTS, THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5. CONTRACTOR SHALL VISIT THE SITE AND VERIFY EXISTING CONDITIONS PRIOR TO THE BEGINNING OF ANY WORK. FAILURE TO VISIT THE SITE SHALL IN NO WAY RELIEVE THE CONTRACTOR FROM ANY RESPONSIBILITY.
6. CONTRACTOR SHALL USE CARE WHEN PERFORMING SELECTIVE DEMOLITION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO BUILDING FINISHES, EQUIPMENT, FURNITURE, STRUCTURE, AND MECHANICAL/ELECTRICAL SYSTEMS AND EQUIPMENT. SHOULD ANY DAMAGE OCCUR THE CONTRACTOR SHALL RESTORE DAMAGED AREA/ITEMS TO ORIGINAL CONDITION TO MEET THE OWNER'S SATISFACTION.
7. CONTRACTOR SHALL NOTIFY AND COORDINATE WITH THE OWNER ANY UTILITY OUTAGES. OWNER SHALL BE GIVEN A MINIMUM OF 72 HOURS NOTICE (THREE WORKING DAYS) FOR ANY OUTAGES.

   CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL WORK BY THEIR SUBCONTRACTORS.
8. SCHEDULE ALL WORK IN OCCUPIED SPACES WITH OWNER AT LEAST TWO (2) WEEKS PRIOR TO CONSTRUCTION.

ATC GENERAL NOTES

1. M&T BANK STADIUM SHALL BE PROVIDED WITH A NEW FULLY DIGITAL BUILDING AUTOMATION SYSTEM (BAS). THIS SYSTEM WILL REPLACE THE EXISTING JOHNSON DDC CONTROL SYSTEM & ANDOVER CONTINUUM CONTROL SYSTEM IN THEIR ENTIRETY (I.E. THE EXPECTATION IS THAT ALL COMPONENTS WILL BE NEW, AND NONE OF THE EXISTING SYSTEM WILL BE REUSED), UNLESS OTHERWISE NOTED.

   ALL IDENTIFIED EQUIPMENT (SEE FLOOR PLANS) IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.

   ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

   ALL EXISTING VALVES AND DAMPERS ARE PNEUMATICALLY ACTUATED. EXISTING VALVE BODIES SHALL BE REPLACED. DAMPERS SHALL REMAIN AND HAVE THEIR ACTUATORS REPLACED. REPLACE ALL PNEUMATIC ACTUATORS WITH ELECTRONIC ACTUATORS.

MECHANICAL ABBREVIATIONS

AIR CONDITIONING UNIT	ACU	EXHAUST FAN	EF	NOT IN CONTRACT	NIC
AIR COOLED CONDENSING UNIT	ACCU	ENERGY MANAGEMENT CONTROL SYSTEM	EMCS	NORMALLY OPEN / NUMBER	NO
AIR FLOW MONITOR	AFM	EXISTING TO REMAIN	ETR	OUTSIDE AIR	OA
AIR HANDLING UNIT	AHU	ENTERING WATER TEMPERATURE	EWT	ORIOLE PARK AT CAMDEN YARDS	OPACY
AUTOMATIC TEMPERATURE CONTROLS	ATC	FAN COIL UNIT	FCU	POUNDS PER SQUARE INCH	PSI
BUILDING AUTOMATION SYSTEM	BAS	GALLON(S)	GAL	QUANTITY	QTY
CABINET UNIT HEATER	CUH	GALLONS PER MINUTE	GPM	RETURN AIR	RA
CHILLED WATER SUPPLY	CWS	GENERAL EXHAUST FAN	GEF	RETURN AIR FAN	RF
CHILLED WATER RETURN	CWR	HEIGHT	H	RELATIVE HUMIDITY	RH
COMPUTER ROOM AIR CONDITIONER	CRAC	HEAT PUMP UNIT	HPU	ROOF TOP UNIT	RTU
CONDENSING UNIT	CU	HEATING WATER SUPPLY	HS	REMOVE EXISTING	RX
CONNECT TO EXISTING	CX	HEATING WATER RETURN	HR	SUPPLY AIR	SA
CONVECTOR	CONV	HEAT EXCHANGER	HX	TOILET EXHAUST FAN	TEF
DRY BULB	DB	INCH(ES)	IN	TYPICAL	TYP
DESIGNATION	DESIG	KITCHEN EXHAUST FAN	KEF	UNIT HEATER	UH
DOMESTIC HOT WATER	DHW	LENGTH	L	UNLESS OTHERWISE NOTED	UON
DIAMETER	DIA	LEAVING AIR TEMPERATURE	LAT	VARIABLE AIR VOLUME	VAV
DOWN	DN	LEAVING WATER TEMPERATURE	LWT	VARIABLE FREQUENCY DRIVE	VFD
DIFFERENTIAL PRESSURE SENSOR	DPS	MAKEUP AIR UNIT	MAU	WIDTH	W
DRAWING(S)	DWG	MINIMUM	MIN	WET BULB	WB
EXHAUST AIR	EA	MARYLAND STADIUM AUTHORITY	MSA	WATER COLUMN	WC
ENTERING AIR TEMPERATURE	EAT	NORMALLY CLOSED	NC	WATER PRESSURE DROP	WPD

MECHANICAL LEGEND

CHILLED WATER SUPPLY	CWS	3-PORT MODULATING CONTROL VALVE	
CHILLED WATER RETURN	CWR	2-PORT MODULATING CONTROL VALVE	
HEATING WATER SUPPLY	HS	LIMIT OF DEMOLITION	
HEATING WATER RETURN	HR	CONNECT TO EXISTING	
THERMOSTAT	T		

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BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
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P: 301-230-0811

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PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

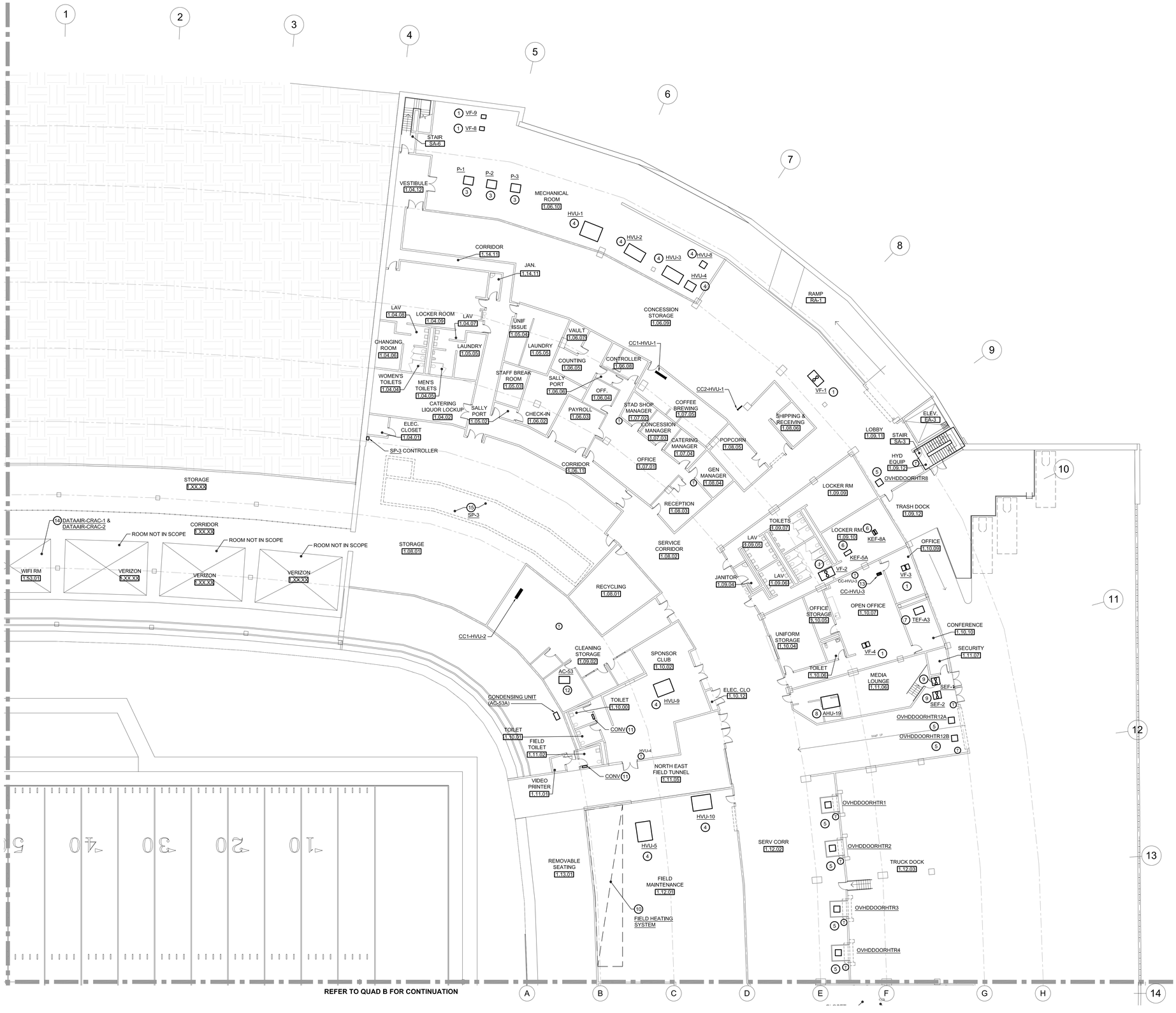
MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES

DRAWING NO:

M0.01

BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:45 PM ARL: G:\20092.01\Drawings\Acad\MM001 MECHANICAL LEGEND AND GENERAL NOTES



1 SERVICE LEVEL PLAN - QUAD A - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING VENTILATION FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. NOT USED.
3. EXISTING CHILLED WATER PUMPS SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS, CHILLED WATER SYSTEM CONTROL, FOR MORE INFORMATION.
4. EXISTING HEATING AND VENTILATION UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING HOT WATER UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING SMOKE EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING FIELD HEATING SYSTEM SHALL BE CONNECTED TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. INTEGRATE ALL AVAILABLE POINTS, INCLUDING TEMPERATURE SETPOINTS, LOOP TEMPERATURE FEEDBACK, ALARMS, TRENDS, STATUS, ALARMS, AND COMMUNICATION FAILURE TO BAS GRAPHICS.
11. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. EXISTING SPLIT SYSTEM UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
13. COOLING COIL FOR HVU-3 LOCATED IN THIS SPACE. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
14. EXISTING TWO (2) CRAC UNITS LOCATED IN WIFI ROOM. CONNECT TO BAS AND MONITOR EXISTING TEMPERATURE SENSOR. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
15. EXISTING SUMP BOWL DRAINAGE PUMPS SP-3 (TOTAL OF 3 PUMPS). MONITOR SUMP PUMPS AND CONNECT TO BAS.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
CONVECTOR	CONV
HEATING AND VENTILATION UNIT	HVU
KITCHEN EXHAUST FAN	KEF
PUMP	P
UNIT HEATER	UH
UTILITY DISTRIBUTION PUMP	UDP
SMOKE EXHAUST FAN	SEF
TOILET EXHAUST FAN	TEF
VENTILATION FAN	VF

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CONSULTANTS:

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1801 RESEARCH BOULEVARD, SUITE 100
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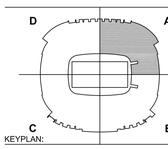

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PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

DATE: FEBRUARY 12, 2021

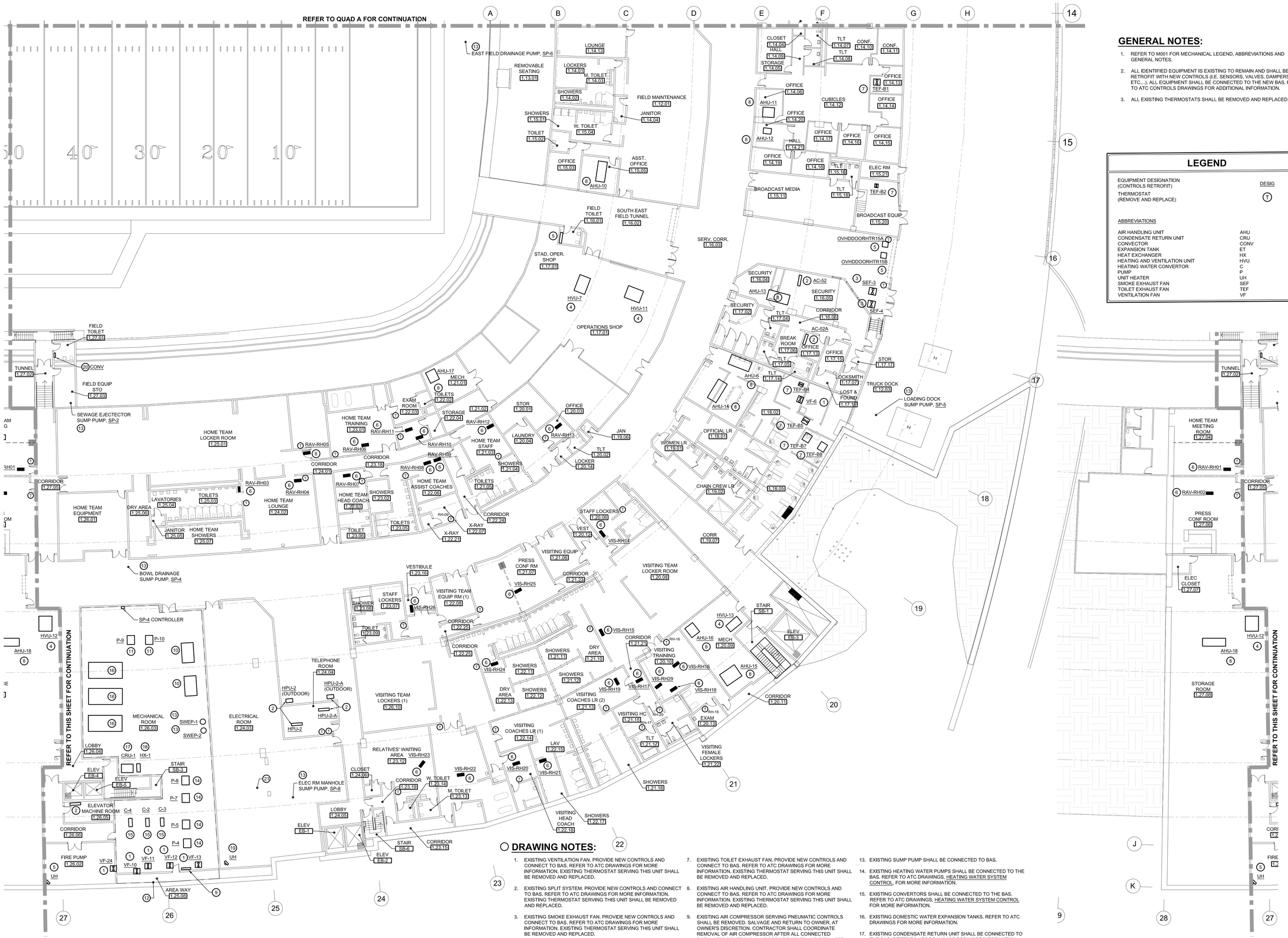
SHEET TITLE:
SERVICE LEVEL
QUAD A
MECHANICAL
NEW WORK

DRAWING NO:
M1.01

BKM# 20092.01

SCALE: 1/16"=1'-0"

Plotted By: Craig M. Parks | 3/3/2021 2:37 PM
ARL: G:\20092.01\Drawings\Acad\MM101 M102 SERVICE LVL PLN N



1 SERVICE LEVEL PLAN - QUAD B - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

2 SERVICE LEVEL PLAN - QUAD B (COL 27 - 29)

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

LEGEND

	DESIG
EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
CONDENSATE RETURN UNIT	CRU
CONVECTOR	CONV
EXPANSION TANK	ET
HEAT EXCHANGER	HX
HEATING AND VENTILATION UNIT	HVU
HEATING WATER CONVERTOR	C
PUMP	P
UNIT HEATER	UH
SMOKE EXHAUST FAN	SEF
TOILET EXHAUST FAN	TEF
VENTILATION FAN	VF

DRAWING NOTES:

1. EXISTING VENTILATION FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING SPLIT SYSTEM. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING SMOKE EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING HEATING AND VENTILATION UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING HOT WATER UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING DUCT MOUNTED REHEAT COIL. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING AIR COMPRESSOR SERVING PNEUMATIC CONTROLS SHALL BE REMOVED, SALVAGE AND RETURN TO OWNER, AT OWNER'S DISCRETION. CONTRACTOR SHALL COORDINATE REMOVAL OF AIR COMPRESSOR AFTER ALL CONNECTED PNEUMATIC CONTROLS HAVE BEEN REMOVED AND REPLACED WITH DDC CONTROLS, SO THERE WILL BE NO DOWNTIME OR EXISTING SYSTEMS.
10. EXISTING DOMESTIC BOOSTER PUMP PACKAGE SHALL BE CONNECTED TO THE BAS. PROVIDE CURRENT SENSING REPLAYS ON EACH PUMP AND PRESSURE SENSORS ON EACH DISCHARGE HEADER.
11. EXISTING DOMESTIC HOT WATER RE-CIRCULATION PUMPS SHALL BE CONNECTED TO THE BAS, REFER TO ATC DRAWINGS, DOMESTIC HOT WATER SYSTEM CONTROL, FOR MORE INFORMATION.
12. M&T BANK STADIUM HEATING PLANT. REFER TO ATC DRAWINGS, DOMESTIC HOT WATER SYSTEM CONTROL, AND HEATING HOT WATER SYSTEM CONTROL FOR MORE INFORMATION.
13. EXISTING SUMP PUMP SHALL BE CONNECTED TO BAS.
14. EXISTING HEATING WATER PUMPS SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS, HEATING WATER SYSTEM CONTROL, FOR MORE INFORMATION.
15. EXISTING CONVERTORS SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS, HEATING WATER SYSTEM CONTROL FOR MORE INFORMATION.
16. EXISTING DOMESTIC WATER EXPANSION TANKS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
17. EXISTING CONDENSATE RETURN UNIT SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
18. EXISTING HEAT EXCHANGER SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
19. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
20. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
21. BATTERY BANK FOR SWITCHGEAR SHALL BE MONITORED THRU THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

N

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

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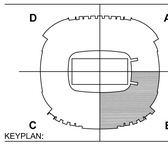

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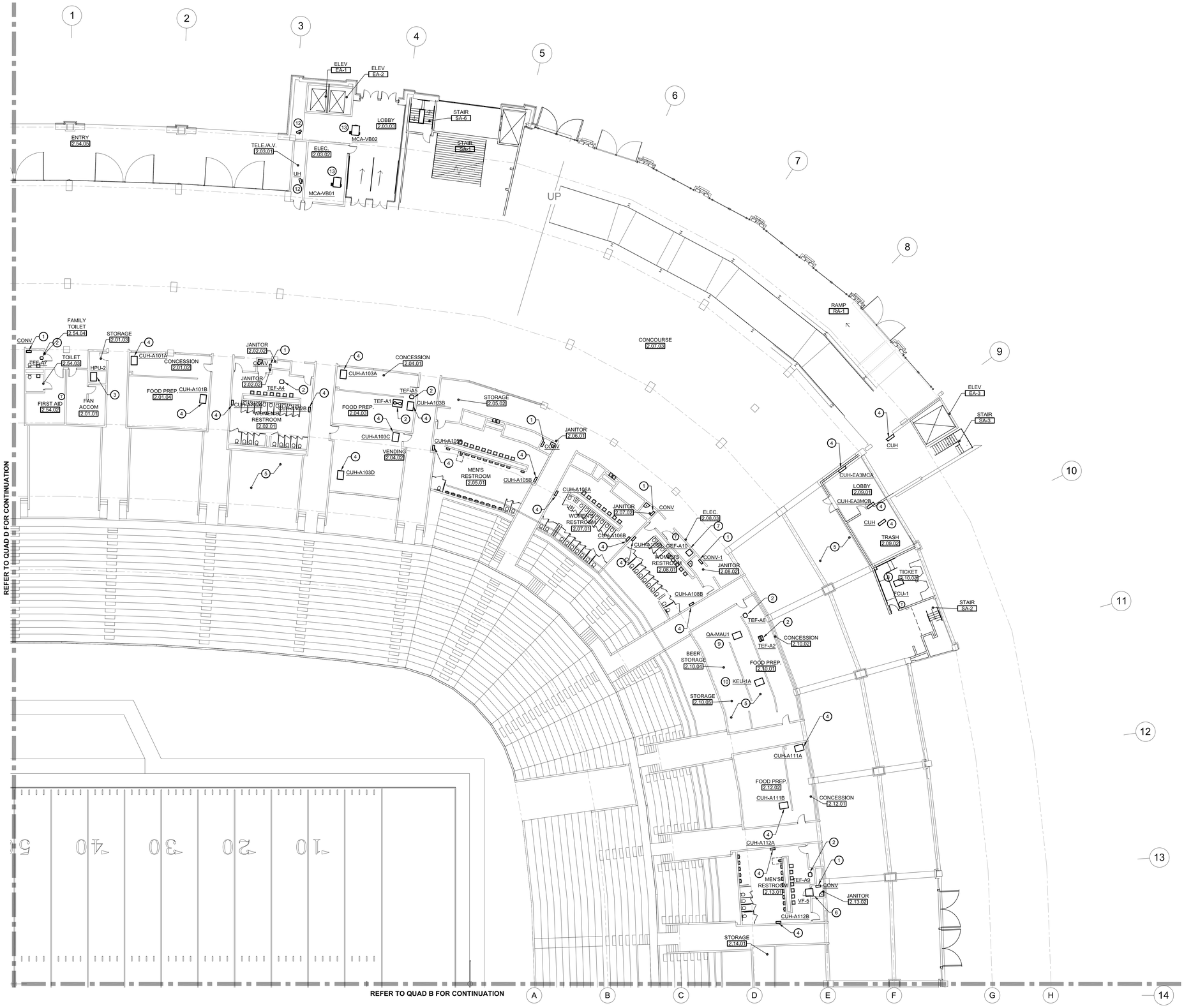
DATE: FEBRUARY 12, 2021

SHEET TITLE:
SERVICE LEVEL QUAD B MECHANICAL NEW WORK

DRAWING NO:
M1.02

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 2:37 PM
ARL: G:\20092.01\Drawings\Acad\MM101 M102 SERVICE LVL PLN N



1 MAIN CONCOURSE LEVEL PLAN - QUAD A -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

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SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

○ DRAWING NOTES:

1. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HEAT PUMP UNIT ON ROOF ABOVE. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
6. EXISTING VENTILATION FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING MAKEUP AIR UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
11. NOT USED.
12. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
13. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

AIR HANDLING UNIT	AHU
CONVECTOR	CONV
CABINET UNIT HEATER	CUH
FAN COIL UNIT	FCU
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST UNIT	KEU
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF
UNIT HEATER	UH
VENTILATION FAN	VF

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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

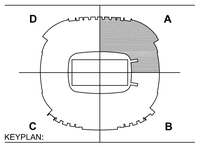
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

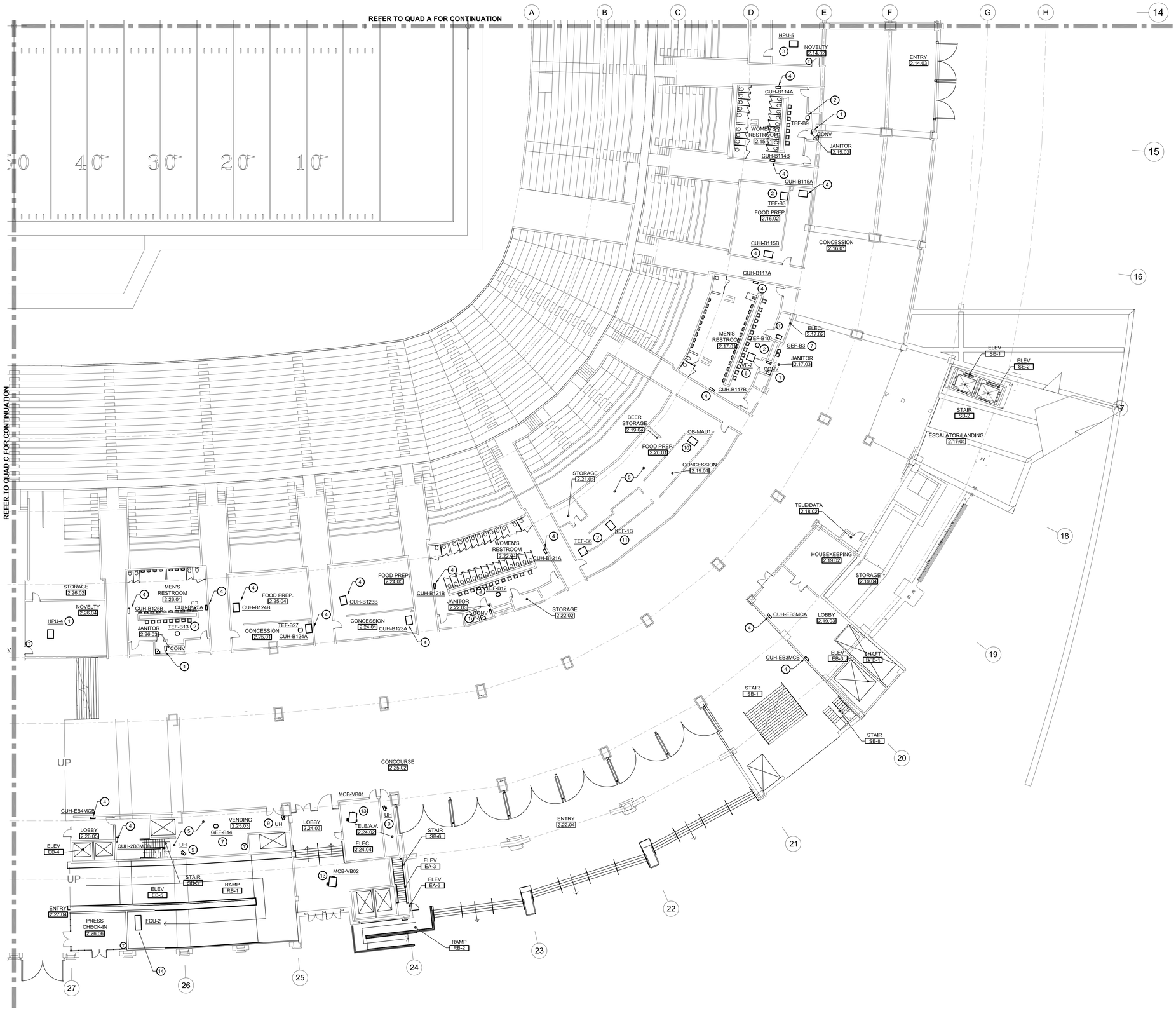
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
MAIN CONCOURSE LVL QUAD A MECHANICAL NEW WORK

DRAWING NO:
M1.11

BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:06 PM
ARL: G:\20092.01\Drawings\Acad\M\M111 M112 M113 M114 MAIN CONCOURSE LVL PLN.N



1 MAIN CONCOURSE LEVEL PLAN - QUAD B -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HEAT PUMP UNIT ON ROOF ABOVE. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
6. EXISTING VENTILATION FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING MAKEUP AIR UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
11. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. NOT USED.
13. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
14. EXISTING FAN COIL UNIT LOCATED IN SERVICE LEVEL STEAM ROOM 1-26-03. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
CONVECTOR	CONV
CABINET UNIT HEATER	CUH
FAN COIL UNIT	FCU
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF
UNIT HEATER	UH
VENTILATION FAN	VF

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MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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BALTIMORE, MD 21201

CONSULTANTS:

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1801 RESEARCH BOULEVARD, SUITE 100
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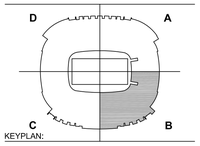
P: 301-230-0811



KEYPLAN:

SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

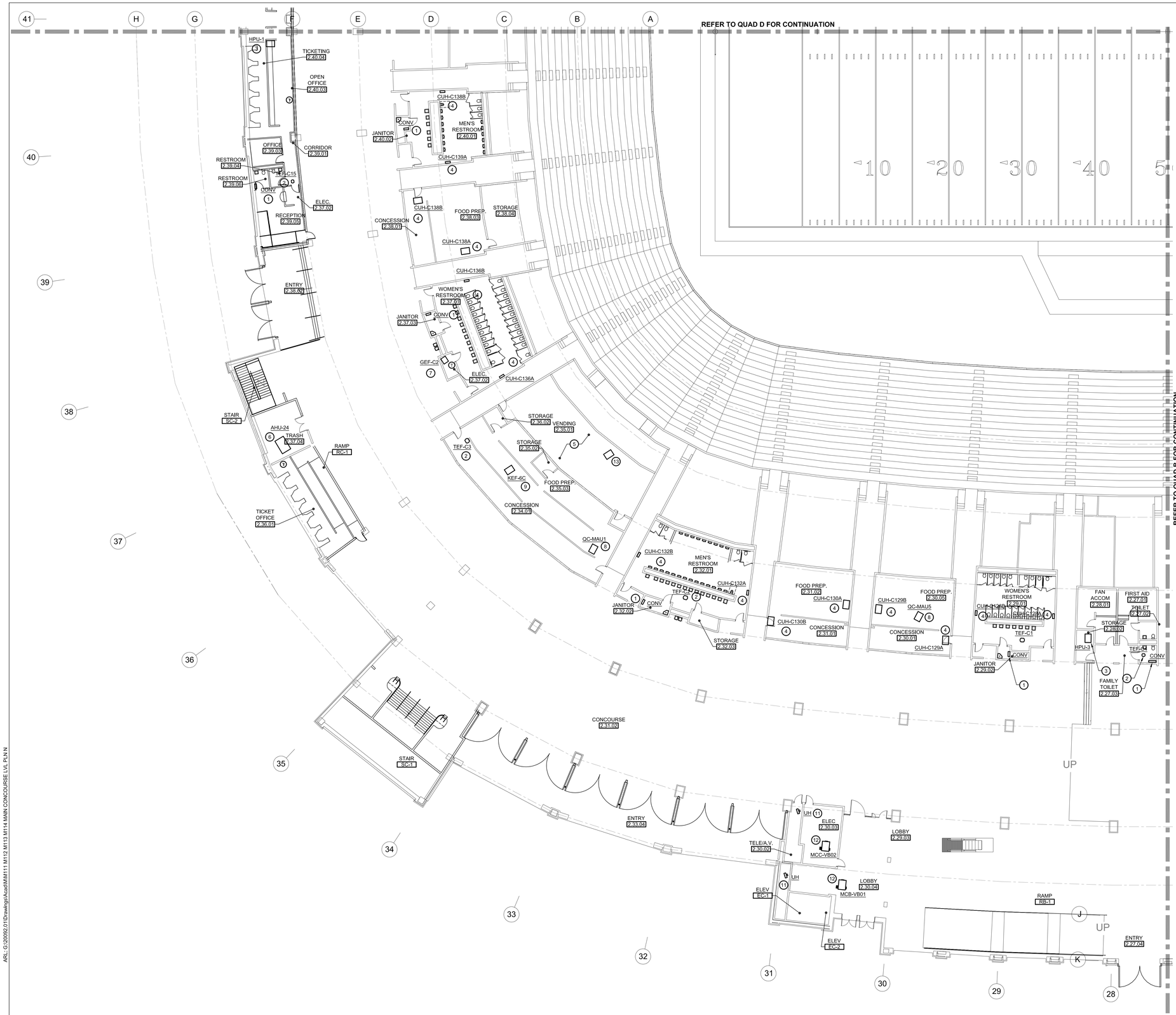
DATE: FEBRUARY 12, 2021

SHEET TITLE:
MAIN CONCOURSE LVL
QUAD B
MECHANICAL
NEW WORK

DRAWING NO:
M1.12

BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:06 PM
ARL: G:\20092.01\Drawings\Acad\MM\M111 M112 M113 M114 MAIN CONCOURSE LVL PLN.N



1 MAIN CONCOURSE LEVEL PLAN - QUAD C -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

○ DRAWING NOTES:

1. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HEAT PUMP UNIT ON ROOF ABOVE. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING VENDOR COOLER / FREEZERS (TYP. 2) SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE, PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
6. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING MAKEUP AIR UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. NOT USED.
11. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
13. EXISTING PIZZA OVEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
CONVECTOR	CONV
CABINET UNIT HEATER	CUH
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF
UNIT HEATER	UH
VENTILATION FAN	VF

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Burdette, Koehler, Murphy & Assoclates, Inc.
Mechanical / Electrical Engineers
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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

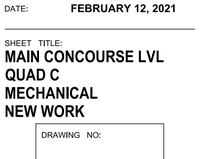
M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

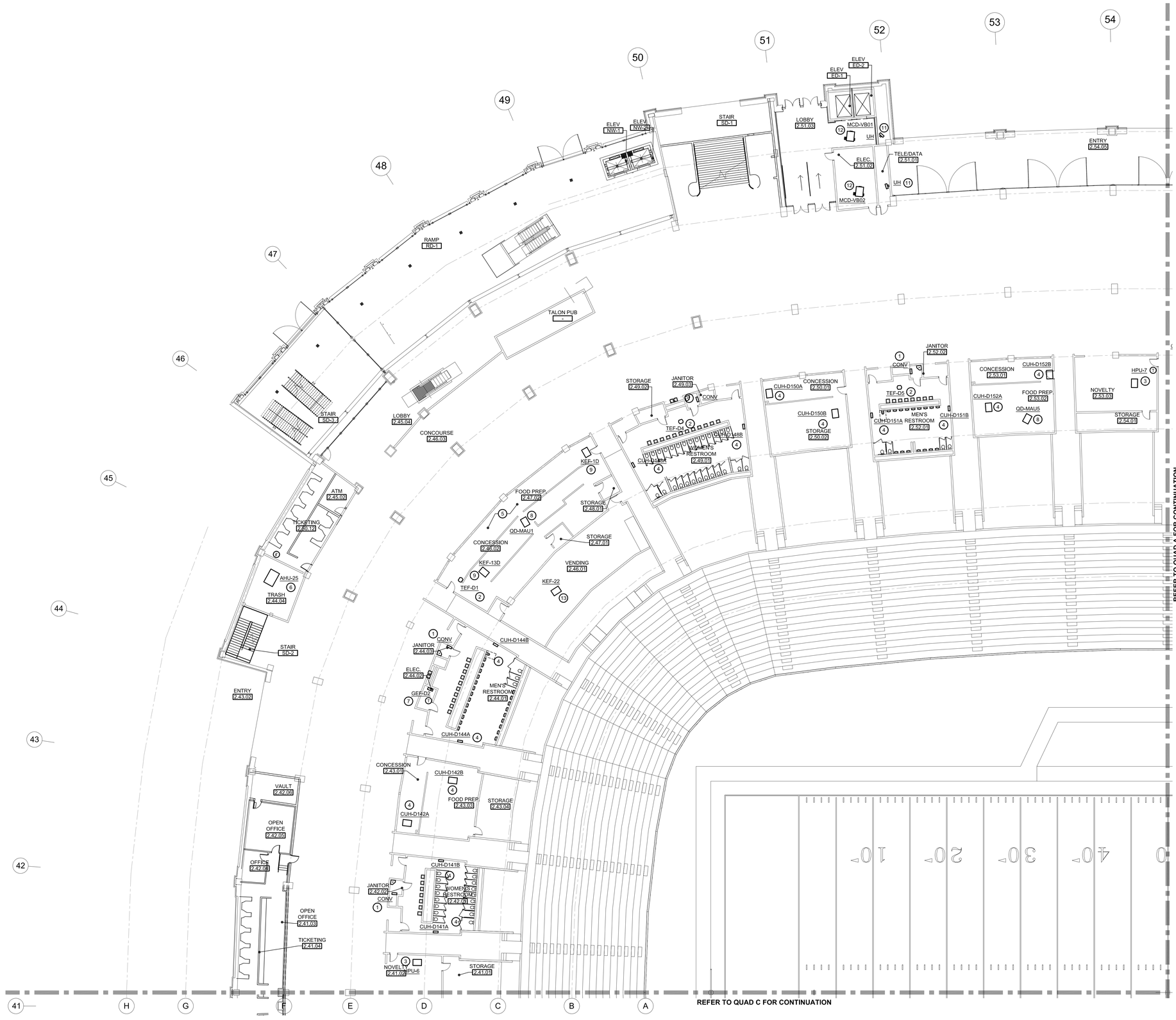
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
MAIN CONCOURSE LVL QUAD C MECHANICAL NEW WORK

DRAWING NO:
M1.13

BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:06 PM
APL: G:\20092.01\Drawings\Acad\M\M111 M112 M113 M114 MAIN CONCOURSE LVL PLN N



1 MAIN CONCOURSE LEVEL PLAN - QUAD D - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

○ DRAWING NOTES:

1. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HEAT PUMP UNIT ON ROOF ABOVE. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING VENDOR COOLER / FREEZERS (TYP. 2) SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE, PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
6. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING MAKEUP AIR UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. NOT USED.
11. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
13. EXISTING PIZZA OVEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXHAUST FAN SHALL ENERGIZE WHEN MAKE-UP AIR UNIT IS ENERGIZED AND DE-ENERGIZE WHEN MAKE-UP AIR UNIT IS DE-ENERGIZED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
CONVECTOR	CONV
CABINET UNIT HEATER	CUH
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF
UNIT HEATER	UH
VENTILATION FAN	VF

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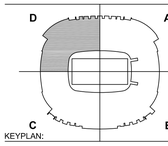
KEYPLAN:



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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

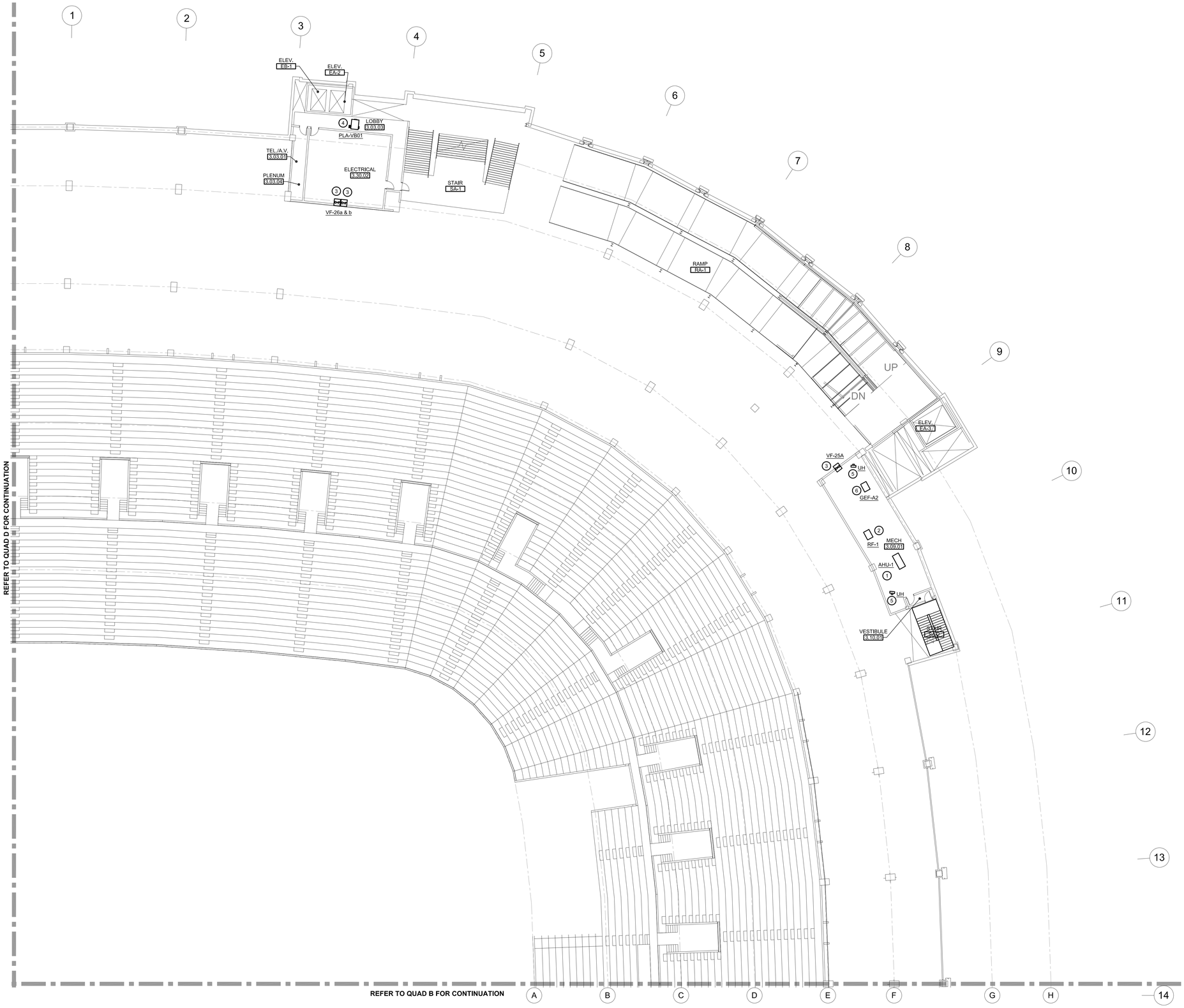
DATE: FEBRUARY 12, 2021

SHEET TITLE:
MAIN CONCOURSE LVL
QUAD D
MECHANICAL
NEW WORK

DRAWING NO:
M1.14

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM1111 M112 M113 M114 MAIN CONCOURSE LVL PLN.N
Plotted By: Craig M. Parks | 2/12/2021 4:06 PM



1 PRESS LEVEL PLAN - QUAD A - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING RETURN FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
3. EXISTING VENTILATION FANS. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
4. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING HOT WATER UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
6. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
RETURN FAN	RF
VENILATION FAN	VF

bkm
Burdette, Koehler, Murphy & Assoclates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

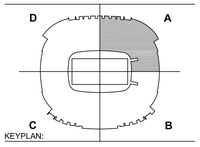
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

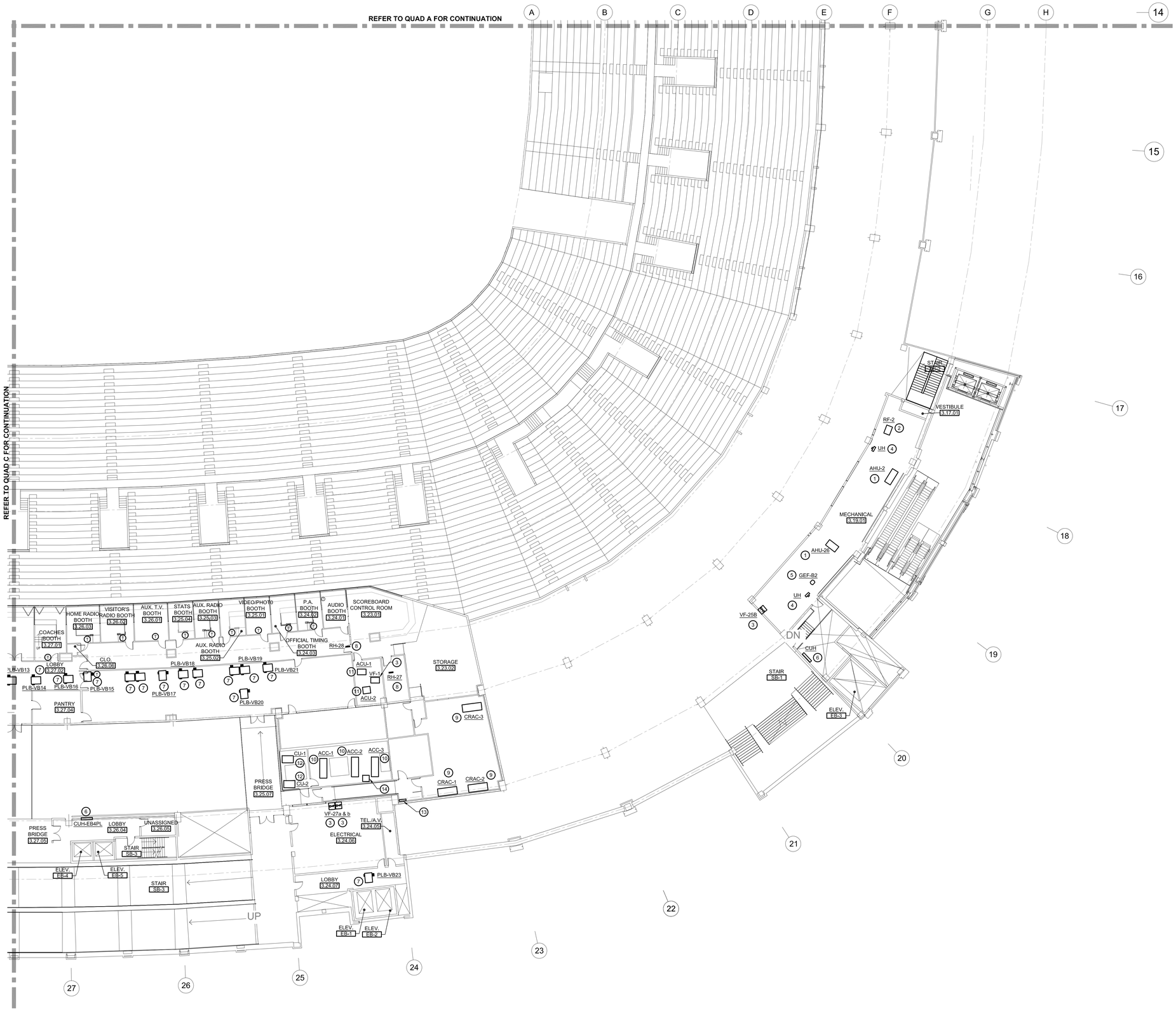
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
PRESS LEVEL QUAD A MECHANICAL NEW WORK

DRAWING NO:
M1.21

BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:10 PM
ARL: G:\20092.01\Drawings\Acad\MM121 M122 M123 M124 PRESS LVL PLN N



1 PRESS LEVEL PLAN - QUAD B - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING RETURN FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
3. EXISTING VENTILATION FANS. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
4. EXISTING HOT WATER UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
5. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING DUCT MOUNTED REHEAT COIL. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING COMPUTER ROOM AIR CONDITIONING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING CONDENSING UNITS SERVING CRAC-1,2 & 3. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
11. EXISTING SPLIT SYSTEM AIR CONDITIONING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. EXISTING CONDENSING UNIT SERVING ACU-1 & 2. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
13. EXISTING ELECTRIC BASEBOARD HEAT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED
14. EXISTING RELIEF FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR CONDITIONING UNIT	ACU
AIR HANDLING UNIT	AHU
CABINET UNIT HEATER	CUH
COMPUTER ROOM AIR CONDITIONER	CRAC
CONDENSING UNIT	CU
GENERAL EXHAUST FAN	GEF
REHEAT COIL	RH
RETURN FAN	RF
UNIT HEATER	UH
VENTILATION FAN	VF

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

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PROJECT NAME:

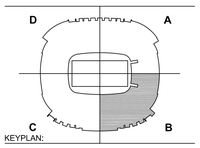
M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

DATE: FEBRUARY 12, 2021

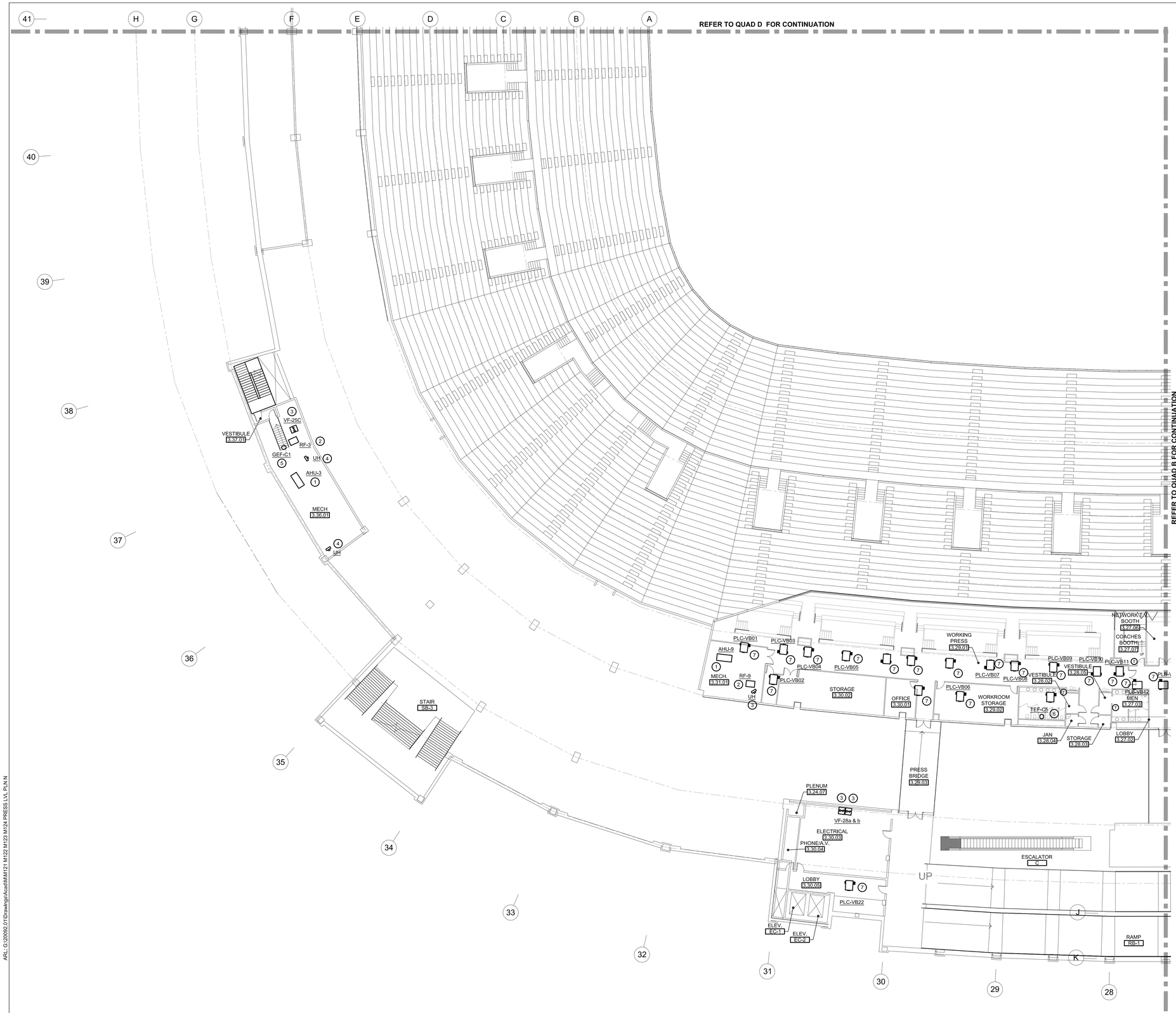
SHEET TITLE:
PRESS LEVEL
QUAD B
MECHANICAL
NEW WORK

DRAWING NO:
M1.22

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\M\M121 M122 M123 M124 PRESS LVL PLN.N

Plotted By: Craig M. Parks | 2/12/2021, 4:10 PM



1 PRESS LEVEL PLAN - QUAD C - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

○ DRAWING NOTES:

1. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING RETURN FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
3. EXISTING VENTILATION FANS. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
4. EXISTING HOT WATER UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
5. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

AIR HANDLING UNIT	AHU
GENERAL EXHAUST FAN	GEF
RETURN FAN	RF
TOILET EXHAUST FAN	TEF
UNIT HEATER	UH
VENTILATION FAN	VF

bkm
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Mechanical / Electrical Engineers
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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS,
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AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

DATE: FEBRUARY 12, 2021

SHEET TITLE:
PRESS LEVEL
QUAD C
MECHANICAL
NEW WORK

DRAWING NO:
M1.23

BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:10 PM
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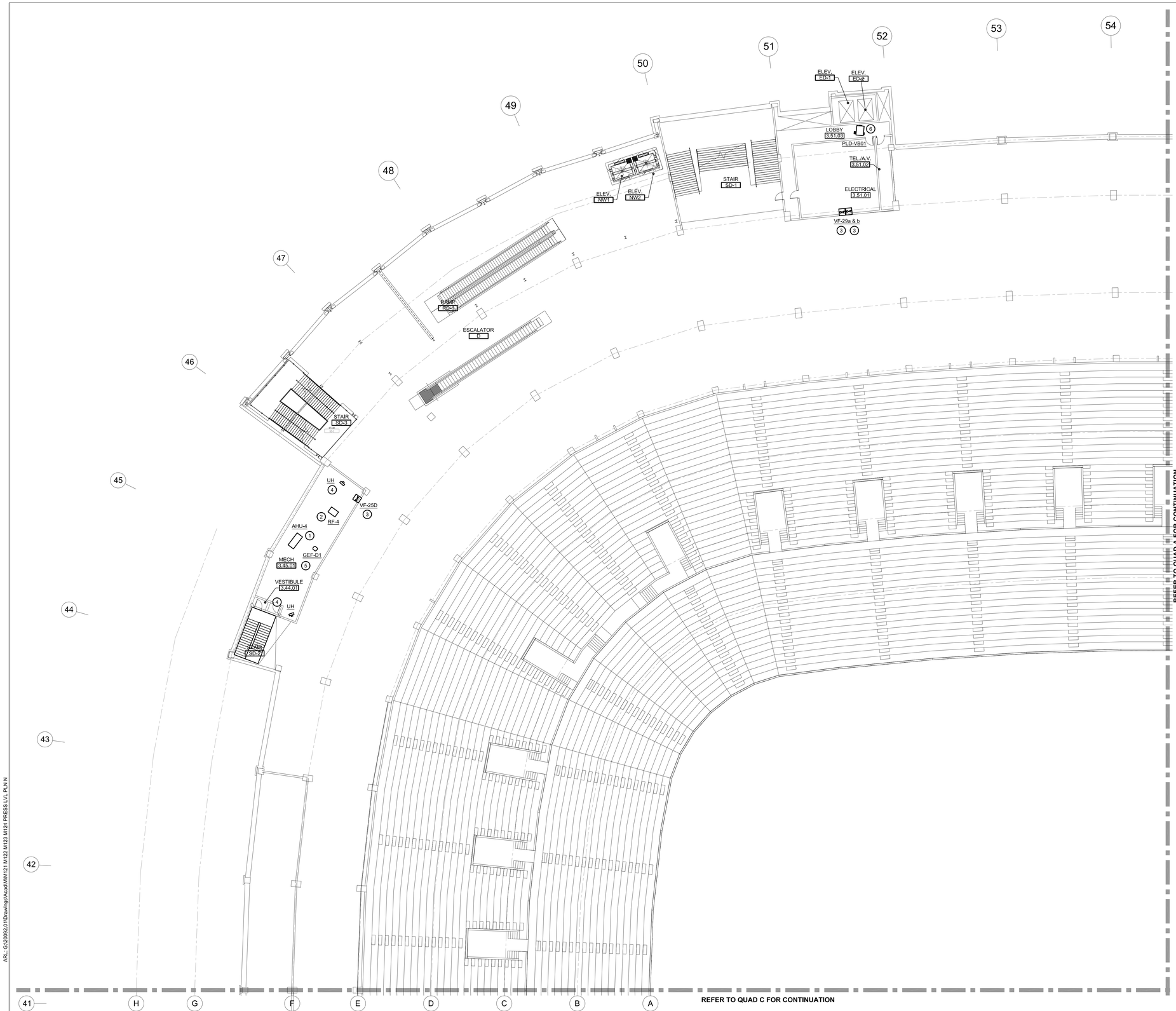

1 PRESS LEVEL PLAN - QUAD D - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING RETURN FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
3. EXISTING VENTILATION FANS. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
4. EXISTING HOT WATER UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
5. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

AIR HANDLING UNIT	AHU
GENERAL EXHAUST FAN	GEF
RETURN FAN	RF
UNIT HEATER	UH
VENTILATION FAN	VF

SCALE: 1/16"=1'-0"

bkm
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Mechanical / Electrical Engineers
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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

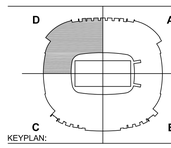
MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811

KEYPLAN:



SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

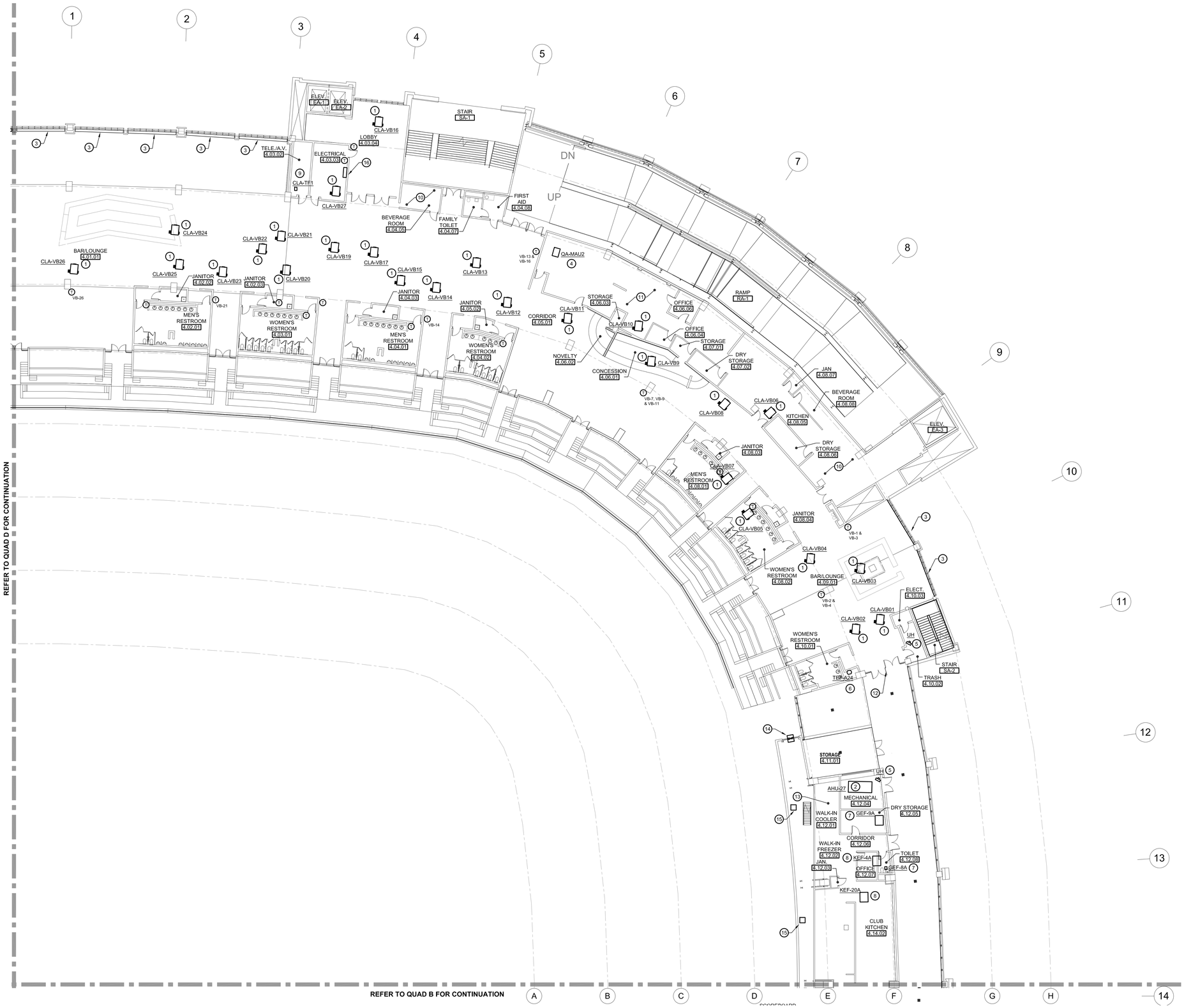
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
PRESS LEVEL QUAD D MECHANICAL NEW WORK

DRAWING NO:
M1.24

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM\121 M122 M123 M124 PRESS LVL PLN.N
Plotted By: Craig M. Parks | 2/12/2021 4:10 PM



1 CLUB LEVEL PLAN - QUAD A - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING AIR HANDLING UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING MAKEUP AIR UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
5. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING TRANSFER FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
11. EXISTING VENDOR COOLER / FREEZERS (TYP. 2) SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
12. EXISTING SMOKE DAMPERS SHALL BE CONNECTED TO BAS. SEE ATC SMOKE CONTROL DRAWINGS FOR MORE INFORMATION.
13. EXISTING WALK IN COOLER AND FREEZER ROOM SHALL BE CONNECTED TO THE BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
14. 3 WALL MOUNTED PROP FANS STACKED BEHIND SCOREBOARD. FANS SHALL BE CONNECTED TO THE BAS. PROVIDE NEW CONTROLS AND REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTATS SERVING THESE UNITS SHALL BE REMOVED AND REPLACED.
15. 2 STACKED PROP FANS BEHIND SCOREBOARD. THERE ARE 8 FANS TOTAL BEHIND SCOREBOARD. FANS SHALL BE FANS LOCATED HERE SHALL BE CONNECTED TO THE BAS. PROVIDE NEW CONTROLS AND REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTATS SERVING THESE UNITS SHALL BE REMOVED AND REPLACED.
16. EXISTING HEAT TRACE PANEL SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

AIR HANDLING UNIT	AHU
GENERAL EXHAUST FAN	GEF
KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF
TRANSFER FAN	TF
UNIT HEATER	UH

SCALE: 1/16"=1'-0"

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PROJECT NAME:

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MSA PROJECT NO. 20-071

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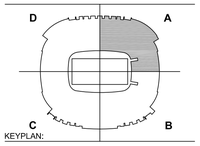

KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

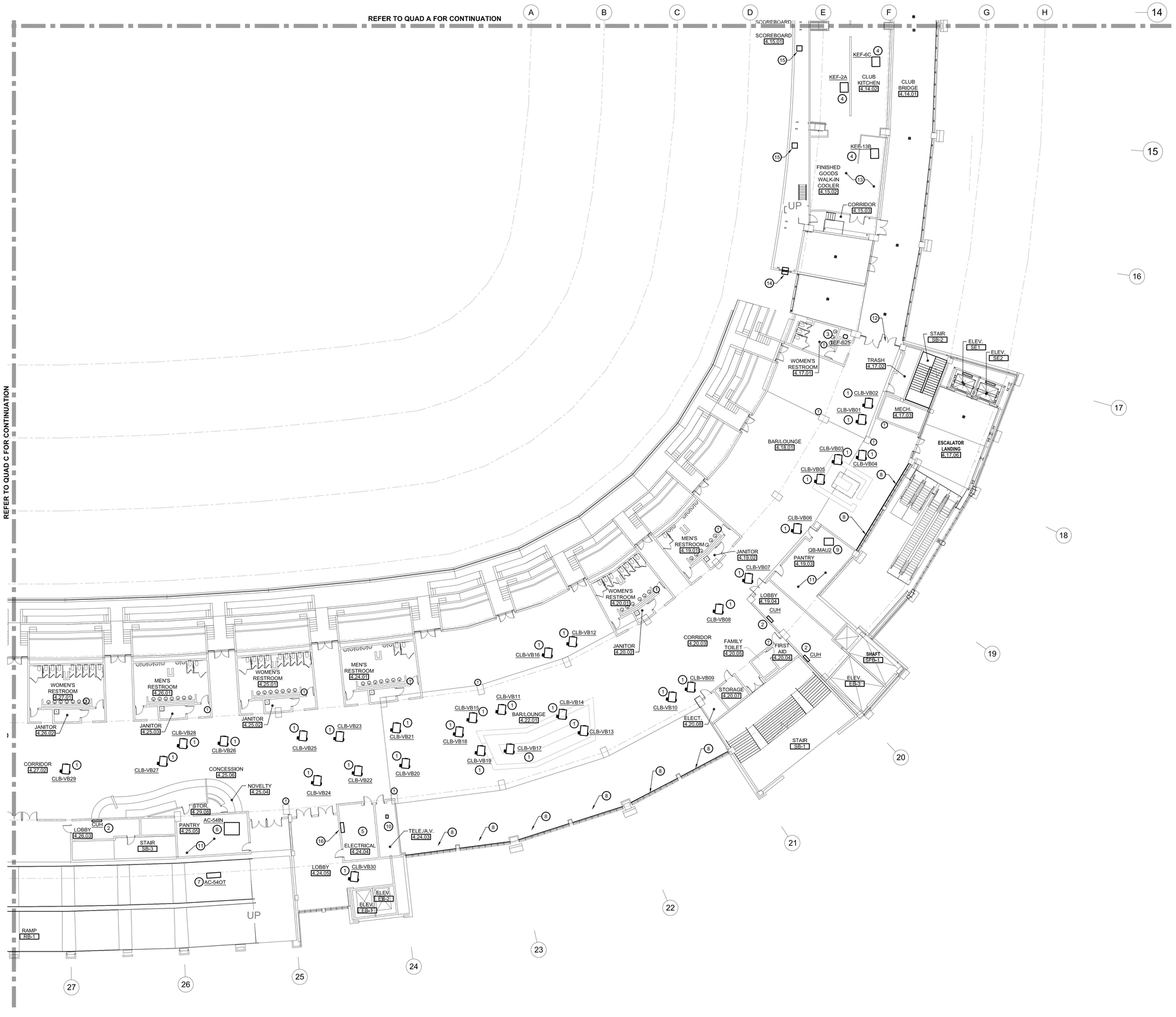
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
CLUB LEVEL QUAD A MECHANICAL NEW WORK

DRAWING NO:
M1.31

BKM# 20092.01

Plotted By: Craig M. Parks | 2/11/2021 2:25 PM
ARL: G:\20092.01\Drawings\Acad\MM\131 M132 M133 M134 CLUB LVL PLN.N



1 CLUB LEVEL PLAN - QUAD B -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
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7. EXISTING CONDENSING UNITS SERVING AC-54IN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
8. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING MAKEUP AIR UNIT WITH COOLING COIL. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING TRANSFER FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
11. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
12. EXISTING SMOKE DAMPERS SHALL BE CONNECTED TO BAS. SEE ATC SMOKE CONTROL DRAWINGS FOR MORE INFORMATION.
13. EXISTING WALK IN COOLER AND FREEZER ROOM SHALL BE CONNECTED TO THE BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
14. 3 WALL MOUNTED PROP FANS STACKED BEHIND SCOREBOARD. FANS SHALL BE CONNECTED TO THE BAS. PROVIDE NEW CONTROLS AND REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTATS SERVING THESE UNITS SHALL BE REMOVED AND REPLACED.
15. 2 STACKED PROP FANS BEHIND SCOREBOARD. THERE ARE 8 FANS TOTAL BEHIND SCOREBOARD. FANS SHALL BE FANS LOCATED HERE SHALL BE CONNECTED TO THE BAS. PROVIDE NEW CONTROLS AND REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTATS SERVING THESE UNITS SHALL BE REMOVED AND REPLACED.
16. EXISTING HEAT TRACE PANEL SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF
CABINET UNIT HEATER	CUH

bkm
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PROJECT NAME:

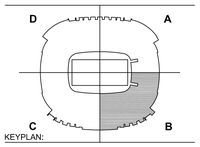
M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

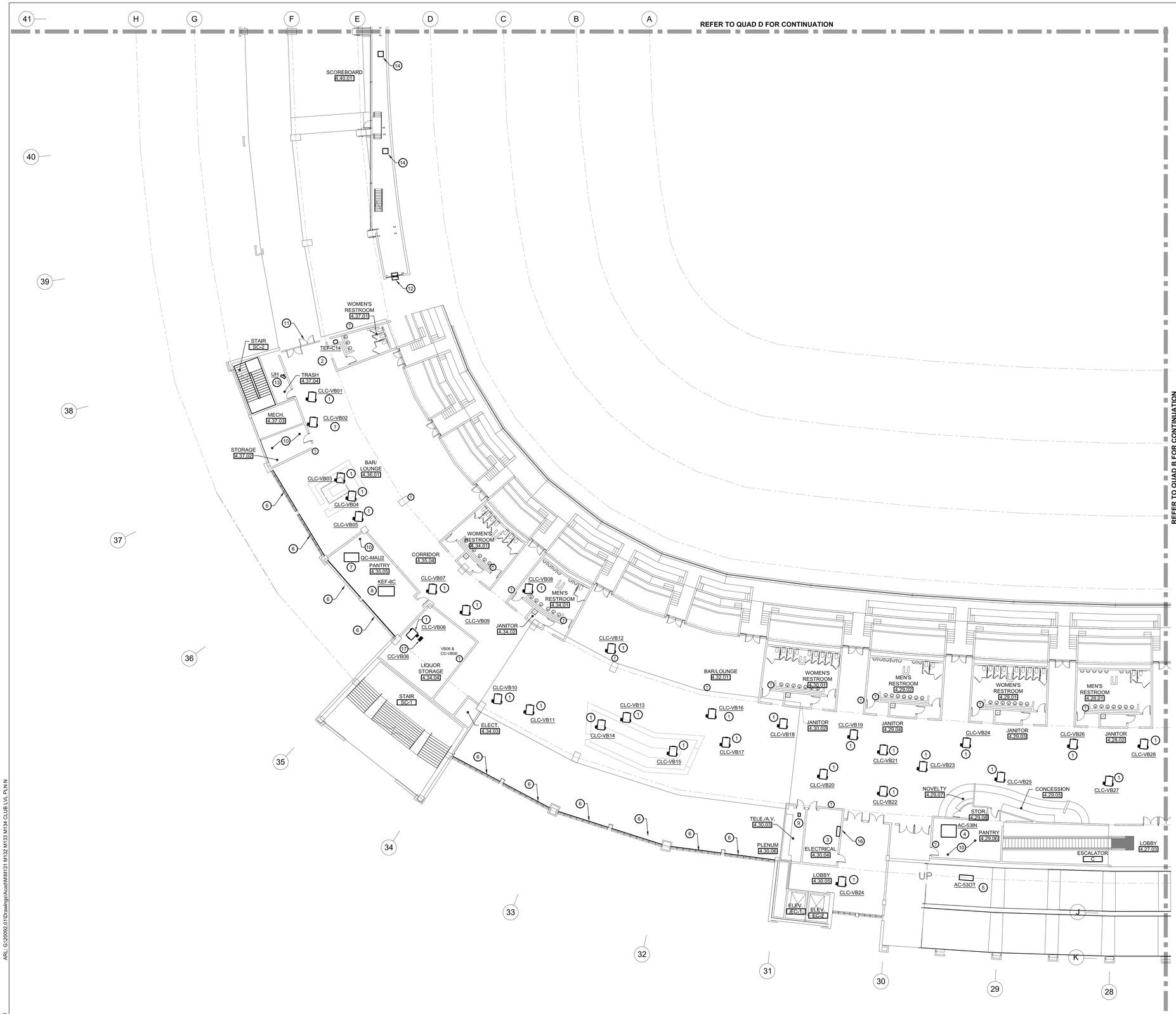
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
CLUB LEVEL QUAD B MECHANICAL NEW WORK

DRAWING NO:
M1.32

BKM# 20092.01

Plotted By: Craig M. Parks | 2/11/2021 2:25 PM
ARL: G:\20092.01\Drawings\Acad\MM131 M132 M133 M134 CLUB LVL PLN N



1 CLUB LEVEL PLAN - QUAD C -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
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3. EXISTING ELECTRIC FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
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7. EXISTING MAKEUP AIR UNIT WITH COOLING COIL. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING KITCHEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
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10. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
11. EXISTING SMOKE DAMPERS SHALL BE CONNECTED TO BAS. SEE ATC SMOKE CONTROL DRAWINGS FOR MORE INFORMATION.
12. 3 WALL MOUNTED PROP FANS STACKED BEHIND SCOREBOARD. FANS SHALL BE CONNECTED TO THE BAS. PROVIDE NEW CONTROLS AND REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTATS SERVING THESE UNITS SHALL BE REMOVED AND REPLACED.
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16. EXISTING HEAT TRACE PANEL SHALL BE CONNECTED TO THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
17. COOLING COIL FOR TERMINAL UNIT CLC-VB06. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
UNIT HEATER	UH
TOILET EXHAUST FAN	TEF

bkm
Burdette, Koehler, Murphy & Associates, Inc.
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PROJECT NAME:

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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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BALTIMORE, MD 21201

CONSULTANTS:

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1801 RESEARCH BOULEVARD, SUITE 100
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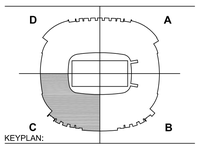

KEYPLAN:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

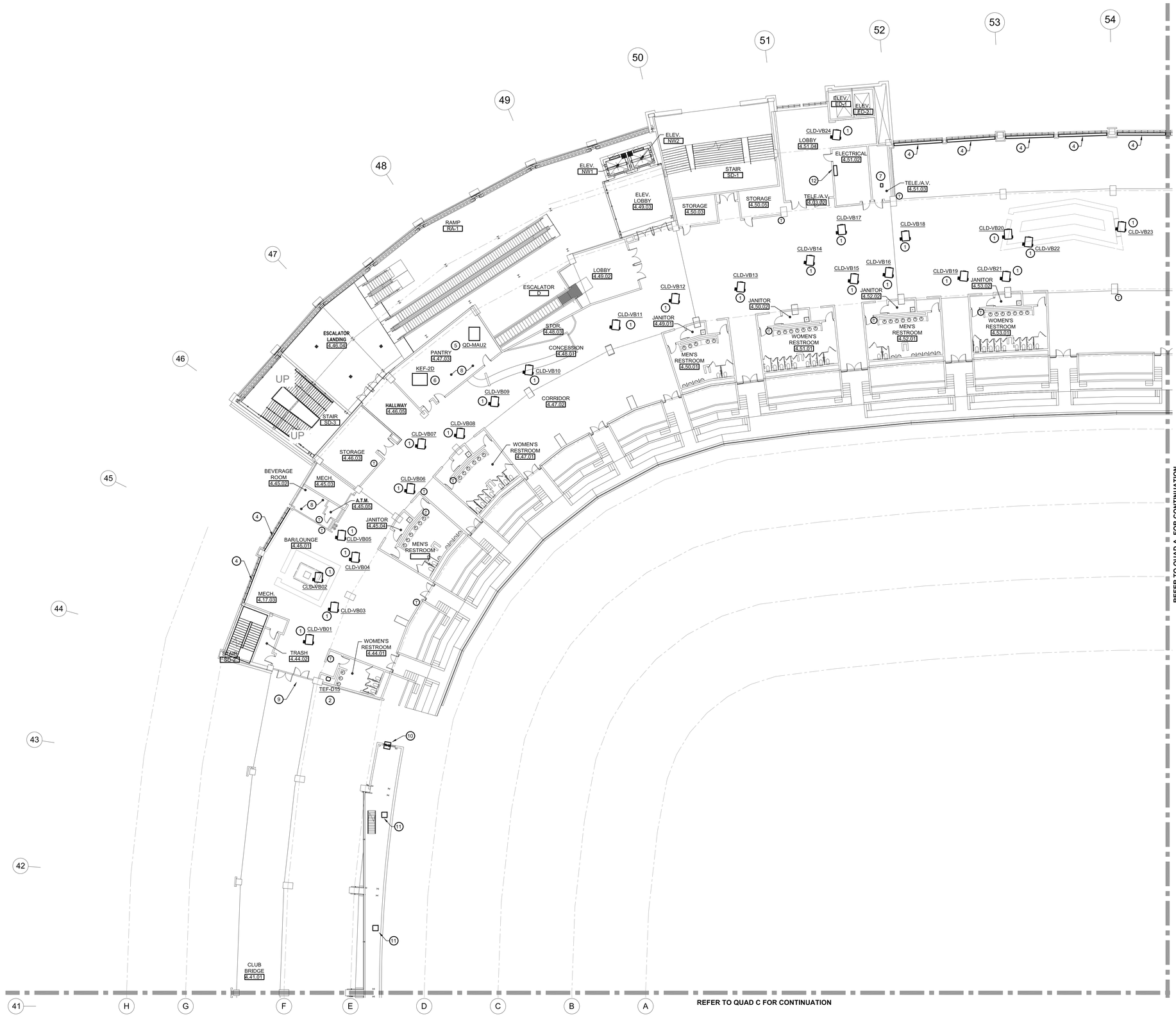
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
CLUB LEVEL QUAD C MECHANICAL NEW WORK

DRAWING NO:
M1.33

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 12:27 PM
ARL: G:\20092.01\Drawings\Acad\MM131 M132 M133 M134 CLUB LVL PLN.N



GENERAL NOTES:

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LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

KITCHEN EXHAUST FAN	KEF
MAKEUP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF

1 CLUB LEVEL PLAN - QUAD D - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

bkm
Burdette, Koehler, Murphy & Associates, Inc.
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PROJECT NAME:

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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
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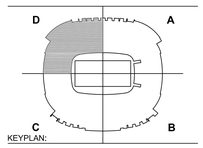
P: 301-230-0811



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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

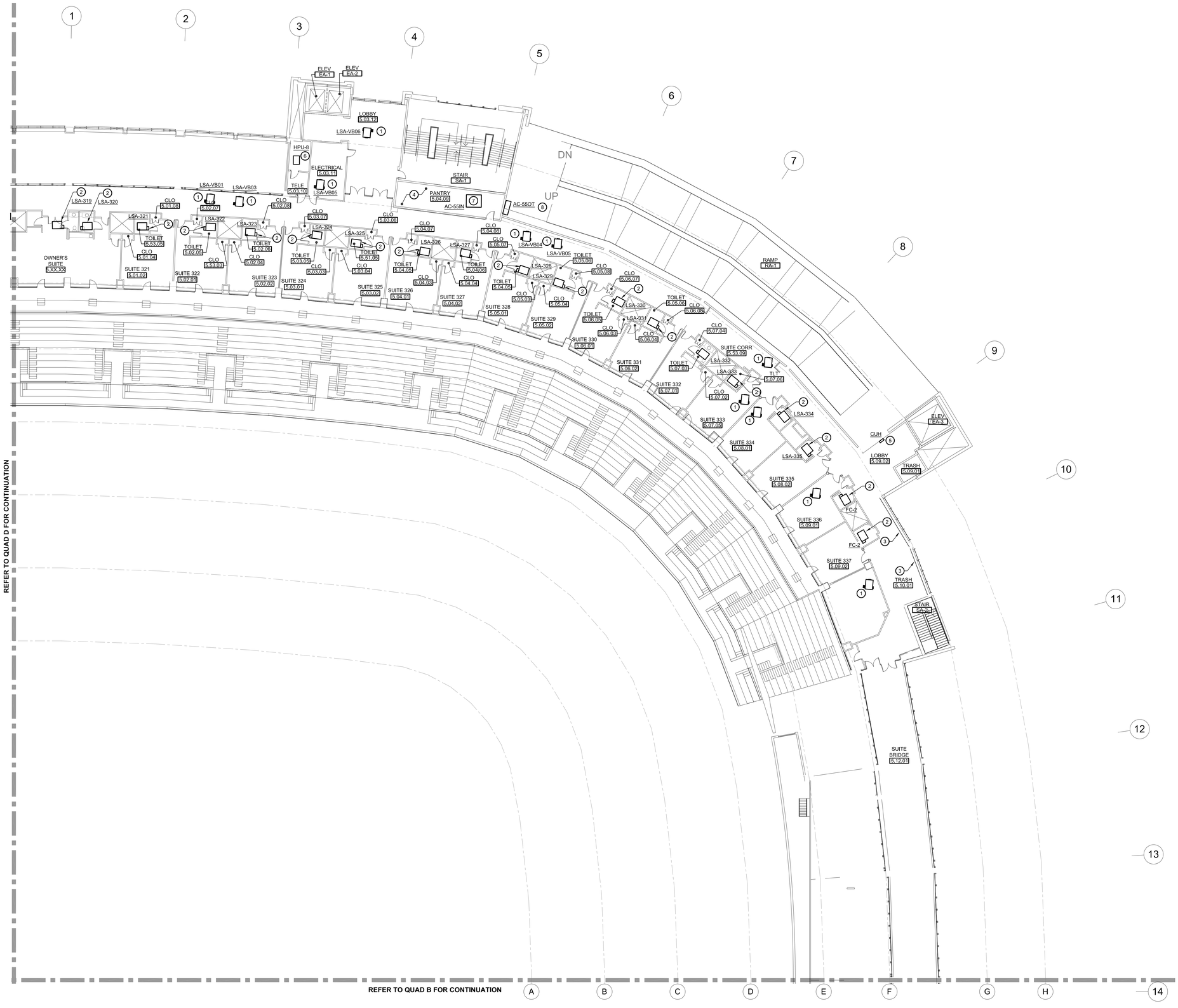
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
CLUB LEVEL QUAD D MECHANICAL NEW WORK

DRAWING NO:
M1.34

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM\M131.M132.M133.M134 CLUB LVL PLN N
Plotted By: Craig M. Parks | 2/11/2021 2:25 PM



1 LOWER SUITE LEVEL PLAN - QUAD A - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

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DRAWING NOTES:

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8. EXISTING CONDENSING UNITS SERVING AC-55IN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
FAN COIL UNIT	FCU
HEAT PUMP UNIT	HPU

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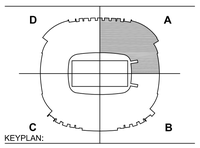

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

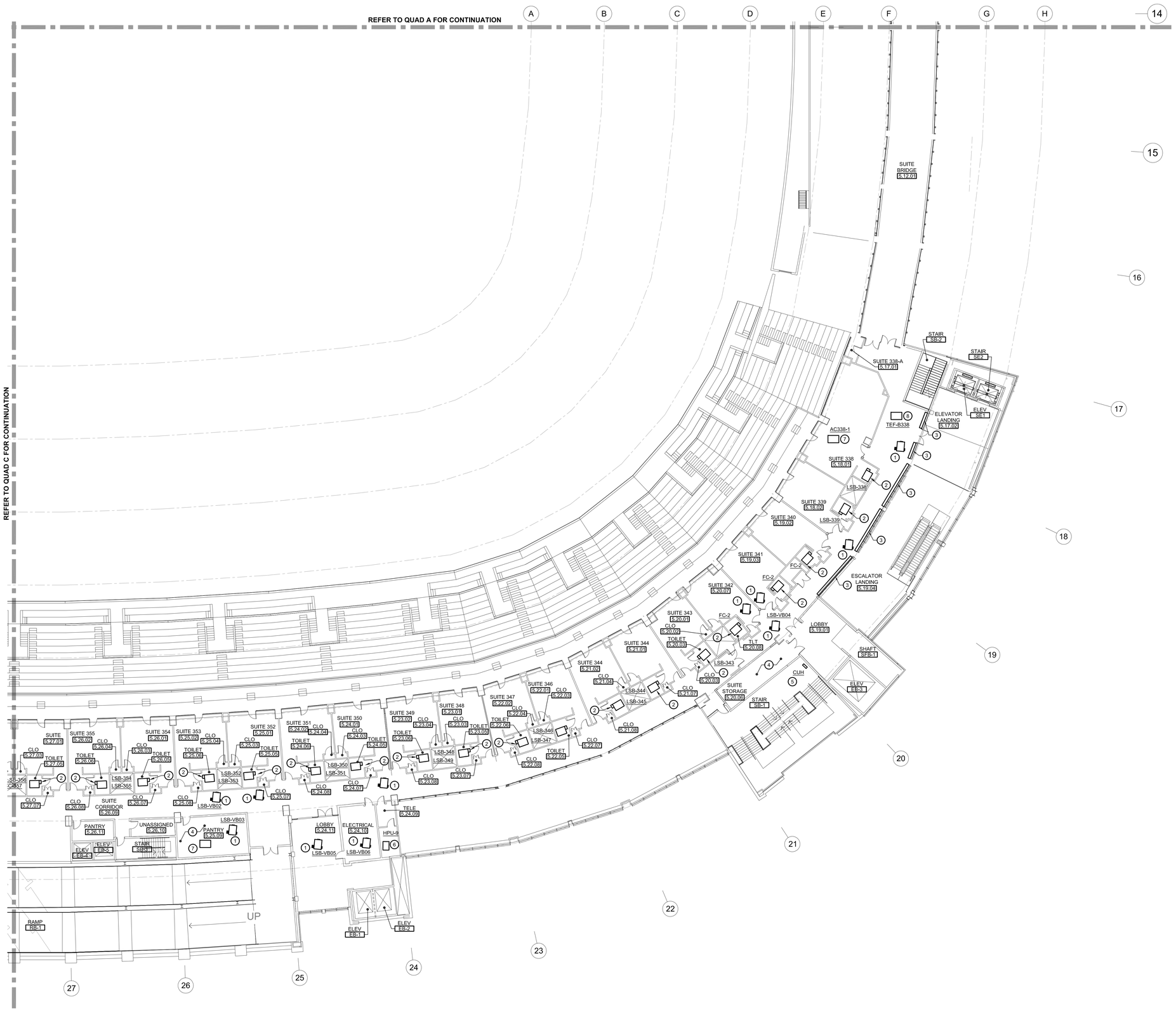
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
LOWER SUITE LEVEL QUAD A MECHANICAL NEW WORK

DRAWING NO:
M1.41

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 12:02 PM
ARL: G:\20092.01\Drawings\Acad\MM\M141 M142 M143 M144 LOWER SUITE LVL PLN N



1 LOWER SUITE LEVEL PLAN - QUAD B - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

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6. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED
7. EXISTING SPLIT SYSTEM AC UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
FAN COIL UNIT	FCU
HEAT PUMP UNIT	HPU

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

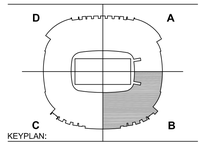
M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

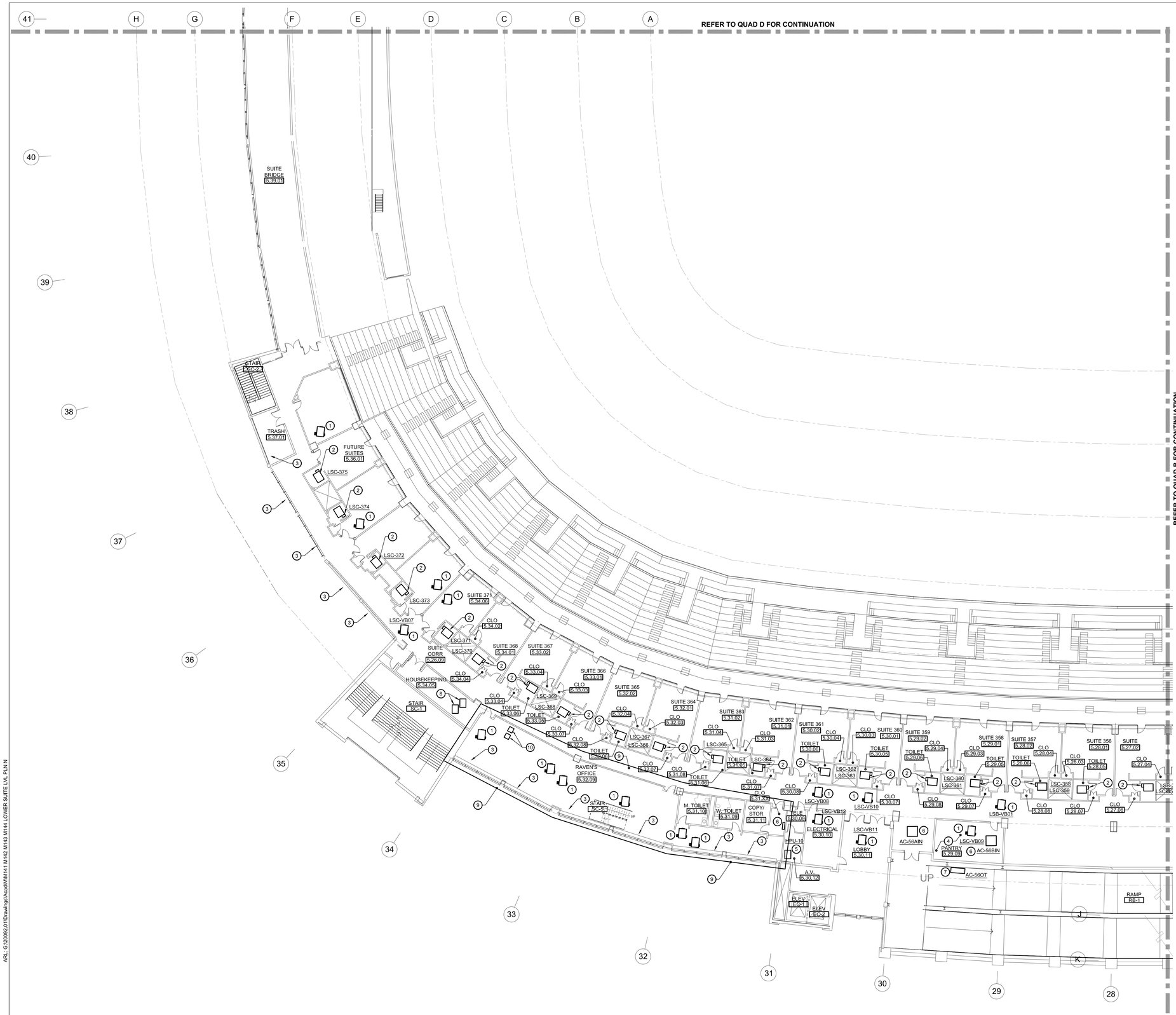
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
LOWER SUITE LEVEL QUAD B MECHANICAL NEW WORK

DRAWING NO:
M1.42

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 12:02 PM
ARL: G:\20092.01\Drawings\Acad\M\M141 M142 M143 M144 LOWER SUITE LVL PLAN N



1 LOWER SUITE LEVEL PLAN - QUAD C - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
5. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED
6. EXISTING SPLIT SYSTEM AC UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING CONDENSING UNITS SERVING AC-56AIN & AC-56BIN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
8. EXISTING RELIEF FAN (TYP 2). PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
9. REFER TO SHEETS M202A AND M202B FOR DETAILED INFORMATION IN THIS AREA.
10. EXISTING RETURN FANS (TYP OF 2) SERVING THE RAVEN'S OFFICES. ONE SERVES THE LOWER SUITE LEVEL & ONE (1) SERVES THE UPPER SUITE LEVEL. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

FAN COIL UNIT	FCU
HEAT PUMP UNIT	HPU

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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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CONSULTANTS:

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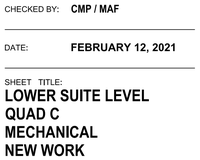

KEYPLAN:

SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

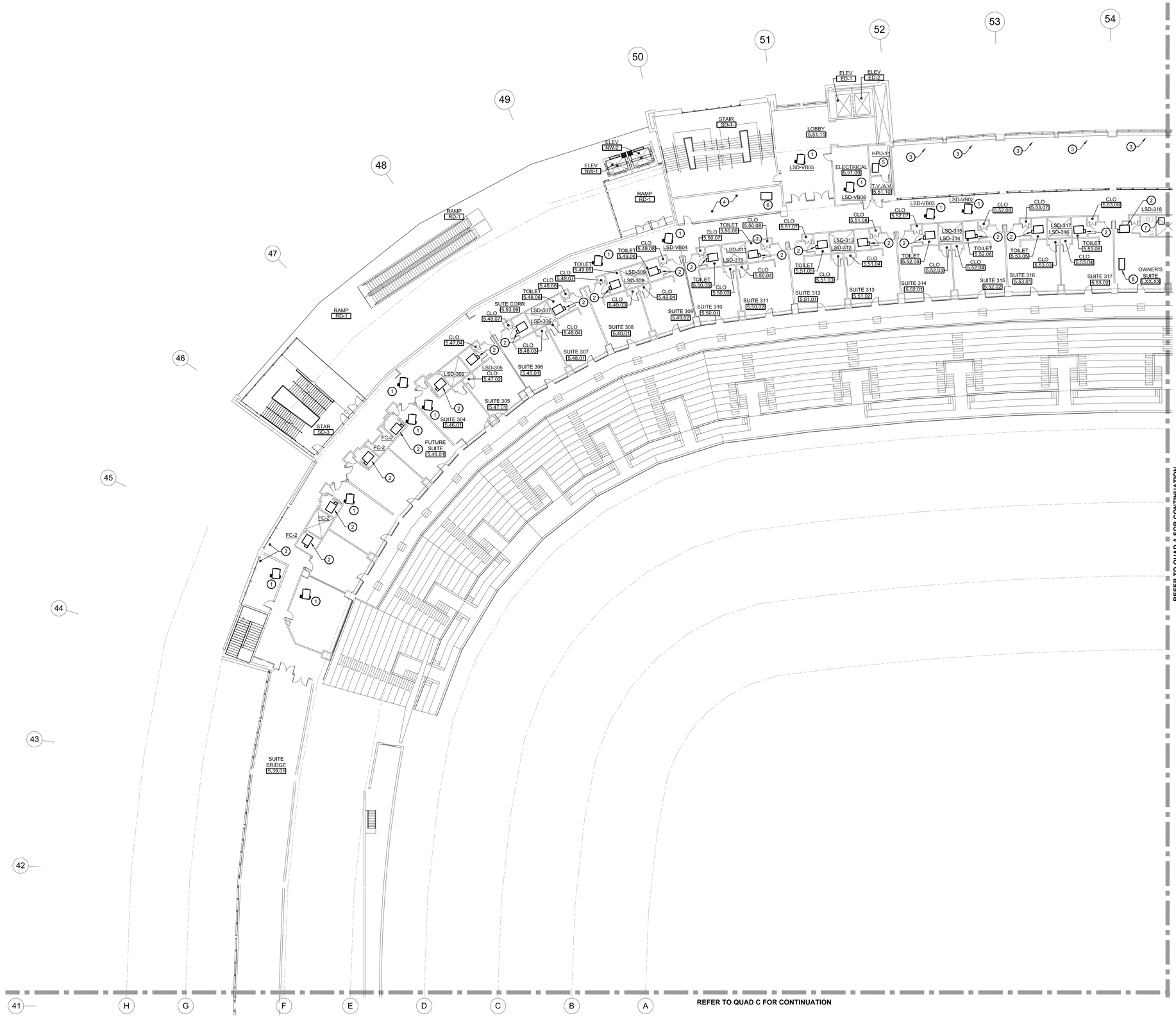
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
LOWER SUITE LEVEL QUAD C MECHANICAL NEW WORK

DRAWING NO:
M1.43

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 12:02 PM ARL: G:\20092.01\Drawings\Acad\MM141 M142 M143 M144 LOWER SUITE LVL PLN N



1 LOWER SUITE LEVEL PLAN - QUAD D - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
5. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED
6. EXISTING SPLIT SYSTEM AC UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING HUMIDIFIER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING HUMIDISTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING SMOKE EATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

FAN COIL UNIT	FCU
HEAT PUMP UNIT	HPU

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PROJECT NAME:

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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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BALTIMORE, MD 21201

CONSULTANTS:

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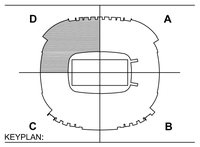
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

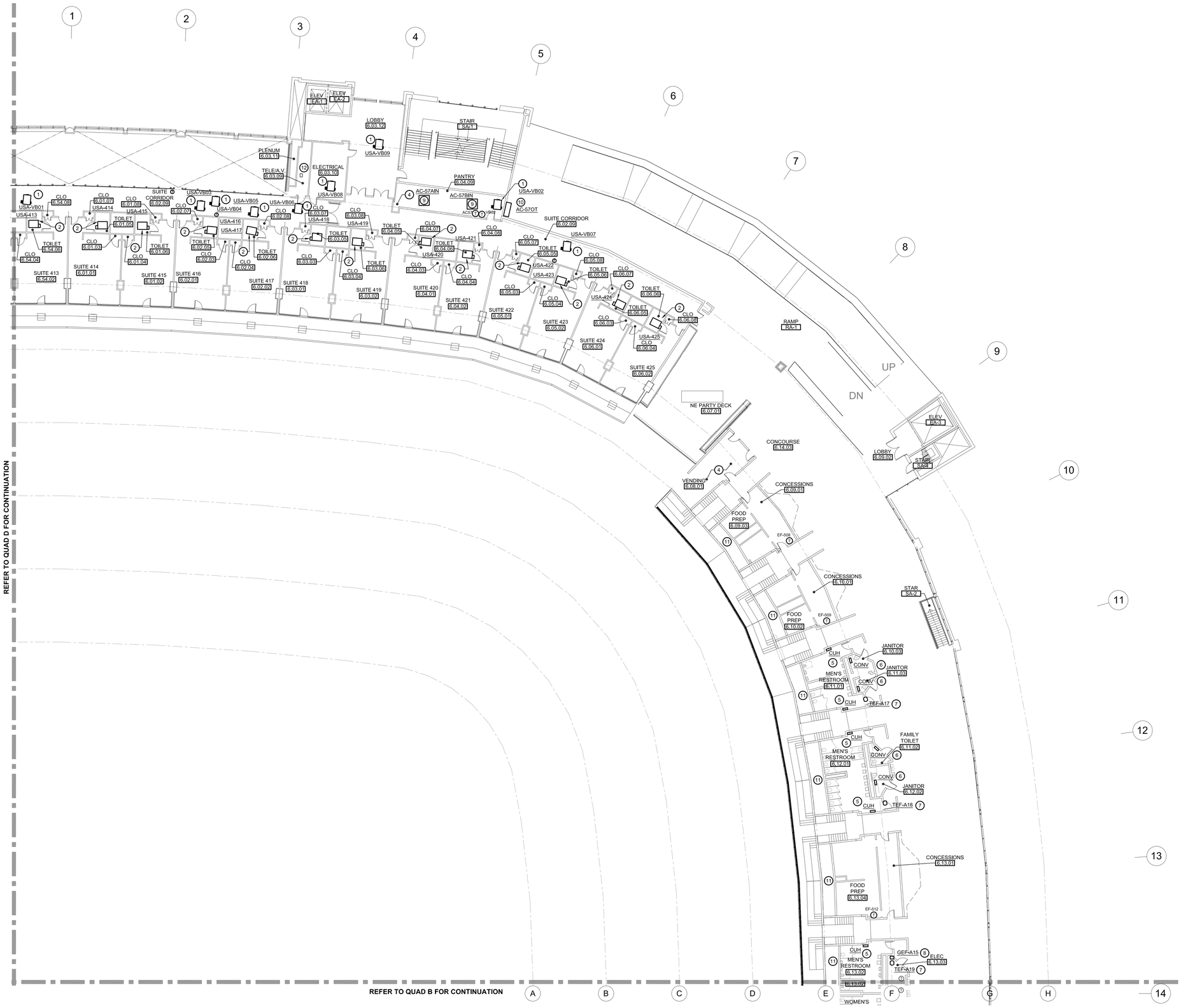
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
LOWER SUITE LEVEL QUAD D MECHANICAL NEW WORK

DRAWING NO:
M1.44

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 12:02 PM
ARL: G:\20092.01\Drawings\Acad\MM\M141 M142 M143 M144 LOWER SUITE LVL PLN N



1 UPPER SUITE LEVEL PLAN - QUAD A - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
5. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING SPLIT SYSTEM AC UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING CONDENSING UNITS SERVING AC-57AIN & AC-57BIN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
11. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.
12. EXISTING TRANSFER FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
FAN COIL UNIT	FCU
GENERAL EXHAUST FAN	GEF
MAKE-UP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

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PROJECT NAME:

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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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CONSULTANTS:

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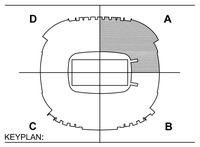

KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

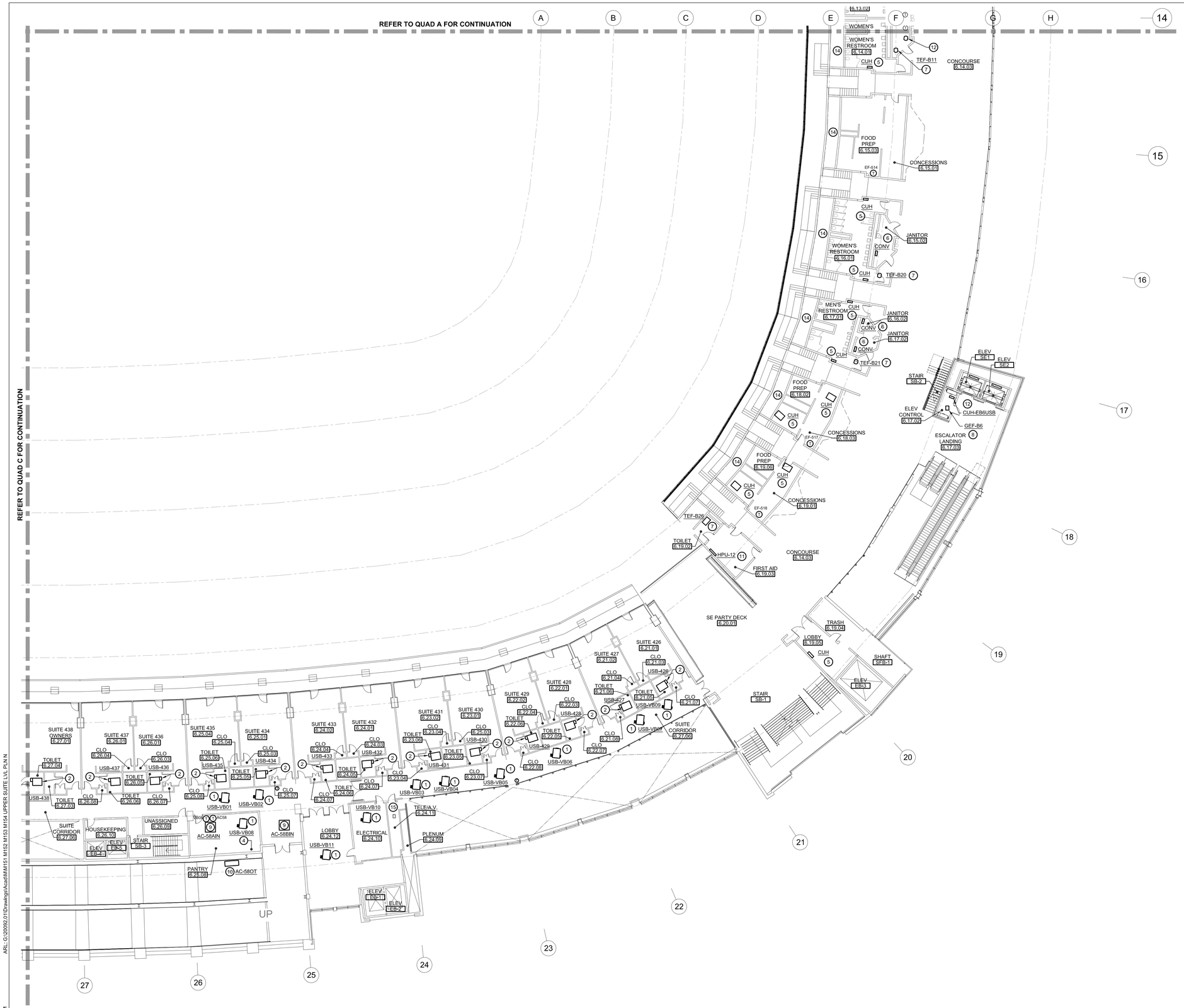
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER SUITE LEVEL QUAD A MECHANICAL NEW WORK

DRAWING NO:
M1.51

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM151 M152 M153 M154 UPPER SUITE LVL PLN.N
Plotted By: Craig M. Parks | 3/3/2021 11:25 AM



1 UPPER SUITE LEVEL PLAN - QUAD B -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
5. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
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10. EXISTING CONDENSING UNITS SERVING AC-58AIN & AC-58BIN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
11. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
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13. NOT USED.
14. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.
15. EXISTING TRANSFER FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
FAN COIL UNIT	FCU
GENERAL EXHAUST FAN	GEF
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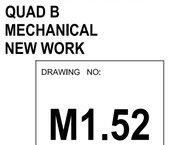

KEYPLAN:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

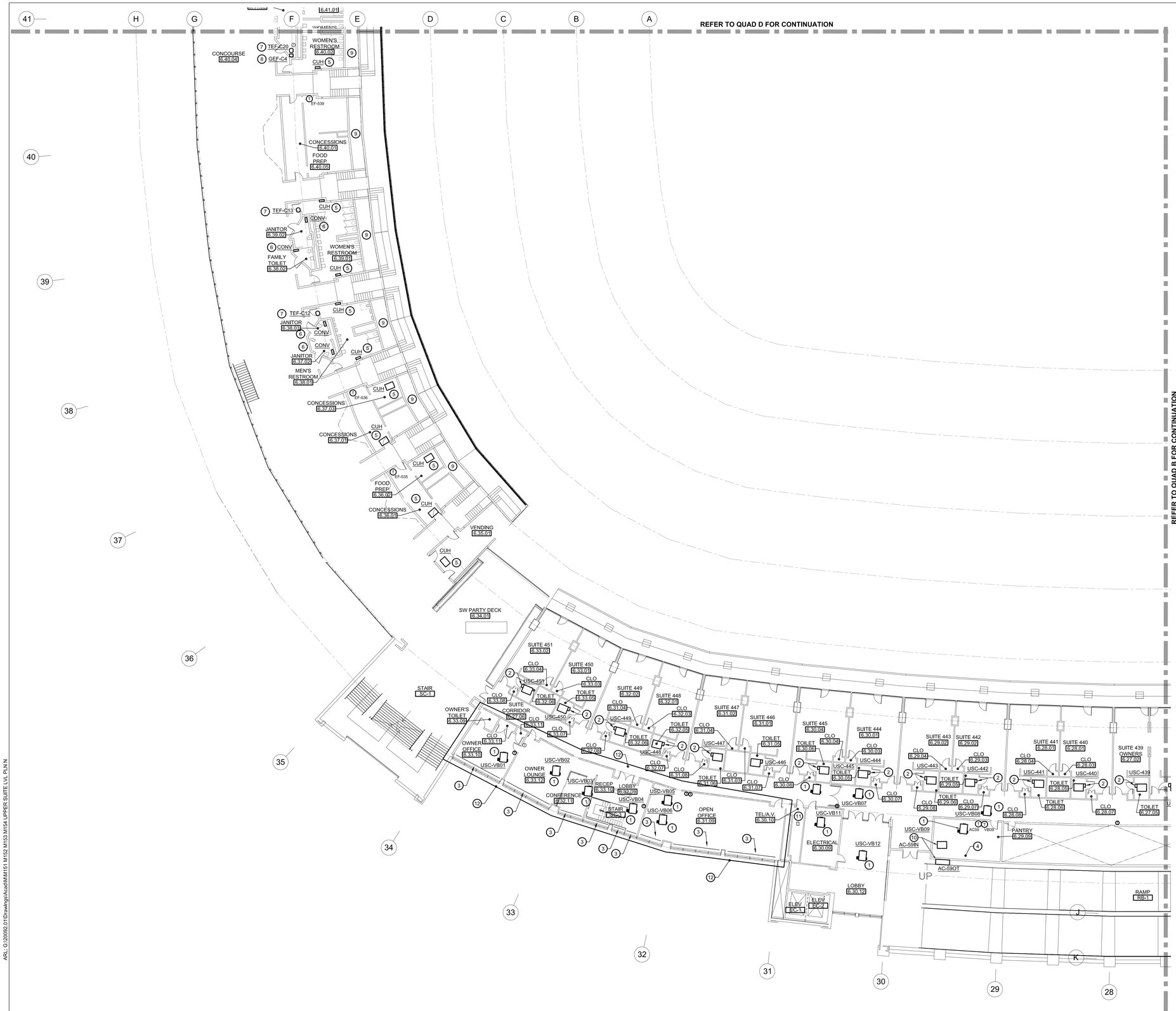
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER SUITE LEVEL QUAD B MECHANICAL NEW WORK

DRAWING NO:
M1.52

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 11:25 AM
ARL: G:\20092.01\Drawings\Acad\M#151 M152 M153 M154 UPPER SUITE LVL PLN.N



1 UPPER SUITE LEVEL PLAN - QUAD C - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
5. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.
10. EXISTING SPLIT SYSTEM AC UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
11. EXISTING TRANSFER FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. REFER TO SHEETS M202A AND M202B FOR DETAILED INFORMATION IN THIS AREA.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
FAN COIL UNIT	FCU
GENERAL EXHAUST FAN	GEF
MAKE-UP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

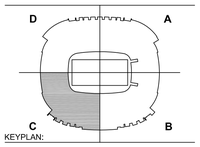
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

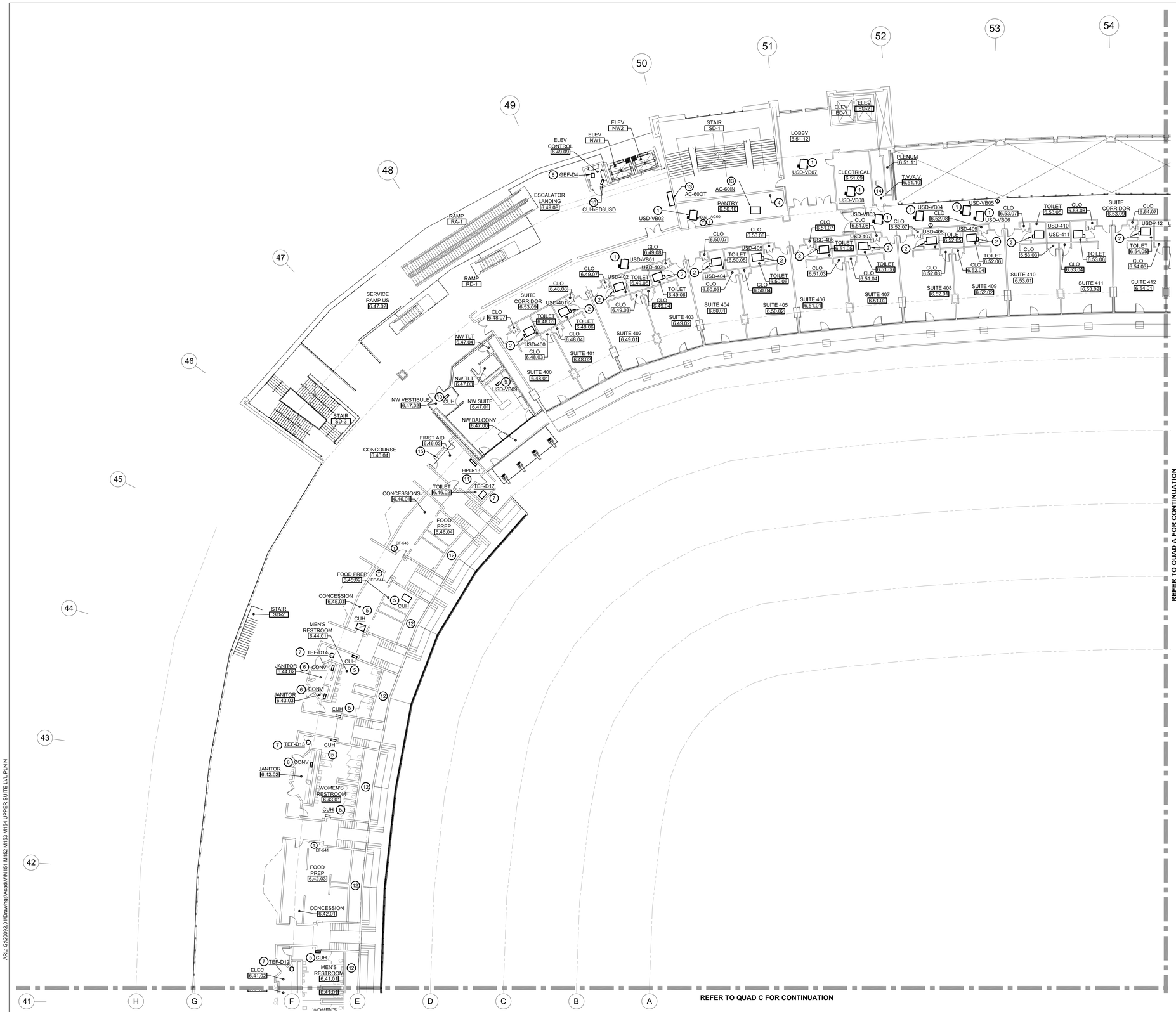
DATE: FEBRUARY 12, 2021

SHEET TITLE:
UPPER SUITE LEVEL
QUAD C
MECHANICAL
NEW WORK

DRAWING NO:
M1.53

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 11:25 AM
ARL: G:\20092.01\Drawings\Acad\MM151 M152 M153 M154 UPPER SUITE LVL PLN N



1 UPPER SUITE LEVEL PLAN - QUAD D -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING FAN POWERED VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING FAN COIL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING HOT WATER RADIATORS ALONG WINDOWS IN THIS AREA. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
4. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
5. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING TOILET EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
8. EXISTING GENERAL EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
9. EXISTING ELECTRIC VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
11. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
12. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.
13. EXISTING SPLIT SYSTEM AC UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
14. EXISTING TRANSFER FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
15. EXISTING AIR CURTAIN ABOVE DOOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
FAN COIL UNIT	FCU
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
MAKE-UP AIR UNIT	MAU
TOILET EXHAUST FAN	TEF

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

bkm
Burdette, Koehler, Murphy & Associates, Inc.
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PROJECT NAME:

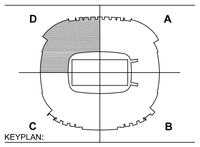
M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



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SEAL:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

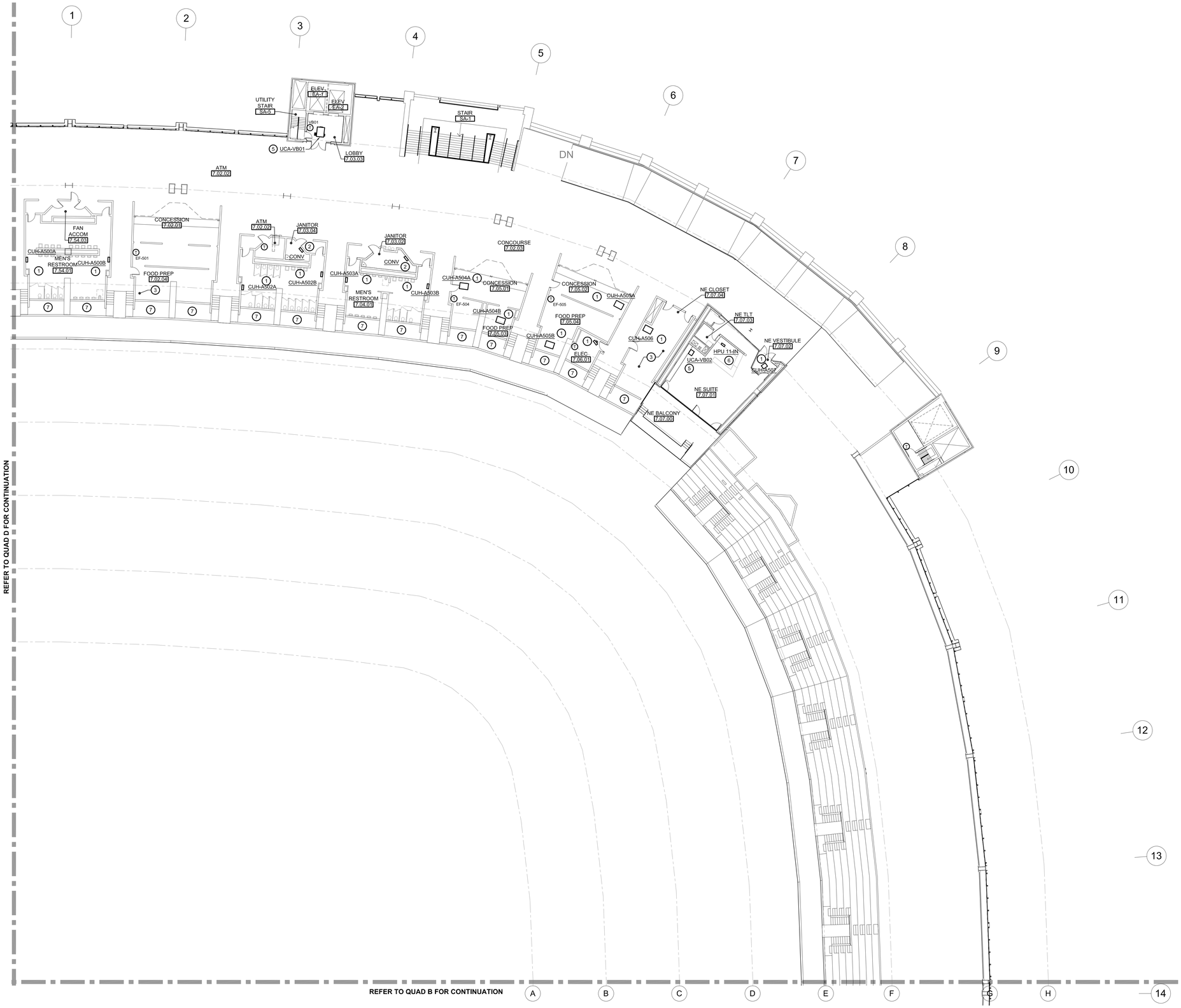
DATE: FEBRUARY 12, 2021

SHEET TITLE:
UPPER SUITE LEVEL
QUAD D
MECHANICAL
NEW WORK

DRAWING NO:
M1.54

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM151 M152 M153 M154 UPPER SUITE LVL PLN.N
Plotted By: Craig M. Parks | 3/3/2021 11:25 AM



1 UPPER CONCOURSE LEVEL PLAN - QUAD A -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER (TYP OF 2).
4. NOT USED.
5. EXISTING ELECTRIC VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
HEAT PUMP UNIT	HPU
MAKE-UP AIR UNIT	MAU

bkm
Burdette, Koehler, Murphy & Associates, Inc.
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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

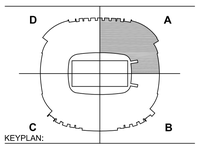
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

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LICENSE NO. _____.
EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER CONCOURSE LVL QUAD A MECHANICAL NEW WORK

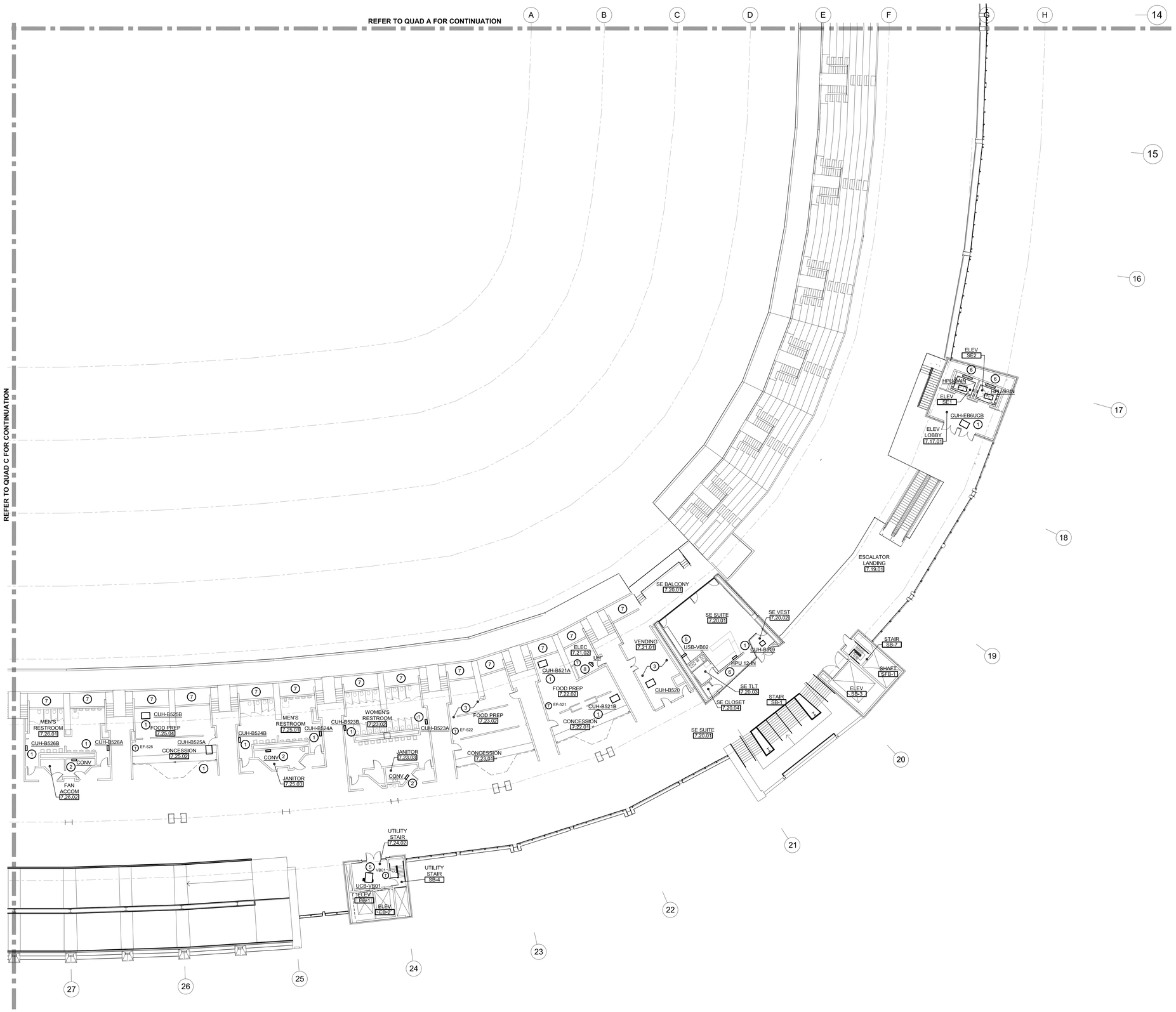
DRAWING NO:
M1.61

BKM# 20092.01

REFER TO QUAD D FOR CONTINUATION

ARL: G:\20092.01\Drawings\Acad\MM\161 M162 M163 M164 UPPER CONCOURSE LVL PLN.N

Plotted By: Craig M. Parks | 3/3/2021 10:16 AM



1 UPPER CONCOURSE LEVEL PLAN - QUAD B -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
4. NOT USED.
5. EXISTING ELECTRIC VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.
8. EXISTING ELECTRIC UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
HEAT PUMP UNIT	HPU
MAKE-UP AIR UNIT	MAU

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

bkm
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PROJECT NAME:

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MSA PROJECT NO. 20-071

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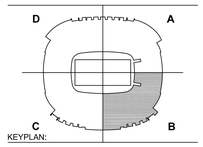

KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

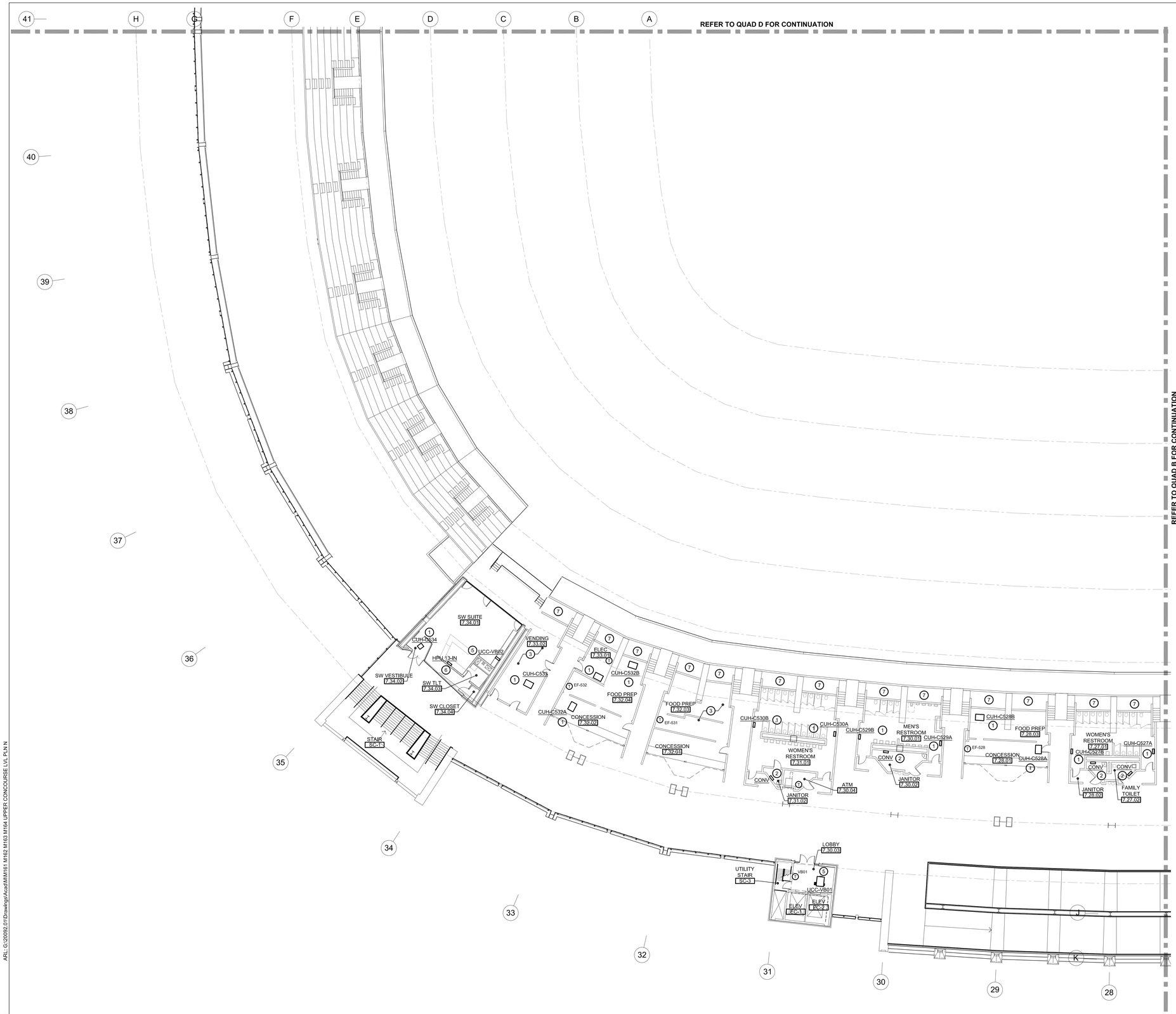
DATE: FEBRUARY 12, 2021

SHEET TITLE:
UPPER CONCOURSE LVL
QUAD B
MECHANICAL
NEW WORK

DRAWING NO:
M1.62

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\M\M1561 M162 M163 M164 UPPER CONCOURSE LVL PLN N
Plotted By: Craig M. Parks | 3/2/2021 10:16 AM



1 UPPER CONCOURSE LEVEL PLAN - QUAD C -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
4. NOT USED.
5. EXISTING ELECTRIC VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
HEAT PUMP UNIT	HPU
MAKE-UP AIR UNIT	MAU

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HVAC CONTROLS,
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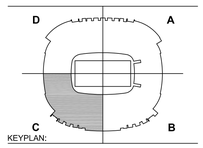

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

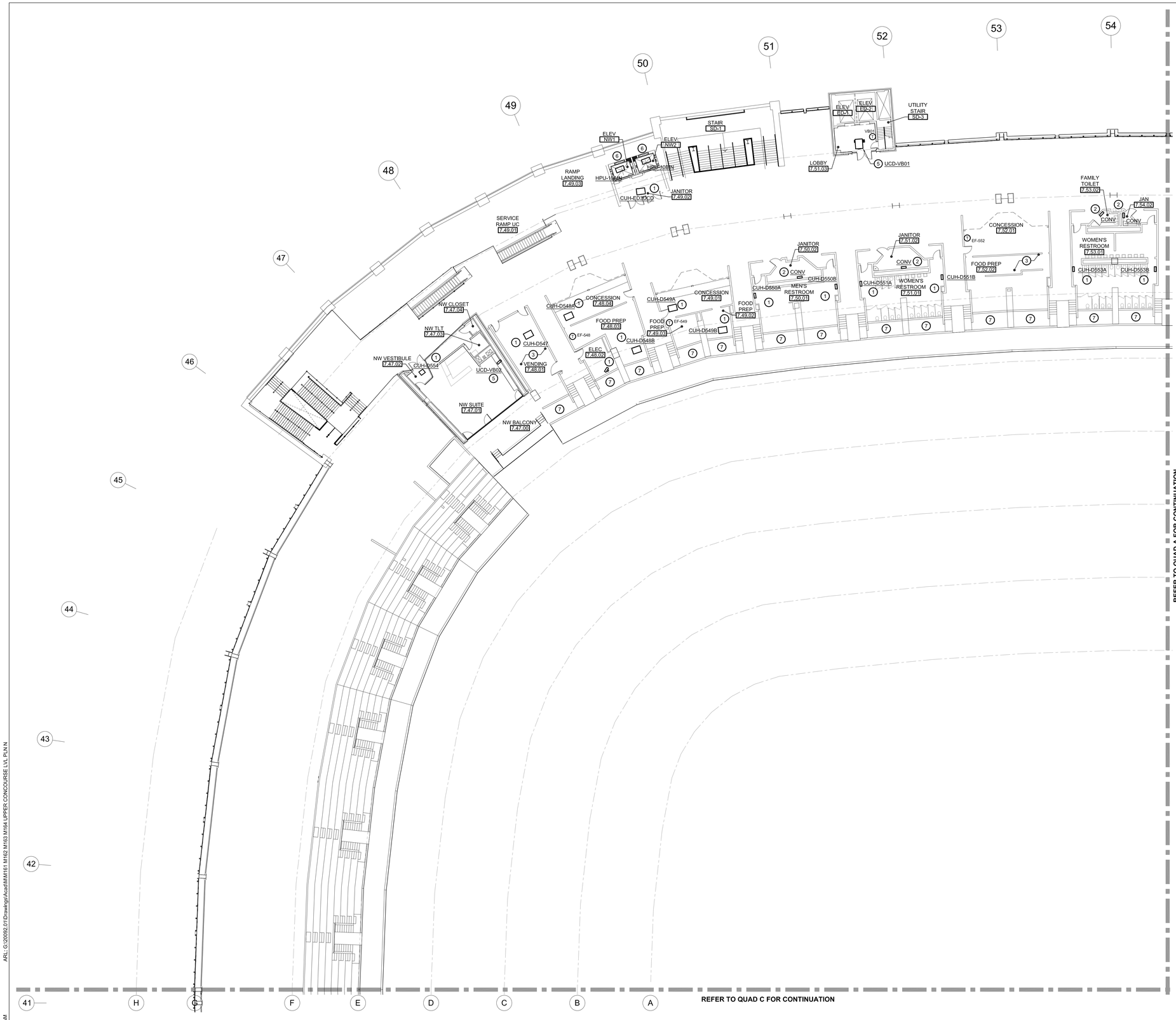
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER CONCOURSE LVL QUAD C MECHANICAL NEW WORK

DRAWING NO:
M1.63

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:16 AM
ARL: G:\20092.01\Drawings\Acad\MM161 M162 M163 M164 UPPER CONCOURSE LVL PLN.N



1 UPPER CONCOURSE LEVEL PLAN - QUAD D -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING ELECTRIC CABINET UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
2. EXISTING ELECTRIC CONVECTOR. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
3. EXISTING VENDOR COOLER / FREEZER SHALL BE CONNECTED TO BAS. PROVIDE CONTROLS FOR MONITORING STATUS AND INTERNAL TEMPERATURE. PENETRATIONS THRU COOLER / FREEZER SHALL BE SEALED TO MAINTAIN THERMAL BARRIER.
4. NOT USED.
5. EXISTING ELECTRIC VAV TERMINAL UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
6. EXISTING HEAT PUMP UNIT. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
7. EXISTING ELECTRIC BASEBOARD HEATERS LOCATED IN CRAWL SPACE. PROVIDE NEW CONTROLS AND CONNECT TO BAS.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	T

ABBREVIATIONS

CABINET UNIT HEATER	CUH
CONVECTOR	CONV
HEAT PUMP UNIT	HPU
MAKE-UP AIR UNIT	MAU

bkm
Burdette, Koehler, Murphy & Assoclates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

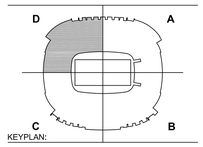
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

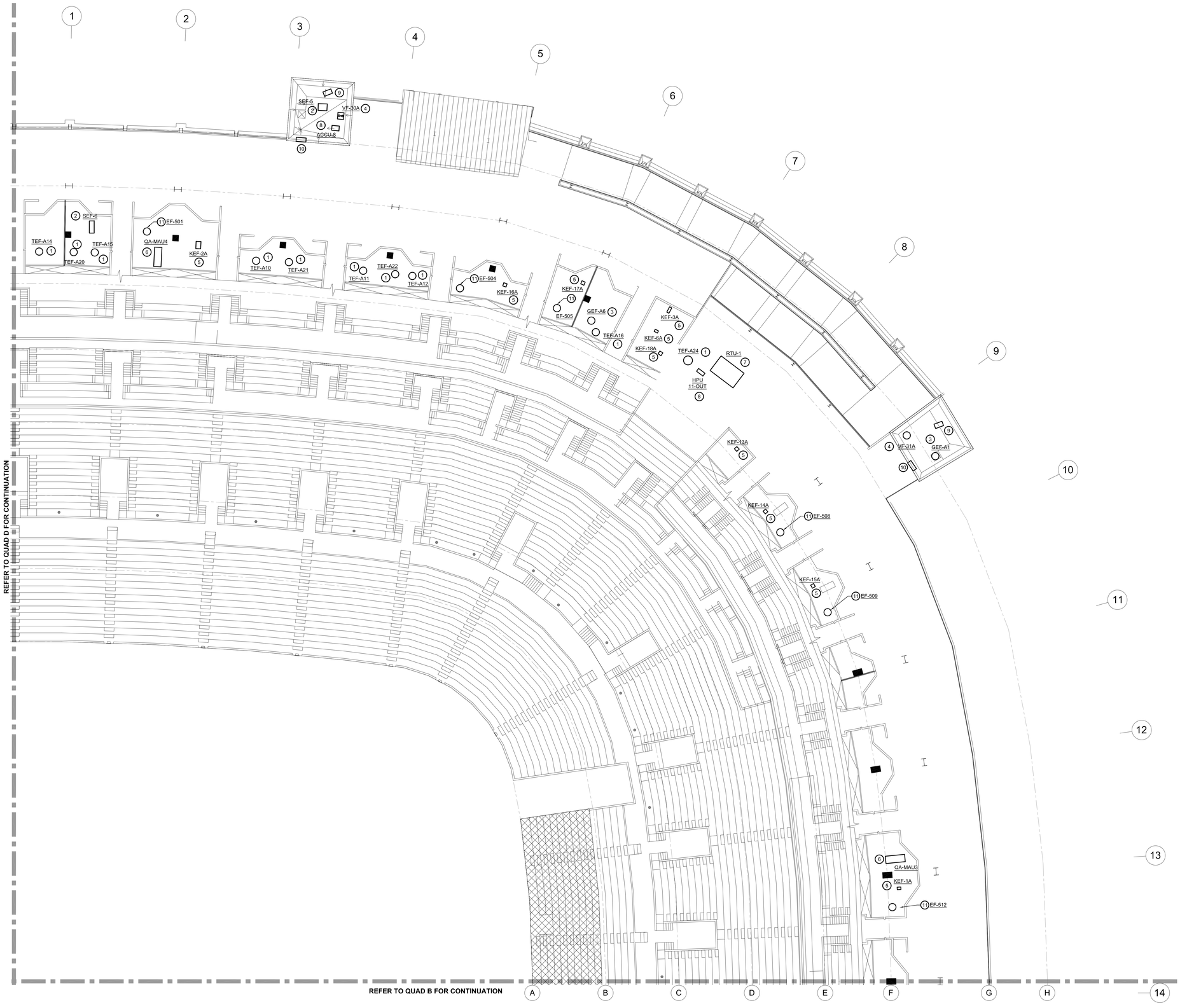
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER CONCOURSE LVL QUAD D MECHANICAL NEW WORK

DRAWING NO:
M1.64

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:16 AM
ARL: G:\20092.01\Drawings\Acad\MM161 M162 M163 M164 UPPER CONCOURSE LVL PLN N



1 UPPER CONCOURSE ROOF PLAN - QUAD A -MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
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3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

○ DRAWING NOTES:

1. EXISTING TOILET EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
2. EXISTING SMOKE EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
3. EXISTING GENERAL EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
4. EXISTING VENTILATION FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
5. EXISTING KITCHEN EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
6. EXISTING MAKE-UP AIR UNIT ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
7. EXISTING ROOFTOP UNIT ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
8. EXISTING AIR COOLED CONDENSING UNIT ON ROOF SERVING SPLIT SYSTEM UNIT BELOW. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
9. EXISTING UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. INTAKE LOUVER WITH MOD. REPLACE MOD AND REFER TO VENTILATION FAN SEQUENCE ON ATC DRAWINGS FOR CONTROL SEQUENCE.
11. EXISTING CONCESSION STAND EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

AIR COOLED CONDENSING UNIT	ACCU
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST FAN	KEF
MAKE-UP AIR UNIT	MAU
ROOFTOP UNIT	RTU
SMOKE EXHAUST FAN	SEF
TOILET EXHAUST FAN	TEF
VENTILATION FAN	VF

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

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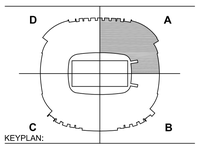

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PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

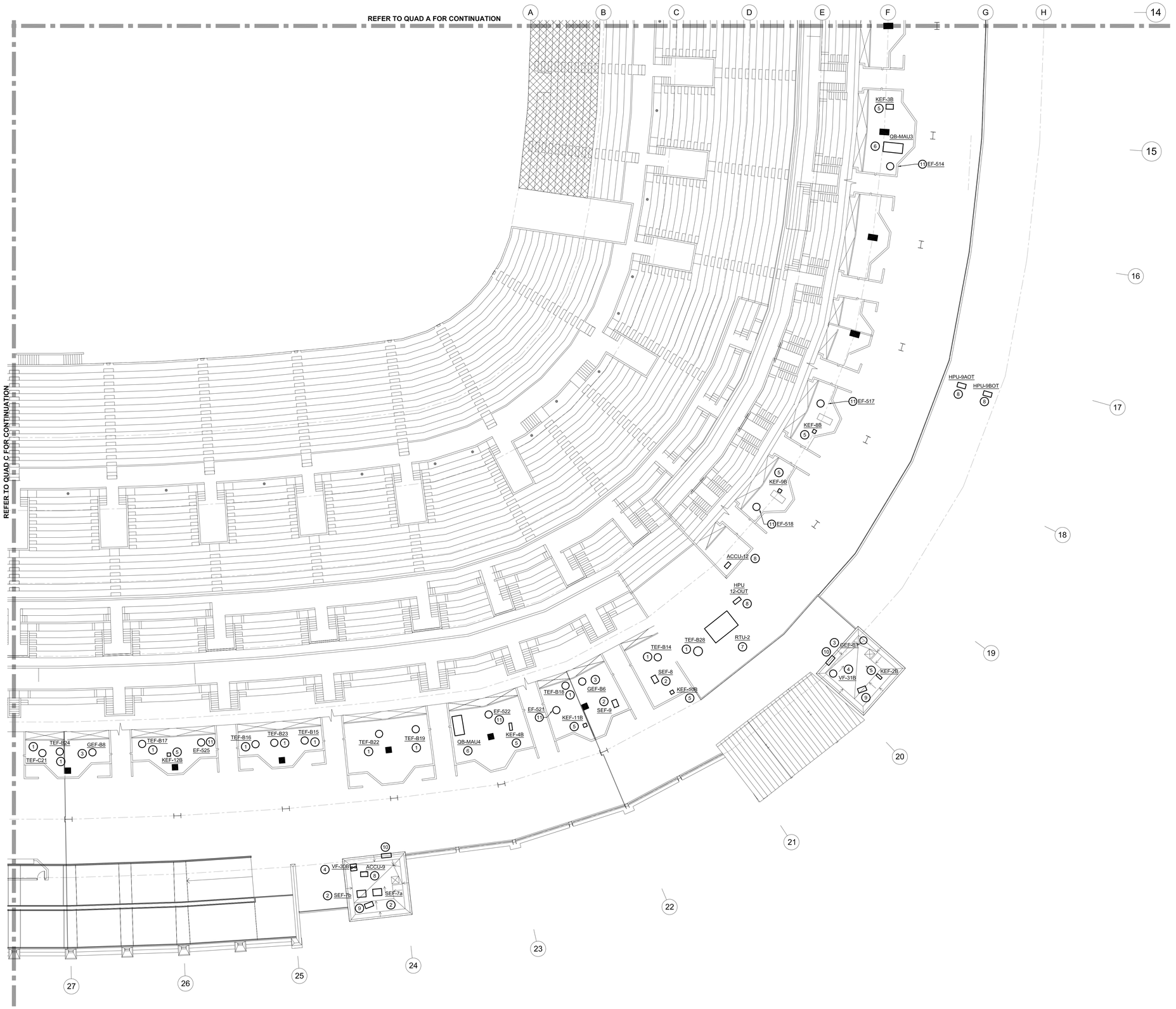
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER CONCOURSE ROOF QUAD A MECHANICAL NEW WORK

DRAWING NO:
M1.71

BKM# 20092.01

Plotted By: Craig M. Parks | 2/24/2021 5:57 PM
ARL: G:\20092.01\Drawings\Acad\MM171 M172 M173 M174 UPPER CONCOURSE LVL ROOF PLN.N



1 UPPER CONCOURSE ROOF PLAN - QUAD B - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC…), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING TOILET EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
2. EXISTING SMOKE EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
3. EXISTING GENERAL EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
4. EXISTING VENTILATION FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
5. EXISTING KITCHEN EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
6. EXISTING MAKE-UP AIR UNIT ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
7. EXISTING ROOFTOP UNIT ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
8. EXISTING AIR COOLED CONDENSING UNIT ON ROOF SERVING SPLIT SYSTEM UNIT BELOW. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
9. EXISTING UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. INTAKE LOUVER WITH MOD. REPLACE MOD AND REFER TO VENTILATION FAN SEQUENCE ON ATC DRAWINGS FOR CONTROL SEQUENCE.
11. EXISTING CONCESSION STAND EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

AIR COOLED CONDENSING UNIT	ACCU
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST FAN	KEF
MAKE-UP AIR UNIT	MAU
ROOFTOP UNIT	RTU
SMOKE EXHAUST FAN	SEF
TOILET EXHAUST FAN	TEF
VENTILATION FAN	VF

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

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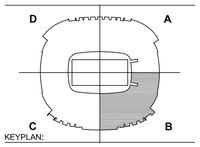

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DATE	DESCRIPTION
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PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: BAS

CHECKED BY: CMP / MAF

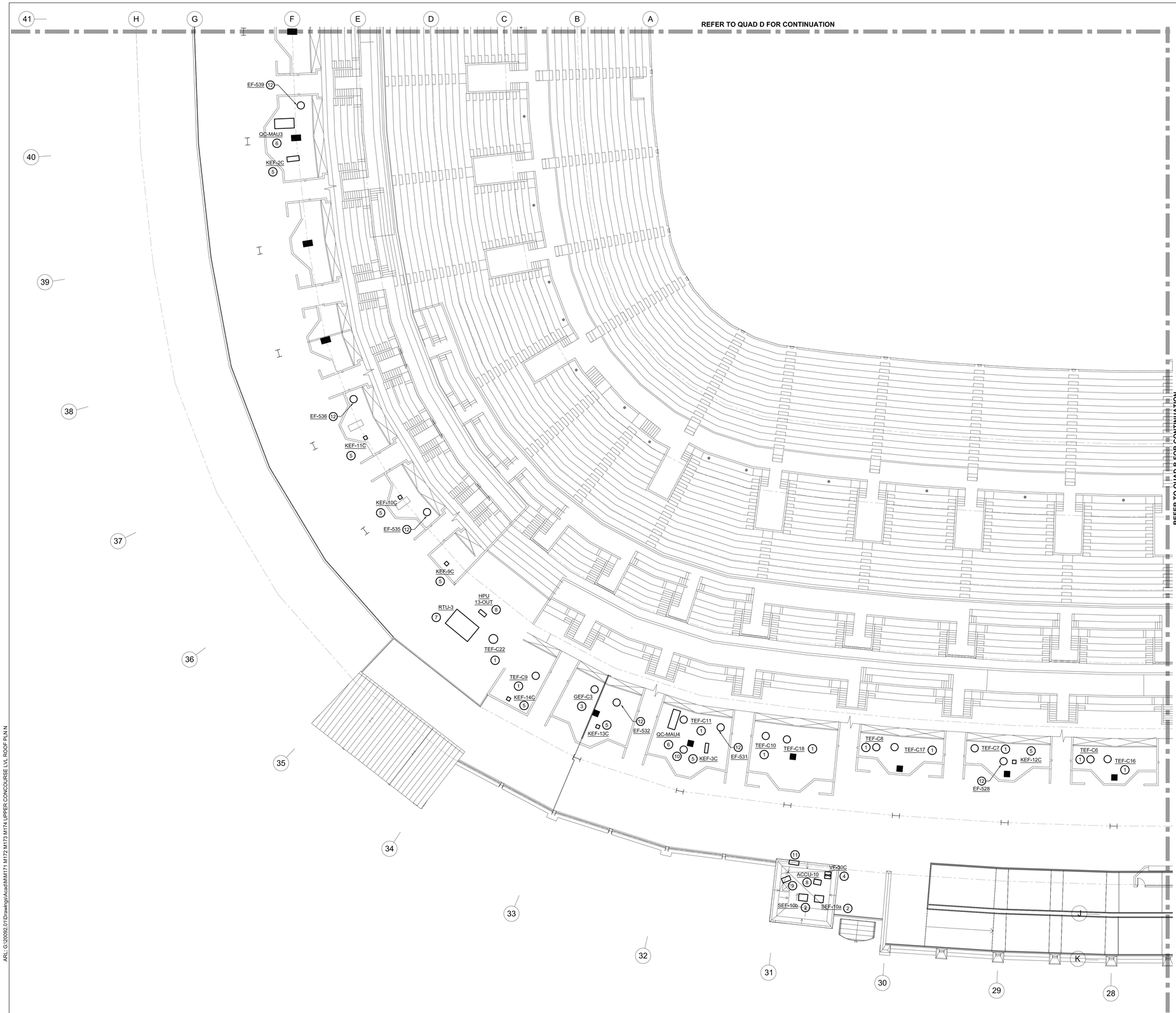
DATE: FEBRUARY 12, 2021

SHEET TITLE:
UPPER CONCOURSE ROOF
QUAD B
MECHANICAL
NEW WORK

DRAWING NO:
M1.72

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM171 M172 M173 M174 UPPER CONCOURSE LVL ROOF PLN N
Plotted By: Craig M. Parks | 2/24/2021 5:57 PM



1 UPPER CONCOURSE ROOF PLAN - QUAD C - MECHANICAL- NEW WORK

SCALE: 1/16" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ALL IDENTIFIED EQUIPMENT IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, VALVES, DAMPERS, ETC...), ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL EXISTING THERMOSTATS SHALL BE REMOVED AND REPLACED.

DRAWING NOTES:

1. EXISTING TOILET EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
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8. EXISTING AIR COOLED CONDENSING UNIT ON ROOF SERVING SPLIT SYSTEM UNIT BELOW. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.
9. EXISTING UNIT HEATER. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION. EXISTING THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED.
10. EXISTING PIZZA OVEN EXHAUST FAN. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXHAUST FAN SHALL ENERGIZE WHEN MAKE-UP AIR UNIT IS ENERGIZED AND DE-ENERGIZE WHEN MAKE-UP AIR UNIT IS DE-ENERGIZED.
11. INTAKE LOUVER WITH MOD. REPLACE MOD AND REFER TO VENTILATION FAN SEQUENCE ON ATC DRAWINGS FOR CONTROL SEQUENCE.
12. EXISTING CONCESSION STAND EXHAUST FAN ON ROOF. PROVIDE NEW CONTROLS AND CONNECT TO BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

AIR COOLED CONDENSING UNIT	ACCU
GENERAL EXHAUST FAN	GEF
HEAT PUMP UNIT	HPU
KITCHEN EXHAUST FAN	KEF
MAKE-UP AIR UNIT	MAU
ROOFTOP UNIT	RTU
SMOKE EXHAUST FAN	SEF
TOILET EXHAUST FAN	TEF
VENTILATION FAN	VF

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

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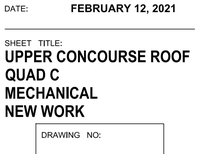

KEYPLAN:

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DRAWN BY: BAS

CHECKED BY: CMP / MAF

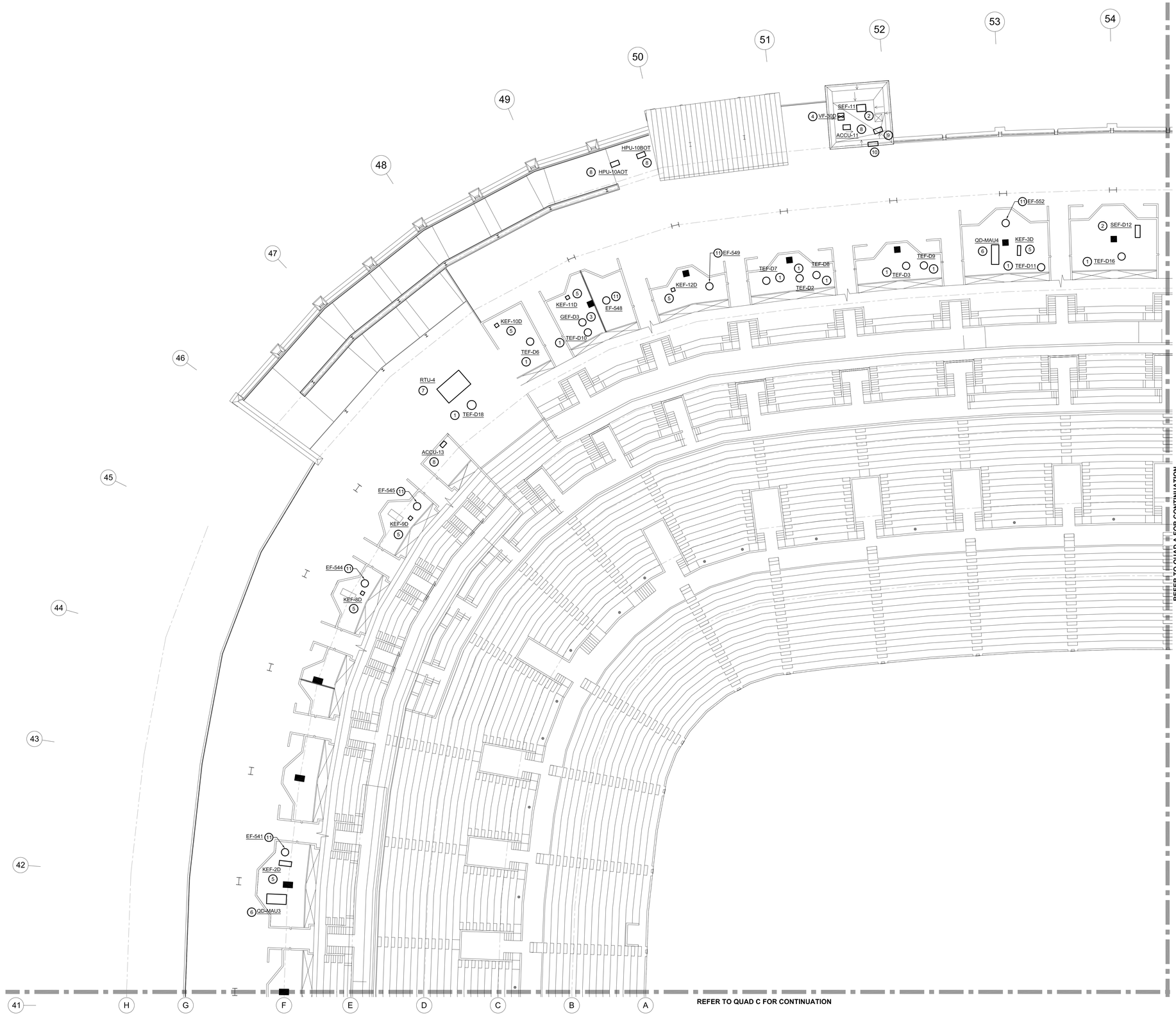
DATE: FEBRUARY 12, 2021

SHEET TITLE:
UPPER CONCOURSE ROOF QUAD C MECHANICAL NEW WORK

DRAWING NO:
M1.73

BKM# 20092.01

Plotted By: Craig M. Parks | 2/24/2021 5:57 PM ARL: G:\20092.01\Drawings\Acad\MM171 M172 M173 M174 UPPER CONCOURSE LVL ROOF PLN.N



1 UPPER CONCOURSE ROOF PLAN - QUAD D - MECHANICAL - NEW WORK

SCALE: 1/16" = 1'-0"

0 8' 16' 32' 48'

SCALE: 1/16"=1'-0"

GENERAL NOTES:

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DRAWING NOTES:

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LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT (REMOVE AND REPLACE)	(T)

ABBREVIATIONS

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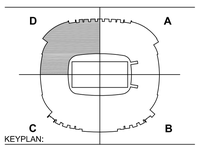

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02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **BAS**

CHECKED BY: **CMP / MAF**

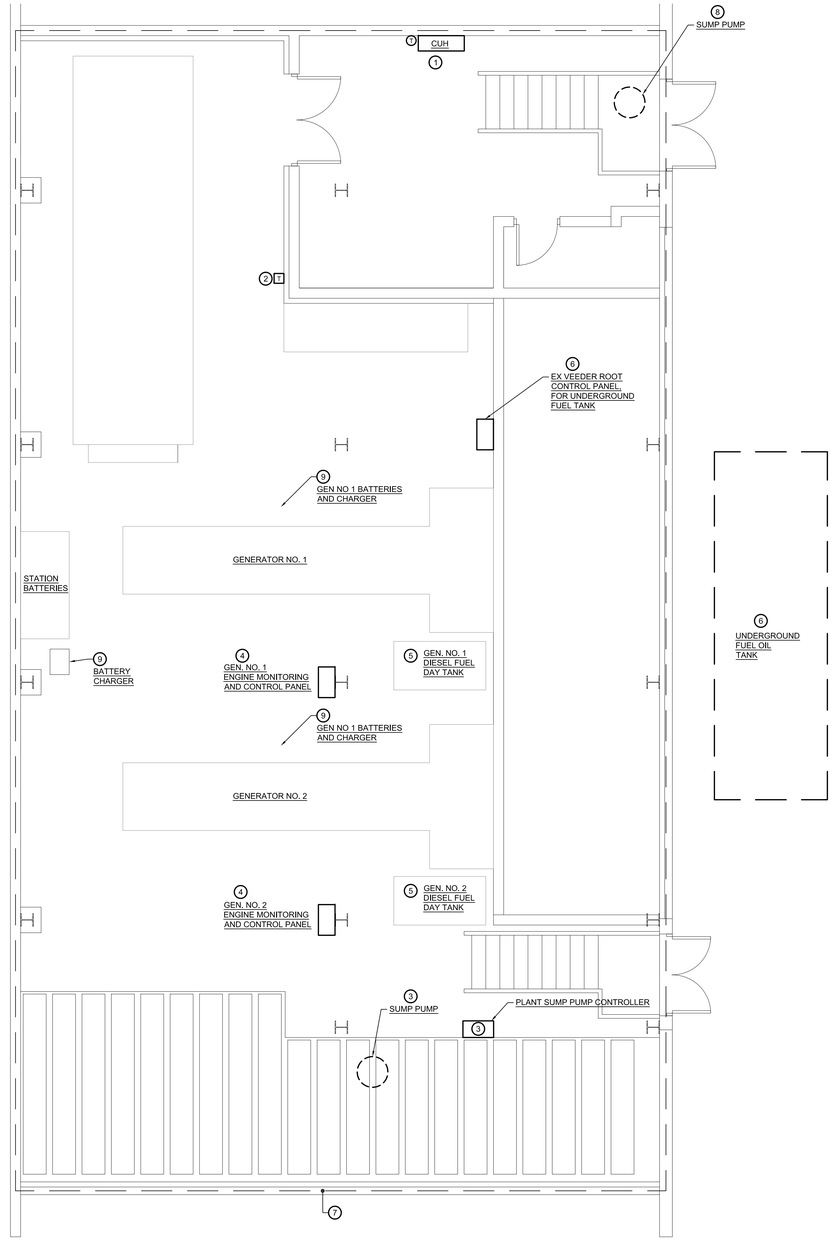
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
UPPER CONCOURSE ROOF QUAD D MECHANICAL NEW WORK

DRAWING NO:
M1.74

BKM# 20092.01

Plotted By: Craig M. Parks | 2/24/2021 5:57 PM
ARL: G:\20092.01\Drawings\Acad\MM171.M172.M173.M174 UPPER CONCOURSE LVL ROOF PLN N



1 LOT C GENERATOR PLAN - MECHANICAL - NEW WORK

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. REFER TO SHEET E2.01 ELECTRICAL PLAN FOR ADDITIONAL INFORMATION.
3. INCLUDE MAPPING OF ALL EXISTING DDC CONTROLS CURRENTLY CONNECTED TO THE JCI/ANDOVER BAS INTO THE NEW BAS. INCLUDE ANY CONTROL DEVICES (I.E. CONTROLLERS, RELAYS, ETC...) REQUIRED TO PROVIDE MONITORING AND CONTROL.
4. REPLACE THE EXISTING CATERPILLAR ENGINE CONTROL SYSTEMS FOR TWO EXISTING ENGINE GENERATORS WITH THE NEW ENGINE MONITORING AND CONTROL SYSTEMS CAPABLE OF COMMUNICATION OVER THE NEW NETWORK INFRASTRUCTURE FURNISHED AS PART OF THIS PROJECT.

   REPLACE THE EXITING POWERCON GENERATOR PARALLELING AND CONTROL CABINET WITH THE NEW EQUIPMENT THAT MAINTAINS THE SYSTEM EMERGENCY AND PEAK SHAVING CAPABILITIES. UPGRADE THE SWITCHGEAR CONTROLS FOR THE EXISTING GENERATOR SWITCHGEAR AND THE COMFORT LINK SWITCHES IN ORIOLES PARK AND RAVEN STADIUM TO ACCOMMODATE THE UPDATED PARALLELING CONTROLS.

○ DRAWING NOTES:

1. EXISTING CABINET HEATER SERVING VESTIBULE. ASSOCIATED THERMOSTAT SERVING THIS UNIT SHALL BE REMOVED AND REPLACED. PROVIDE A CONTROLLER FOR THE VESTIBULE HEATER TO PROVIDE MONITORING AND CONTROL THROUGH THE BAS.
2. PROVIDE SEPARATE TEMPERATURE SENSOR IN THE GENERATOR PLANT ROOM FOR MONITORING AND ALARM THROUGH THE BAS. APPROX LOCATION OF TEMPERATURE SENSOR SHOWN, COORDINATE FINAL LOCATION WITH FIELD CONDITIONS.
3. EXISTING SUMP PUMP IN THE GENERATOR PLANT (WITH CONTROL PANEL), SHALL CONNECT TO THE BAS FOR MONITORING AND ALARM. INTEGRATE HIGH WATER (ALARM), WATER LEVEL (MONITOR) AND STATUS (MONITOR) INTO BAS GRAPHICS.
4. CONNECT NEW GENERATOR CONTROL PANEL (PROVIDED UNDER ELECTRICAL DIVISION) TO BAS. INTEGRATE ALL AVAILABLE POINTS, TRENDS, STATUS, ALARMS, AND COMMUNICATION FAILURE INTO BAS GRAPHICS.

   MONITORING AND ALARM THROUGH THE BAS. (ALL GENERATOR CONTROL SHALL BE LOCAL, WITH THE EXCEPTION OF LOAD SHEDDING), LOAD SHEDDING OPERATION SHALL BE CONTROLLABLE THRU THE BAS.

   GENERATOR MONITORING: VOLTAGE (L-L, L-N); CURRENT (PHASE); AVERAGE VOLT, AMP, FREQUENCY; KW, KVAR, KVA (AVERAGE, PHASE, %), POWER FACTOR (AVERAGE, PHASE); KW-HR, KVAR-HR (TOTAL); EXCITATION VOLTAGE AND CURRENT (WITH CDVR); GENERATOR STATOR AND BEARING TEMP

   ENGINE MONITORING: COOLANT TEMPERATURE; OIL PRESSURE; ENGINE SPEED (RPM); BATTERY VOLTAGE; RUN HOURS; CRANK ATTEMPT AND SUCCESSFUL START COUNTER.

   ENGINE PROTECTION (ALARM): CONTROL SWITCH NOT IN AUTO (ALARM); HIGH COOLANT TEMP (ALARM AND SHUTDOWN); LOW COOLANT TEMP (ALARM); LOW COOLANT LEVEL (ALARM); HIGH ENGINE TEMP (ALARM AND SHUTDOWN); LOW, HIGH AND WEAK BATTERY VOLTAGE; OVERSPEED AND OVERCRANK.
5. EXISTING FUEL OIL DAY TANK SHALL BE CONNECTED TO THE BAS. INTEGRATE ALL AVAILABLE POINTS, INCLUDING LOW FUEL (ALARM) AND SYSTEM MALFUNCTION (ALARM), TRENDS, STATUS, ALARMS, AND COMMUNICATION FAILURE INTO BAS GRAPHICS.
6. EXISTING 10,000 GAL UNDERGROUND FUEL TANK ON SITE AND EXISTING VEEDER ROOT FUEL MONITORING SYSTEM SHALL CONNECT TO BAS. INTEGRATE LOW FUEL (ALARM), FUEL LEVEL (MONITOR), AND WATER READING (MONITOR) INTO BAS GRAPHICS.
7. PROVIDE ALL NEW CONTROLS (I.E. CONTROLLERS, DEVICES, ETC...) FOR EXTENSION OF NEW BAS TO SERVE THE GENERATOR PLANT. CONTRACTOR SHALL PROVIDE ALL NEW INFRASTRUCTURE (I.E. LAN SWITCH, FIBER OPTIC LINES, CONTROLLERS, ETC...). THE EXISTING FIBER OPTIC LINES TO M&T BANK STADIUM SHALL BE REMOVED AND REPLACED. FIBER OPTIC LINES ENTER M&T BANK STADIUM THRU THE SERVICE LEVEL MECHANICAL ROOM #1.06.10.
8. EXISTING SUMP PUMP IN THE VESTIBULE (WITH FLOAT SWITCH), SHALL CONNECT TO THE BAS FOR MONITORING AND ALARM. INTEGRATE HIGH WATER (ALARM), AND STATUS (MONITOR) INTO BAS GRAPHICS.
9. BATTERY BANK FOR SWITCHGEAR, GENERATOR #1, AND GENERATOR #2 SHALL BE MONITORED THRU THE BAS. REFER TO ATC DRAWINGS FOR MORE INFORMATION.

0 2' 4' 8' 12'

SCALE: 1/4" = 1'-0"

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PROJECT NAME:

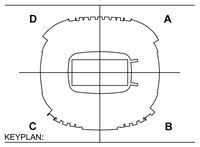
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **CMP**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
LOT C GENERATOR PLANT MECHANICAL NEW WORK

DRAWING NO:
M2.01

BKM# 20092.01

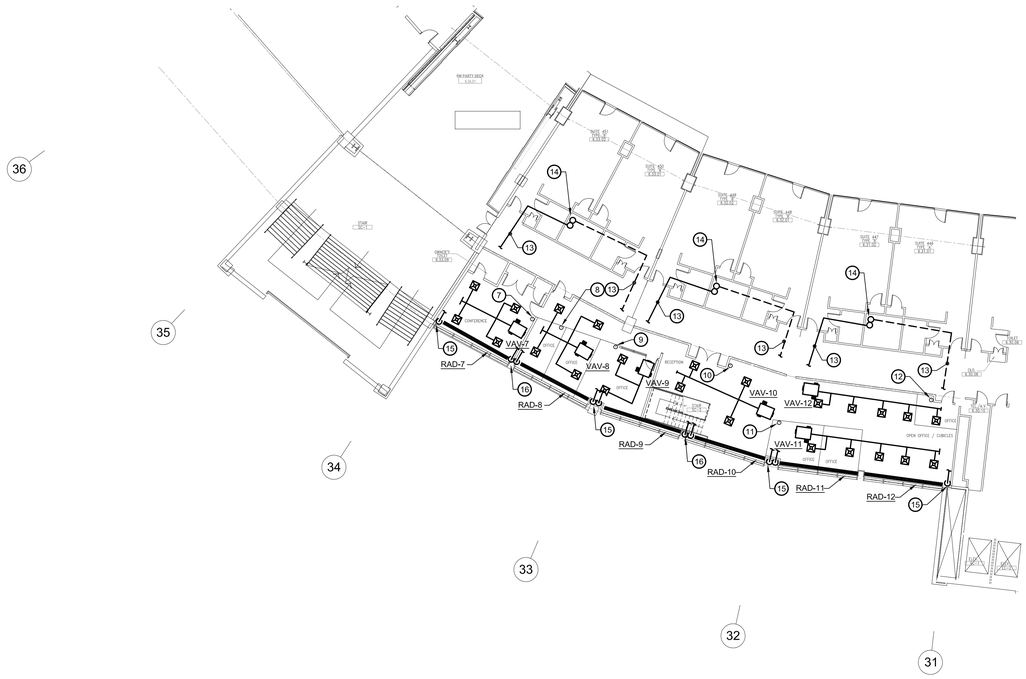
Plotted By: Craig M. Parks | 3/3/2021 10:23 PM ARL: G:\20092.01\Drawings\Acad\MM\M201 LOT C GENERATOR PLN N

GENERAL NOTES:

1. REFER TO M001 FOR MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. REFER TO SHEET M202b FOR SCHEMATIC, DETAIL AND CONTROL SEQUENCE.
3. REMOVE ALL EXISTING THERMOSTATS SERVING EXISTING RADIATORS AND EXISTING VAV BOXES SHOWN ON THIS PLAN. NEW THERMOSTATS SHALL BE PROVIDED IN LOCATIONS INDICATED ON PLANS.

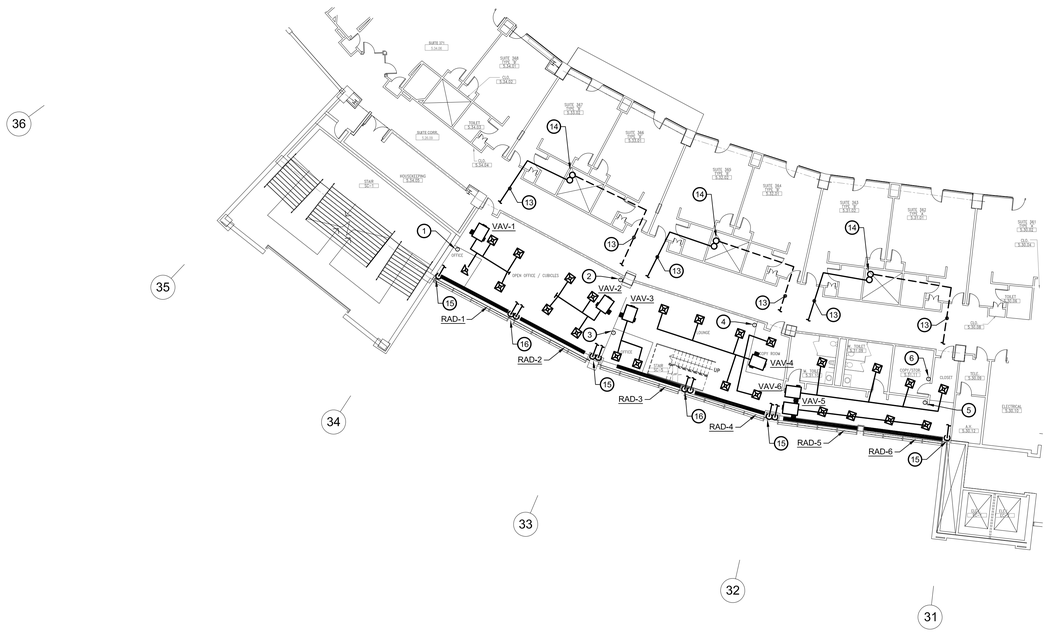
DRAWING NOTES:

1. THIS THERMOSTAT SHALL CONTROL VAV-1 & RAD-1. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
2. THIS THERMOSTAT SHALL CONTROL VAV-2 & RAD-2. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
3. THIS THERMOSTAT SHALL CONTROL VAV-3 & RAD-3. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
4. THIS THERMOSTAT SHALL CONTROL VAV-4 & RAD-4. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
5. THIS THERMOSTAT SHALL CONTROL VAV-5, RAD-5 & RAD-6. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
6. THIS THERMOSTAT SHALL CONTROL VAV-6. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
7. THIS THERMOSTAT SHALL CONTROL VAV-7 & RAD-7. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
8. THIS THERMOSTAT SHALL CONTROL VAV-8 & RAD-8. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
9. THIS THERMOSTAT SHALL CONTROL VAV-9 & RAD-9. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
10. THIS THERMOSTAT SHALL CONTROL VAV-10 & RAD-10. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
11. THIS THERMOSTAT SHALL CONTROL VAV-11, RAD-11 & RAD-12. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
12. THIS THERMOSTAT SHALL CONTROL VAV-12. PROVIDE NEW CONTROL VALVE FOR RADIAITION. REFER TO SHEET M2.04 FOR MORE INFORMATION.
13. HS/HR PIPING ROUTED TO COLUMN ENCLOSURES. REFER TO SCHEMATIC ON M204 FOR MORE INFORMATION. ALL REQUIRED VALVES SHALL BE LOCATED BEFORE PIPES DROP DOWN IN COLUMN ENCLOSURE. REFER TO DETAIL ON M204 FOR ALL REQUIRED VALVES.
14. EXISTING HS/HR PIPING UP AND DOWN IN CHASE.
15. EXISTING HS/HR PIPING DOWN IN COLUMN ENCLOSURE.
16. NEW HS/HR PIPING DOWN IN COLUMN ENCLOSURE. CUT AND PATCH WALL AS REQUIRED.



1 UPPER SUITE LEVEL PART PLAN - QUAD C - MECHANICAL - DEMOLITION & NEW WORK

SCALE: 1/16" = 1'-0"



2 LOWER SUITE LEVEL PART PLAN - QUAD C - MECHANICAL - DEMOLITION & NEW WORK

SCALE: 1/16" = 1'-0"

LEGEND

EQUIPMENT DESIGNATION (CONTROLS RETROFIT)	DESIG
THERMOSTAT	(T)

ABBREVIATIONS

HEATING RETURN PIPING	HR
HEATING SUPPLY PIPING	HS
RADIATION ELEMENT	RAD
VARIABLE AIR VOLUME	VAV

0 4' 8' 16' 24'

SCALE: 1/8"=1'-0"

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MSA PROJECT NO. 20-071

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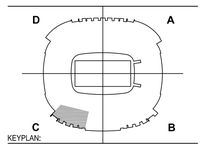
CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



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PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG / CMP**

CHECKED BY: **MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

RAVENS OFFICE PART PLAN - QUAD C
MECHANICAL - NEW WORK

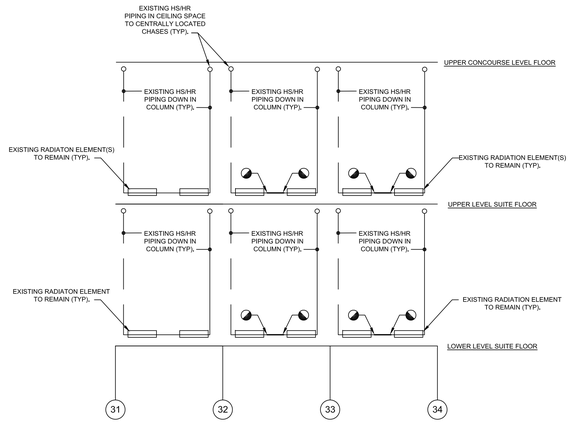
DRAWING NO:

M2.02a

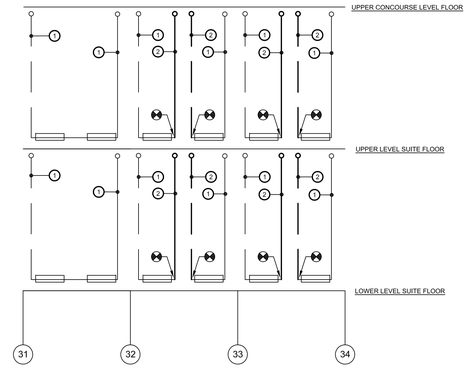
BKM# 20092.01

Plotted By: Craig M. Parks | 2/12/2021 4:48 PM ARL: G:\20092.01\Drawings\Acad\M\M202a RAVENS OFFICE RADIATION

DEMOLITION



NEW WORK

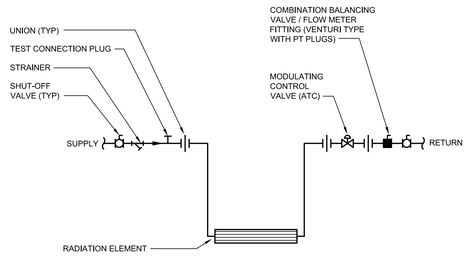


1 LOWER & UPPER SUITE LEVEL PIPING SCHEMATIC - DEMOLITION & NEW WORK

NO SCALE

GENERAL NOTES:
1. ALL VALVES AND CONTROLS SHALL BE LOCATED BEFORE PIPES DROP DOWN IN COLUMN ENCLOSURE. PROVIDE ACCESS PANELS WHERE REQUIRED TO ENSURE ALL VALVES ARE ACCESSIBLE.
2. ALL HS/HR PIPING SERVING RADIATORS IS APPROXIMATELY 1". CONTRACTOR SHALL CONFIRM EXACT SIZE IN FIELD AND ANY NEW PIPING SHALL MATCH EXISTING SIZES.

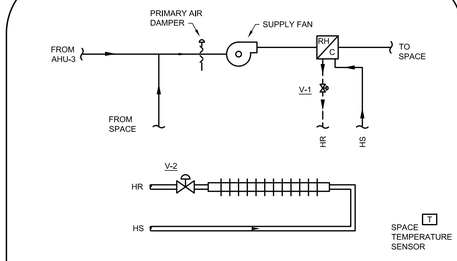
DRAWING NOTES:
1. EXISTING HS/HR PIPING DOWN IN COLUMN ENCLOSURE.
2. NEW HS/HR PIPING DOWN IN COLUMN ENCLOSURE.



2 FINNED TUBE RADIATION PIPING DETAIL

NO SCALE

NOTE:
1. ALL VALVES AND CONTROLS SHALL BE LOCATED BEFORE PIPES DROP DOWN IN COLUMN ENCLOSURE. PROVIDE ACCESS PANELS WHERE REQUIRED TO ENSURE ALL VALVES ARE ACCESSIBLE.
2. ALL VALVES SHOWN IN THIS DETAIL SHALL BE NEW AND BE PROVIDED FOR EACH RADIATION ELEMENT SHOWN ON SHEET M2.03.



RAVENS OFFICE - VAVS & RADIATORS CONTROL

1. WHEN AHU-3 IS INDEXED TO "OCCUPIED", THE SPACE THERMOSTAT SHALL MODULATE THE TERMINAL UNIT PRIMARY AIR DAMPER TO MAINTAIN OCCUPIED SPACE TEMPERATURE SETPOINT AND THE FAN SHALL BE DE-ENERGIZED. ON A FALL IN SPACE TEMPERATURE, THE PRIMARY AIR DAMPER SHALL MODULATE TOWARD MINIMUM POSITION. WHEN THE PRIMARY AIR DAMPER REACHES MINIMUM SETTING, AND THE SPACE TEMPERATURE CONTINUES TO FALL, THE FAN SHALL BE ENERGIZED. ON A FURTHER DROP IN SPACE TEMPERATURE, THE THERMOSTAT SHALL MODULATE HEATING COIL CONTROL VALVES, V-1 & V-2 PROPORTIONALLY TO MAINTAIN SPACE TEMPERATURE SETPOINT. ON A RISE IN SPACE TEMPERATURE, THE OPPOSITE SHALL OCCUR.
2. WHEN AHU-3 IS INDEXED TO "UNOCCUPIED", THE TERMINAL UNIT PRIMARY AIR DAMPER SHALL GO TO MINIMUM SETTING. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SETPOINT, THE HEATING COIL CONTROL VALVE, V-1 SHALL OPEN AND THE TERMINAL UNIT FAN SHALL ENERGIZE. WHEN SPACE THERMOSTAT IS SATISFIED THE HEATING COIL VALVE, V-1 SHALL CLOSE AND FAN SHALL BE DE-ENERGIZED. HEATING COIL CONTROL VALVE, V-2 SHALL REMAIN CLOSED DURING UNOCCUPIED MODE.
3. WHEN AHU-3 IS INDEXED TO "MORNING WARM-UP", THE TERMINAL UNITS PRIMARY AIR DAMPER SHALL BE AT MINIMUM POSITION, HEATING VALVE, V-1 SHALL OPEN AND THE TERMINAL UNIT FAN SHALL BE ENERGIZED. WHEN THE OCCUPIED HEATING SETPOINT IS ACHIEVED, THE HEATING VALVE, V-1 SHALL CLOSE AND THE FAN SHALL DE-ENERGIZE. THIS SEQUENCE SHALL CONTINUE AS REQUIRED TO MAINTAIN OCCUPIED SETPOINT UNTIL THE ASSOCIATED AHU SYSTEM IS INDEXED TO "OCCUPIED". HEATING COIL CONTROL VALVE, V-2 SHALL REMAIN CLOSED DURING MORNING WARM UP MODE.

bkm
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MSA PROJECT NO. 20-071

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CONSULTANTS:

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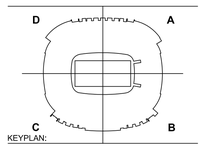
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

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PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

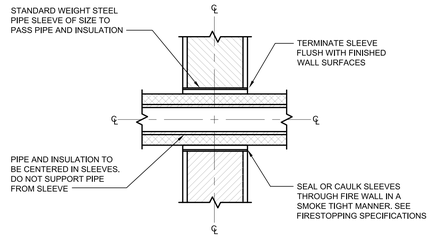
RAVENS OFFICE SCHEMATICS, DETAILS AND CONTROLS

DRAWING NO:

M2.02b

BKM# 20092.01

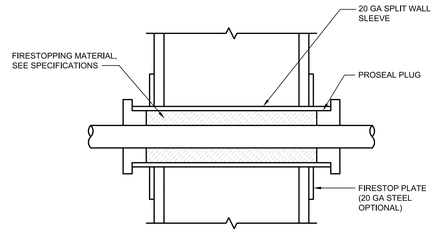
Plotted By: Craig M. Parks | 2/11/2021 2:50 PM ARL: G:\20092.01\Drawings\Acad\MM\02b RAVENS OFFICE SCHEMATIC & ATC



1 PIPE SLEEVE DETAIL

NO SCALE MD0023

NOTE: DETAIL APPLIES TO PIPING OR CONDUIT PASSING THRU WALLS, FLOORS OR CEILINGS. ALL PENETRATIONS SHALL BE SEALED.



2 FIRE RATED SLEEVING SYSTEM DETAIL

NO SCALE MD0024

NOTE: DETAIL APPLIES TO PIPING OR CONDUIT PASSING THRU WALLS, FLOORS OR CEILINGS. ALL PENETRATIONS SHALL BE SEALED.

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HVAC CONTROLS,
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MSA PROJECT NO. 20-071

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SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

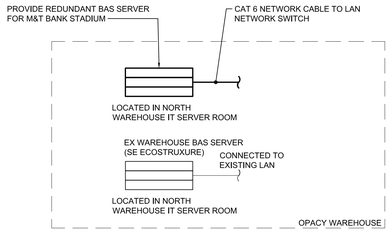
MECHANICAL DETAILS

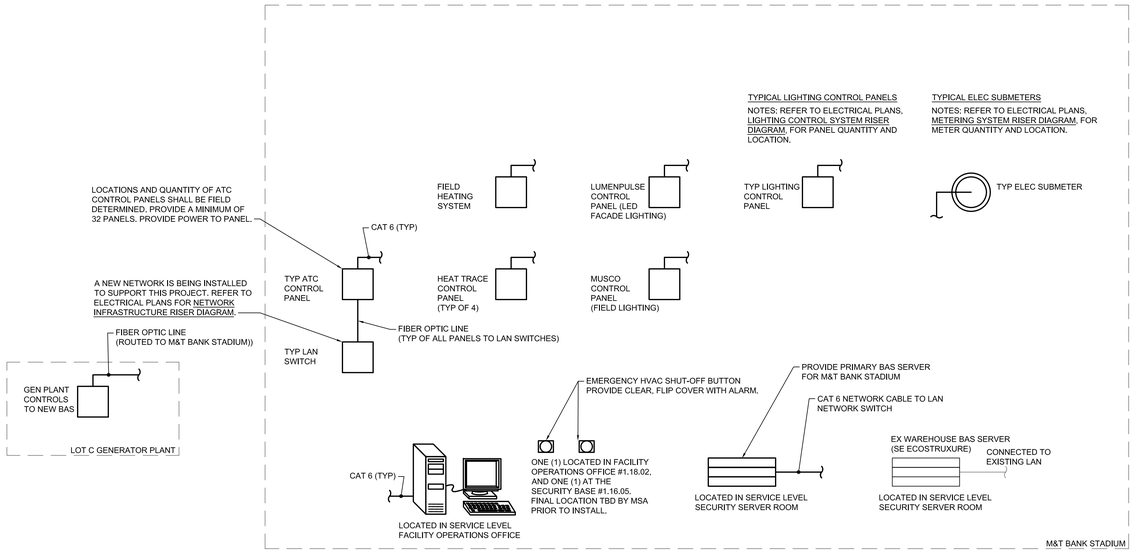
DRAWING NO:

M3.01

BKM# 20092.01

Plotted By: Craig M. Parks | 2/11/2021 2:52 PM ARL: G:\20092.01\Drawings\Acad\MM301 MECHANICAL DETAILS





BAS NETWORK DIAGRAM

NOTE: REFER TO ELECRICAL DRAWINGS FOR IT NETWORK INFORMATION

BUILDING AUTOMATION SYSTEM NETWORK ARCHITECTURE

1. M&T BANK STADIUM SHALL BE PROVIDED WITH A NEW FULLY DIGITAL BUILDING AUTOMATION SYSTEM (BAS). THIS SYSTEM WILL REPLACE THE EXISTING JOHNSON DDC CONTROL SYSTEM & ANDOVER CONTINUUM CONTROL SYSTEM IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.

   ALL SYSTEMS PROVIDED UNDER THIS PROJECT SHALL BE CONNECTED THRU THE NEW NETWORK INFRASTRUCTURE.

2. ELECTRIC SUBMETERING SHALL BE CONNECTED THRU THE NEW NETWORK INFRASTRUCTURE. THIS INCLUDES EXISTING AND NEW METERS. REFER TO ELECTRICAL PLANS, METERING SYSTEM RISER DIAGRAM, FOR ADDITIONAL INFORMATION.

3. BUILDING LIGHTING CONTROL SHALL BE CONNECTED THRU THE NEW NETWORK INFRASTRUCTURE. REFER TO ELECTRICAL PLANS ELECTRICAL PLANS, LIGHTING CONTROL SYSTEM RISER DIAGRAM, FOR ADDITIONAL INFORMATION.

4. ADDITIONAL EXISTING LIGHTING SYSTEMS SHALL BE CONTROLLED THROUGH THE NEW LIGHTING CONTROLS SYSTEM INCLUDING, BUT NOT LIMITED TO:
   - LUMENPULSE LIGHTING SYSTEM (LED FACADE LIGHTING)
   - MUSCO LIGHTING SYSTEM (FIELD LIGHTING)
   - ETC LIGHTING SYSTEM

   REFER TO ELECTRICAL PLANS FOR ADDITIONAL INFORMATION. WHERE EXISTING SYSTEMS ARE CONNECTED TO THE BAS, THE ATC CONTRACTOR SHALL PROVIDE THE ANY REQUIRED BACNET GATEWAYS, TRANSLATORS, RELAYS, ETC... FOR CONNECTION TO THE BAS.

   EACH UNIQUE LIGHTING SYSTEM SHALL HAVE A DEDICATED BAS GRAPHICS PAGE.

   AT A MINIMUM, THE BAS SHALL HAVE CONTROL OVER ALL LIGHTING SYSTEMS BY SENDING A SIGNAL TO MULTIPLE CONTACTS IN THE ASSOCIATED LIGHTING PANELS, THE BAS SHALL BE ABLE TO OVERRIDE ON/OFF MODE, SELECT PRE-PROGRAMMED LIGHTING MODES/SCENES, AND HAVE ALL SCHEDULING FUNCTIONS. THE LIGHTING SYSTEMS SHALL REPORT BACK TO INDICATE STATUS THRU THE BAS GRAPHICS.

5. ALL EXISTING HVAC / MECHANICAL EQUIPMENT WITHIN M&T BANK STADIUM SHALL BE CONNECTED TO THE NEW BAS, UNLESS OTHERWISE NOTED. INCLUDE EQUIPMENT LISTED BELOW AND WITHIN THE DOCUMENTS;
   a. CHILLED WATER SECONDARY PUMPING PLANT
   b. HEATING PLANT
   c. DOMESTIC COLD WATER BOOSTER PUMP SKIDS
   d. DOMESTIC HOT WATER PLANT
   e. FIELD HEATING SYSTEM
   f. AIR HANDLING UNITS
   g. HEATING & VENTILATING UNITS
   h. CONTROL ROOM LIEBERT UNITS
   i. PACKAGED HEAT PUMPS, SPLIT SYSTEMS AND PACKAGED WIFI ROOM A/C UNITS
   j. VAV SINGLE-DUCT AIR TERMINAL UNITS
   k. FAN-POWERED AIR TERMINAL UNITS
   l. FINNED TUBE RADIATORS & CONVECTORS
   m. UNIT HEATERS & CABINET UNIT HEATERS
   n. EXHAUST, VENTILATION & SMOKE CONTROL FANS
   o. TOILET EXHAUST FANS
   p. SCOREBOARD VENTILATION FANS
   q. VENDOR COOLERS & FREEZERS (MONITORING ONLY)
   r. SUMP PUMPS (INCLUDING SEWAGE EJECTORS AND STORM WATER)
   s. HEAT TRACE CONTROL PANELS
   t. ELECTRICAL ROOMS AND DATA ROOMS CLOSET - TEMPERATURE SENSORS
   u. ELECTRICAL SUBSTATION ENCLOSURES - TEMPERATURE SENSORS
   v. BATTERY BANK STORAGE (WITHIN GENERATOR PLANT AND MAIN ELECTRICAL ROOM SWITCHGEAR)
   w. GENERATOR PLANT

6. THE BAS GRAPHICAL USER INTERFACE (GUI) SHALL PROVIDE DYNAMIC GRAPHICS OF THE HVAC SYSTEM OPERATION (INCLUDING FLOOR PLANS). THE CONTROLS CONTRACTOR SHALL PROVIDE PROGRAMMING FOR ALL SYSTEM ADJUSTMENTS, SCHEDULING, TRENDING, AND ALARMING. THE CONTROLS CONTRACTOR SHALL INCLUDE IN THE NEW BAS, ALL OF THE EXISTING CUSTOM PROGRAMMING THAT THE MSA HAS SETUP IN THEIR CURRENT SYSTEMS, UNLESS OTHERWISE NOTED.

7. THE CONTROLS CONTRACTOR SHALL COORDINATE PHASING AND INSTALLATION OF THE NEW BAS CONTROL PANELS WITH THE EXISTING CONTROL PANELS. WHERE REQUIRED, THE CONTROLS CONTRACTOR SHALL INCLUDE TEMPORARY SUPPORTS (I.E. UNSTRUCT, ETC...) FOR REMOVAL AND REPLACEMENT OF PANELS.

BAS SERVICE COMMAND PRIORITIES

PRIORITY LEVEL	APPLICATION
1	GLOBAL HVAC SHUT-DOWN BUTTON
2	AVAILABLE - LIFE SAFETY
3	MANUAL LIFE SAFETY
4	AVAILABLE - LIFE SAFETY
5	AUTOMATIC LIFE SAFETY
6	AVAILABLE - LIFE SAFETY
7	RAVENS GAMEDAY
8	AVAILABLE
9	ESSENTIAL EQUIPMENT FAILURE
10	MINIMUM ON OFF
11	AVAILABLE
12	MAINTENANCE MANAGER
13	CORRECTIVE ACTION
14	AVAILABLE
15	SCHEDULING
16	AVAILABLE

NOTES:

1. SERVICE COMMAND PRIORITIES ARE FOR REFERENCE AND SHALL BE REVIEWED WITH OWNER PRIOR TO IMPLEMENTATION.
2. PROVIDE A "HEART BEAT" SYSTEM CHECK. SET AT 3PM EVERYDAY (ADJ.).

BAS SERVICE COMMAND PRIORITIES AND ALARMS

- NOT TO SCALE

ATC GENERAL NOTES

1. M&T BANK STADIUM SHALL BE PROVIDED WITH A NEW FULLY DIGITAL BUILDING AUTOMATION SYSTEM (BAS). THIS SYSTEM WILL REPLACE THE EXISTING JOHNSON DDC CONTROL SYSTEM & ANDOVER CONTINUUM CONTROL SYSTEM IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.

   ALL IDENTIFIED EQUIPMENT (SEE FLOOR PLANS) IS EXISTING TO REMAIN AND SHALL BE RETROFIT WITH NEW CONTROLS (I.E. SENSORS, DAMPERS, ETC...). ALL EQUIPMENT SHALL BE CONNECTED TO THE NEW BAS. REFER TO ATC CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.

   ALL EXISTING THERMOSTATS RELATED TO WORK SHOWN ON PLANS OR IN SEQUENCES SHALL BE REMOVED AND REPLACED.

   ALL EXISTING VALVES AND DAMPERS ARE PNEUMATICALLY ACTUATED. REPLACE ALL PNEUMATIC ACTUATORS WITH ELECTRONIC ACTUATORS.

2. THE ATC WORK SHALL INCLUDE PROVISIONS FOR A COMPLETE AND OPERABLE CONTROL SYSTEM, INCLUDING ALL DEVICES REQUIRED TO ACHIEVE THE SEQUENCES AND FUNCTIONS INDICATED THROUGHOUT THE CONTRACT DOCUMENTS. ATC CONTRACTOR SHALL HAVE A DEDICATED PERSON FOR BAS SYSTEMS INTEGRATION.

3. THE ATC CONTRACTOR SHALL FURNISH AND INSTALL ALL ELECTRICAL WIRING AND CONDUIT FROM POWER SOURCE, INCLUDING TERMINATION TO ALL REQUIRED ATC RELATED POWER CONNECTIONS INCLUDING, BUT NOT LIMITED TO, DDC CONTROLLERS (PROVIDE LOW VOLTAGE CONTROLLER FOR AIR TERMINAL UNITS INCLUDING TRANSFORMERS AND DISCONNECT SWITCHES AS REQUIRED), SENSORS, VALVE AND DAMPER ACTUATORS (INCLUDING SMOKE DAMPERS), AIR FLOW MONITORS, ATC PANELS, ETC. THE ATC CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ALL POWER REQUIREMENTS NECESSARY FOR A COMPLETE INSTALLATION FROM THE POWER SOURCE TO ALL ATC RELATED CONNECTIONS.

4. THE ATC CONTRACTOR SHALL COORDINATE AND VERIFY THAT ALL CONTROLLERS, DEVICES AND ACCESSORIES ARE PROVIDED AS REQUIRED TO ACCOMPLISH ALL CONTROL FUNCTIONS AND SEQUENCES INDICATED IN THE CONTRACT DOCUMENTS. WHERE CONTROL RELATED DEVICES ARE NOT PROVIDED BY AN EQUIPMENT MANUFACTURER, IT SHALL BE THE RESPONSIBILITY OF THE ATC CONTRACTOR TO PROVIDE THE CONTROL DEVICES REQUIRED TO ACCOMPLISH THE FUNCTIONS AND SEQUENCES INDICATED.

5. THE ATC CONTRACTOR SHALL PROVIDE NEW CONTROLLERS, DEVICES, POINTS, ETC REQUIRED TO ACCOMPLISH THE CONTROL SEQUENCES AND FUNCTIONS INDICATED ON THE DRAWINGS AND IN THE SPECIFICATIONS. EXISTING CONTROLLERS AND DEVICES SHALL BE DEMOLISHED AND NOT BE RE-USED FOR THIS PROJECT, ALL POINTS SHALL BE TIED INTO THE BUILDING AUTOMATION SYSTEM (BAS). IN ADDITION, THE ATC CONTRACTOR SHALL PROVIDE ALL CONTROLLERS, DEVICES, POINTS, ETC REQUIRED TO CONTROL, OPERATE AND MONITOR ALL EQUIPMENT INDICATED THROUGHOUT THE CONTRACT DOCUMENTS.

   ALL CONTROLLERS SHALL BE PROVIDED WITH A MINIMUM 10% SPARE CAPACITY AND NO LESS THAN ONE (1) SPARE POINT.

6. PROVIDE EQUIPMENT STATUS FOR ALL MECHANICAL EQUIPMENT. EQUIPMENT FAILURES SHALL BE ALARMED AT THE BAS. PROVIDE END SWITCHES FOR ALL MOTOR OPERATED DAMPERS. END SWITCHES SHALL BE INTERFACED WITH THE BAS.

7. PROVIDE CURRENT SENSING RELAYS FOR ALL MECHANICAL EQUIPMENT AS REQUIRED TO PROVIDE EQUIPMENT STATUS. EQUIPMENT STATUS SHALL BE INDICATED AS THE BAS.

8. PROVIDE TEMPERATURE SENSOR IN SUPPLY DUCTWORK DOWNSTREAM OF ALL TERMINAL REHEAT UNITS, VAV TERMINALS WITH REHEAT COILS AND DUCT MOUNTED HEATING COILS.

9. WATER PRESSURE DROP THROUGH ATC CONTROL VALVES SHALL NOT EXCEED 10 FT. HEAD. TWO-POSITION ATC VALVES UTILIZED FOR ISOLATION, BY-PASS OR SHUT-OFF PURPOSES SHALL BE FULL LINE SIZE.

10. ALL ATC DEMOLITION SHALL BE PERFORMED BY THE ATC CONTRACTOR ONLY. REMOVAL OF EXISTING PNEUMATICALLY CONTROLLED EQUIPMENT SHALL BE SEQUENCED TO ENSURE CONTINUED OPERATION OF THE FACILITY. ALL PNEUMATIC PIPING, EQUIPMENT, ETC. LOCATED WITHIN MECHANICAL ROOMS, SERVICE LEVEL AND EXPOSED TO VIEW SHALL BE REMOVED AT THE COMPLETION OF THIS PROJECT. EXISTING PNEUMATIC TUBING ROUTED TO TERMINAL UNITS ON EACH FLOOR AND CONCEALED FROM VIEW SHALL BE ABANDONED IN PLACE. ANY ABANDONED TUBING SHALL BE SEALED AT EACH END AND LABELED "ABANDONED ATC TUBING".

11. ALL AIR HANDLING EQUIPMENT WITH A COOLING COIL THAT PRODUCE CONDENSATE SHALL BE EQUIPPED WITH A CONDENSATE WATER-LEVEL DETECTION DEVICE CONFORMING TO UL 508 WHICH SHALL SHUT OFF THE EQUIPMENT SERVED IN THE EVENT THAT THE PRIMARY DRAIN IS BLOCKED. THE DEVICE SHALL BE INSTALLED IN THE EQUIPMENT-SUPPLIED DRAIN PAN AT A POINT HIGHER THAN THE PRIMARY DRAIN LINE CONNECTION AND BELOW THE OVERFLOW RIM OF SUCH PAN. ALL CONDENSATE PUMP BASINS SHALL ALSO BE PROVIDED WITH A WATER-LEVEL DETECTION DEVICE THAT SHUTS OFF EQUIPMENT SERVED WHEN OVERFLOW IS SENSED. LEAK DETECTION FOR ALL UNITS SHALL ALSO ALARM AT THE BUILDING AUTOMATION SYSTEM (BAS).

12. PROVIDE THERMOSTAT/SENSOR GUARDS IN ALL AREAS SUBJECT TO POTENTIAL DAMAGE. THERMOSTAT/SENSOR GUARDS SHALL BE CLEAR, IMPACT RESISTANT LOCKABLE PLASTIC OR APPROVED EQUIVALENT. LOCATIONS SHALL BE COORDINATED WITH THE OWNER. CONTRACTOR SHALL PROVIDE FIFTEEN (15) GUARDS.

13. ALL SETPOINTS INDICATED ON THE SEQUENCES SHALL BE ADJUSTABLE. OPERATOR SHALL BE ABLE TO EASILY ADJUST ALL POINTS THRU THE GRAPHICAL USER INTERFACE.

14. ALL ATC WIRING IN MECHANICAL ROOMS, SERVICE LEVEL AND WHERE EXPOSED TO VIEW SHALL BE INSTALLED IN CONDUIT. ALL ATC WIRING SHALL BE PLENUM RATED.

15. EXISTING CONDUIT MAY BE REUSED IF IN GOOD CONDITION AND WILL NOT CAUSE CONFLICT WITH PHASING OF WORK.

16. REFER TO SPECIFICATIONS FOR FUNCTION PERFORMANCE TEST VERIFICATION REQUIREMENTS.

17. THE BAS SYSTEM SHALL HAVE THE ABILITY TO EMAIL AND TEXT MESSAGE ALARM SIGNALS.

18. THE BAS SHALL INCLUDE BACKUP CONFIGURATION WITH ONE (1) YEAR OF BACKUP STORAGE.

19. NETWORK CABLE SHALL BE CAT 6 AND "ORANGE", ON CLUB LEVEL, ALL EXPOSED CABLING SHALL BE PAINTED BLACK, EXCEPT CABLING WITHIN CABLE TRAY.

20. PROVIDE TWO (2) GLOBAL HVAC SHUT DOWN BUTTON FOR ALL STADIUM AIR HANDLING EQUIPMENT. SHUT-DOWN BUTTON SHALL BE LOCATED IN THE SERVICE LEVEL AT THE FACILITY OPERATIONS OFFICE #1.18.02. AND AT THE SECURITY BASE #1.16.05. (FINAL LOCATIONS FOR INSTALLATION SHALL BE APPROVED BY MSA, COORDINATE PRIOR TO INSTALLATION). PROVIDE CLEAR COVER OVER BUTTON. GLOBAL SHUT-DOWN SHALL ALSO BE INCLUDED ON THE BAS GRAPHICAL USER INTERFACE.

21. NETWORK WIRING LAYOUT SHALL BE SUBMITTED FOR REVIEW AND APPROVAL.

FIRE ALARM

22. THE FIRE ALARM SYSTEM SHALL OVERRIDE THE BAS SYSTEM FOR ALL LIFE-SAFETY OPERATIONS (I.E. SMOKE CONTROL, ETC...). COORDINATE WIRING AND CONTROLS WITH THE FIRE ALARM CONTRACTOR. ALL CONTROL DEVICES AND WIRING USED FOR THE SMOKE CONTROL SYSTEMS SHALL MEET THE UL 864, UUKL LISTING REQUIREMENTS.

23. THERE SHALL BE A BAS GRAPHICS PAGE DEDICATED TO THE FIRE ALARM SYSTEM. THIS PAGE SHALL DISPLAY THE THREE (3) FIRE ALARM INPUT POINTS (FIRE ALARM, TROUBLE, AND SUPERVISORY) AND THE SMOKE EXHAUST FAN STATUS.

24. ALL ASSOCIATED FIRE ALARM WORK SHALL BE COORDINATED WITH THE EXISTING FIRE ALARM SYSTEM VENDOR. ALL FIRE ALARM WORK SHALL BE TESTED AND COMMISSIONED.
   - ATRIUM SMOKE ZONE CONTROL
   - CLUB SMOKE ZONE CONTROL

25. THE EXISTING FIRE ALARM SYSTEM IS A SIEMENS FIRE ALARM SYSTEM.

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PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS;

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1801 RESEARCH BOULEVARD, SUITE 100
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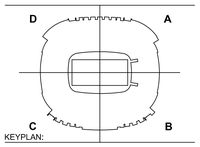


KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **CMP**

CHECKED BY: **MAF**

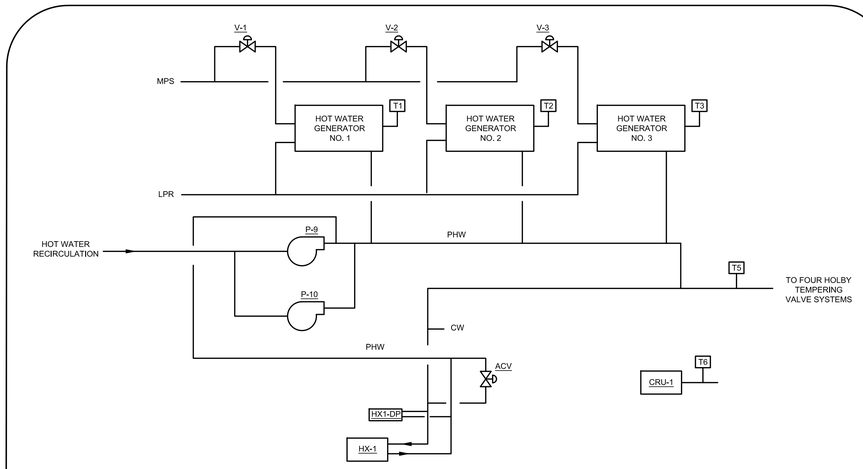
DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
BUILDING AUTOMATION SYSTEM - GENERAL NOTES & NETWORK ARCHITECTURE

DRAWING NO:
M4.11

BKM# 20092.01

Plotted By: Craig M. Parks | 3/2/2021 12:00 PM ARL: G:\20092.01\Drawings\Acad\MM411 BAS GENERAL NOTES AND NETWORK LAYOUT



DOMESTIC HOT WATER SYSTEM CONTROL

1. DOMESTIC WATER HEATERS:

1.1. TANK MOUNTED SENSORS T1, T-2 & T-3 SHALL MODULATE STEAM VALVES V-1, V-2 & V-3 TO MAINTAIN ITS SETTING OF 140°F (ADJUSTABLE).

1.2. THREE (3) STORAGE WATER HEATERS ARE PIPED IN PARALLEL TO HANDLE THE DESIGN LOAD.

1.3. EACH HEATER WILL HAVE SELF CONTAINED CONTROL OF ITS OWN TANK TEMPERATURE AND THAT TEMPERATURE SHALL BE MONITORED AT THE BAS.

1.4. TWO (2) DOMESTIC HOT WATER RETICULATION PUMPS ARE PROVIDED TO MAINTAIN LOOP WATER TEMPERATURE. ONE (1) PUMP IS REQUIRED FOR DESIGN LOAD AND WILL RUN CONTINUOUSLY.

1.5. THE LEAD PUMP WILL ENERGIZE AND RUN CONTINUOUSLY. IF THE LEAD PUMP FAILS OR FAILS TO START, THE LAG PUMP WILL AUTOMATICALLY START AND RUN CONTINUOUSLY.

1.6. FAILURE OF EITHER PUMP WILL BE ALARMED AT THE BAS.

1.7. DOMESTIC WATER SUPPLY TEMPERATURE SENSOR T5 WILL MONITOR LOOP TEMPERATURE AND TREND DATA DURING STADIUM EVENTS IN TEN (10) MINUTE INCREMENTS.

1.8. DOMESTIC HOT WATER SUPPLY TEMPERATURE TO DISTRIBUTION WILL BE MECHANICALLY REGULATED TO 120°F USING MANUALLY ADJUSTING TEMPERING VALVES, LOCATED DOWNSTREAM OF WATER HEATERS.

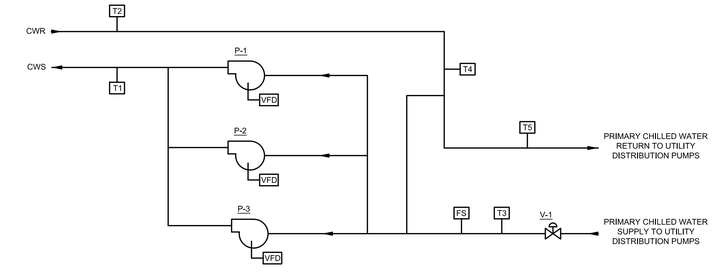
1.9. HEAT EXCHANGER HX-1 WILL BE USED TO PREHEAT DOMESTIC HOT WATER AND TO COOL DOWN STEAM CONDENSATE BEFORE DISCHARGING TO THE DRAINAGE SYSTEM. SELF-CONTAINED TEMPERATURE CONTROL VALVE V-5 WILL BE USED TO INJECT COLD WATER INTO STEAM CONDENSATE DOWNSTREAM OF OF HX-1 AS REQUIRED TO FURTHER REDUCE CONDENSATE TEMPERATURE TO 140°F. HEAT EXCHANGER HX-1 IS A MECHANICAL DEVICE THAT REQUIRES NO TEMPERATURE CONTROLS. ALARM AT BAS WHEN TEMPERATURE RISES ABOVE 145°F (ADJUSTABLE).

1.10. BYPASS COLD WATER VALVE ACV WILL MODULATE OPEN AS THE DIFFERENTIAL PRESSURE AS SENSED BY HX1-DP INLET AND OUTLET PIPING RISES ABOVE ITS SETTING (AS HOT WATER DEMAND RISES ABOVE CAPACITY OF HX-1 AND PREHEATING IS MAXIMIZED).

2. DOMESTIC WATER BOOSTER PUMPS:

2.1. TWO PACKAGED DOMESTIC WATER BOOSTER PUMP SYSTEMS WITH FOUR (4) PUMPS EACH ARE PROVIDED FOR THE FACILITY.

2.2. EACH SYSTEM SHALL BE SELF CONTAINED WITH FULLY PACKAGED CONTROLS AND STATUS INDICATIONS SHALL BE PROVIDED ON THE BAS THROUGH THE BOOSTER PUMP CONTROL PANEL FOR EACH PUMP.



CHILLED WATER SYSTEM CONTROL

1. GENERAL:

1.1. THE BAS SHALL CONTROL THE CHILLED WATER SYSTEM. WHEN THE SYSTEM IS DE-ENERGIZED, THE PRIMARY CHILLED WATER VALVE, V-1 SHALL CLOSE AND BUILDING SECONDARY CHILLED WATER DISTRIBUTION PUMPS P-1, P-2 & P-3 SHALL BE OFF. CONTROL OF THE UTILITY DISTRIBUTION PUMPS SHALL BE PROVIDED BY THE UTILITY COMPANY. WHEN THE CHILLED WATER SYSTEM IS ENERGIZED BY THE BUILDING HEATING-COOLING CONTROL, CHILLED WATER VALVE V-1 SHALL MODULATE OPEN TO ITS MAXIMUM POSITION. THE SECONDARY CHILLED WATER DISTRIBUTION PUMPS MAY BE STARTED MANUALLY OR THROUGH THE BAS AFTER PRIMARY CHILLED WATER FLOW HAS BEN CONFIRMED BY THE UTILITY FLOW METER AND SYSTEM FLOW SWITCH, FS-1.

1.2. THE VARIABLE FREQUENCY DRIVE (VFD) SYSTEM FOR THE SECONDARY CHILLED WATER DISTRIBUTION PUMPS SHALL BE CONFIGURED WITH THREE (3) INDEPENDENT VFD CABINETS, ONE FOR EACH PUMP. VFD CABINETS SHALL BE CAPABLE OF MANUAL OPERATION THROUGH OPERATOR INTERVENTION IF REQUIRED.

1.3. AFTER PRIMARY CHILLED WATER FLOW HAS BEEN CONFIRMED, THE LEAD PUMP WILL START AT REDUCED SPEED AND RUN CONTINUOUSLY. PROVIDE ALTERNATORS AS REQUIRED TO CONTROL LEAD/LAG PUMP OPERATION. LEAD PUMP SHALL BE ALTERNATED EVERY 300 HOURS (ADJ) OF RUN TIME.

1.4. REDUCED SPEED STARTING WILL BE THE MINIMUM SETTING OF THE VARIABLE FREQUENCY PUMP DRIVE AND WILL BE FULLY ADJUSTABLE THROUGHOUT THE RANGE OF THE DRIVE. IF PUMP P-1 FAILS OR FAILS TO START AS SENSED BY THE VFD PANEL CONTACT, PUMP P-2 OR P-3 WILL AUTOMATICALLY START AND RUN CONTINUOUSLY.

1.5. A FAILURE OF ANY DISTRIBUTION PUMP WILL BE ALARMED AT THE BAS.

1.6. EACH DISTRIBUTION PUMP WILL BE STARTED AT REDUCED SPEED THROUGH INDIVIDUAL VARIABLE FREQUENCY PUMP DRIVES AND SEQUENCED WITH THE PROGRAMMED LEAD/LAG OPERATION. THREE (3) DIFFERENTIAL PRESSURE TRANSMITTERS DPT-1, DPT-2 & DPT-3 WITH ADJUSTABLE SETPOINT, WILL MODULATE THE VARIABLE FREQUENCY PUMP DRIVE TO MAINTAIN THEIR SETPOINT. THE TRANSMITTER CALLING FOR AN INCREASE IN DIFFERENTIAL PRESSURE ABOVE ITS MINIMUM SETPOINT WILL TAKE CONTROL OF THE PUMP DRIVE. ON A FALL IN THE REQUIRED DIFFERENTIAL PRESSURE AS SENSED BY EITHER TRANSMITTER THE PUMP DRIVE WILL GRADUALLY INCREASE THE PUMP SEED FROM MINIMUM TO MAXIMUM AS REQUIRED TO MAINTAIN THE SETPOINT. ON A RISE IN DIFFERENTIAL PRESSURE THE REVERSE WILL OCCUR.

1.7. THREE (3) DIFFERENTIAL PRESSURE TRANSMITTERS DPT-1, DPT-2 & DPT-3 AND THREE (3) TEMPERATURE SENSORS T-5, T-6 & T-7 WILL BE LOCATED THROUGHOUT THE STADIUM COMPLEX AS FOLLOWS:

DPT-1 & T-5: LOCATED ADJACENT TO AHU-3 ON THE PRESS LEVEL - QUAD C.
DPT-2 & T-6: LOCATED AT THE TOP OF RISER ON UPPER LEVEL SUITES - QUAD C.
DPT-3 & T-7: LOCATED ADJACENT TO AHU-4 ON THE PRESS LEVEL - QUAD D

1.8. ON A CONTINUED FALL IN DIFFERENTIAL PRESSURE AS SENSED BY EITHER TRANSMITTER WITH PUMP P-1 AT MAXIMUM SPEED, A SECOND PUMP P-2 OR P-3 AS APPLICABLE SHALL START. PRIOR TO STARTING THE SECOND PUMP, P-1 WILL BE REDUCED TO 50% FULL LOAD. THE SECOND PUMP WILL BE STARTED AT REDUCED SPEED.

1.9. BOTH PUMPS WILL THEN GRADUALLY MODULATE AT THE SAME SPEED TO MAINTAIN THE SETPOINTS OF THE DPT-1, DPT-2 & DPT-3 AS DETERMINED BY THE BAS.

1.10. ON A CONTINUED FALL IN DIFFERENTIAL PRESSURE AS SENSED BY EITHER TRANSMITTER WITH PUMP P-1 & P-2 AT MAXIMUM SPEED, THE THIRD PUMP P-3 WILL START. PRIOR TO STARTING THE THIRD PUMP, P-1 & P-2 WILL BE REDUCED TO 67% FULL LOAD.1.9.

1.11. ALL THREE PUMPS WILL THEN GRADUALLY MODULATE AT THE SAME SPEED TO MAINTAIN THE SETPOINTS OF THE DPT-1, DPT-2 & DPT-3 AS DETERMINED BY THE BAS.

1.12. ON A RISE IN DIFFERENTIAL PRESSURE ABOVE THE SETPOINT, THE REVERSE SEQUENCE WILL OCCUR.

1.13. TEMPERATURE SENSOR T-1 WILL MODULATE VALVE V-1 TO MAINTAIN ITS SETTING OF 36°F (ADJUSTABLE).

1.14. TEMPERATURE SENSORS T-2, T-3, T-4 WILL MONITOR CHILLED WATER TEMPERATURE AT LOCATIONS INDICATED.

1.15. UTILITY FLOW METER SHALL MONITOR AND TREND CHILLED WATER CONSUMPTION AT THE FACILITY.

SPACE CONTROL

A. GENERAL:

1. EACH THERMOSTAT/SENSOR SHALL HAVE INDIVIDUAL OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE BAS. DEFAULT VALUES SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED.

HEATING - OCCUPIED:	70°F (ADJUSTABLE)
HEATING - UNOCCUPIED:	60°F (ADJUSTABLE)
COOLING - OCCUPIED:	75°F (ADJUSTABLE)
COOLING - UNOCCUPIED:	80°F (ADJUSTABLE)

2. EACH THERMOSTAT/SENSOR SHALL BE CAPABLE OF INDIVIDUAL TIME OF DAY SCHEDULING.

B. CONSTANT VOLUME AHU'S WITH NO REHEAT COILS:

1. EACH THERMOSTAT/SENSOR SHALL HAVE INDIVIDUAL OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE BAS.

HEATING - OCCUPIED:	72°F (ADJUSTABLE)
HEATING - UNOCCUPIED:	60°F (ADJUSTABLE)
COOLING - OCCUPIED:	75°F (ADJUSTABLE)
COOLING - UNOCCUPIED:	80°F (ADJUSTABLE)

C. DUCT MOUNTED REHEAT COILS:

1. UPON A FALL IN SPACE TEMPERATURE, TWO-WAY VALVE SHALL MODULATE TO MAINTAIN TEMPERATURE SETPOINT (ADJUSTABLE).

D. VARIABLE VOLUME TERMINAL WITH ELECTRIC HEATING COIL:

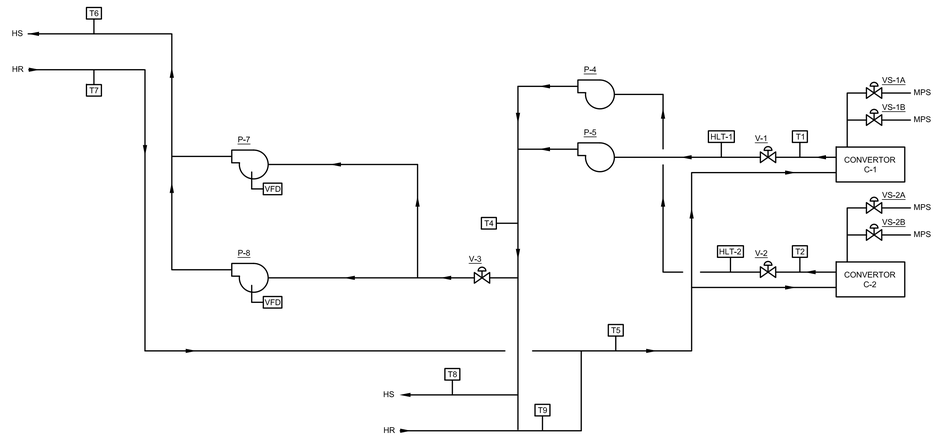
1. ON A FALL IN SPACE TEMPERATURE, SPACE THERMOSTAT/SENSOR SHALL MODULATE VAV DAMPER TOWARDS MINIMUM SETTING.

2. ON A CONTINUED FALL IN TEMPERATURE, THERMOSTAT/SENSOR SHALL ENERGIZE ELECTRIC HEATING COIL TO MAINTAIN SETPOINT.

3. ON A RISE IN SPACE TEMPERATURE, THE OPPOSITE SHALL OCCUR.

E. GENERAL EXHAUST FANS (GEF):

1. ALL GENERAL EXHAUST FANS SHALL HAVE THE ABILITY TO BE CONTROLLED BY THE BAS. FANS SHALL BE ENERGIZED WHEN THE SYSTEM IS IN OCCUPIED MODE. FAN SHALL BE DE-ENERGIZED IN UNOCCUPIED MODE. OCCUPIED/UNOCCUPIED MODE SHALL BE DETERMINED BY BAS.



HEATING WATER SYSTEM CONTROL

1. GENERAL:

1.1. WHEN THE SYSTEM IS DE-ENERGIZED, THE STEAM / HEATING WATER CONVERTORS AND BUILDING HEAT PUMPS SHALL BE OFF.

1.2. HEATING SYSTEM SHALL RUN ALL YEAR WITH A REDUCED CAPACITY IN THE COOLING SEASON.

1.3. WHEN SYSTEM IS ENERGIZED, PRIMARY HEATING WATER PUMPS AND CONVERTORS WILL ENERGIZE IN STAGES TO MAINTAIN HEATING WATER TEMPERATURE DIFFERENCE.

2. PUMPS & CONVECTOR STARTER SEQUENCE:

2.1. LEAD PUMP (P-4 OR P-5) & LEAD CONVERTOR (C-1 OR C-2) SHALL RUN CONTINUOUSLY AFTER V-1 OR V-2 OPENS. LAG PUMP AND CONVERTOR SHALL START AUTOMATICALLY & RUN CONTINUOUSLY WHEN LOSS OF FLOW IS SENSED BY CURRENT SENSING RELAYS AT EACH PUMP. PROVIDE ALTERNATOR TO CONTROL LEAD/LAG PUMP OPERATION. LEAD PUMP SHALL BE ALTERNATED EVERY 300 HOURS (ADJUSTABLE) OF RUN TIME. A FAILURE OF ANY COMPONENT SHALL BE ALARMED AT THE BAS.

2.2. STEAM CONTROL VALVES VS-1A AND VS-1B SERVING C-1 CONVERTOR, V-1 WILL BE MODULATED IN SEQUENCE BY TEMPERATURE SENSOR T1 TO MAINTAIN HEATING WATER SUPPLY TEMPERATURE AS INDICATED ON HEATING WATER RESET SCHEDULE. CONTROL FOR CONVERTOR C-2 WILL BE SIMILAR TO C-1 AND INDEPENDENT OF EACH OTHER.

2.3. TEMPERATURE SENSORS, HLT-1 & HLT-2 ARE HIGH LIMIT THERMOSTATS IN THE SUPPLY LINE WHICH SHALL PREVENT SUPPLY WATER FROM EXCEEDING 210°F.

2.4. WITH THE LEAD HEATING PUMP AND LEAD CONVERTOR OPERATIONAL, IF THE HEATING WATER TEMPERATURE DIFFERENCE BETWEEN T4 & T5 EXCEEDS 24°F, THE LAG PUMP AND LAG CONVERTOR WILL BE ENERGIZED.

2.5. WHEN BOTH HEATING WATER PUMPS AND CONVERTORS ARE OPERATIONAL AND THE PRIMARY HEATING WATER TEMPERATURE DIFFERENCE IS REDUCED TO 12°F, THE LEAD PUMP AND CONVERTOR WILL BE DE-ENERGIZED.

3. DIFFERENTIAL PRESSURE CONTROL:

3.1. THE VFD FOR THE SECONDARY HEATING WATER DISTRIBUTION PUMPS WILL BE CONFIGURED WITH TWO INDEPENDENT VFD CABINETS (ONE FOR EACH PUMP). VFD CABINETS WILL BE CAPABLE OF MANUAL OPERATION THROUGH OPERATOR INTERVENTION IF REQUIRED.

3.2. THE LEAD PUMP WILL START AT A REDUCED SPEED RAMP UP AND DOWN AS REQUIRED. IF PUMP P-7 FAILS OR FAILS TO START AS SENSED BY THE VFD PANEL CONTACT, PUMP P-8 WILL AUTOMATICALLY START AND RUN CONTINUOUSLY.

3.3. THREE DIFFERENTIAL PRESSURE TRANSMITTERS (DPT-1, DPT-2 & DPT-3), WILL MODULATE THE VARIABLE FREQUENCY PUMP DRIVE TO MAINTAIN THEIR SETPOINT. THE TRANSMITTER CALLING FOR AN INCREASE IN DIFFERENTIAL PRESSURE AS SENSED BY EITHER TRANSMITTER, THE PUMP DRIVE WILL GRADUALLY INCREASE THE PUMP SPEED FROM MINIMUM TO MAXIMUM AS REQUIRED TO MAINTAIN THE SETPOINT. ON A RISE IN DIFFERENTIAL PRESSURE, THE REVERSE WILL OCCUR. THE DIFFERENTIAL PRESSURE TRANSMITTERS AND TEMPERATURE SENSORS WILL BE LOCATED THROUGHOUT THE STADIUM COMPLEX AS FOLLOWS:

DPT-1 & TH-10: LOCATED ADJACENT TO AHU-3 ON THE PRESS LEVEL - QUAD C.
DPT-2 & TH-11: LOCATED AT THE TOP OF RISER ON UPPER LEVEL SUITES - QUAD C.
DPT-3 & TH-12: LOCATED ADJACENT TO AHU-4 ON THE PRESS LEVEL - QUAD D

3.4. ON A CONTINUED FALL IN DIFFERENTIAL PRESSURE AND THE LEAD PUMP AT MAXIMUM SPEED, THE LAG PUMP WILL BE STARTED AT A REDUCED SPEED AND THE LEAD PUMP WILL REDUCED TO 50% FULL LOAD. BOTH PUMPS SHALL GRADUALLY MODULATE AT THE SAME SPEED TO MAINTAIN THE SETPOINTS OF DPT-1, DPT-2 & DPT-3.

3.5. T3 SHALL MODULATE V-4 TO MAINTAIN SETPOINT (ADJUSTABLE), AS INDICATED ON RESET SCHEDULE.

RESET SCHEDULE	
OA	SYSTEM WATER TEMP HS
0° F	200° F
65° F	120° F
95° F	120° F

*TEMPERATURES SHALL BE LINEAR BETWEEN INTERMEDIATE SETPOINTS.

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PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
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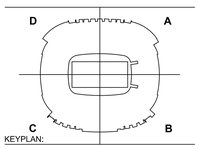


KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

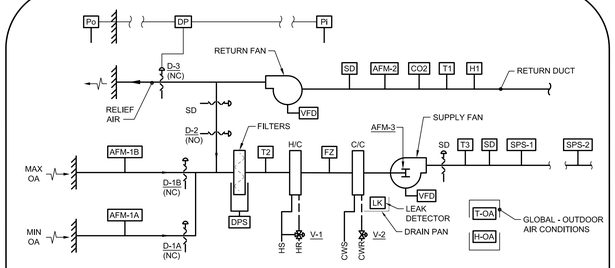
AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.21

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 5:21 PM ARL: G:\20092.01\Drawings\Acad\M\M421 - M424 ATC CONTROLS



LOW-TEMPERATURE, VAV AIR HANDLING UNIT CONTROL (AHU-1 THRU 4)

1. GENERAL

1.1. SUPPLY AIR FAN AND RETURN AIR FAN OPERATION SHALL BE INTERLOCKED. SUPPLY AND RETURN FANS SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE. H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN "OFF" POSITION, D-1A, D-1B AND D-3 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FANS ARE DE-ENERGIZED, D-1A, D-1B AND D-3 SHALL BE FULLY CLOSED.

1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE DETERMINED THE BUILDING AUTOMATION SYSTEM (BAS).

1.3. PROVIDE SEPARATE, INDEPENDENT LINKAGE CONTROL FOR EACH M.O.D. (D-1A, D-1B, D-2 & D-3).

1.4. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

2.1. OCCUPIED:

A. WHEN THE OUTSIDE AIR ENTHALPY IS ABOVE THE RETURN AIR ENTHALPY, D-1A, D-1B, D-2 & D-3 SHALL MODULATE AS FOLLOWS:

1) D-1A (MIN OUTSIDE AIR) SHALL FULLY OPEN AND D-1B (MAX OUTSIDE AIR) SHALL BE FULLY CLOSED.

2) D-2 (RETURN AIR) SHALL FULLY OPEN.

3) D-3 (RELIEF AIR) SHALL BE CLOSED WHEN D-1B (MAX OA) IS CLOSED. WHEN THE UNIT GOES TO ECONOMIZER, AND D-1B (MAX OA) BEGINS TO OPEN, THEN D-3 (RELIEF AIR) SHALL MODULATE OPEN AND 'TRACK' WITH D-1B (MAX OA). ALSO, RELIEF DAMPER SHALL OPEN WHENEVER BUILDING PRESSURE (PI VERSUS Po) EXCEEDS 0.05" W.C.

B. WHEN THE OUTSIDE AIR ENTHALPY IS LESS THEN THE RETURN AIR ENTHALPY, D-1A, D-1B, D-2 & D-3 SHALL MODULATE TO MAXIMIZE ATMOSPHERIC (FREE) COOLING AND MAINTAIN A DISCHARGE AIR TEMPERATURE EQUAL TO THE SUPPLY AIR TEMPERATURE SETPOINT (45° ADJUSTABLE). D-2 (RETURN AIR) AND D-3 (RELIEF AIR) DAMPERS SHALL BE INTERLOCKED IN ECONOMIZER MODE SUCH THAT D-3 POSITION (% OPEN) = [100% MINUS D-2 POSITION (% OPEN)].

C. THE SUPPLY AIR TEMPERATURE, SENSED BY T3, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED. THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE AS PER THE FOLLOWING SUPPLY AIR RESET SCHEDULE (ALL TEMPERATURES SHALL BE ADJUSTABLE).

SUPPLY AIR RESET SCHEDULE	
OA TEMP (°F)	SUPPLY AIR TEMP (°F)
ABOVE 65	45
55 - 65	*
BELOW 55	45

← PROVIDE SUPPLY AIR TEMP. RESET (SATR) SCHEDULE PROGRAMMING.
- INPUT DEFAULT VALUES AS INDICATED.
- FINAL VALUES SHALL BE REVIEWED WITH OWNER.
- ALL VALUES SHALL BE ADJUSTABLE.

SUPPLY AIR TEMPERATURE SHALL BE LINEAR BETWEEN 'ABOVE 65' SETPOINT AND 'BELOW 55' SETPOINT.

2.2 UNOCCUPIED (HEATING): CYCLE FANS AND OPEN HEATING VALVE, V-1, TO MAINTAIN ALL NIGHT SETBACK TEMPERATURES. D-1A, D-1B AND D-3 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN. WHEN SUPPLY FAN CYCLES 'ON' THE ASSOCIATED VAV TERMINAL DAMPERS SHALL OPEN. BELOW 35°F OUTSIDE AIR TEMPERATURE, HEATING VALVE SHALL MODULATE TO MAINTAIN INTERIOR UNIT TEMPERATURE OF 90°F (ADJUSTABLE).

2.3 UNOCCUPIED (COOLING): NIGHT THERMOSTAT/SENSOR AND HUMIDITY SENSOR SHALL CYCLE FAN(S) AND OPEN COOLING VALVE, V-2, TO MAINTAIN NIGHT SETBACK TEMPERATURE AND HUMIDITY SETPOINTS (ADJUSTABLE). D-1A, D-1B AND D-3 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN.

2.4 MORNING WARM-UP: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED AND THERMOSTATS/SENSORS ARE BELOW OCCUPIED HEATING SETPOINT, DAMPERS D-1A, D-1B & D-3 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN. FANS SHALL OPERATE, VALVE (V-1) SHALL MODULATE TO MAINTAIN AN AHU LEAVING AIR TEMPERATURE OF 80°F (ADJ). WHEN ALL SPACES REACH HEATING SETPOINT, SYSTEM SHALL RETURN TO OCCUPIED MODE CONTROL (SEE 2.1), WHEN TRANSITIONING FROM MORNING WARM-UP TO OCCUPIED MODE, THE OA DAMPER STROKE TIME SHALL BE A MINIMUM OF 15 MINUTES (ADJ).

2.5 MORNING COOLING DOWN: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED AND NIGHT THERMOSTATS/SENSORS ARE ABOVE OCCUPIED COOLING SETPOINT, DAMPERS D-1A, D-1B & D-3 SHALL REMAIN CLOSED, UNLESS ECONOMIZER CONDITIONS EXIST (SEE 2.1.B). SUPPLY AIR TEMPERATURE SHALL BE MAINTAINED AS PER 2.1.C ABOVE. LOCAL THERMOSTATS/SENSORS SHALL CONTROL VAV TERMINALS AS PER 'SPACE CONTROL' SEQUENCE OF OPERATION TO MAINTAIN OCCUPIED COOLING SETPOINTS. WHEN ALL SPACES REACH COOLING SETPOINT, SYSTEM SHALL RETURN TO OCCUPIED CONTROL (SEE 2.1). WHEN TRANSITIONING FROM MORNING COOL DOWN TO OCCUPIED MODE, THE OA DAMPER STROKE TIME SHALL BE A MINIMUM OF 15 MINUTES (ADJ).

3. AIR FLOW / FAN CONTROL

3.1. OCCUPIED:

A. STATIC PRESSURE SENSOR, SPS-2, SHALL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE, VFD TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SETPOINT.

1) FAN PRESSURE OPTIMIZATION (STATIC PRESSURE RESET): EVERY 10 MINUTES (ADJUSTABLE) DURING THE OCCUPIED MODE, THE DAMPER POSITIONS OF EACH VAV TERMINAL ASSOCIATED WITH THE AHU SHALL BE POLLED. BASED ON FEEDBACK FROM THE VAV DAMPER POSITIONS, THE STATIC PRESSURE SETPOINT SHALL BE RESET IN +/- 0.1" W.C. INCREMENTS (MAX 0.1" PER 10 MINUTE POLLING CYCLE) BETWEEN A FIXED RANGE (LOW END SHALL BE MINIMUM 1.0" W.C. - ADJUSTABLE, UPPER END SHALL BE 0.25" W.C. ABOVE THE STATIC PRESSURE SETPOINT DETERMINED BY THE BALANCE CONTRACTOR). IF THERE ARE NO VAV DAMPER POSITIONS GREATER THAN 90% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL BE LOWERED UNTIL AT LEAST ONE VAV DAMPER IS AT LEAST 90% OPEN (ADJUSTABLE). IF ANY ONE VAV DAMPER OPENS GREATER THAN 95% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL BE RAISED UNTIL THE MAXIMUM VAV DAMPER POSITION IS BELOW 95% OPEN (ADJUSTABLE). IF THE MAX. VAV DAMPER POSITION IS BETWEEN 90% AND 95% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL REMAIN IN STEADY STATE UNTIL THE NEXT TEN MINUTE POLLING CYCLE.

B. AIR FLOW MONITORS, AFM-2 & AFM-3, LOCATED IN THE SUPPLY AND RETURN DUCT SHALL MODULATE THE RETURN AIR FAN VARIABLE FREQUENCY DRIVE, VFD TO MAINTAIN AN AIR FLOW OFFSET EQUAL TO THE OUTSIDE AIR.

C. DAMPER D-1A LOCATED AT THE MINIMUM OUTSIDE AIR INTAKE SHALL ALWAYS BE OPEN DURING OCCUPIED MODE. MODULATE D-1B DURING ECONOMIZER MODE (ATMOSPHERIC COOLING).

D. UNOCCUPIED: DURING NIGHT SETBACK AND MORNING WARM-UP OPERATION, FANS SHALL BE ENERGIZED AS PER 2.2 AND 2.3 ABOVE. RETURN FAN VARIABLE FREQUENCY DRIVE, VFD, SHALL MODULATE TO MAINTAIN FULL AIRFLOW (EQUAL TO SUPPLY AIRFLOW) DURING WARM-UP & NIGHT SETBACK OPERATION.

4. MISCELLANEOUS

4.1 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FANS AND CLOSE ASSOCIATED SMOKE DAMPERS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

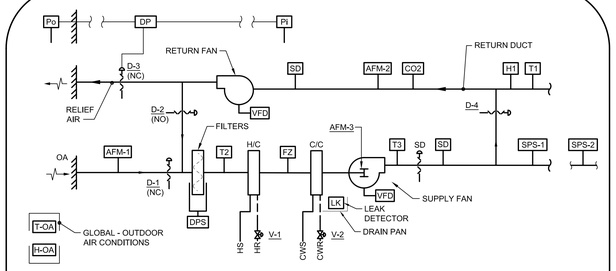
4.2 HIGH LIMIT STATIC PRESSURE SENSOR, SPS-1 SHALL DE-ENERGIZE AHU FANS WHEN STATIC PRESSURE REACHES 6.0" (ADJUSTABLE). ALARM AT THE BAS.

4.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

4.4 ON FAILURE OF SUPPLY FAN OR RETURN FAN, DAMPERS D-1A, D-1B, D-2 AND D-3 SHALL CLOSE. ALARM AT BAS.

4.5 MONITOR RETURN AIR CO2 SENSORS AT THE BAS.

4.6 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



LOW-TEMPERATURE, VAV AIR HANDLING UNIT CONTROL (AHU-9)

1. GENERAL

1.1. SUPPLY AIR FAN AND RETURN AIR FAN OPERATION SHALL BE INTERLOCKED. SUPPLY AND RETURN FANS SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE. H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN "OFF" POSITION, D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FANS ARE DE-ENERGIZED, D-1 AND D-3 SHALL BE FULLY CLOSED. D-4 SHALL REMAIN CLOSED UNDER ALL CONDITIONS.

1.2. D-4 (BYPASS DAMPER) SHALL BE CLOSED UNDER OCCUPIED, UNOCCUPIED AND ALL OTHER MODES.

1.3. OCCUPIED-UNOCCUPIED MODE SHALL BE DETERMINED THE BUILDING AUTOMATION SYSTEM (BAS).

1.4. PROVIDE SEPARATE, INDEPENDENT LINKAGE CONTROL FOR EACH M.O.D. (D-1, D-2, D-3 & D-4).

1.5. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

2.1. OCCUPIED:

A. WHEN THE OUTSIDE AIR ENTHALPY IS ABOVE THE RETURN AIR ENTHALPY, D-1, D-2 & D-3 SHALL MODULATE AS FOLLOWS:

1) D-1 (OUTSIDE AIR) SHALL MODULATE TO MINIMUM OUTSIDE AIR POSITION IN RESPONSE TO AIRFLOW MONITOR, AFM-1. SEE AIR FLOW CONTROL BELOW.

2) D-2 (RETURN AIR) SHALL FULLY OPEN.

3) D-3 (RELIEF AIR) SHALL BE CLOSED WHEN THE OUTSIDE AIR DAMPER IS AS MINIMUM OUTSIDE AIR POSITION (OR LESS). WHEN THE UNIT GOES TO ECONOMIZER, AND THE OUTSIDE AIR IS ABOVE MINIMUM AIRFLOW, THEN RELIEF DAMPER SHALL MODULATE OPEN AND 'TRACK' WITH THE OA DAMPER. ALSO, RELIEF DAMPER SHALL OPEN WHENEVER BUILDING PRESSURE (PI VERSUS Po) EXCEEDS 0.05" W.C.

B. WHEN THE OUTSIDE AIR ENTHALPY IS LESS THEN THE RETURN AIR ENTHALPY, D-1, D-2 & D-3 SHALL MODULATE TO MAXIMIZE ATMOSPHERIC (FREE) COOLING AND MAINTAIN A DISCHARGE AIR TEMPERATURE EQUAL TO THE SUPPLY AIR TEMPERATURE SETPOINT (45° ADJUSTABLE). D-2 (RETURN AIR) AND D-3 (RELIEF AIR) DAMPERS SHALL BE INTERLOCKED IN ECONOMIZER MODE SUCH THAT D-3 POSITION (% OPEN) = [100% MINUS D-2 POSITION (% OPEN)].

C. THE SUPPLY AIR TEMPERATURE, SENSED BY T3, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED. THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE AS PER THE FOLLOWING SUPPLY AIR RESET SCHEDULE (ALL TEMPERATURES SHALL BE ADJUSTABLE).

SUPPLY AIR RESET SCHEDULE	
OA TEMP (°F)	SUPPLY AIR TEMP (°F)
ABOVE 65	45
55 - 65	*
BELOW 55	45

← PROVIDE SUPPLY AIR TEMP. RESET (SATR) SCHEDULE PROGRAMMING.
- INPUT DEFAULT VALUES AS INDICATED.
- FINAL VALUES SHALL BE REVIEWED WITH OWNER.
- ALL VALUES SHALL BE ADJUSTABLE.

SUPPLY AIR TEMPERATURE SHALL BE LINEAR BETWEEN 'ABOVE 65' SETPOINT AND 'BELOW 55' SETPOINT.

2.2 UNOCCUPIED (HEATING): CYCLE FANS AND OPEN HEATING VALVE, V-1, TO MAINTAIN ALL NIGHT SETBACK TEMPERATURES. D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN. WHEN SUPPLY FAN CYCLES 'ON' THE ASSOCIATED VAV TERMINAL DAMPERS SHALL OPEN. BELOW 35°F OUTSIDE AIR TEMPERATURE, HEATING VALVE SHALL MODULATE TO MAINTAIN INTERIOR UNIT TEMPERATURE OF 90°F (ADJUSTABLE).

2.3 UNOCCUPIED (COOLING): NIGHT THERMOSTAT/SENSOR AND HUMIDITY SENSOR SHALL CYCLE FAN(S) AND OPEN COOLING VALVE, V-2, TO MAINTAIN NIGHT SETBACK TEMPERATURE AND HUMIDITY SETPOINTS (ADJUSTABLE). D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN.

2.4 MORNING WARM-UP: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED AND THERMOSTATS/SENSORS ARE BELOW OCCUPIED HEATING SETPOINT, DAMPERS D-1 & D-3 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN. FANS SHALL OPERATE, VALVE (V-1) SHALL MODULATE TO MAINTAIN AN AHU LEAVING AIR TEMPERATURE OF 80°F (ADJ). WHEN ALL SPACES REACH HEATING SETPOINT, SYSTEM SHALL RETURN TO OCCUPIED MODE CONTROL (SEE 2.1). WHEN TRANSITIONING FROM MORNING WARM-UP TO OCCUPIED MODE, THE OA DAMPER STROKE TIME SHALL BE A MINIMUM OF 15 MINUTES (ADJ).

2.5 MORNING COOLING DOWN: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED AND NIGHT THERMOSTATS/SENSORS ARE ABOVE OCCUPIED COOLING SETPOINT, DAMPERS D-1 & D-3 SHALL REMAIN CLOSED, UNLESS ECONOMIZER CONDITIONS EXIST (SEE 2.1.B). SUPPLY AIR TEMPERATURE SHALL BE MAINTAINED AS PER 2.1.C ABOVE. LOCAL THERMOSTATS/SENSORS SHALL CONTROL VAV TERMINALS AS PER 'SPACE CONTROL' SEQUENCE OF OPERATION TO MAINTAIN OCCUPIED COOLING SETPOINTS. WHEN ALL SPACES REACH COOLING SETPOINT, SYSTEM SHALL RETURN TO OCCUPIED CONTROL (SEE 2.1). WHEN TRANSITIONING FROM MORNING COOL DOWN TO OCCUPIED MODE, THE OA DAMPER STROKE TIME SHALL BE A MINIMUM OF 15 MINUTES (ADJ).

3. AIR FLOW / FAN CONTROL

3.1. OCCUPIED:

A. STATIC PRESSURE SENSOR, SPS-2, SHALL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE, VFD TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SETPOINT.

1) FAN PRESSURE OPTIMIZATION (STATIC PRESSURE RESET): EVERY 10 MINUTES (ADJUSTABLE) DURING THE OCCUPIED MODE, THE DAMPER POSITIONS OF EACH VAV TERMINAL ASSOCIATED WITH THE AHU SHALL BE POLLED. BASED ON FEEDBACK FROM THE VAV DAMPER POSITIONS, THE STATIC PRESSURE SETPOINT SHALL BE RESET IN +/- 0.1" W.C. INCREMENTS (MAX 0.1" PER 10 MINUTE POLLING CYCLE) BETWEEN A FIXED RANGE (LOW END SHALL BE MINIMUM 1.0" W.C. - ADJUSTABLE, UPPER END SHALL BE 0.25" W.C. ABOVE THE STATIC PRESSURE SETPOINT DETERMINED BY THE BALANCE CONTRACTOR). IF THERE ARE NO VAV DAMPER POSITIONS GREATER THAN 90% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL BE LOWERED UNTIL AT LEAST ONE VAV DAMPER IS AT LEAST 90% OPEN (ADJUSTABLE), IF ANY ONE VAV DAMPER OPENS GREATER THAN 95% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL BE RAISED UNTIL THE MAXIMUM VAV DAMPER POSITION IS BELOW 95% OPEN (ADJUSTABLE), IF THE MAX. VAV DAMPER POSITION IS BETWEEN 90% AND 95% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL REMAIN IN STEADY STATE UNTIL THE NEXT TEN MINUTE POLLING CYCLE.

B. AIR FLOW MONITORS, AFM-2 & AFM-3, LOCATED IN THE SUPPLY AND RETURN DUCT SHALL MODULATE THE RETURN AIR FAN VARIABLE FREQUENCY DRIVE, VFD TO MAINTAIN AN AIR FLOW OFFSET EQUAL TO THE OUTSIDE AIR.

C. AIR FLOW MONITOR. AFM-1, LOCATED AT THE OUTSIDE AIR INTAKE SHALL MODULATE D-1 TO MAINTAIN VENTILATION AIR QUANTITY AS INDICATED ON AIR HANDLING UNIT SCHEDULE. AFM-1 CONTROL SHALL BE OVERRIDDEN DURING ECONOMIZER MODE (ATMOSPHERIC COOLING), OR BY AHU VENTILATION RESET CONTROL / DEMAND CONTROLLED VENTILATION (SEE ATC SPECIFICATION FOR AHU VENTILATION RESET REQUIREMENTS).

D. UNOCCUPIED: DURING NIGHT SETBACK AND MORNING WARM-UP OPERATION, FANS SHALL BE ENERGIZED AS PER 2.2 AND 2.3 ABOVE. RETURN FAN VARIABLE FREQUENCY DRIVE, VFD, SHALL MODULATE TO MAINTAIN FULL AIRFLOW (EQUAL TO SUPPLY AIRFLOW) DURING WARM-UP & NIGHT SETBACK OPERATION.

4. MISCELLANEOUS

4.1 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FANS AND CLOSE ASSOCIATED SMOKE DAMPERS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

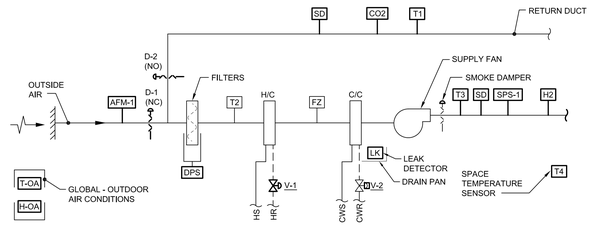
4.2 HIGH LIMIT STATIC PRESSURE SENSOR, SPS-1 SHALL DE-ENERGIZE AHU FANS WHEN STATIC PRESSURE REACHES 6.0" (ADJUSTABLE). ALARM AT THE BAS.

4.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

4.4 ON FAILURE OF SUPPLY FAN OR RETURN FAN, DAMPERS D-1, D-2 AND D-3 SHALL CLOSE. ALARM AT BAS.

4.5 MONITOR RETURN AIR CO2 SENSORS AT THE BAS.

4.6 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



CONSTANT VOLUME AIR HANDLING UNIT CONTROL (AHU-10,14,19,27)

1. GENERAL

1.1. SUPPLY FAN SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE. H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FAN(S) ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

1.3. PROVIDE SEPARATE, INDEPENDENT LINKAGE CONTROL FOR EACH M.O.D. (D-1 & D-2).

1.4. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

2.1. OCCUPIED:

A. D-1 (OUTSIDE AIR) SHALL FULLY OPEN & D-2 (RETURN AIR) SHALL FULLY CLOSE.

B. THE SPACE TEMPERATURE, SENSED BY T4, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

2.2. UNOCCUPIED:

A. D-1 (OUTSIDE AIR) SHALL FULLY CLOSE & D-2 (RETURN AIR) SHALL FULLY OPEN.

B. NIGHT THERMOSTAT/SENSOR SHALL CYCLE FAN AND OPEN VALVES V-1 AND V-2 AS REQUIRED, TO MAINTAIN NIGHT SETBACK TEMPERATURE (ADJUSTABLE).

2.3. MORNING COOL DOWN: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH COOLING VALVE OPEN UNTIL OCCUPIED SETPOINT IS MET, AT THIS TIME, SYSTEM SHALL RETURN TO THE OCCUPIED MODE, SEE 2.1.

2.4. MORNING WARM-UP: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL RETURN AIR, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE). AT THIS TIME, SYSTEM SHALL RETURN TO THE OCCUPIED MODE, SEE 2.1.

3. AIR FLOW CONTROL

3.1 OCCUPIED: AIR FLOW MONITOR, AFM-1, LOCATED IN OUTSIDE AIR DUCT SHALL MODULATE D-1 TO MAINTAIN VENTILATION AIR QUANTITY AS INDICATED ON AIR HANDLING UNIT SCHEDULE.

4. MISCELLANEOUS

4.1 SMOKE DETECTORS SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FAN AND CLOSE ASSOCIATED SMOKE DAMPERS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

4.2 HIGH LIMIT STATIC PRESSURE SENSOR, SPS-1, SHALL DE-ENERGIZE FANS WHEN STATIC PRESSURE REACHES 6.0" (ADJUSTABLE). ALARM AT THE BAS.

4.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK, ALARM AT THE BAS.

4.4 ON FAILURE OF SUPPLY FAN, DAMPERS D-1 & D2 SHALL CLOSE. ALARM AT BAS.

4.5 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SHALL BE INDICATED AT THE BAS.

TOILET EXHAUST FANS

A. TOILET EXHAUST FANS (TEF):

1. WHEN THE ASSOCIATED AHU OR HVU SUPPLY FANS ARE ENERGIZED AND THE SYSTEM IS IN OCCUPIED MODE, THE FOLLOWING EXHAUST FANS SHALL BE ENERGIZED. FAN SHALL BE DE-ENERGIZED IN UNOCCUPIED MODE. REFER TO TABLE BELOW FOR ASSOCIATED AHU'S & HVU'S

2. ALL OTHER TOILET EXHAUST FANS NOT ASSOCIATED WITH AN AHU OR HVU, SHALL BE ENERGIZED IN OCCUPIED MODE AND DE-ENERGIZED IN UNOCCUPIED MODE.

3. OCCUPIED/UNOCCUPIED MODE SHALL BE DETERMINED BY BAS.

DESIG.	ASSOCIATED EXHAUST FAN
AHU-1	TEF-A10, TEF-A11, TEF-A12, TEF-A15, TEF-A16, TEF-A23
AHU-2	TEF-B14, TEF-B15, TEF-B16, TEF-B17, TEF-B25
AHU-3	TEF-C6, TEF-C7, TEF-C8, TEF-C9, TEF-C14
AHU-4	TEF-D6, TEF-D7, TEF-D8, TEF-D9, TEF-D11, TEF-D15, TEF-D17
AHU-9	TEF-C5
AHU-10	TEF-B3
AHU-11	TEF-B1
AHU-12	TEF-B2
AHU-13	TEF-B4
AHU-14	TEF-B5
AHU-15	TEF-B8
AHU-16	TEF-B7
AHU-17	TEF-B6
AHU-19	TEF-A3
HVU-1	TEF-A1
HVU-2	TEF-A2
HVU-3	TEF-A3

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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
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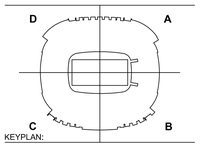


KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

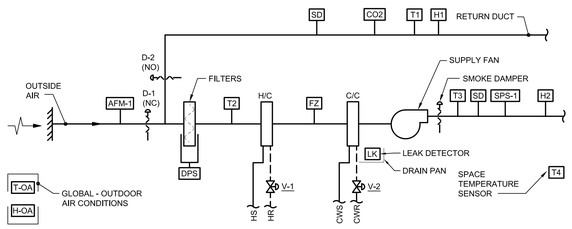
AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.22

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 5:21 PM
ARL: G:\20092.01\Drawings\Acad\M4\M421 - M424 ATC CONTROLS



CONSTANT VOLUME AIR HANDLING UNIT CONTROL (AHU-11,12,13,18)

1. GENERAL

   1.1. SUPPLY FAN SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE. H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FAN(S) ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3. PROVIDE SEPARATE, INDEPENDENT LINKAGE CONTROL FOR EACH M.O.D. (D-1 & D-2).

   1.4. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED (COOLING):

   A. WHEN THE OUTSIDE AIR ENTHALPY IS ABOVE THE RETURN AIR ENTHALPY, D-1,& D-2 SHALL MODULATE AS FOLLOWS:

   1) D-1 (OUTSIDE AIR) SHALL MODULATE TO MINIMUM OUTSIDE AIR POSITION IN RESPONSE TO AIRFLOW MONITOR, AFM-1. SEE AIRFLOW CONTROL BELOW.

   2) D-2 (RETURN AIR) SHALL FULLY OPEN.

   B. WHEN THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY, AND ALSO WHENEVER THE OA IS LESS THAN 55°F, DAMPERS D-1 & D-2 SHALL MODULATE TO MAXIMIZE ATMOSPHERIC (FREE) COOLING AND MAINTAIN A MINIMUM MIXED AIR TEMPERATURE AS REQUIRED TO SATISFY THE SPACE SETPOINT.

   C. THE SPACE TEMPERATURE, SENSED BY T5, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

   2.2. OCCUPIED (HEATING):

   A. D-1 (OUTSIDE AIR) SHALL MODULATE TO MINIMUM OUTSIDE AIR POSITION IN REPSONSE TO AIRFLOW MONITOR, AFM-1. D-2 (RETURN AIR) SHALL FULLY OPEN.

   B. THE SPACE TEMPERATURE, SENSED BY T5, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING V-1 AS REQUIRED.

   C. ON A RISE IN SPACE TEMPERATURE, V-1 SHALL SHALL CLOSE.

   D. ON A FURTHER RISE IN SPACE TEMPERATURE, D-1 (OUTSIDE AIR) & D-2 (RETURN AIR) WILL MODULATE TO MAINTAIN SPACE TEMPERATURE.

   2.3. UNOCCUPIED: NIGHT THERMOSTAT/SENSOR SHALL CYCLE FAN AND OPEN VALVES V-1 AND V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED, TO MAINTAIN NIGHT SETBACK TEMPERATURE (ADJUSTABLE). D-1 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN.

   2.4. MORNING COOL DOWN: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH COOLING VALVE OPEN UNTIL OCCUPIED SETPOINT IS MET. AT THIS TIME, SYSTEM SHALL RETURN TO THE OCCUPIED MODE, SEE 2.1.

   2.5. MORNING WARM-UP: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL RETURN AIR, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE). AT THIS TIME, SYSTEM SHALL RETURN TO THE OCCUPIED MODE, SEE 2.2.

3. AIR FLOW CONTROL

   3.1 OCCUPIED: AIR FLOW MONITOR, AFM-1, LOCATED IN OUTSIDE AIR DUCT SHALL MODULATE D-1 TO MAINTAIN VENTILATION AIR QUANTITY AS INDICATED ON AIR HANDLING UNIT SCHEDULE.

4. MISCELLANEOUS

   4.1 SMOKE DETECTORS SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FAN AND CLOSE ASSOCIATED SMOKE DAMPERS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

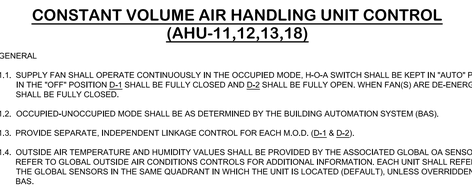
   4.2 HIGH LIMIT STATIC PRESSURE SENSOR, SPS-1, SHALL DE-ENERGIZE FANS WHEN STATIC PRESSURE REACHES 6.0" (ADJUSTABLE). ALARM AT THE BAS.

   4.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   4.4 ON FAILURE OF SUPPLY FAN, DAMPERS D-1 & D2 SHALL CLOSE. ALARM AT BAS.

   4.5 MONITOR RETURN AIR CO2 SENSORS AT THE BAS.

   4.6 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SHALL BE INDICATED AT THE BAS.



4 PIPE FAN COIL UNIT CONTROL

1. GENERAL

   1.1. SUPPLY FAN & ASSOCIATED EXHAUST FANS SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

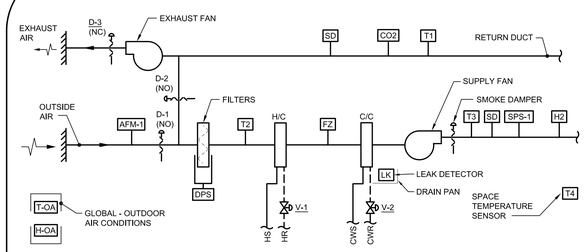
2. TEMPERATURE CONTROL

   2.1. OCCUPIED:

   A. THE SPACE TEMPERATURE, SENSED BY T-1 SHALL THEN BE MAINTED AT SETPOINT BY MODULATING VALVES V-1 AND V-2 , WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

   2.2. UNOCCUPIED:

   A. T-1 SHALL CYCLE FAN(S) AND OPEN VALVES V-1 AND V-2, WITHOUT OVERLAPPING CONTROL, TO MAINTAIN NIGHT SETBACK TEMPERATURE, 55°F (ADJUSTABLE).



LOW TEMPERATURE, CONSTANT VOLUME AIR HANDLING UNIT CONTROL (AHU 15,16,17)

1. GENERAL

   1.1. SUPPLY AIR FAN ANDEXHAUST AIR FAN OPERATION SHALL BE INTERLOCKED. SUPPLY AND EXHAUST FANS SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FAN(S) ARE DE-ENERGIZED, D-1 AND D-3 SHALL BE FULLY CLOSED.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3. PROVIDE SEPARATE, INDEPENDENT LINKAGE CONTROL FOR EACH M.O.D. (D-1, D-2 & D-3).

   1.4. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED:

   A. D-1 (OUTSIDE AIR) & D-3 (EXHAUST AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL FULLY CLOSE.

   B. THE SUPPLY AIR TEMPERATURE, SENSED BY T3, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED. THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE AS PER THE FOLLOWING SUPPLY AIR RESET SCHEDULE (ALL TEMPERATURES SHALL BE ADJUSTABLE).

SUPPLY AIR RESET SCHEDULE	
OA TEMP (°F)	SUPPLY AIR TEMP (°F)
ABOVE 65	45
55 - 65	*
BELOW 55	45

PROVIDE SUPPLY AIR TEMP. RESET (SATR) SCHEDULE PROGRAMMING.
- INPUT DEFAULT VALUES AS INDICATED.
- FINAL VALUES SHALL BE REVIEWED WITH OWNER.
- ALL VALUES SHALL BE ADJUSTABLE.

SUPPLY AIR TEMPERATURE SHALL BE LINEAR BETWEEN 'ABOVE 65' SETPOINT AND 'BELOW 55' SETPOINT

2.2 UNOCCUPIED:

   A. D-1 (OUTSIDE AIR) & D-3 (EXHAUST AIR) SHALL FULLY CLOSE. D-2 (RETURN AIR) SHALL FULLY OPEN.

   B. NIGHT THERMOSTAT/SENSOR SHALL CYCLE FAN AND OPEN VALVES V-1 AND V-2 , WITHOUT OVERLAPPING CONTROL, AS REQUIRED, TO MAINTAIN NIGHT SETBACK TEMPERATURE (ADJUSTABLE).

   2.3 MORNING COOL DOWN: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 & D-3 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH COOLING VALVE OPEN UNTIL OCCUPIED SETPOINT IS MET. AT THIS TIME, SYSTEM SHALL RETURN TO THE OCCUPIED MODE, SEE 2.1.

   2.4 MORNING WARM-UP: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 & D-3 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL RETURN AIR, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE). AT THIS TIME, SYSTEM SHALL RETURN TO THE OCCUPIED MODE, SEE 2.2.

3. AIR FLOW CONTROL

   3.1 OCCUPIED: AIR FLOW MONITOR, AFM-1, LOCATED IN OUTSIDE AIR DUCT SHALL MODULATE D-1 TO MAINTAIN VENTILATION AIR QUANTITY AS INDICATED ON AIR HANDLING UNIT SCHEDULE.

4. MISCELLANEOUS

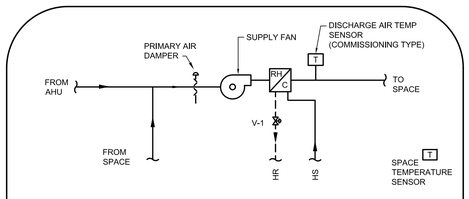
   4.1 SMOKE DETECTORS SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FAN AND CLOSE ASSOCIATED SMOKE DAMPERS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

   4.2 HIGH LIMIT STATIC PRESSURE SENSOR, SPS-1, SHALL DE-ENERGIZE FANS WHEN STATIC PRESSURE REACHES 6.0" (ADJUSTABLE). ALARM AT THE BAS.

   4.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   4.4 ON FAILURE OF SUPPLY FAN, DAMPERS D-1, D-2 & D-3 SHALL CLOSE. ALARM AT BAS.

   4.5 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SHALL BE INDICATED AT THE BAS.

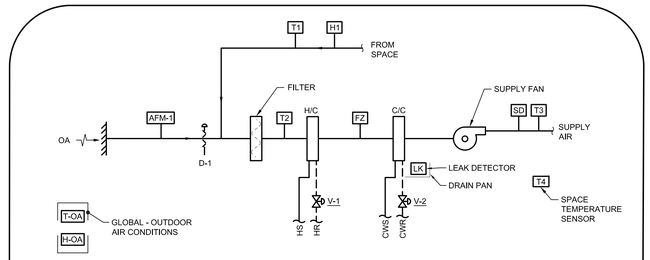


SERIES FAN POWERED TERMINAL UNIT CONTROL

1. WHEN THE ASSOCIATED AHU SYSTEM IS INDEXED TO "OCCUPIED", THE SPACE THERMOSTAT SHALL MODULATE THE TERMINAL UNIT PRIMARY AIR DAMPER TO MAINTAIN OCCUPIED SPACE TEMPERATURE SETPOINT AND THE FAN SHALL BE DE-ENERGIZED. ON A FALL IN SPACE TEMPERATURE, THE PRIMARY AIR DAMPER SHALL MODULATE TOWARD MINIMUM POSITION. WHEN THE PRIMARY AIR DAMPER REACHES MINIMUM SETTING, AND THE SPACE TEMPERATURE CONTINUES TO FALL, THE FAN SHALL BE ENERGIZED. ON A FURTHER DROP IN SPACE TEMPERATURE, THE THERMOSTAT SHALL MODULATE THE HEATING COIL CONTROL VALVE OR ELECTRIC HEATING ELEMENT TO MAINTAIN SPACE TEMPERATURE SETPOINT. ON A RISE IN SPACE TEMPERATURE, THE OPPOSITE SHALL OCCUR.

2. WHEN THE ASSOCIATED AHU SYSTEM IS INDEXED TO "UNOCCUPIED", THE TERMINAL UNIT PRIMARY AIR DAMPER SHALL GO TO MINIMUM SETTING. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SETPOINT, THE HEATING COIL CONTROL VALVE SHALL OPEN OR ELECTRIC HEATING ELEMENT SHALL ENERGIZE, AND THE TERMINAL UNIT FAN SHALL ENERGIZE. WHEN SPACE THERMOSTAT IS SATISFIED THE HEATING COIL VALVE SHALL CLOSE OR ELECTRIC HEATING ELEMENT SHALL DE-ENERGIZE AND FAN SHALL BE DE-ENERGIZED.

3. WHEN THE ASSOCIATED AHU SYSTEM IS INDEXED TO "MORNING WARM-UP", THE TERMINAL UNIT PRIMARY AIR DAMPER SHALL BE AT MINIMUM POSITION, HEATING VALVE SHALL OPEN AND THE TERMINAL UNIT FAN SHALL BE ENERGIZED. WHEN THE OCCUPIED HEATING SETPOINT IS ACHIEVED, THE HEATING VALVE SHALL CLOSE AND THE FAN SHALL DE-ENERGIZE. THIS SEQUENCE SHALL CONTINUE AS REQUIRED TO MAINTAIN OCCUPIED SETPOINT UNTIL THE ASSOCIATED AHU SYSTEM IS INDEXED TO "OCCUPIED".



CONSTANT VOLUME AIR HANDLING UNIT CONTROL (AHU-24 THRU 26)

1. GENERAL

   1.1. SUPPLY FAN SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED:

   A. D-1 (OUTSIDE AIR) SHALL MODULATE TO MINIMUM OUTSIDE AIR POSITION IN RESPONSE TO AIR FLOW MONITOR, AFM-1.

   B. THE SPACE TEMPERATURE, SENSED BY T4, SHALL THEN BE MAINTAINED BY MODULATING V-1 & V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

   2.2. UNOCCUPIED:

   A. D-1 (OUTSIDE AIR) SHALL BE FULLY CLOSED.

   B. MODULATE V-1 & V-2 , WITHOUT OVERLAPPING CONTROL, AS REQUIRED TO MAINTAIN UNOCCUPIED SETPOINT.

3. MISCELLANEOUS

   3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

   3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

   3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SHALL BE INDICATED AT THE BAS.

MISC. HEATERS CONTROL

A. HOT WATER UNIT HEATERS (UH):

   1. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXISTING THERMOSTAT SHALL BE REMOVED AND REPLACED.

   2. THERMOSTATS SHALL BE DESIGNED TO OPERATE ON A 2°F DIFFERENTIAL OVER A RANGE OF 40°F-90°F. THERMOSTATS SHALL BE OF THE START/STOP TYPE WITH AN INTEGRAL "AUTO-OFF-FAN" SWITCH.

   3. IN THE "AUTO" POSITION THE UNIT FAN SHALL CYCLE TO MAINTAIN SETPOINT. PROVIDE AQUASTAT MOUNTED TO HEATING RETURN LINE TO PREVENT OPERATION OF CABINET UNIT HEATER FAN MOTOR WHEN HOT WATER HEATER IS NOT AVAILABLE TO COIL. AQUASTAT SETTING SHALL BE APPROXIMATELY 90°F

   4. IN THE "OFF" POSITION, FAN SHALL BE DE-ENERGIZED.

   5. IN THE "FAN" POSITION, FAN SHALL RUN REGARDLESS OF HOT WATER TEMPERATURE.

B. ELECTRIC UNIT HEATERS (UH) & CABINET UNIT HEATERS (CUH):

   1. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXISTING THERMOSTAT SHALL BE REMOVED AND REPLACED.

   2. THERMOSTAT SHALL ENERGIZE HEATING ELEMENT AND FAN TO MAINTAIN SETPOINT.

C. CONVECTORS (CONV):

   1. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXISTING THERMOSTAT SHALL BE REMOVED AND REPLACED.

   2. THERMOSTAT SHALL ENERGIZE HEATING ELEMENT TO MAINTAIN SETPOINT.

D. FINNED TUBE RADIATORS (ALONG WINDOWS):

   1. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXISTING THERMOSTAT SHALL BE REMOVED AND REPLACED.

   2. THERMOSTAT SHALL MODULATE HEATING VALVE TO MAINTAIN SETPOINT.

E. ELECTRIC BASEBOARD RADIATION:

   1. PROVIDE NEW CONTROLS AND CONNECT TO BAS. EXISTING THERMOSTAT SHALL BE REMOVED AND REPLACED.

   2. THERMOSTAT SHALL ENERGIZE HEATING ELEMENT TO MAINTAIN SETPOINT.

MISC. AIR CONDITIONING CONTROL

A. SPLIT SYSTEM AC UNITS:

   1. EACH THERMOSTAT/SENSOR SHALL HAVE INDIVIDUAL OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE BAS. DEFAULT VALUES SHALL BE AS FOLLOWED, UNLESS OTHERWISE NOTED.

B. HEAT PUMP AC UNITS:

   1. EACH THERMOSTAT/SENSOR SHALL HAVE INDIVIDUAL OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE BAS. DEFAULT VALUES SHALL BE AS FOLLOWED, UNLESS OTHERWISE NOTED.

C. COMPUTER ROOM AC UNITS:

   1. EACH THERMOSTAT/SENSOR SHALL HAVE INDIVIDUAL OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE BAS. DEFAULT VALUES SHALL BE AS FOLLOWED, UNLESS OTHERWISE NOTED.

bkm
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PROJECT NAME:

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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

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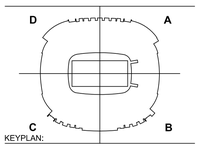

KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: 20092.01

SCALE: AS NOTED

DRAWN BY: MJG

CHECKED BY: CMP / MAF

DATE: FEBRUARY 12, 2021

SHEET TITLE:

AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.23

BKM# 20092.01

Plotted By: Craig M. Parks | 3/2/2021 5:21 PM
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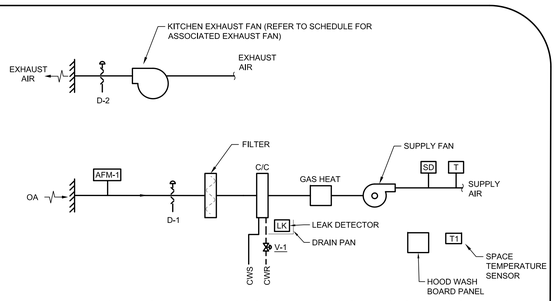


MAKEUP AIR UNIT & KITCHEN EXHAUST WITH COOLING COIL CONTROL

1. GENERAL

1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

1.3 HOOD WASH BOARD PANEL SHALL BE INTERLOCKED WITH THE MAKE-UP AIR UNIT AND KITCHEN EXHAUST FAN. PANEL MUST BE SET TO "ON" FOR UNITS TO OPERATE.

2. TEMPERATURE CONTROL

2.1. OCCUPIED HEATING MODE:

A. SUPPLY FAN AND EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) & D-2 (EXHAUST AIR) SHALL FULLY OPEN.

C. THE SPACE TEMPERATURE SHALL THEN BE MAINTAINED AT 50° (ADJUSTABLE) BY MODULATING GAS FIRED HEAT AS REQUIRED.

2.2. OCCUPIED COOLING MODE:

A. SUPPLY FAN AND EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) & D-2 (EXHAUST AIR) SHALL FULLY OPEN.

C. THE SPACE TEMPERATURE SHALL THEN BE MAINTAINED AT 80° (ADJUSTABLE) BY MODULATING VALVE V-1 AS REQUIRED.

2.3. UNOCCUPIED HEATING:

A. MAKEUP AIR UNIT AND ASSOCIATED EXHAUST FANS WILL BE DE-ENERGZIED AND DAMPERS D-1 & D-2 SHALL BE CLOSED.

B. WHERE INDICATED ON PLANS, ELECTRIC UNIT HEATERS WITHIN SPACE (WITH BUILT IN THERMOSTATS) WILL CYCLE ON & OFF TO MAINTAIN 50°F (ADJUSTABLE).

2.4 UNOCCUPIED COOLING:

A. MAKEUP AIR UNIT AND ASSOCIATED EXHAUST FANS WILL BE DE-ENERGZIED AND DAMPERS D-1 & D-2, AND VALVE V-1 SHALL BE CLOSED.

3. MISCELLANEOUS

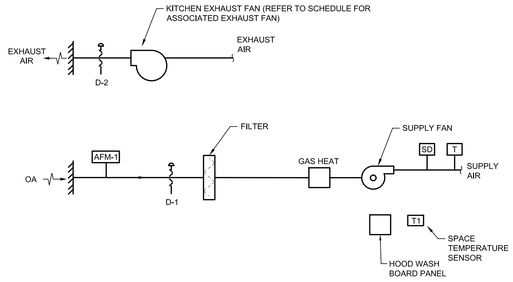
3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

3.2 SMOKE DETECTORS, SD, SHALL DE-ENERGIZE FANS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

3.3 THE SYSTEM SHALL ALARM WHEN ROOM SENSOR T-1 DROPS BELOW 50°F (ADJUSTABLE).

3.4 DIRECT GAS FIRED HEATER CONTROL PANEL SHALL BE INTERLOCKED WITH GAS EMERGENCY SHUT OFF SYSTEM ASSOCIATED WITH GAS COOKING EQUIPMENT. AUTOMATIC SHUT-DOWN SHALL BE PROVIDED AS REQUIRED BY NFPA.

3.5 CONDENSATE WATER LEAK DETECTOR, LK, SHALL BE INSTALLED IN THE COOLING COIL DRAIN PAN AT A LEVEL HIGHER THAN THE DRAIN CONNECTION. WHEN AN OVERFLOW CONDITION IS SENSED THE LEAK DETECTOR SHALL SHUT DOWN THE UNIT (HARD-WIRED) AND ALARM AT THE BAS.



MAKEUP AIR UNIT & KITCHEN EXHAUST CONTROL

1. GENERAL

1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

1.3 HOOD WASH BOARD PANEL SHALL BE INTERLOCKED WITH THE MAKE-UP AIR UNIT AND KITCHEN EXHAUST FAN. PANEL MUST BE SET TO "ON" FOR UNITS TO OPERATE.

2. TEMPERATURE CONTROL

2.1. OCCUPIED HEATING MODE:

A. SUPPLY FAN AND EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) & D-2 (EXHAUST AIR) SHALL FULLY OPEN.

C. THE SPACE TEMPERATURE SHALL THEN BE MAINTAINED AT 50° (ADJUSTABLE) BY MODULATING GAS FIRED HEAT AS REQUIRED.

2.2. UNOCCUPIED HEATING:

A. MAKEUP AIR UNIT AND ASSOCIATED EXHAUST FANS WILL BE DE-ENERGZIED AND DAMPERS D-1 & D-2 SHALL BE CLOSED.

B. WHERE INDICATED ON PLANS, ELECTRIC UNIT HEATERS WITHIN SPACE (WITH BUILT IN THERMOSTATS) WILL CYCLE ON & OFF TO MAINTAIN 50°F (ADJUSTABLE).

3. MISCELLANEOUS

3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

3.2 SMOKE DETECTORS, SD, SHALL DE-ENERGIZE FANS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

3.3 THE SYSTEM SHALL ALARM WHEN ROOM SENSOR T-1 DROPS BELOW 50°F (ADJUSTABLE).

3.4 DIRECT GAS FIRED HEATER CONTROL PANEL SHALL BE INTERLOCKED WITH GAS EMERGENCY SHUT OFF SYSTEM ASSOCIATED WITH GAS COOKING EQUIPMENT, AUTOMATIC SHUT-DOWN SHALL BE PROVIDED AS REQUIRED BY NFPA.

CONCESSION STAND EXHAUST FANS CONTROL

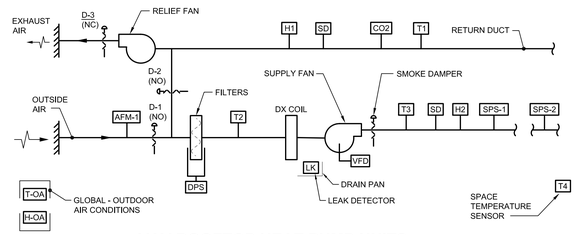
A. EACH CONCESSION STAND EXHAUST FAN SHALL BE CONTROLLED BY A THERMOSTAT. UPON A RISE IN SPACE TEMPERATURE ABOVE 85°F (ADJUSTABLE), THE FAN SHALL ENERGIZE. UPON A FALL IN SPACE TEMPERATURE BELOW 80°F (ADJUSTABLE).

B. ALL SETPOINTS LISTED ABOVE SHALL BE ADJUSTABLE.

C. EACH FAN (TYP. 24) SHALL HAVE THE ABILITY TO BE TURNED ON/OFF AT THE BAS.

D. ALL CONCESSION STAND EXHAUST FANS (TYP. 24) SHALL HAVE THE ABILITY TO BE TURNED ON/OFF AS A GROUP.

E. MONITOR STATUS AND ALARM AT BAS UPON FAILURE OF EXHAUST FAN.



VAV ROOFTOP HEAT PUMP UNITS (RTU-1 THRU 4)

1. GENERAL

1.1. SUPPLY AIR FAN AND RELIEF AIR FAN OPERATION SHALL BE INTERLOCKED. SUPPLY AND RELIEF FANS SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE. H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN "OFF" POSITION, D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FANS ARE DE-ENERGIZED, D-1 AND D-3 SHALL BE FULLY CLOSED.

1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE DETERMINED THE BUILDING AUTOMATION SYSTEM (BAS).

1.3. PROVIDE SEPARATE, INDEPENDENT LINKAGE CONTROL FOR EACH M.O.D. (D-1, D-2 & D-3).

1.4. OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

2.1. OCCUPIED:

A. WHEN THE OUTSIDE AIR ENTHALPY IS ABOVE THE RETURN AIR ENTHALPY, D-1, D-2 & D-3 SHALL MODULATE AS FOLLOWS:

1) D-1 (OUTSIDE AIR) SHALL MODULATE TO MINIMUM OUTSIDE AIR POSITION IN RESPONSE TO AIRFLOW MONITOR, AFM-1. SEE AIR FLOW CONTROL BELOW.

2) D-2 (RETURN AIR) SHALL FULLY OPEN.

3) D-3 (RELIEF AIR) SHALL BE CLOSED WHEN THE OUTSIDE AIR DAMPER IS AS MINIMUM OUTSIDE AIR POSITION (OR LESS), WHEN THE UNIT GOES TO ECONOMIZER, AND THE OUTSIDE AIR IS ABOVE MINIMUM AIRFLOW, THEN RELIEF DAMPER SHALL MODULATE OPEN AND 'TRACK' WITH THE OA DAMPER, ALSO, RELIEF DAMPER SHALL OPEN WHENEVER BUILDING PRESSURE (PI VERSUS Po) EXCEEDS 0.05" W.C.

B. WHEN THE OUTSIDE AIR ENTHALPY IS LESS THEN THE RETURN AIR ENTHALPY, D-1, D-2 & D-3 SHALL MODULATE TO MAXIMIZE ATMOSPHERIC (FREE) COOLING AND MAINTAIN A DISCHARGE AIR TEMPERATURE EQUAL TO THE SUPPLY AIR TEMPERATURE SETPOINT. D-2 (RETURN AIR) AND D-3 (RELIEF AIR) DAMPERS SHALL BE INTERLOCKED IN ECONOMIZER MODE SUCH THAT D-3 POSITION (% OPEN) = [100% MINUS D-2 POSITION (% OPEN)].

C. THE SUPPLY AIR TEMPERATURE, SENSED BY T3, SHALL THEN BE MAINTAINED AT SETPOINT BY MODULATING THE DX COIL AS REQUIRED. THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE AS PER THE FOLLOWING SUPPLY AIR RESET SCHEDULE (ALL TEMPERATURES SHALL BE ADJUSTABLE).

SUPPLY AIR RESET SCHEDULE	
OA TEMP (°F)	SUPPLY AIR TEMP (°F)
ABOVE 65	55
55 - 65	*
BELOW 55	60

PROVIDE SUPPLY AIR TEMP. RESET (SATR) SCHEDULE PROGRAMMING.
- INPUT DEFAULT VALUES AS INDICATED.
- FINAL VALUES SHALL BE REVIEWED WITH OWNER.
- ALL VALUES SHALL BE ADJUSTABLE.

SUPPLY AIR TEMPERATURE SHALL BE LINEAR BETWEEN 'ABOVE 65' SETPOINT AND 'BELOW 55' SETPOINT.

2.2 UNOCCUPIED (HEATING): CYCLE FANS AND ENERGIZE DX COIL TO MAINTAIN ALL NIGHT SETBACK TEMPERATURES. D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN. WHEN SUPPLY FAN CYCLES 'ON' THE ASSOCIATED VAV TERMINAL DAMPERS SHALL OPEN. BELOW 35°F OUTSIDE AIR TEMPERATURE, DX COIL SHALL ENERGIZE TO MAINTAIN INTERIOR UNIT TEMPERATURE OF 90°F (ADJUSTABLE).

2.3 UNOCCUPIED (COOLING): NIGHT THERMOSTAT/SENSOR AND HUMIDITY SENSOR SHALL CYCLE FAN(S) AND ENERGIZE DX COIL TO MAINTAIN NIGHT SETBACK TEMPERATURE AND HUMIDITY SETPOINTS (ADJUSTABLE). D-1 AND D-3 SHALL BE FULLY CLOSED AND D-2 FULLY OPEN.

2.4 MORNING WARM-UP: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED AND THERMOSTATS/SENSORS ARE BELOW OCCUPIED HEATING SETPOINT, DAMPERS D-1 & D-3 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN, FANS SHALL OPERATE, DX COIL SHALL MODULATE TO MAINTAIN AN AHU LEAVING AIR TEMPERATURE OF 80°F (ADJ). WHEN ALL SPACES REACH HEATING SETPOINT, SYSTEM SHALL RETURN TO OCCUPIED MODE CONTROL (SEE 2.1). WHEN TRANSITIONING FROM MORNING WARM-UP TO OCCUPIED MODE, THE OA DAMPER STROKE TIME SHALL BE A MINIMUM OF 15 MINUTES (ADJ).

2.5 MORNING COOLING DOWN: WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED AND NIGHT THERMOSTATS/SENSORS ARE ABOVE OCCUPIED COOLING SETPOINT, DAMPERS D-1 & D-3 SHALL REMAIN CLOSED, UNLESS ECONOMIZER CONDITIONS EXIST (SEE 2.1.B). SUPPLY AIR TEMPERATURE SHALL BE MAINTAINED AS PER 2.1.C ABOVE. LOCAL THERMOSTATS/SENSORS SHALL CONTROL VAV TERMINALS AS PER 'SPACE CONTROL' SEQUENCE OF OPERATION TO MAINTAIN OCCUPIED COOLING SETPOINTS. WHEN ALL SPACES REACH COOLING SETPOINT, SYSTEM SHALL RETURN TO OCCUPIED CONTROL (SEE 2.1). WHEN TRANSITIONING FROM MORNING COOL DOWN TO OCCUPIED MODE, THE OA DAMPER STROKE TIME SHALL BE A MINIMUM OF 15 MINUTES (ADJ).

3. AIR FLOW / FAN CONTROL

3.1. OCCUPIED:

A. STATIC PRESSURE SENSOR, SPS-2, SHALL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE, VFD TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SETPOINT.

1) FAN PRESSURE OPTIMIZATION (STATIC PRESSURE RESET): EVERY 10 MINUTES (ADJUSTABLE) DURING THE OCCUPIED MODE, THE DAMPER POSITIONS OF EACH VAV TERMINAL ASSOCIATED WITH THE RTU SHALL BE POLLED. BASED ON FEEDBACK FROM THE VAV DAMPER POSITIONS, THE STATIC PRESSURE SETPOINT SHALL BE RESET IN +/- 0.1" W.C. INCREMENTS (MAX 0.1" PER 10 MINUTE POLLING CYCLE) BETWEEN A FIXED RANGE (LOW END SHALL BE MINIMUM 1.0" W.C. - ADJUSTABLE, UPPER END SHALL BE 0.25" W.C. ABOVE THE STATIC PRESSURE SETPOINT DETERMINED BY THE BALANCE CONTRACTOR), IF THERE ARE NO VAV DAMPER POSITIONS GREATER THAN 90% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL BE LOWERED UNTIL AT LEAST ONE VAV DAMPER IS AT LEAST 90% OPEN (ADJUSTABLE), IF ANY ONE VAV DAMPER OPENS GREATER THAN 95% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL BE RAISED UNTIL THE MAXIMUM VAV DAMPER POSITION IS BELOW 95% OPEN (ADJUSTABLE). IF THE MAX. VAV DAMPER POSITION IS BETWEEN 90% AND 95% OPEN (ADJUSTABLE), THEN THE STATIC PRESSURE SET POINT SHALL REMAIN IN STEADY STATE UNTIL THE NEXT TEN MINUTE POLLING CYCLE.

B. AIR FLOW MONITOR, AFM-1, LOCATED AT THE OUTSIDE AIR INTAKE SHALL MODULATE D-1 TO MAINTAIN VENTILATION AIR QUANTITY AS INDICATED ON AIR HANDLING UNIT SCHEDULE. AFM-1 CONTROL SHALL BE OVERRIDDEN DURING ECONOMIZER MODE (ATMOSPHERIC COOLING), OR BY AHU VENTILATION RESET CONTROL / DEMAND CONTROLLED VENTILATION (SEE ATC SPECIFICATION FOR AHU VENTILATION RESET REQUIREMENTS).

C. UNOCCUPIED; DURING NIGHT SETBACK AND MORNING WARM-UP OPERATION, FANS SHALL BE ENERGIZED AS PER 2.2 AND 2.3 ABOVE. RETURN FAN VARIABLE FREQUENCY DRIVE, VFD, SHALL MODULATE TO MAINTAIN FULL AIRFLOW (EQUAL TO SUPPLY AIRFLOW) DURING WARM-UP & NIGHT SETBACK OPERATION.

4. MISCELLANEOUS

4.1 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AND RETURN AIR SHALL DE-ENERGIZE FANS AND CLOSE ASSOCIATED SMOKE DAMPERS SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

4.2 HIGH LIMIT STATIC PRESSURE SENSOR, SPS-1 SHALL DE-ENERGIZE AHU FANS WHEN STATIC PRESSURE REACHES 6.0" (ADJUSTABLE), ALARM AT THE BAS.

4.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK, ALARM AT THE BAS.

4.4 ON FAILURE OF SUPPLY FAN OR RETURN FAN, DAMPERS D-1, D-2 AND D-3 SHALL CLOSE. ALARM AT BAS.

4.5 MONITOR RETURN AIR CO2 SENSORS AT THE BAS.

4.6 CONDENSATE WATER LEAK DETECTOR, LK, SHALL BE INSTALLED IN THE COOLING COIL DRAIN PAN AT A LEVEL HIGHER THAN THE DRAIN CONNECTION. WHEN AN OVERFLOW CONDITION IS SENSED THE LEAK DETECTOR SHALL SHUT DOWN THE UNIT (HARD-WIRED) AND ALARM AT THE BAS.

bkm
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PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

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1801 RESEARCH BOULEVARD, SUITE 100
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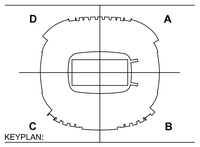


KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.24

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 5:21 PM ARL: G:\20092.01\Drawings\Acad\M4\M421 - M424 ATC CONTROLS

VENTILATION FANS

1. VF-8 & 9

   1.1. VF-8 & VF-9 SHALL BE CONTROLLED BY THE SAME THERMOSTAT. UPON A RISE IN SPACE TEMPERATURE, ABOVE 85°F (ADJUSTABLE), VF-8 SHALL ENERGIZE. ON A CONTINUED RISE IN SPACE TEMPERATURE, VF-9 SHALL ENERGIZE. UPON A FALL IN SPACE TEMPERATURE, BELOW 80°F (ADJUSTABLE), THE FANS SHALL DE-ENERGIZE. FANS SHALL BE INTERLOCKED WITH ASSOCIATED EXHAUST AND INTAKE MOD'S.

2. VF-11,12,13,25 & 30

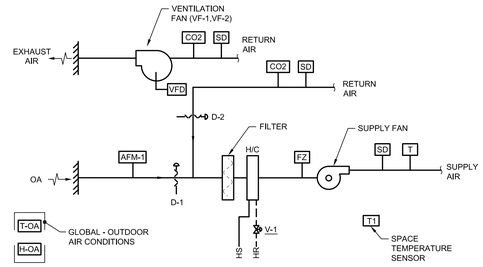
   2.1. FANS SHALL BE CONTROLLED BY THERMOSTAT. UPON A RISE IN SPACE TEMPERATURE, ABOVE 85°F (ADJUSTABLE), THE FAN SHALL ENERGIZE. UPON A FALL IN SPACE TEMPERATURE, BELOW 80°F (ADJUSTABLE), THE FAN SHALL DE-ENERGIZE. FAN SHALL BE INTERLOCKED WITH ASSOCIATED EXHAUST AND INTAKE MOD'S.

3. VF-10,24,26,27,28,29 & 31

   3.1. FANS SHALL BE CONTROLLED BY THERMOSTAT. UPON A RISE IN SPACE TEMPERATURE, ABOVE 85°F (ADJUSTABLE), THE FAN SHALL ENERGIZE. UPON A FALL IN SPACE TEMPERATURE, BELOW 80°F (ADJUSTABLE), THE FAN SHALL DE-ENERGIZE. FAN SHALL BE INTERLOCKED WITH ASSOCIATED EXHAUST AND INTAKE MOD'S.

DESIG.	REMARKS
VF-1	REFER TO HVU-1
VF-2	REFER TO HVU-2
VF-3	REFER TO HVU-3
VF-4	REFER TO HVU-4
VF-5	REFER TO HVU-5
VF-6	REFER TO HVU-6
VF-7	REFER TO HVU-7
VF-8	REFER TO NOTE 1 ABOVE
VF-9	REFER TO NOTE 1 ABOVE
VF-10	REFER TO NOTE 2 ABOVE
VF-11	REFER TO NOTE 3 ABOVE

DESIG.	REMARKS
VF-12	REFER TO NOTE 3 ABOVE
VF-13	REFER TO NOTE 3 ABOVE
VF-14 THRU VF-23	DO NOT EXIST
VF-24	REFER TO NOTE 2 ABOVE
VF-25 (A, B, C, D)	REFER TO NOTE 3 ABOVE
VF-26 (A & B)	REFER TO NOTE 2 ABOVE
VF-27 (A & B)	REFER TO NOTE 2 ABOVE
VF-28 (A & B)	REFER TO NOTE 2 ABOVE
VF-29 (A & B)	REFER TO NOTE 2 ABOVE
VF-30 (A, B, C, D)	REFER TO NOTE 3 ABOVE
VF-31 (A & B)	REFER TO NOTE 2 ABOVE



HVU-1 & 2 CONTROL

1. GENERAL

   1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3 OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED HEATING MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 AS REQUIRED.

   2.2. OCCUPIED VENTILATION MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. V-1 SHALL BE CLOSED.

   2.3. UNOCCUPIED:

      A. D-1 (OUTSIDE AIR) SHALL BE FULLY CLOSED. D-2 (RETURN AIR) SHALL BE OPEN.

      B. CYCLE FAN AND MODULATE V-1 AS REQUIRED TO MAINTAIN UNOCCUPIED SETPOINT.

   2.4 WARM UP MODE:

      A. WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL SPACE TEMPERATURE, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE).

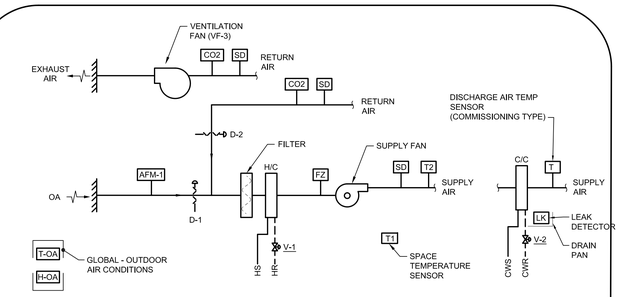
3. MISCELLANEOUS

   3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE AND D-2 SHALL BE OPEN. ALARM AT BAS.

   3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY, EXHAUST AND RETURN AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED, ALARM AT THE BAS.

   3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



HVU-3 CONTROL

1. GENERAL

   1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED AND D-2 SHALL BE FULLY OPEN.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3 OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL MODULATE TO MINIMUM OUTSIDE AIR POSITION IN RESPONSE TO AIRFLOW MONITOR, AFM-1.

      C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 & V-2 , WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

   2.2. OCCUPIED VENTILATION MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. V-1 & V-2 SHALL BE CLOSED.

   2.3. UNOCCUPIED:

      A. D-1 (OUTSIDE AIR) SHALL BE FULLY CLOSED. D-2 (RETURN AIR) SHALL BE OPEN.

      B. CYCLE FAN AND MODULATE V-1 & V-2 , WITHOUT OVERLAPPING CONTROL, AS REQUIRED TO MAINTAIN UNOCCUPIED SETPOINT.

   2.4 WARM UP MODE:

      A. WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL SPACE TEMPERATURE, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE).

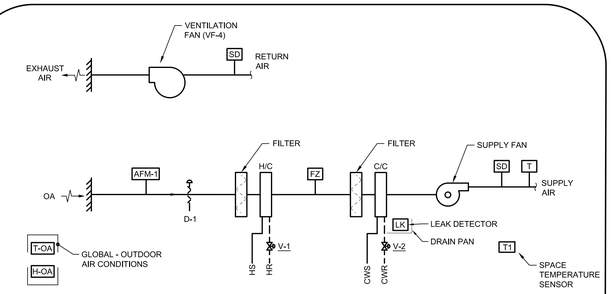
3. MISCELLANEOUS

   3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE AND D-2 SHALL BE OPEN. ALARM AT BAS.

   3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY, EXHAUST AND RETURN AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

   3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



HVU-4 CONTROL

1. GENERAL

   1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3 OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN.

      C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 & V-2 , WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

   2.2. OCCUPIED VENTILATION MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN.

      C. V-1 & V-2 SHALL BE CLOSED.

   2.3. UNOCCUPIED:

      A. ON A FALL IN SPACE TEMPERATURE BELOW 50°F (ADJUSTABLE), SYSTEM SHALL RUN IN OCCUPIED HEATING MODE UNTIL SPACE TEMPERATURE REACHES 55°F (ADJUSTABLE), ONCE SYSTEM REACHES DESIRED TEMPERATURE, THE SYSTEM SHALL DE-ENERGIZE.

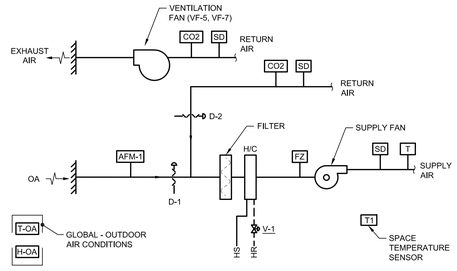
3. MISCELLANEOUS

   3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

   3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AND EXHAUST AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

   3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



HVU-5 & 7 CONTROL

1. GENERAL

   1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED, WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3 OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED HEATING MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 AS REQUIRED.

   2.2. OCCUPIED VENTILATION MODE:

      A. SUPPLY FAN AND VENTILATION FAN SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. V-1 SHALL BE CLOSED.

   2.3. UNOCCUPIED:

      A. D-1 (OUTSIDE AIR) SHALL BE FULLY CLOSED. D-2 (RETURN AIR) SHALL BE OPEN.

      B. CYCLE FAN AND MODULATE V-1 AS REQUIRED TO MAINTAIN UNOCCUPIED SETPOINT.

   2.4 WARM UP MODE:

      A. WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL SPACE TEMPERATURE, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE).

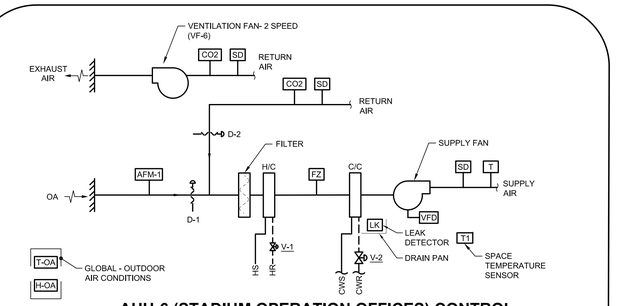
3. MISCELLANEOUS

   3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

   3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY, EXHAUST AND RETURN AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

   3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



AHU-6 (STADIUM OPERATION OFFICES) CONTROL

1. GENERAL

   1.1. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

   1.2. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

   1.3 OUTSIDE AIR TEMPERATURE AND HUMIDITY VALUES SHALL BE PROVIDED BY THE ASSOCIATED GLOBAL OA SENSORS. REFER TO GLOBAL OUTSIDE AIR CONDITIONS CONTROLS FOR ADDITIONAL INFORMATION. EACH UNIT SHALL REFERENCE THE GLOBAL SENSORS IN THE SAME QUADRANT IN WHICH THE UNIT IS LOCATED (DEFAULT), UNLESS OVERRIDDEN BY THE BAS.

2. TEMPERATURE CONTROL

   2.1. OCCUPIED MODE:

      A. SUPPLY FAN AND VENTILATION FAN (LOW SPEED) SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED.

   2.2. OCCUPIED VENTILATION MODE:

      A. SUPPLY FAN AND VENTILATION FAN (HIGH SPEED) SHALL OPERATE CONTINUOUSLY.

      B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN. D-2 (RETURN AIR) SHALL BE CLOSED.

      C. V-1 AND V-2 SHALL BE CLOSED.

   2.3. UNOCCUPIED:

      A. D-1 (OUTSIDE AIR) SHALL BE FULLY CLOSED. D-2 (RETURN AIR) SHALL BE OPEN.

      B. CYCLE FAN AND MODULATE V-1 OR V-2, WITHOUT OVERLAPPING CONTROL, AS REQUIRED TO MAINTAIN UNOCCUPIED SETPOINT.

   2.4 WARM UP MODE:

      A. WHEN SYSTEM IS FIRST INDEXED TO OCCUPIED, D-1 SHALL REMAIN CLOSED, D-2 SHALL REMAIN OPEN AND FAN SHALL OPERATE WITH HEATING VALVE OPEN UNTIL SPACE TEMPERATURE, AS SENSED BY T1, REACHES 70°F (ADJUSTABLE).

3. MISCELLANEOUS

   3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

   3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY,EXHAUST AND RETURN AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

   3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

   3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.

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PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

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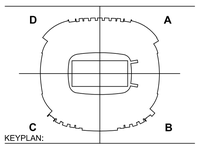


KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

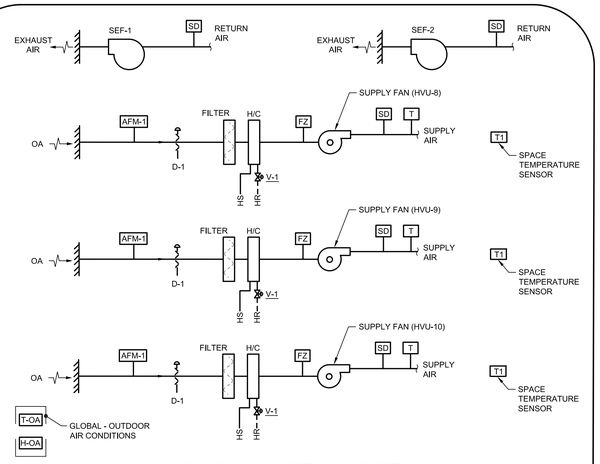
AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.25

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\MM4425 - M428 ATC CONTROLS
Plotted By: Craig M. Parks | 3/3/2021 10:13 PM



HVU-8,9,10 & SEF-1,2 CONTROL

1. GENERAL

1.1. FIRE SYSTEM SHALL INITIATE STARTING OF HVU-8,9 OR 10 SHALL INITIATE THE START OF THE LEAD SMOKE EXHAUST FAN, SEF-1 OR SEF-2. IF THE LEAD FAN FAILS OR FAILS TO START, THE LAG EXHAUST FAN, SEF-1 OR SEF-2 WILL START AND RUN CONTINUOUSLY.

1.2. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

1.3. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

2. TEMPERATURE CONTROL

2.1. OCCUPIED HEATING MODE:

A. SUPPLY FAN AND LEAD SMOKE EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN.

C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 AS REQUIRED.

2.2. OCCUPIED VENTILATION MODE:

A. SUPPLY FAN AND LEAD SMOKE EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN.

C. V-1 SHALL BE CLOSED.

2.3. UNOCCUPIED:

A. ON A FALL IN SPACE TEMPERATURE BELOW 50°F (ADJUSTABLE), SYSTEM SHALL RUN IN OCCUPIED HEATING MODE UNTIL SPACE TEMPERATURE REACHES 55°F (ADJUSTABLE). ONCE SYSTEM REACHES DESIRED TEMPERATURE, THE SYSTEM SHALL DE-ENERGIZE.

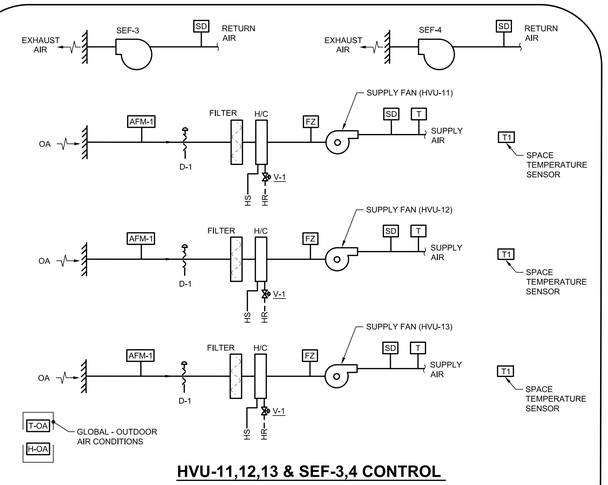
3. MISCELLANEOUS

3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.



HVU-11,12,13 & SEF-3,4 CONTROL

1. GENERAL

1.1. FIRE SYSTEM SHALL INITIATE STARTING OF HVU-8,9 OR 10 SHALL INITIATE THE START OF THE LEAD SMOKE EXHAUST FAN, SEF-3 OR SEF-4. IF THE LEAD FAN FAILS OR FAILS TO START, THE LAG EXHAUST FAN, SEF-3 OR SEF-4 WILL START AND RUN CONTINUOUSLY.

1.2. IN THE OCCUPIED MODE, H-O-A SWITCH SHALL BE KEPT IN "AUTO" POSITION. IN THE "OFF" POSITION D-1 SHALL BE FULLY CLOSED. WHEN FANS ARE DE-ENERGIZED, D-1 SHALL BE FULLY CLOSED.

1.3. OCCUPIED-UNOCCUPIED MODE SHALL BE AS DETERMINED BY THE BUILDING AUTOMATION SYSTEM (BAS).

2. TEMPERATURE CONTROL

2.1. OCCUPIED HEATING MODE:

A. SUPPLY FAN AND LEAD SMOKE EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN.

C. THE SPACE TEMPERATURE, SENSED BY T1, SHALL THEN BE MAINTAINED BY MODULATING V-1 AS REQUIRED.

2.2. OCCUPIED VENTILATION MODE:

A. SUPPLY FAN AND LEAD SMOKE EXHAUST FAN SHALL OPERATE CONTINUOUSLY.

B. D-1 (OUTSIDE AIR) SHALL FULLY OPEN.

C. V-1 SHALL BE CLOSED.

2.3. UNOCCUPIED:

A. ON A FALL IN SPACE TEMPERATURE BELOW 50°F (ADJUSTABLE), SYSTEM SHALL RUN IN OCCUPIED HEATING MODE UNTIL SPACE TEMPERATURE REACHES 55°F (ADJUSTABLE). ONCE SYSTEM REACHES DESIRED TEMPERATURE, THE SYSTEM SHALL DE-ENERGIZE.

3. MISCELLANEOUS

3.1 ON A FAILURE OF SUPPLY FAN, DAMPER D-1 SHALL CLOSE. ALARM AT BAS.

3.2 SMOKE DETECTORS, SD, LOCATED IN THE SUPPLY AIR SHALL DE-ENERGIZE FAN SHOULD PRODUCTS OF COMBUSTION BE SENSED. ALARM AT THE BAS.

3.3 THE BAS SHALL MONITOR FILTER LOADING ACROSS EACH FILTER BANK. ALARM AT THE BAS.

3.4 WHEN THE AIR TEMPERATURE, AS SENSED BY FZ, FALLS BELOW 35°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE BAS.

GLOBAL OUTSIDE AIR CONDITIONS CONTROLS (MULTIPLE SENSORS)

T-OA OUTSIDE AIR TEMPERATURE SENSOR

H-OA OUTSIDE AIR HUMIDITY SENSOR

1. PROTECT ALL INPUTS FROM LIGHTNING WITH EXTERNAL SURGE SUPPRESSION DEVICES.
2. FOLLOW ALL MANUFACTURER RECOMMENDED INSTALLATION INSTRUCTIONS.
3. INSTALL DEVICES IN LOCATIONS WHERE READINGS ARE NO EFFECTED BY DIRECT SUNLIGHT, ETC.
4. PROVIDE MULTIPLE SENSORS AT VARIOUS LOCATIONS FOR ACCURATE MEASUREMENT OF OUTDOOR CONDITIONS (LOCATIONS ARE THE APPROX. AREAS, CONTRACTOR SHALL FIELD DETERMINE EXACT LOCATIONS):

DESIGNATION	LOCATION
OA-A	PRESS LEVEL, MECHANCIAL ROOM QUAD A
OA-B	PRESS LEVEL, MECHANCIAL ROOM QUAD B
OA-C	PRESS LEVEL, MECHANCIAL ROOM QUAD C
OA-D	PRESS LEVEL, MECHANCIAL ROOM QUAD D
OA-LOTC-GEN	LOT C - GENERATOR PLANT

OUTSIDE AIR CONDITIONS - SEQUENCE OF OPERATION

1.
2. GENERAL

2.1. THE BAS SHALL MONITOR OUTSIDE CONDITIONS.

2.2. THE BAS SHALL DISPLAY OA DRY BULB TEMPERATURE, OA WET BULB TEMPERATURE, OA RELATIVE HUMIDITY, AND OA ENTHALPY.

2.3. THE BAS SHALL HAVE A DEDICATED GRAPHICS SCREEN FOR OUTSIDE AIR CONDITIONS. ADDITIONALLY, THE BAS SHALL DISPLAY THE OUTSIDE CONDITIONS ON EACH ASSOCIATED MECHANICAL EQUIPMENT GRAPHIC SCREEN.

2.4. MULTIPLE SENSORS SHALL BE PROVIDED AT VARIOUS LOCATIONS FOR ACCURATE MEASUREMENT OF OUTSIDE AIR CONDITIONS. MECHANICAL EQUIPMENT SHALL REFERENCE THE ASSOCIATED OA SENSORS FOR THE AREA (I.E. QUADRANT).

A. FOR MULTIPLE OA SENSORS SERVING THE SAME BUILDING, THE BAS SHALL ALSO PROVIDE A CALCULATED AVERAGE OA CONDITION BY POOLING ALL AVAILABLE SENSORS.

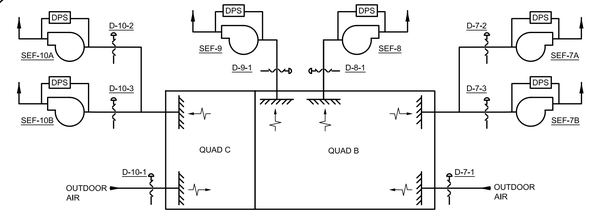
B. THE BAS OPERATOR SHALL HAVE THE OPTION TO SELECT ONE (1) SET OF OA SENSOR AS A MASTER OVERRIDE FOR ALL EQUIPMENT. ADDITIONALLY, THE BAS OPERATOR SHALL BE ABLE TO RE-ASSIGN ASSOCIATED OA SENSORS FOR EQUIPMENT AS A PERMANENT RE-ASSIGNMENT OR TEMPORARY OVERRIDE.

3. CONTROL

3.1. MECHANICAL EQUIPMENT SHALL BE CONTROLLED BY THE ASSOCIATED OA SENSORS. THE BAS SHALL DISPLAY THE ASSOCIATED OA CONDITIONS ON THE EQUIPMENT GRAPHIC SCREEN.

4. ALARMS

4.1. AN ALARM SHALL BE ISSUED AT THE BAS WHENEVER THE CONTROLS SYSTEM SENSES ANY SENSOR IN A FAILED STATE.

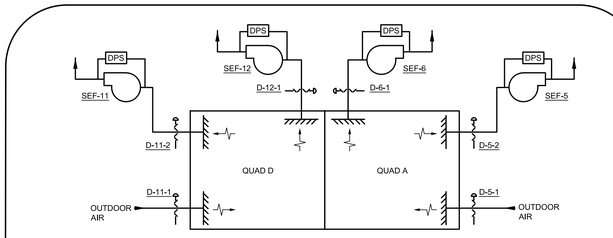


SOUTHEAST ATRIUM SMOKE ZONE CONTROL (QUAD B)

1. CROSS ZONED CEILING SMOKE DETECTORS, HVAC SMOKE DETECTORS, OR A SPRINKLER WATER FLOW ALARM WITHIN THE ATRIUM WILL ENERGIZE SMOKE EXHAUST SYSTEM THROUGH THE FIRE ALARM SYSTEM.
2. WHEN THIS SIGNAL IS RECEIVED, OUTDOOR AIR DAMPERS D-7-1 & D-10-1 WILL OPEN AND EXHAUST AIR DAMPERS D-7-2, D-7-3, D-8-1 & D-9-1 WILL OPEN. SMOKE EXHAUST FANS, SEF-7A, SEF-7B, SEF-8 & SEF-9 WILL ENERGIZE AND RUN CONTINUOUSLY.
3. AIR HANDLING UNITS, AHU-2 & AHU-3 SERVING THIS ATRIUM SHALL BE DE-ENERGIZED AND ALL ASSOCIATED DAMPERS SHALL CLOSE WHEN THE SMOKE EXHAUST IS ENERGIZED.
4. ATRIUM SMOKE EXHAUST FANS SHALL HAVE THE ABILITY TO BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM PANEL.

SOUTHWEST CLUB SMOKE ZONE CONTROL (QUAD C)

1. CROSS ZONED CEILING SMOKE DETECTORS, HVAC SMOKE DETECTORS, OR A SPRINKLER WATER FLOW ALARM WITHIN THE ATRIUM WILL ENERGIZE SMOKE EXHAUST SYSTEM THROUGH THE FIRE ALARM SYSTEM.
2. WHEN THIS SIGNAL IS RECEIVED, OUTDOOR AIR DAMPERS D-7-1 & D-10-1 WILL OPEN AND EXHAUST AIR DAMPERS D-10-2 & D-10-3 WILL OPEN. SMOKE EXHAUST FANS, SEF-10A & SEF-10B WILL ENERGIZE AND RUN CONTINUOUSLY.
3. AIR HANDLING UNITS, AHU-2 & AHU-3 SERVING THIS ATRIUM SHALL BE DE-ENERGIZED AND ALL ASSOCIATED DAMPERS SHALL CLOSE WHEN THE SMOKE EXHAUST IS ENERGIZED.
4. ATRIUM SMOKE EXHAUST FANS SHALL HAVE THE ABILITY TO BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM PANEL.



NORTH ATRIUM SMOKE ZONE CONTROL (QUAD A & D)

1. CROSS ZONED CEILING SMOKE DETECTORS, HVAC SMOKE DETECTORS, OR A SPRINKLER WATER FLOW ALARM WITHIN THE ATRIUM WILL ENERGIZE SMOKE EXHAUST SYSTEM THROUGH THE FIRE ALARM SYSTEM.
2. WHEN THIS SIGNAL IS RECEIVED, OUTDOOR AIR DAMPERS D-5-1 & D-11-1 WILL OPEN AND EXHAUST AIR DAMPERS D-5-2, D-6-1, D-11-2 & D-12-1 WILL OPEN. SMOKE EXHAUST FANS, SEF-5, SEF-6, SEF-11 & SEF-12 WILL ENERGIZE AND RUN CONTINUOUSLY.
3. AIR HANDLING UNITS, AHU-1 & AHU-4 SERVING THIS ATRIUM SHALL BE DE-ENERGIZED AND ALL ASSOCIATED DAMPERS SHALL CLOSE WHEN THE SMOKE EXHAUST IS ENERGIZED.
4. ATRIUM SMOKE EXHAUST FANS SHALL HAVE THE ABILITY TO BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM PANEL.

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS;

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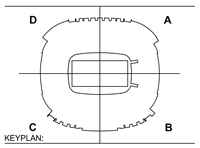

KEYPLAN:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.26

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:13 PM
ARL: G:\20092.01\Drawings\Acad\M\M425 - HM28 ATC CONTROLS

FIELD HEATING POINTS LIST

NAME	TYPE	VALUE
AC_PwrFail	BinaryValue	Normal / Failure
EffReturnTempSpt	AnalogValue	Deg F
FieldTemp	AnalogValue	Deg F
HeaderPmpRotate	BinaryValue	On/ Off
HeaderSupplySpt	AnalogValue	Deg F
HxBypassVlvCmd	AnalogValue	%
MainHeaderPump1Command	BinaryValue	Start / Stop
MainHeaderPump1Status	BinaryValue	On/ Off
MainHeaderPump2Command	BinaryValue	Start / Stop
MainHeaderPump2Status	BinaryValue	On/ Off
MainHeaderReturnTemp	AnalogValue	Deg F
MainHeaderSupplyTemp	AnalogValue	Deg F
MainHeaderSysPress	AnalogValue	PSI
OaEnableDiffSpt	AnalogValue	Deg F
OaEnableSpt	AnalogValue	Deg F
Occupancy	BinaryValue	Enabled / Disabled
OutsideAirHighLimit	AnalogValue	Deg F
OutsideAirLowLimit	AnalogValue	Deg F
ReturnHighLimit	AnalogValue	Deg F
ReturnLowLimit	AnalogValue	Deg F
SystemStatus	BinaryValue	Enabled / Disabled
SystemSwitch	BinaryValue	Auto
Zn1AvgTemp	AnalogInput	Deg F
Zn1PmpRotate	BinaryValue	On/ Off
Zn2AvgTemp	AnalogInput	Deg F
Zn2PmpRotate	BinaryValue	On/ Off
Zn3AvgTemp	AnalogInput	Deg F
Zn3PmpRotate	BinaryValue	On/ Off
Zn4AvgTemp	AnalogInput	Deg F
Zn4PmpRotate	BinaryValue	On/ Off
Zn5AvgTemp	AnalogInput	Deg F
Zn5PmpRotate	BinaryValue	On/ Off
Zn6AvgTemp	AnalogInput	Deg F
Zn6PmpRotate	BinaryValue	On/ Off
Zone1_Temp1	AnalogInput	Deg F
Zone1_Temp2	AnalogInput	Deg F
Zone1_Temp3	AnalogInput	Deg F
Zone1_Temp4	AnalogInput	Deg F
Zone1HtgVlvCmd	AnalogValue	Deg F
Zone1Pump1Cmd	BinaryValue	Start / Stop
Zone1Pump1Sts	BinaryValue	On/ Off
Zone1Pump2Cmd	BinaryValue	Start / Stop
Zone1Pump2Sts	BinaryValue	On/ Off
Zone1ReturnTemp	AnalogValue	Deg F
Zone1SupplyTemp	AnalogValue	Deg F
Zone2_Temp5	AnalogInput	Deg F
Zone2_Temp6	AnalogInput	Deg F
Zone2_Temp7	AnalogInput	Deg F
Zone2_Temp8	AnalogInput	Deg F
Zone2HtgVlvCmd	AnalogValue	Deg F
Zone2Pump1Cmd	BinaryValue	Start / Stop
Zone2Pump1Sts	BinaryValue	On/ Off
Zone2Pump2Cmd	BinaryValue	Start / Stop
Zone2Pump2Sts	BinaryValue	On/ Off
Zone2ReturnTemp	AnalogValue	Deg F
Zone2SupplyTemp	AnalogValue	Deg F
Zone3_Temp9	AnalogInput	Deg F
Zone3_Temp10	AnalogInput	Deg F
Zone3_Temp11	AnalogInput	Deg F
Zone3_Temp12	AnalogInput	Deg F
Zone3HtgVlvCmd	AnalogValue	Deg F
Zone3Pump1Cmd	BinaryValue	Start / Stop
Zone3Pump1Sts	BinaryValue	On/ Off
Zone3Pump2Cmd	BinaryValue	Start / Stop
Zone3Pump2Sts	BinaryValue	On/ Off
Zone3ReturnTemp	AnalogValue	Deg F
Zone3SupplyTemp	AnalogValue	Deg F
Zone4_Temp13	AnalogInput	Deg F
Zone4_Temp14	AnalogInput	Deg F
Zone4_Temp15	AnalogInput	Deg F
Zone4_Temp16	AnalogInput	Deg F
Zone4HtgVlvCmd	AnalogValue	Deg F
Zone4Pump1Cmd	BinaryValue	Start / Stop
Zone4Pump1Sts	BinaryValue	On/ Off
Zone4Pump2Cmd	BinaryValue	Start / Stop
Zone4Pump2Sts	BinaryValue	On/ Off
Zone4ReturnTemp	AnalogValue	Deg F
Zone4SupplyTemp	AnalogValue	Deg F
Zone5_Temp17	AnalogInput	Deg F
Zone5_Temp18	AnalogInput	Deg F
Zone5_Temp19	AnalogInput	Deg F
Zone5_Temp20	AnalogInput	Deg F
Zone5HtgVlvCmd	AnalogValue	Deg F
Zone5Pump1Cmd	BinaryValue	Start / Stop
Zone5Pump1Sts	BinaryValue	On/ Off
Zone5Pump2Cmd	BinaryValue	Start / Stop
Zone5Pump2Sts	BinaryValue	On/ Off
Zone5ReturnTemp	AnalogValue	Deg F
Zone5SupplyTemp	AnalogValue	Deg F
Zone6_Temp17	AnalogInput	Deg F
Zone6_Temp18	AnalogInput	Deg F
Zone6_Temp19	AnalogInput	Deg F
Zone6_Temp20	AnalogInput	Deg F
Zone6HtgVlvCmd	AnalogValue	Deg F
Zone6Pump1Cmd	BinaryValue	Start / Stop
Zone6Pump1Sts	BinaryValue	On/ Off
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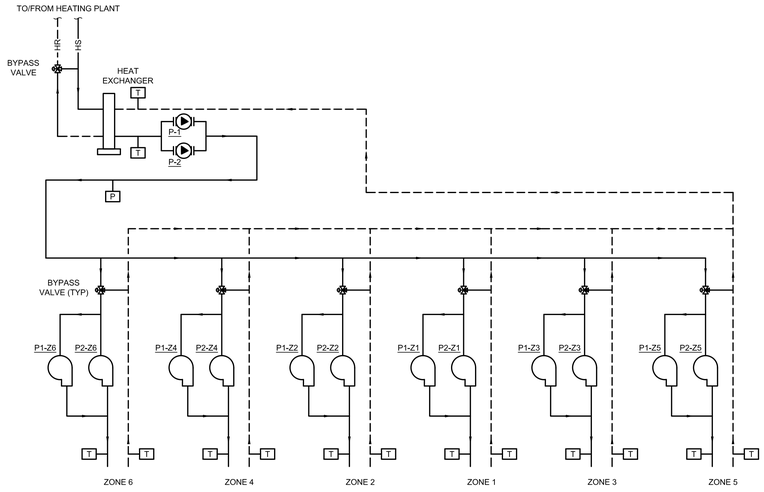
Zone6Pump2Sts	BinaryValue	On/ Off
Zone6ReturnTemp	AnalogValue	Deg F
Zone6SupplyTemp	AnalogValue	Deg F



FIELD HEATING SYSTEM - SCHEMATIC DIAGRAM

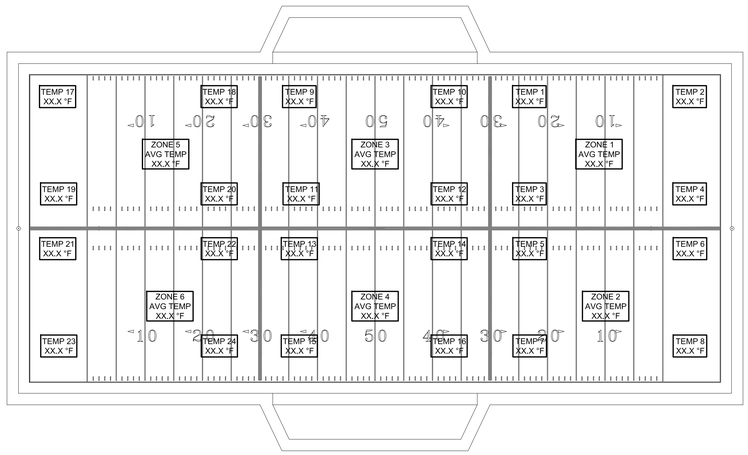
FIELD HEATING SYSTEM CONTROL

GENERAL:

1. VERIFY AND REPLICATE EXISTING SEQUENCE OF OPERATION.
2. ALL EXISTING SENSORS AND VALVES IN SCHEMATIC SHALL BE REMOVED AND REPLACED.
3. EXISTING FIELD TEMPERATURE SENSORS (LOCATED APPROX. 10 -12" BELOW THE FIELD) SHALL BE REPLACE. ACCESS SHALL BE COORDINATED THRU THE OWNER. CONTRACTOR SHALL NOT TOUCH THE FIELD, ALL EXCAVATIONS AND FIELD WORK WILL BE BY THE OWNER'S GROUNDS CREW.
4. THIS IS A CRITICAL SYSTEM. ALL WORK RELATED TO THIS SYSTEM SHALL BE PROVIDED UNDER SEPARATE SUBMITTALS FOR APPROVAL.

SEQUENCE OF OPERATION (REFERENCE ONLY):

1. PER HEATING PLANT CONTROL SEQUENCE, PLANT BOILERS AND PUMPS SHALL BE OPERATIONAL AT ALL TIMES.
2. LEAD FIELD HEATING SYSTEM PRIMARY PUMP (P-1) SHALL BE ENERGIZED WHENEVER OUTSIDE AIR TEMPERATURE FALLS BELOW 50°F (ADJUSTABLE). UPON A FAILURE OF PRIMARY PUMP, P-1, LAG PUMP, P-2, SHALL ENERGIZE. LEAD / LAG PUMP SHALL ALTERNATE EVERY 300 HOURS OF RUN TIME.
3. ZONE PUMPS (TYP 6) SHALL ENERGIZE WHEN PRIMARY PUMP ENERGIZES.
4. 3-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN 120°F RETURN WATER TEMPERATURE FROM FIELD.
5. PROVIDE TEMPERATURE SENSOR AT SUPPLY AND RETURN FOR EACH ZONE. EACH ZONE SHALL BE MONITORED AT THE BAS.
6. FIELD PRIMARY PUMP AND ZONE PUMPS SHALL DE-ENERGIZE WHEN OUTSIDE AIR TEMPERATURE RISES ABOVE 50°F (ADJUSTABLE).



FIELD HEATING SYSTEM - TEMPERATURE / ZONES

SCOREBOARD FANS CONTROL

1. ALL SCOREBOARD FANS (I.E. SIX (6) WALL MOUNTED EXHAUST FANS AND EIGHT (8) INTERIOR PROP FANS PER SCOREBOARD) SHALL BE CONTROLLED VIA REVERSE ACTING THERMOSTAT.
2. FANS SHALL ENERGIZE WHEN SPACE TEMPERATURE IS ABOVE 85°F (ADJUSTABLE) AND DE-ENERGIZE WHEN SPACE TEMPERATURE IS BELOW 80°F (ADJUSTABLE).
3. ALARM AT BAS WHEN SPACE TEMPERATURE RISES ABOVE 105°F (ADJUSTABLE).

PIZZA OVEN EXHAUST FANS CONTROL

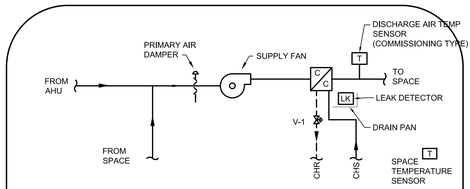
1. EXHAUST FANS SHALL BE TIED INTO ASSOCIATED MAKE-UP AIR UNIT.
2. FAN SHALL ENERGIZE WHEN ASSOCIATED MAKE-UP AIR UNIT IS ENERGIZED AND DE-ENERGIZE WHEN ASSOCIATED MAKE-UP AIR UNIT IS DE-ENERGIZED.
3. ALARM AT BAS WHEN FAN IS NOT OPERATIONAL WHEN ASSOCIATED MAKE-UP AIR UNIT IS OPERATING.

RAVENS OFFICE RELIEF FANS

1. RELIEF FANS (TYP 2) LOCATED IN HOUSEKEEPING RM 5.34.05.
2. FANS SHALL ENERGIZE WHEN IN OCCUPIED MODE.

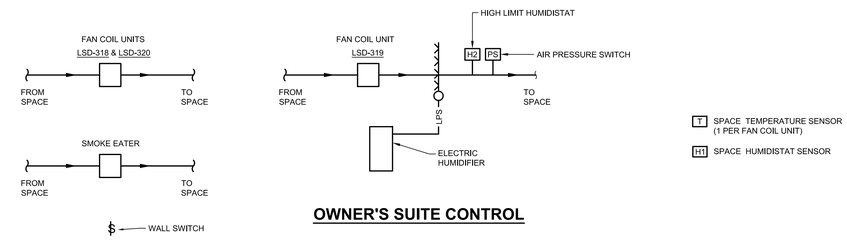
TRANSFER FANS CONTROL

1. ALL TRANSFER FANS SHALL BE CONTROLLED VIA REVERSE ACTING THERMOSTAT.
2. FANS SHALL ENERGIZE WHEN SPACE TEMPERATURE IS ABOVE 85°F (ADJUSTABLE) AND DE-ENERGIZE WHEN SPACE TEMPERATURE IS BELOW 80°F (ADJUSTABLE). FAN SHALL BE INTERLOCKED WITH ALL ASSOCIATED INTAKE AND EXHAUST MODS.
3. ALARM AT BAS WHEN SPACE TEMPERATURE RISES ABOVE 105°F (ADJUSTABLE).



LIQUOR STORAGE ROOM CLC-VB06 TERMINAL UNIT CONTROL

1. WHEN AHU-3 SYSTEM IS INDEXED TO "OCCUPIED", THE SPACE THERMOSTAT SHALL MODULATE THE TERMINAL UNIT PRIMARY AIR DAMPER TO MAINTAIN OCCUPIED SPACE TEMPERATURE SETPOINT AND THE FAN SHALL BE DE-ENERGIZED.
2. WHEN AHU-3 SYSTEM IS INDEXED TO "UNOCCUPIED" AND/OR AHU-3 IS DE-ENERGIZED, THE TERMINAL UNIT PRIMARY AIR DAMPER SHALL GO TO MINIMUM SETTING. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SPACE SETPOINT, THE UNIT FAN SHALL ENERGIZE AND THE COOLING COIL CONTROL VALVE SHALL OPEN AND MODULATE AS REQUIRED TO MAINTAIN SPACE SETPOINT.



OWNER'S SUITE CONTROL

1. GENERAL:
   1.1. OWNERS SUITE IS SERVED BY THREE (3) FAN COIL UNITS, A HUMIDIFIER AND A SMOKE EATER.
   1.2. ALL UNITS SHALL BE CONNECTED TO THE BAS FOR MONITORING, CONTROL, AND ALARM.
2. FAN COIL UNITS CONTROL:
   2.1. REFER TO 4-PIPE FAN COIL UNIT CONTROL ON SHEET M4.23.
3. HUMIDIFIER CONTROL:
   3.1. SPACE HUMIDITY SENSOR, H1, SHALL MODULATE THE HUMIDIFIER TO MAINTAIN THE RELATIVE HUMIDITY SETPOINT (ADJUSTABLE). HIGH LIMIT HUMIDITY SENSOR, H2, SHALL OVERRIDE THIS CONTROL TO MAINTAIN A MAXIMUM HUMIDITY OF 85% (ADJUSTABLE).
      A. HUMIDIFIER SHALL REMAIN DE-ENERGIZED UNTIL AIRFLOW IS SENSED AT AIR SENSE AIR PRESSURE SWITCH, PS.
4. SMOKE EATER CONTROL:
   4.1 CONNECT TO THE BAS FOR MONITORING, ON/OFF CONTROL, AND STATUS.
   4.2 UNIT SHALL OPERATE VIA WALL FAN SWITCH.

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PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

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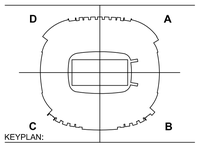

KEYPLAN:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID SET**

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

AUTOMATIC TEMPERATURE CONTROLS

DRAWING NO:

M4.27

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:13 PM ARL: G:\20092.01\Drawings\Acad\MM4425 - M428 ATC CONTROLS

HEAT TRACE PANELS CONTROL

A. CONTRACTOR SHALL CONNECT EACH HEAT TRACE PANEL TO BE MONITORED AND CONTROLLED THRU THE BAS. PROVIDE ALL POINTS AND ALARMS IDENTIFIED. POINTS IDENTIFIED AS "GLOBAL" SHALL AFFECT ALL PANELS, AND "BY QUAD" SHALL BE SPECIFIC TO THE ZONE.

B. HEAT TRACE SYSTEM IS ENERGIZED THRU THE GLOBAL OUTSIDE AIR TEMPERATURE. THE TEMPERATURE SENSORS LOCATED IN EACH QUAD ARE HARDWIRED TO ENERGIZE THE HEAT TRACE WHEN THE TEMPERATURE DROPS BELOW THE FAILURE SETPOINT(ADJ)

C. HEAT TRACE ALARMS SHALL BE CATEGORIZED AS "CRITICAL".

POINTS SCHEDULE

PANEL	LOCATION	SERVICE
HT-CLA	CLUB LEVEL, QUAD A, ELECTRICAL ROOM 4.03.03	QUAD A
HT-CLB	CLUB LEVEL, QUAD B, ELECTRICAL ROOM 4.24.04	QUAD B
HT-CLC	CLUB LEVEL, QUAD C, ELECTRICAL ROOM 4.30.04	QUAD C
HT-CLD	CLUB LEVEL, QUAD D, ELECTRICAL ROOM 4.51.02	QUAD D

POINTS LIST

POINT	DEFAULT SETPOINT OR VALUE	NOTES
HEAT TRACE ENABLED SETPOINT	DEFAULT 40°F (ADJ)	GLOBAL & BY QUAD
HEAT TRACE SETPOINT DIFFERENTIAL DEADBAND	DEFAULT 2°F (ADJ)	GLOBAL & BY QUAD
HEAT TRACE FAILURE SETPOINT (ALARM)	DEFAULT 36°F (ADJ)	GLOBAL & BY QUAD
HEAT TRACE FAILURE ALARM	ON / OFF	BY QUAD
OA TEMPERATURE	°F	BY QUAD
OA TEMPERATURE AVERAGE	°F	GLOBAL
HEAT TRACE COMMAND	ON / OFF	BY QUAD

ELECTRICAL SUBSTATIONS

A. SUBSTATION TRANSFORMER HIGH TEMPERATURE ALARMS AND SUBSTATION ELECTRIC USAGE SHALL BE MONITORED THROUGH THE BAS.

TMP-S HIGH TEMPERATURE ALARM IN SUBSTATION ENCLOSURE

DCM-S DIGITAL ELECTRIC METER IN SUBSTATION ENCLOSURE

SUBSTATION	LOCATION
SS1-PRA	PRESS LEVEL ELECTRICAL ROOM QUAD A
SS2-PRA	PRESS LEVEL ELECTRICAL ROOM QUAD A
SS1-PRB	PRESS LEVEL ELECTRICAL ROOM QUAD B
SS2-PRB	PRESS LEVEL ELECTRICAL ROOM QUAD B
SS1-PRC	PRESS LEVEL ELECTRICAL ROOM QUAD C
SS2-PRC	PRESS LEVEL ELECTRICAL ROOM QUAD C
SS1-PRD	PRESS LEVEL ELECTRICAL ROOM QUAD D
SS2-PRD	PRESS LEVEL ELECTRICAL ROOM QUAD D
SS1-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B
SS2-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B
SS3-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B
SSFP-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B
SSGE-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B
SSGL-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B

SUMP PUMP CONTROL

1. SUMP PUMP SHALL BE CONNECTED TO THE BAS FOR MONITORING AND ALARM. EXISTING METHOD OF CONTROL SHALL REMAIN.
2. PROVIDE A HI-LEVEL WATER SENSOR FOR THE PUMPS THAT DO NOT HAVE ELECTRONIC CONTROLS.
3. SUMP PUMPS WITH FLOAT SWITCH
   3.1. PUMPS SHALL BE ENERGIZED VIA A FLOAT ACTIVATED SWITCH.
   3.2. INTEGRATE HIGH WATER (ALARM), AND STATUS (MONITOR) INTO BAS GRAPHICS.
4. SUMP PUMPS WITH ELECTRONIC CONTROLS:
   4.1. PUMPS SHALL BE ENERGIZED BY THE ELECTRONIC WATER LEVEL DETECTOR.
   4.2. INTEGRATE HIGH WATER (ALARM), WATER LEVEL (MONITOR) AND STATUS (MONITOR) INTO BAS GRAPHICS.

SUMP PUMP SCHEDULE

DESIG	SERVICE	# OF PUMPS	LOCATION	REMARKS
SP-1	SEWAGE EJECTOR	2	QUAD B, RM 1.27.03	FLOAT SWITCH
SWEP-1 & SWEP-2	SEWAGE EJECTOR EQUIP. ROOM	2	QUAD B, RM 1.26.03	ELECTRONIC CONTROLS
SP-3	SUMP BOWL DRAINAGE	3	QUAD A	ELECTRONIC CONTROLS
SP-4	SUMP BOWL DRAINAGE	3	QUAD B	ELECTRONIC CONTROLS
SP-5	SUMP LOADING DOCK	2	QUAD B	FLOAT SWITCH
SP-6	SUMP FIELD DRAINAGE EAST	2	QUAD B (NEAR EAST END ZONE)	ELECTRONIC CONTROLS
SP-7	SUMP FIELD DRAINAGE WEST	2	QUAD C (NEAR WEST END ZONE)	ELECTRONIC CONTROLS
SP-8	ELECTRIC ROOM MANHOLE	1	QUAD B, RM 1.24.03	FLOAT SWITCH
SP-9	GENERATOR PLANT - VESTIBULE	1	GENERATOR PLANT	FLOAT SWITCH
SP-10	GENERATOR PLANT	2	GENERATOR PLANT	ELECTRONIC CONTROLS

SWITCHGEAR AND GENERATOR BATTERY BANK MONITORING

A. BATTERY BANKS IN THE FOLLOWING LOCATIONS NOTED BELOW SHALL BE MONITORED THROUGH THE BAS.

GENERATOR PLANT GENERATOR #1
GENERATOR PLANT GENERATOR #2
GENERATOR PLANT SWITCHGEAR
MAIN ELECTRICAL ROOM SWITCHGEAR
(SERVICE LEVEL, RM #1.24.03)

B. THE FOLLOWING POINTS SHALL BE MONITORED:

AC FAILURE
CHARGER FAILURE
LOW DC VOLTS
HIGH DC VOLTS
GROUND FAULT

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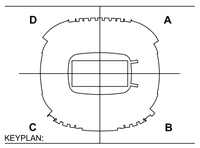

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M4.28

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:13 PM ARL: G:\20092.01\Drawings\Acad\MM425 - M428 ATC CONTROLS

INPUT / OUTPUT SCHEDULE

SYSTEM DESIG.	I/O LEGEND X - REQUIRED POINT	INPUTS																OUTPUTS									SYSTEM FEATURES																		GENERAL		
		ANALOG								BINARY								DIGITAL				ANALOG					ALARMS						APPLICATION PROGRAMS														
		MEASURED				CALCULATED																																									
		TEMPERATURE	PRESSURE	RH	AIR FLOW/FLUID FLOW	KWH	ENTHALPY	RUN TIME	STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	METER	DP SWITCH	CURRENT SWITCH	END SWITCH	OFF ON	OFF AUTO ON	OFF HIGH LOW	OPEN CLOSE	DAMPER POSITION	VALVE POSITION	SET POINT ADJ.	AOP	AOE	HIGH ANALOG	LOW ANALOG	HIGH BINARY	LOW BINARY	PROOF	SMOKE	TIME SCHEDULING	DEMAND LIMITING	PREVENTIVE MAINTENANCE	DUTY CYCLE	START STOP OPT	ENTHALPY ECON	SMOKE OPT	TREND	ALARM INSTRUMENT	DDC	MANUAL OVERRIDE	DRYBULB ECON	COLOR GRAPHICS		
CHILLED WATER SYSTEM	CHILLED WATER PUMP, P-1		X					X	X							X		X								X					X					X				X		X			X		
	CHILLED WATER PUMP, P-2		X					X	X							X		X								X					X					X				X		X			X		
	CHILLED WATER PUMP, P-3		X					X	X							X		X								X					X					X				X		X			X		
	PRIMARY CHILLED WATER SUPPLY TEMPERATURE, T-1	X	X		X									X												X	X	X												X		X			X		
	PRIMARY WATER RETURN TEMPERATURE, T-2	X	X		X									X												X	X	X												X		X			X		
	SECONDARY CHILLED WATER SUPPLY TEMPERATURE, T-3	X	X		X									X												X	X	X												X		X			X		
	SECONDARY CHILLED WATER RETURN TEMPERATURE, T-4	X	X		X									X												X	X	X												X		X			X		
	SECONDARY CHILLED WATER RETURN TEMPERATURE, T-5	X	X		X									X												X	X	X												X		X			X		
	CHILLED WATER VALVE, V-1		X																				X			X														X		X			X		
	FREEZE STAT, FS											X																			X									X		X			X		
	DIFFERENTIAL PRESSURE TRANSMITTER, DPT-1																									X														X		X			X		
	DIFFERENTIAL PRESSURE TRANSMITTER, DPT-2																									X														X		X			X		
	DIFFERENTIAL PRESSURE TRANSMITTER, DPT-3																									X														X		X			X		
HEATING WATER SYSTEM	STEAM CONVERTOR, C-1	X						X	X														X				X													X		X			X		
	STEAM CONVERTOR, C-2	X						X	X														X				X													X		X			X		
	HEATING PUMP, P-4		X					X	X							X		X									X				X					X				X		X			X		
	HEATING PUMP, P-5		X					X	X							X		X									X				X					X				X		X			X		
	HEATING PUMP, P-7		X					X	X							X		X									X				X					X				X		X			X		
	HEATING PUMP, P-8		X					X	X							X		X									X				X					X				X		X			X		
	CONVERTOR C-1 SUPPLY TEMPERATURE, T-1	X	X		X									X										X		X	X	X												X		X			X		
	CONVERTOR C-2 SUPPLY TEMPERATURE, T-2	X	X		X									X												X	X	X												X		X			X		
	PRIMARY HEATING SUPPLY TEMPERATURE, T-4	X	X		X									X										X		X	X	X												X		X			X		
	PRIMARY HEATING RETURN TEMPERATURE, T-5	X	X		X									X												X	X	X												X		X			X		
	SECONDARY HEATING SUPPLY TEMPERATURE, T-6	X	X		X									X										X		X	X	X												X		X			X		
	SECONDARY HEATING RETURN TEMPERATURE, T-7	X	X		X									X												X	X	X												X		X			X		
	SECONDARY HEATING SUPPLY TEMPERATURE, T-8	X	X		X									X										X		X	X	X												X		X			X		
	SECONDARY HEATING RETURN TEMPERATURE, T-9	X	X		X									X												X	X	X												X		X			X		
	HIGH LIMIT TEMPERATURE SENSOR, HLT-1													X										X																X		X			X		
	HIGH LIMIT TEMPERATURE SENSOR, HLP-2													X										X																X		X			X		
	HEATING WATER SUPPLY VALVE, V-1		X																				X			X														X		X			X		
	HEATING WATER SUPPLY VALVE, V-2		X																				X			X														X		X			X		
	HEATING WATER SUPPLY VALVE, V-3		X																				X			X														X		X			X		
	DIFFERENTIAL PRESSURE TRANSMITTER, DPT-1													X												X														X		X			X		
	DIFFERENTIAL PRESSURE TRANSMITTER, DPT-2													X												X														X		X			X		
	DIFFERENTIAL PRESSURE TRANSMITTER, DPT-3													X												X														X		X			X		
DOMESTIC WATER HEATERS	TANK TEMPERATURE	X	X		X									X										X		X	X	X												X		X			X		
	HW RECIRC PUMP		X					X	X							X		X									X				X					X				X		X			X		
	LOOP TEMPERATURE SENSORS	X	X		X									X										X		X	X	X												X		X			X		
	HW MAIN SUPPLY TEMP, T-5	X	X		X									X										X		X	X	X												X		X			X		
DOMESTIC WATER BOOSTER PUMPS	BOOSTER PUMPS		X					X	X							X		X								X	X				X					X				X		X			X		
	PRESSURE SENSORS		X																						X														X		X			X		
	TEMPERATURE SENSOR	X																							X														X		X			X		
	COMMON SUCTION		X																						X														X		X			X		
	COMMON DISCHARGE		X																						X														X		X			X		
STEAM SYSTEM	UTILITY FLOW METER				X									X												X														X		X			X		
	STEAM PRESSURE		X																						X														X		X			X		
	CONDENSATE DISCHARGE							X	X																X														X		X			X		
	CONDENSATE RECEIVER, CRU-1							X	X																X														X		X			X		
AIR HANDLING UNITS & ROOFTOP UNITS	AIR FLOW MONITORS, AFM-1, AFM-2, ETC.				X								X																										X		X			X		
	DAMPERS, D-1, D-2, D-3 D-4, ETC.																X					X				X														X		X			X		
	FILTERS, DPS		X							X					X												X									X					X		X			X		
	FREEZSTAT, FZ											X																											X		X			X		
	TEMPERATURE SENSORS	X	X		X									X										X		X	X	X												X		X			X		
	SPACE TEMPERATURE SENSORS	X	X		X									X										X		X	X	X												X		X			X		
	HEATING COIL VALVE, V-1		X																				X																	X		X			X		
	COOLING COIL VALVE, V-2		X																				X																	X		X			X		
	SMOKE DETECTOR, SD										X																					X								X		X			X		
	STATIC PRESSURE SENSOR, SPS-1		X																																					X		X			X		
	HIGH STATIC PRESSURE SENSOR, SPS-2		X																																					X		X			X		
	HUMIDITY, H-1			X																						X														X		X			X		
	SUPPLY FAN, W/ VFD				X											X										X					X									X		X			X		
	RETURN FAN, W/ VFD				X											X										X					X									X		X			X		
FAN COIL UNITS	SUPPLY FAN																																						X		X			X		
	HEATING COIL VALVE, V-1		X																				X			X														X		X			X		
	COOLING COIL VALVE, V-2		X																				X			X														X		X			X		
	SPACE TEMPERATURE	X	X		X									X										X		X	X	X												X		X			X		
SERIES FAN POWERED TERMINALS	PRIMARY AIR DAMPER																X					X				X														X		X			X		
	SUPPLY FAN																																						X		X			X		
	REHEAT COIL HEATING VALVE, V-1		X																				X			X														X		X			X		
	SPACE TEMPERATURE	X	X		X									X										X		X	X	X												X		X			X		
MISC. EQUIPMENT	TOILET & GENERAL EXHAUST FANS				X			X	X																														X		X			X		
	HOT WATER UNIT HEATERS				X			X	X																														X		X			X		
	HOT WATER CABINET UNIT HEATERS				X			X	X																														X		X			X		
	ELECTRIC UNIT HEATERS							X	X										X																				X		X			X		
	ELECTRIC CABINET UNIT HEATERS							X	X										X																				X		X			X		
	CONVECTORS & FINNED TUBE RADIATORS				X			X	X																														X		X			X		
	VAV TERMINALS WITH ELECTRIC REHEAT																	X																					X		X			X		

INPUT / OUTPUT SCHEDULE

SYSTEM DESIG.	I/O LEGEND X - REQUIRED POINT	INPUTS																OUTPUTS									SYSTEM FEATURES																		GENERAL		
		ANALOG								BINARY								DIGITAL				ANALOG					ALARMS						APPLICATION PROGRAMS														
		MEASURED				CALCULATED																																									
		TEMPERATURE	PRESSURE	RH	AIR FLOW/FLUID FLOW	KWH	ENTHALPY	RUN TIME	STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	METER	DP SWITCH	CURRENT SWITCH	END SWITCH	OFF ON	OFF AUTO ON	OFF HIGH LOW	OPEN CLOSE	DAMPER POSITION	VALVE POSITION	SET POINT ADJ.	AOP	AOE	HIGH ANALOG	LOW ANALOG	HIGH BINARY	LOW BINARY	PROOF	SMOKE	TIME SCHEDULING	DEMAND LIMITING	PREVENTIVE MAINTENANCE	DUTY CYCLE	START STOP OPT	ENTHALPY ECON	SMOKE OPT	TREND	ALARM INSTRUMENT	DDC	MANUAL OVERRIDE	DRYBULB ECON	COLOR GRAPHICS		
MAKEUP AIR UNITS	AIR FLOW MONITOR, AFM-1				X								X																										X		X			X		
	OUTSIDE AIR DAMPER, D-1																X					X				X														X		X			X		
	FILTERS		X							X					X												X													X		X			X		
	COOLING COIL VALVE, V-1		X																				X			X														X		X			X		
	GAS HEAT																																						X		X			X		
	SUPPLY FAN				X											X										X					X									X		X			X		
	SMOKE DETECTOR, SD										X																					X								X		X			X		
	SPACE TEMPERATURE SENSOR, T-1	X	X		X									X										X		X	X	X												X		X			X		
KITCHEN EXHAUST FANS	EXHAUST AIR DAMPER, D-2																X					X				X														X		X			X		
	EXHAUST FAN				X											X										X					X									X		X			X		
	WASHBOARD PANEL							X	X									X								X														X		X			X		
HEATING AND VENTILATING UNITS	OUTSIDE AIR DAMPER, D-1																X					X				X														X		X			X		
	RETURN AIR DAMPER, D-2																X					X				X														X		X			X		
	FILTERS		X							X					X												X													X		X			X		
	HEATING COIL VALVE, V-1		X																				X			X														X		X			X		
	COOLING COIL VALVE, V-2		X																				X			X														X		X			X		
	FREEZE STAT, FZ											X																											X		X			X		
	SUPPLY FAN				X											X										X					X									X		X			X		
	SMOKE DETECTORS, SD										X																					X								X		X			X		
	STATIC PRESSURE SENSOR, SPS-1		X																																					X		X			X		
	HIGH STATIC PRESSURE SENSOR, SPS-2		X																																					X		X			X		
	SPACE TEMPERATURE SENSOR	X	X		X									X										X		X	X	X												X		X			X		
	SUPPLY AIR TEMPERATURE SENSOR	X	X		X									X										X		X	X	X												X		X			X		
VENTILATION FANS	VENTILATION FAN				X											X										X					X									X		X			X		
	SMOKE DETECTOR										X																					X								X		X			X		
	SPACE TEMPERATURE SENSOR	X	X		X									X										X		X	X	X												X		X			X		
SMOKE EXHAUST FANS	SMOKE EXHAUST FAN				X											X										X					X									X		X			X		
	SMOKE DETECTOR										X																					X								X		X			X		
	SPACE TEMPERATURE SENSOR	X	X		X									X										X		X	X	X												X		X			X		
ATRIUM SMOKE EXHAUST	SMOKE EXHAUST FAN, SEF-5				X											X										X					X									X		X			X		
	SMOKE EXHAUST FAN, SEF-6				X											X										X					X									X		X			X		
	OUTSIDE AIR DAMPER, D-5-1																X					X				X														X		X			X		
	SMOKE EXHAUST FAN SEF-11				X											X										X					X									X		X			X		
	SMOKE EXHAUST FAN SEF-12				X											X										X					X									X		X			X		
	OUTSIDE AIR DAMPER, D-11-1																X					X				X														X		X			X		
	SMOKE EXHAUST FAN SEF-7A				X											X										X					X									X		X			X		
	SMOKE EXHAUST FAN SEF-7B				X											X										X					X									X		X			X		
	SMOKE EXHAUST FAN SEF-8				X											X										X					X									X		X			X		
	OUTSIDE AIR DAMPER, D-7-1																X					X				X														X		X			X		
	SMOKE EXHAUST FAN SEF-9				X											X										X					X									X		X			X		
	SMOKE EXHAUST FAN SEF-10A				X											X										X					X									X		X			X		
	SMOKE EXHAUST FAN SEF-10B				X											X										X					X									X		X			X		
	OUTSIDE AIR DAMPER, D-10-1																X					X				X														X		X			X		
	FIRE ALARM INTERFACE								X																	X													X		X			X		
GLOBAL SENSORS	GLOBAL OUTSIDE AIR TEMPERATURE SENSORS, QUAD A	X	X		X									X										X		X	X	X												X		X			X		
	GLOBAL OUTSIDE AIR TEMPERATURE SENSORS, QUAD B	X	X		X									X										X		X	X	X												X		X			X		
	GLOBAL OUTSIDE AIR TEMPERATURE SENSORS, QUAD C	X	X		X									X										X		X	X	X												X		X			X		
	GLOBAL OUTSIDE AIR TEMPERATURE SENSORS, QUAD D	X	X		X									X										X		X	X	X												X		X			X		
	GLOBAL OUTSIDE AIR HUMIDITY SENSORS, QUAD A			X			X																			X														X		X			X		
	GLOBAL OUTSIDE AIR HUMIDITY SENSORS, QUAD B			X			X																			X														X		X			X		
	GLOBAL OUTSIDE AIR HUMIDITY SENSORS, QUAD C			X			X																			X														X		X			X		
	GLOBAL OUTSIDE AIR HUMIDITY SENSORS, QUAD D			X			X																			X														X		X			X		

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PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:
WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
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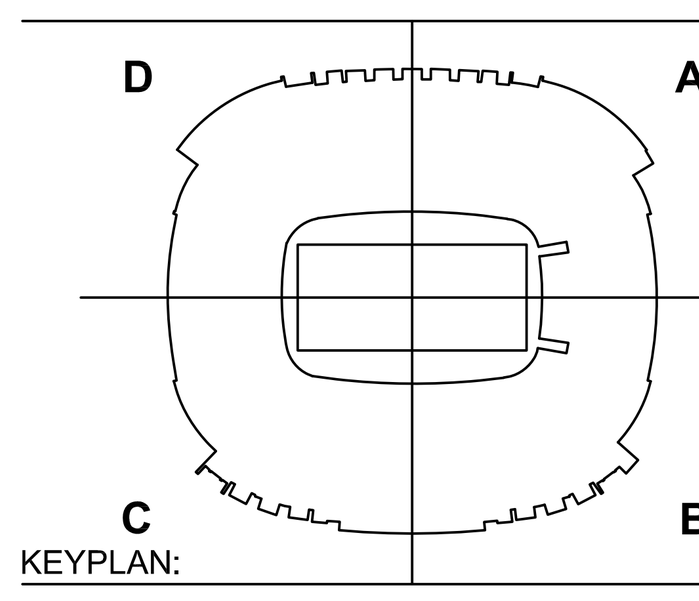

KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. __________, EXPIRATION DATE: ____________.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP / MAF**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

AUTOMATIC TEMPERATURE CONTROLS I/O POINTS SCHEDULE

DRAWING NO:

M4.29

BKM# 20092.01

ARL: G:\20092.01\Drawings\Acad\M\M429 ATC CONTROLS IO POINTS
Plotted By: Craig M. Parks | 3/3/2021 8:55 PM

HEATING AND VENTILATING UNIT SCHEDULE

DESIG	SERVICE	LOCATION	AIRFLOW (NOTE 5)		HEATING COIL (NOTE 3) - ATC VALVE				ATC SEQUENCE (NOTE 1)	REMARKS
			SUPPLY CFM	OA CFM	TYPE	MIN SIZE (NOTE 4) IN	FLOW GPM	MAX WPD FT		
HVU-1	CONCESSION STO / COMMISSARY	SERVICE LEVEL - QUAD A	30,000	3,000	2-WAY	NOTE 4	59.8	10	HVU 1 & 2 CONTROL	-
HVU-2	CONC. LOCKERS	SERVICE LEVEL - QUAD A	13,000	3,900	2-WAY	NOTE 4	39.4	10	HVU 1 & 2 CONTROL	-
HVU-3	GAME DAY LOCKERS	SERVICE LEVEL - QUAD A	6,000	3,000	2-WAY	NOTE 4	18.2	10	HVU 3 CONTROL	-
HVU-4	RECYCLE	SERVICE LEVEL - QUAD A	2,000	2,000	2-WAY	NOTE 4	8.7	10	HVU 4 CONTROL	-
HVU-5	FIELD MAINTENANCE	SERVICE LEVEL - QUAD A FIELD MAINTENANCE 1.12.06	6,600	1,320	2-WAY	NOTE 4	14.3	10	HVU 5 & 7 CONTROL	-
HVU-6 (NOT USED)										
HVU-7	SHOP-WEST	SERVICE LEVEL - QUAD B STAD, OPPER, SHOP 1,17.01	5,700	2,850	2-WAY	NOTE 4	17.3	10	HVU 5 & 7 CONTROL	-
HVU-8	FREIGHT ELEVATOR LOBBY	SERVICE LEVEL - QUAD A	2,700	2,700	2-WAY	NOTE 4	11.7	10	HVU 8, 9 & 10 CONTROL	-
HVU-9	SERVICE TUNNEL	SERVICE LEVEL - QUAD A	3,200	3,200	2-WAY	NOTE 4	13.9	10	HVU 8, 9 & 10 CONTROL	-
HVU-10	SERVICE TUNNEL	SERVICE LEVEL - QUAD A	8,800	8,800	2-WAY	NOTE 4	38.1	10	HVU 8, 9 & 10 CONTROL	-
HVU-11	SERVICE TUNNEL	SERVICE LEVEL - QUAD B	5,800	5,800	2-WAY	NOTE 4	25.1	10	HVU 11,12 & 13 CONTROL	-
HVU-12	SERVICE TUNNEL	SERVICE LEVEL - QUAD B HOME TEAM STORAGE ROOM 1.27.08	5,800	5,800	2-WAY	NOTE 4	25.1	10	HVU 11,12 & 13 CONTROL	-
HVU-13	FREIGHT ELEVATOR LOBBY	SERVICE LEVEL - QUAD B MECH 1.20.09	5,800	2,700	2-WAY	NOTE 4	11.7	10	HVU 11,12 & 13 CONTROL	-

NOTES:
1. REFER TO ATC CONTROLS DIAGRAMS FOR ASSOCIATED CONTROL SEQUENCE.
2. ALL EQUIPMENT IS EXISTING.
3. HEATING WATER IS 40% ETHYLENE GLYCOL SOLUTION.
4. ATC VALVE SHALL BE SIZED TO MATCH THE AHU PIPED COIL CONNECTION SIZE OR SCHEDULED MAXIMUM WATER PRESSURE DROP (WPD) (WHICHEVER IS GREATER). PIPE SIZE PROVIDED IS FOR REFERENCE ONLY AND SHALL BE FIELD VERIFIED.
5. ALL AIRFLOW VALUES ARE COPIED FROM RECORD DOCUMENTS. EXACT AIRFLOWS SHALL BE OBTAINED FROM PRE-DEMOLITION TESTING.

PUMP SCHEDULE

DESIG	SERVICE	LOCATION	ATC SEQUENCE (NOTE 1)	REMARKS
P-1	SECONDARY CHW	SERVICE LEVEL - QUAD A	CHILLED WATER CONTROL	-
P-2	SECONDARY CHW	SERVICE LEVEL - QUAD A	CHILLED WATER CONTROL	-
P-3	SECONDARY CHW	SERVICE LEVEL - QUAD A	CHILLED WATER CONTROL	-
P-4	PRIMARY HTG WATER	SERVICE LEVEL - QUAD B MECHANICAL ROOM 1.26.03	HEATING WATER CONTROL	-
P-5	PRIMARY HTG WATER	SERVICE LEVEL - QUAD B MECHANICAL ROOM 1.26.03	HEATING WATER CONTROL	-
P-6	NOT USED			
P-7	SECONDARY HTG WATER	SERVICE LEVEL - QUAD B MECHANICAL ROOM 1.26.03	HEATING WATER CONTROL	-
P-8	SECONDARY HTG WATER	SERVICE LEVEL - QUAD B MECHANICAL ROOM 1.26.03	HEATING WATER CONTROL	-
UDP-1	PRIMARY CHW	SERVICE LEVEL - QUAD A	CHILLED WATER CONTROL	-
UDP-2	PRIMARY CHW	SERVICE LEVEL - QUAD A	CHILLED WATER CONTROL	-
PCWP-1	PRIMARY CONDENSER WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PCWP-2	PRIMARY CONDENSER WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PCWP-3	PRIMARY CONDENSER WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PCWP-8	PRIMARY CONDENSER WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PGWP-1	PRIMARY CHILLED WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PGWP-2	PRIMARY CHILLED WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PGWP-3	PRIMARY CHILLED WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
PGWP-4	PRIMARY CHILLED WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
SGWP-1	SECONDARY CHILLED WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-
SGWP-2	SECONDARY CHILLED WATER	OPACY CHILLER PLANT	OPACY CW CONTROL	-

NOTES:
1. REFER TO ATC CONTROLS DIAGRAMS FOR ASSOCIATED CONTROL SEQUENCE.
2. ALL EQUIPMENT IS EXISTING.

NOT ALL EQUIPMENT IS INCLUDED IN THE SCHEDULES. REFER TO PLANS AND ATC CONTROLS FOR ADDITIONAL EQUIPMENT.

AIR HANDLING UNIT SCHEDULE

DESIG	SERVICE	LOCATION	AIRFLOW (NOTE 5)		COOLING COIL (NOTE 3) - ATC VALVE				HEATING COIL (NOTE 3) - ATC VALVE				ATC SEQUENCE (NOTE 1)	REMARKS
			SUPPLY CFM	OA CFM	TYPE	MIN SIZE (NOTE 4) IN	FLOW GPM	MAX WPD FT	TYPE	MIN SIZE (NOTE 4) IN	FLOW GPM	MAX WPD FT		
AHU-1	CLUB SUITES - QUAD A	PRESS LEVEL - QUAD A MECH RM 3.09.01	36,400	23,300	2-WAY	NOTE 4	197.0	10	3-WAY	NOTE 4	28.0	10	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	
AHU-2	CLUB SUITES - QUAD B	PRESS LEVEL - QUAD B MECH RM 3.19.01	55,000	30,800	2-WAY	NOTE 4	280.0	10	3-WAY	NOTE 4	43.0	10	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	
AHU-3	CLUB SUITES - QUAD C	PRESS LEVEL - QUAD C	55,000	34,100	2-WAY	NOTE 4	295.0	10	3-WAY	NOTE 4	43.0	10	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	
AHU-4	CLUB SUITES - QUAD D	PRESS LEVEL - QUAD D MECH RM 3.45.01	36,400	24,020	2-WAY	NOTE 4	201.0	10	3-WAY	NOTE 4	28.0	10	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	
AHU-5 (NOT USED)														
AHU-6	SERVICE LEVEL - STADIUM OPS OFFICES	SERVICE LEVEL - QUAD B STAD OPS OFFICES 1.18.02	2,300	1,150	2-WAY	NOTE 4	?	10	2-WAY	NOTE 4	?	10	SINGLE-ZONE, VAV, AHU CONTROL	
AHU-7 THRU 8 (NOT USED)														
AHU-9	PRESS LEVEL	PRESS LEVEL - QUAD C	13,300	3,720	2-WAY	NOTE 4	102.0	10	2-WAY	NOTE 4	20.5	10	LOW-TEMP, VAV AHU CONTROL (AHU-9)	
AHU-10	GAME DAY SERVICES - QUAD A	SERVICE LEVEL - QUAD B ASST, OFFICE 1.15.06	1,800	1,800	2-WAY	NOTE 4	20.7	10	2-WAY	NOTE 4	10.7	10	CONSTANT VOLUME AHU CONTROL (AHU-10, 14 & 19)	
AHU-11	STADIUM OPERATIONS - QUAD B	SERVICE LEVEL - QUAD B OFFICE 1.14.06	2,900	1,420	2-WAY	NOTE 4	18.9	10	2-WAY	NOTE 4	9.4	10	CONSTANT VOLUME AHU CONTROL (AHU-11, 12, 13 & 18)	
AHU-12	BROADCAST MEDIA - QUAD B	SERVICE LEVEL - QUAD B OFFICE 1.14.20	3,000	1,350	2-WAY	NOTE 4	18.5	10	2-WAY	NOTE 4	9.3	10	CONSTANT VOLUME AHU CONTROL (AHU-11, 12, 13 & 18)	
AHU-13	SECURITY - QUAD B	SERVICE LEVEL - QUAD B SECURITY 1.16.04	1,600	320	2-WAY	NOTE 4	7.9	10	2-WAY	NOTE 4	2.8	10	CONSTANT VOLUME AHU CONTROL (AHU-11, 12, 13 & 18)	
AHU-14	OFFICIALS - QUAD B	SERVICE LEVEL - QUAD B STAD OPS SHOP 1.18.02	2,500	2,500	2-WAY	NOTE 4	27.9	10	2-WAY	NOTE 4	14.9	10	CONSTANT VOLUME AHU CONTROL (AHU-10, 14 & 19)	
AHU-15	VISITING LOCKER NO. 1 - QUAD B	SERVICE LEVEL - QUAD B MECH 1.20.09	9,300	9,300	2-WAY	NOTE 4	104.0	10	2-WAY	NOTE 4	55.2	10	LOW-TEMP, CV AHU CONTROL (AHU-15 THRU 17)	
AHU-16	VISITING LOCKER NO. 2 - QUAD B	SERVICE LEVEL - QUAD B MECH 1.20.09	8,100	8,100	2-WAY	NOTE 4	90.5	10	2-WAY	NOTE 4	48.1	10	LOW-TEMP, CV AHU CONTROL (AHU-15 THRU 17)	
AHU-17	HOME TEAM AREA - QUAD B	SERVICE LEVEL - QUAD B MECH 1.21.01	12,900	12,900	2-WAY	NOTE 4	144.0	10	2-WAY	NOTE 4	76.6	10	LOW-TEMP, CV AHU CONTROL (AHU-15 THRU 17)	
AHU-18	HOME TEAM STORAGE - QUAD B	SERVICE LEVEL - QUAD B HOME TEAM STORAGE ROOM 1.27.08	2,600	260	2-WAY	NOTE 4	11.7	10	2-WAY	NOTE 4	4.0	10	CONSTANT VOLUME AHU CONTROL (AHU-11, 12, 13 & 18)	
AHU-19	MEDIA LOUNGE - QUAD A	SERVICE LEVEL - QUAD A	640	640	2-WAY	NOTE 4	7.3	10	2-WAY	NOTE 4	3.8	10	CONSTANT VOLUME AHU CONTROL (AHU-10, 14 & 19)	
AHU-20 THRU 23 (NOT USED)														
AHU-24	TICKET OFFICE - QUAD C	MAIN CONCOURSE - QUAD C TRASH 2.37.04	1,260	130	2-WAY	NOTE 4	5.0	10	2-WAY	NOTE 4	4.5	10	CONSTANT VOLUME AHU CONTROL (AHU-24 THRU 26)	
AHU-25	TICKET OFFICE - QUAD D	MAIN CONCOURSE - QUAD D TRASH 2.44.04	1,260	130	2-WAY	NOTE 4	5.0	10	2-WAY	NOTE 4	4.5	10	CONSTANT VOLUME AHU CONTROL (AHU-24 THRU 26)	
AHU-26	TELE/DATA & STORAGE - QUAD B	PRESS LEVEL - QUAD B MECH 3.19.01	1,260	130	2-WAY	NOTE 4	5.0	10	2-WAY	NOTE 4	4.5	10	CONSTANT VOLUME AHU CONTROL (AHU-24 THRU 26)	
AHU-27	CLUB LEVEL - KITCHEN	CLUB LEVEL - QUAD A MECH RM 4.12.04			2-WAY	NOTE 4	83.0	10	2-WAY	NOTE 4	165.0	10	-	

NOTES:
1. REFER TO ATC CONTROLS DIAGRAMS FOR ASSOCIATED CONTROL SEQUENCE.
2. ALL EQUIPMENT IS EXISTING.
3. CHILLED WATER AND HEATING WATER ARE 40% ETHYLENE GLYCOL SOLUTION.
4. ATC VALVE SHALL BE SIZED TO MATCH THE AHU PIPED COIL CONNECTION SIZE OR SCHEDULED MAXIMUM WATER PRESSURE DROP (WPD) (WHICHEVER IS GREATER). PIPE SIZE PROVIDED IS FOR REFERENCE ONLY AND SHALL BE FIELD VERIFIED.
5. ALL AIRFLOW VALUES ARE COPIED FROM RECORD DOCUMENTS. EXACT AIRFLOWS SHALL BE OBTAINED FROM PRE-DEMOLITION TESTING.

MAKE UP AIR UNIT SCHEDULE

DESIG	CFM AIRFLOW (NOTE 3)	SERVICE	MAU LOCATION	ASSOCIATED EXHAUST FAN	EXHAUST FAN LOCATION	ATC SEQUENCE (NOTE 1)	REMARKS
QA-MAU1	5,500	MAIN CONCOURSE - RM 2.10.02	MAIN CONCOURSE - RM 2.10.02	KEU-1A	MAIN CONCOURSE - RM 2.10.02	MAKEUP AIR & KITCHEN EXHAUST	-
QB-MAU1	8,250	MAIN CONCOURSE - RM 2.19.01	MAIN CONCOURSE - RM 2.19.01	KEF-1B	MAIN CONCOURSE - RM 2.19.01	MAKEUP AIR & KITCHEN EXHAUST	-
QC-MAU1	11,000	MAIN CONCOURSE - RM 2.34.01	MAIN CONCOURSE - RM 2.34.01	KEF-6C	MAIN CONCOURSE - RM 2.34.01	MAKEUP AIR & KITCHEN EXHAUST	-
QD-MAU1	8,250	MAIN CONCOURSE - RM 2.46.01	MAIN CONCOURSE - RM 2.46.01	KEF-1D & KEF-13D	MAIN CONCOURSE - RM 2.46.01	MAKEUP AIR & KITCHEN EXHAUST	-
QA-MAU2	8,600	CLUB LEVEL - RM 4.06.05	CLUB LEVEL - RM 4.06.05	KEF-3A, KEF-4A & KEF-6A	CLUB LEVEL - RM 4.06.05	MAKEUP AIR & KITCHEN EXHAUST	-
QB-MAU2	2,575	CLUB LEVEL - RM 4.19.03	CLUB LEVEL - RM 4.19.03	KEF-2B	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST WITH COOLING COIL	-
QC-MAU2	2,575	CLUB LEVEL - RM 4.35.05	CLUB LEVEL - RM 4.35.05	KEF-8C	CLUB LEVEL - RM 4.35.05	MAKEUP AIR & KITCHEN EXHAUST WITH COOLING COIL	-
QD-MAU2	2,575	CLUB LEVEL - RM 4.47.03	CLUB LEVEL - RM 4.47.03	KEF-7D	CLUB LEVEL - RM 4.47.03	MAKEUP AIR & KITCHEN EXHAUST WITH COOLING COIL	-
QA-MAU3	2,750	UPPER SUITE - RM 6.13.01	UPPER CONCOURSE ROOF	KEF-1A	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QB-MAU3	5,500	UPPER SUITE - RM 6.15.01	UPPER CONCOURSE ROOF	KEF-3B	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QC-MAU3	2,750	UPPER SUITE - RM 6.40.05	UPPER CONCOURSE ROOF	KEF-3C	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QD-MAU3	5,500	UPPER SUITE - RM 6.42.03	UPPER CONCOURSE ROOF	KEF-2D	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QA-MAU4	5,500	UPPER CONCOURSE - RM 7.02.01	UPPER CONCOURSE ROOF	KEF-2A	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QB-MAU4	5,500	UPPER CONCOURSE - RM 7.23.01	UPPER CONCOURSE ROOF	KEF-4B	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QC-MAU4	2,750	UPPER CONCOURSE - RM 7.32.01	UPPER CONCOURSE ROOF	KEF-3C	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QD-MAU4	2,750	UPPER CONCOURSE - RM 7.52.01	UPPER CONCOURSE ROOF	KEF-3D	UPPER CONCOURSE ROOF	MAKEUP AIR & KITCHEN EXHAUST	-
QC-MAU5	-	MAIN CONCOURSE - RM 2.30.01	MAIN CONCOURSE - RM 2.30.01	-	-	MAKEUP AIR & KITCHEN EXHAUST	-
QD-MAU5	-	MAIN CONCOURSE - RM 2.53.01	MAIN CONCOURSE - RM 2.53.01	-	-	MAKEUP AIR & KITCHEN EXHAUST	-

NOTES:
1. REFER TO ATC CONTROLS DIAGRAMS FOR ASSOCIATED CONTROL SEQUENCE.
2. ALL EQUIPMENT IS EXISTING.
3. ALL AIRFLOW VALUES ARE COPIED FROM RECORD DOCUMENTS. EXACT AIRFLOWS SHALL BE OBTAINED FROM PRE-DEMOLITION TESTING.

RETURN FAN SCHEDULE

DESIG	SERVICE	LOCATION	ATC SEQUENCE (NOTE 1)	REMARKS
RF-1	AHU-1 CLUB SUITES - QUAD A	PRESS LEVEL - QUAD A MECH RM 3.09.01	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	-
RF-3	AHU-2 CLUB SUITES - QUAD B	PRESS LEVEL - QUAD B MECH RM 3.19.01	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	-
RF-5	AHU-3 CLUB SUITES - QUAD C	PRESS LEVEL - QUAD C MECH RM 3.36.01	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	-
RF-7	AHU-4 CLUB SUITES - QUAD D	PRESS LEVEL - QUAD D MECH RM 3.45.01	LOW-TEMP, VAV AHU CONTROL (AHU-1 THRU 4)	-
RF-9	AHU-9 - PRESS LEVEL	PRESS LEVEL - QUAD C MECH RM 3.31.01	LOW-TEMP, VAV AHU CONTROL (AHU-9)	-

NOTES:
1. REFER TO ATC CONTROLS DIAGRAMS FOR ASSOCIATED CONTROL SEQUENCE.
2. ALL EQUIPMENT IS EXISTING.

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PROJECT NAME:

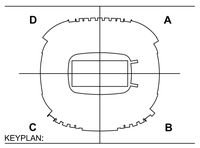
M&T BANK STADIUM
HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



KEYPLAN:

SEAL:

PROFESSIONAL CERTIFICATION:

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID SET

PROJECT NO: **20092.01**

SCALE: **AS NOTED**

DRAWN BY: **MJG**

CHECKED BY: **CMP**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

MECHANICAL SCHEDULES

DRAWING NO:

M5.01

BKM# 20092.01

Plotted By: Craig M. Parks | 3/3/2021 10:27 PM ARL: G:\20092.01\Drawings\Acad\MM\M01 MECH SCHEDULES

SUMMARY OF WORK

LIGHTING CONTROL SYSTEM:

REPLACE THE EXISTING MICROLITE RELAY-BASED LIGHTING CONTROL SYSTEM WITH A NEW RELAY BASED SYSTEM CAPABLE OF CONTROL OVER THE NEW IP NETWORK INFRASTRUCTURE FURNISHED AS PART OF THIS PROJECT.

THE WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, NEW RELAYS AND ASSOCIATED CONTROLS ELECTRONICS, COMMUNICATIONS MEDIA, SOFTWARE, SOFTWARE CONFIGURATION AND PROGRAMMING OF CONTROL ASSIGNMENTS FOR UP TO 1600 LOADS (RELAYS) IN UP TO 500 GROUP ASSIGNMENTS.

THE EXISTING LIGHTING CONTROL SYSTEM ENERGIZES LIGHTING AND TELEVISION CIRCUITS AND/OR TRIGGERS PRESET SCENES FOR SEVERAL EXISTING LIGHTING CONTROL SYSTEMS, INCLUDING THE MUSCO FIELD LIGHTING SYSTEM AND THE LUMENPULSE PHAROS EXTERIOR FACADE LIGHTING SYSTEM. THE EXISTING SYSTEM ONLY ENERGIZES THE ETC UNISON DIMMING SYSTEMS SERVING THE CLUB LEVEL BAR AREAS AND THE ETC ECHO DIMMING SYSTEMS SERVING THE CORNER SUITES.

THE NEW SYSTEM SHALL BE INTEGRATED INTO THE NEW BUILDING MANAGEMENT SYSTEM TO ENABLE REMOTE CONTROL, OPERATION AND SCHEDULING OF SYSTEM RELAYS FROM THE BMS SYSTEM WORKSTATION. THE SYSTEM SHALL ENABLE REMOTE CONTROL, OPERATION AND SCHEDULING OF THE EXTERNAL LIGHTING CONTROL SYSTEMS FROM THE BMS SYSTEM WORKSTATION. PROVIDE WIRING AND HARDWARE TO ENABLE REMOTE TRIGGERING OF EXISTING DIMMING SYSTEM PRESET SCENES + OFF IN THE BAR AREAS AND CORNER SUITES.

REFER TO THE SPECIFICATIONS FOR SYSTEM AND INSTALLATION REQUIREMENTS.

REFER TO THE OVERALL PLANS AND ENLARGED PLANS FOR LOCATION OF THE EXISTING AND NEW EQUIPMENT.

REFER TO THE RISER DIAGRAMS FOR THE SYSTEM ARCHITECTURE.

REFER TO THE RELAY PANEL SCHEDULES FOR RELAY PANEL REQUIREMENTS AND LOAD INFORMATION.

SUB-METERING SYSTEM:

REPLACE THE EXISTING EMON ELECTRICAL SUB-METERING SYSTEM WITH NEW SUB-METERS CAPABLE OF REPORTING OVER THE NEW IP NETWORK INFRASTRUCTURE FURNISHED AS PART OF THIS PROJECT. THE NEW METERS SHALL BE INTEGRATED INTO MSA'S EXISTING SCHNEIDER POWERLOGIC MONITORING SYSTEM.

THE WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, NEW METERS, COMMUNICATIONS MEDIA, SOFTWARE SOFTWARE CONFIGURATION AND ACCOUNT CREATION FOR UP TO 15 ACCOUNTS.

REFER TO THE SPECIFICATIONS FOR SYSTEM AND INSTALLATION REQUIREMENTS.

REFER TO THE OVERALL PLANS AND ENLARGED PLANS FOR LOCATION OF THE EXISTING AND NEW EQUIPMENT.

REFER TO THE RISER DIAGRAMS FOR THE SYSTEM ARCHITECTURE AND METER REQUIREMENTS.

GENERATOR CONTROL SYSTEM:

REPLACE THE EXISTING CATERPILLAR ENGINE CONTROL SYSTEMS FOR TWO EXISTING ENGINE GENERATORS WITH NEW ENGINE MONITORING AND CONTROL SYSTEMS CAPABLE OF INTERFACING WITH THE NEW BAS SYSTEM FURNISHED AS PART OF THIS PROJECT.

REPLACE THE EXISTING POWERCON GENERATOR PARALLELING AND CONTROL CABINET WITH NEW EQUIPMENT THAT MAINTAINS THE SYSTEM EMERGENCY AND PEAK SHAVING CAPABILITIES. UPGRADE THE SWITCHGEAR CONTROLS FOR THE EXISTING GENERATOR SWITCHGEAR AND THE COMFORT LINK SWITCHES IN ORIOLES PARK AND RAVEN STADIUM TO ACCOMMODATE THE UPDATED PARALLELING CONTROLS.

ALL EXISTING EMERGENCY GENERATION & PEAK SHAVING FUNCTIONALITY MUST BE MAINTAINED

REFER TO THE SPECIFICATIONS FOR SYSTEM AND INSTALLATION REQUIREMENTS.

REFER TO THE OVERALL PLANS AND ENLARGED PLANS FOR LOCATION OF THE EQUIPMENT.

REFER TO THE RISER DIAGRAMS FOR THE SYSTEM ARCHITECTURE AND CONTROL REQUIREMENTS.

ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION	MTG HEIGHT TO ℄ A.F.F. U.O.N.
	DUPLEX RECEPTACLE, NEMA 5-20R, GFI, WP, 120V, 20A.	
J	JUNCTION/PULL BOX	
NE 30	DISCONNECT SWITCH: TOP NOTATION SHOWN IS FUSED SIZE. BOTTOM IS NOTATION IS DISCONNECT SIZE, NF=NON-FUSED.	
V	VARIABLE FREQUENCY DRIVE	
	PANELBOARD – 120/208V, 3PH, 4W	
	PANELBOARD – 277/480V, 3PH, 4W	
LCC	LIGHTING CONTROL CABINET	
	CIRCUITRY TURNED UP	
	CIRCUITRY TURNED DOWN	
	GROUND BAR	
#F L8-4,5	HOMERUN TO PANELBOARD – NUMBER OF ARROWHEADS INDICATES NUMBER OF CIRCUITS. NUMERAL AND LETTERS ADJACENT TO ARROWHEADS INDICATE ASSIGNED PANEL AND CIRCUIT NUMBERS. TICK MARKS IN CIRCUITRY INDICATE QUANTITY OF No. 12 CONDUCTORS AND (⁄) CHECK MARK IN CIRCUITRY INDICATES GROUND CONDUCTOR. CIRCUITRY WITH NO TICK MARKS INDICATES 2#12 CONDUCTORS. ALL CONDUCTORS ARE No. 12 UNLESS NOTED OTHERWISE.	
	CONTROL WIRING. REFER TO SPECIFICATIONS FOR DETAILS	

ABBREVIATIONS

A	AMPERE	N	NEW
AFF	ABOVE FINISHED FLOOR	No.	NUMBER
AIC	AMPERES INTERRUPTING CAPACITY	P	POLE
C	CONDUIT/EMT	PNL	PANEL
E	EXISTING TO REMAIN	ø	PHASE
EC	EMPTY CONDUIT/EMT	UON	UNLESS OTHERWISE NOTED
G	GROUND	V	VOLT
HP	HORSEPOWER	W	WIRE
MCB	MAIN CIRCUIT BREAKER	R	EXISTING TO BE REMOVED
MTD	MOUNTED		
MLO	MAIN LUGS ONLY		

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M&T BANK STADIUM
HVAC CONTROLS,
LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811

SEAL:

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LICENSE NO. _____.
EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NONE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

ELECTRICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES

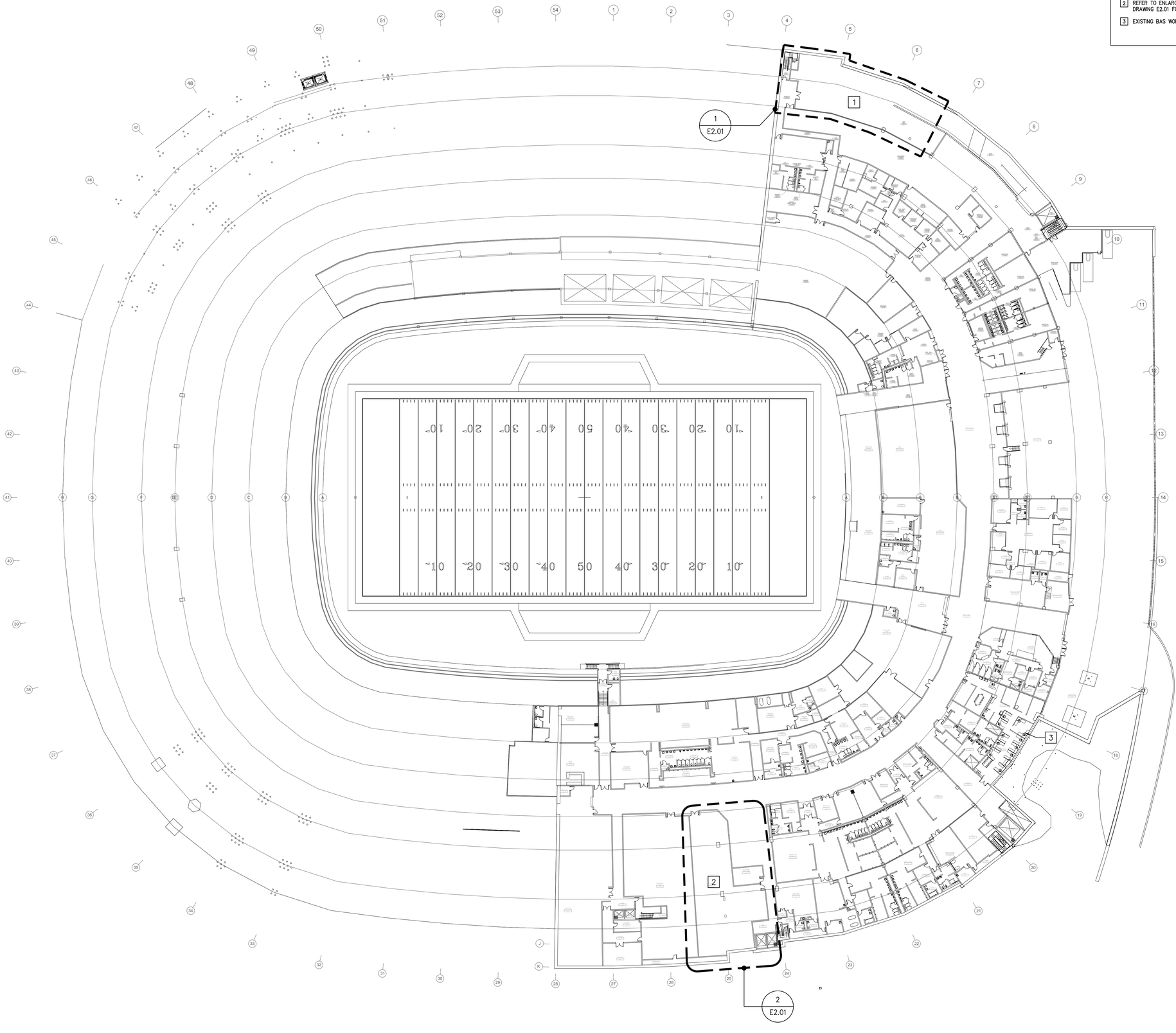
DRAWING NO:

E0.01

Plotted By: Brad Mahon | 2/26/2021 5:38 PM ARL-P:\2020\062\Current\E0.01 Electrical Legend, Abbreviations, And General Notes

DRAWING NOTES

1. REFER TO ENLARGED QUDARANT A ELECTRICAL ROOM ON DRAWING E2.01 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUDARANT B ELECTRICAL ROOM ON DRAWING E2.01 FOR ADDTIONAL INFORMATION.
3. EXISTING BAS WORKSTATION IS LOCATED IN MSA OFFICES.



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DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

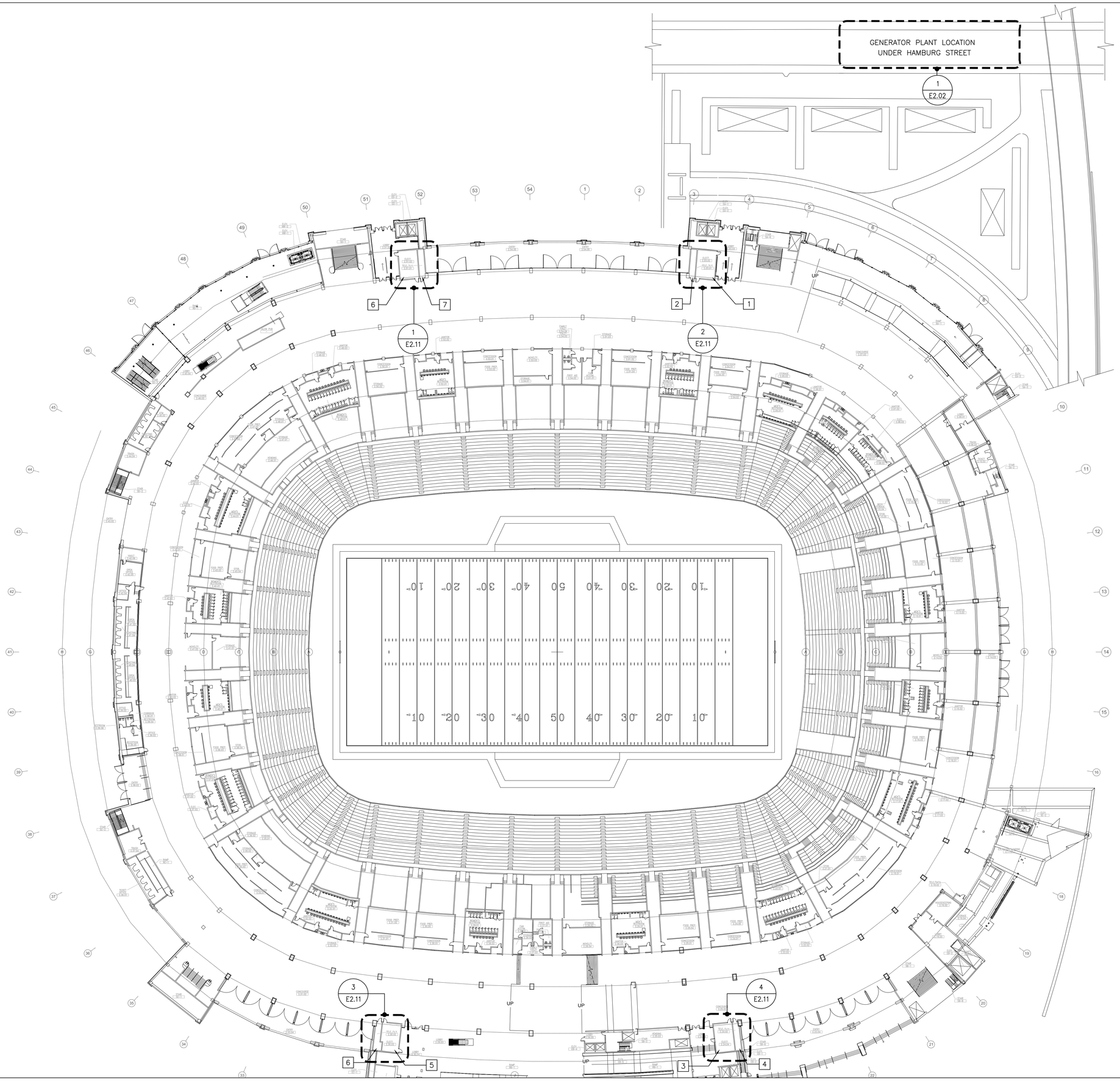
SHEET TITLE:

SERVICE LEVEL OVERALLPLAN

DRAWING NO:

E1.01

Plotted By: Brad Mahon | 2/11/2021 4:03 PM ARL: P:\2020\062\Current\E1.01 Service Level Overall Plan



DRAWING NOTES

1. REFER TO ENLARGED QUADRANT A ELECTRICAL ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUADRANT A IT/AV ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
3. REFER TO ENLARGED QUADRANT B ELECTRICAL ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
4. REFER TO ENLARGED QUADRANT B IT/AV ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
5. REFER TO ENLARGED QUADRANT C ELECTRICAL ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
6. REFER TO ENLARGED QUADRANT C IT/AV ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
7. REFER TO ENLARGED QUADRANTT D ELECTRICAL ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.
8. REFER TO ENLARGED QUADRANT D IT/AV ROOM ON DRAWING E2.11 FOR ADDTIONAL INFORMATION.

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

MAIN CONCOURSE OVERALL PLAN

DRAWING NO:

E1.11

Plotted By: Brad Mahon | 2/11/2021 3:55 PM
ARL-P:\2020\062\Current\E1.11 Main Concourse Overall Plan

DRAWING NOTES

1. REFER TO ENLARGED QUADRANT A ELECTRICAL ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUADRANT A IT/AV ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
3. REFER TO ENLARGED QUADRANT B ELECTRICAL ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
4. REFER TO ENLARGED QUADRANT B IT/AV ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
5. REFER TO ENLARGED QUADRANT C ELECTRICAL ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
6. REFER TO ENLARGED QUADRANT C IT/AV ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
7. REFER TO ENLARGED QUADRANT D ELECTRICAL ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.
8. REFER TO ENLARGED QUADRANT D IT/AV ROOM ON DRAWING E2.21 FOR ADDTIONAL INFORMATION.

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02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

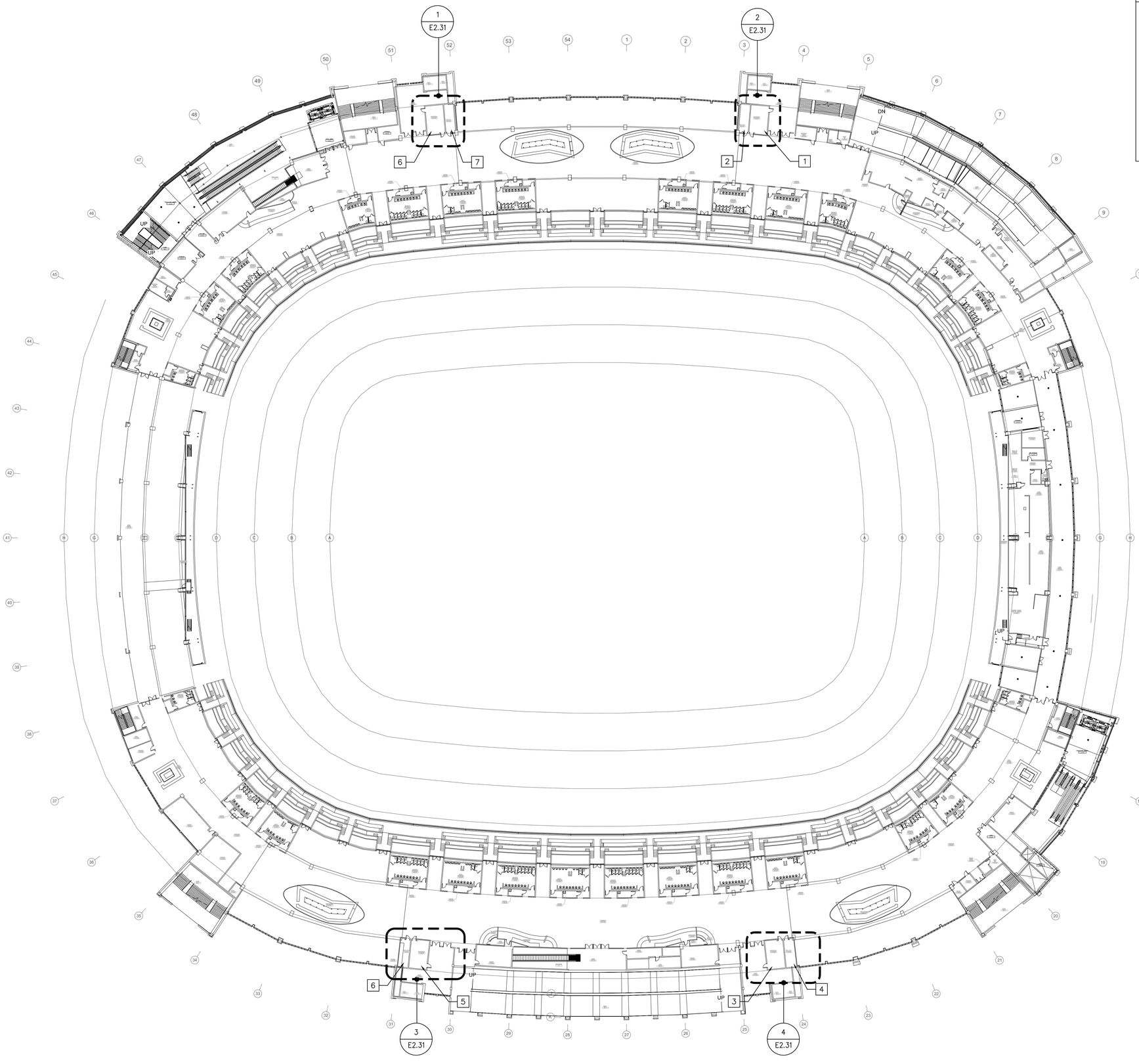
SHEET TITLE:

PRESS LEVEL OVERALL PLAN

DRAWING NO:

E1.21

Plotted By: Brad Mahon | 2/11/2021 3:56 PM ARL: P:\2020\062\Current\E1.21 Press Level Overall Plan



DRAWING NOTES

1. REFER TO ENLARGED QUADRANT A ELECTRICAL ROOM ON DRAWING E2.31 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUADRANT A IT/AV ROOM ON DRAWING E2.31 FOR ADDTIONAL INFORMATION.
3. REFER TO ENLARGED QUADRANT B ELECTRICAL ROOM ON DRAWING E2.31 FOR ADDTIONAL INFORMATION.
4. REFER TO ENLARGED QUADRANT B IT/AV ROOM ON DRAWING E2.31 FOR ADDTIONAL INFORMATION.
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6. REFER TO ENLARGED QUADRANT C IT/AV ROOM ON DRAWING E2.3 FOR ADDTIONAL INFORMATION.
7. REFER TO ENLARGED QUADRANT D ELECTRICAL ROOM ON DRAWING E2.31 FOR ADDTIONAL INFORMATION.
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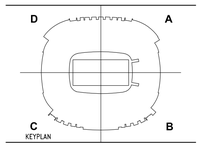

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WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

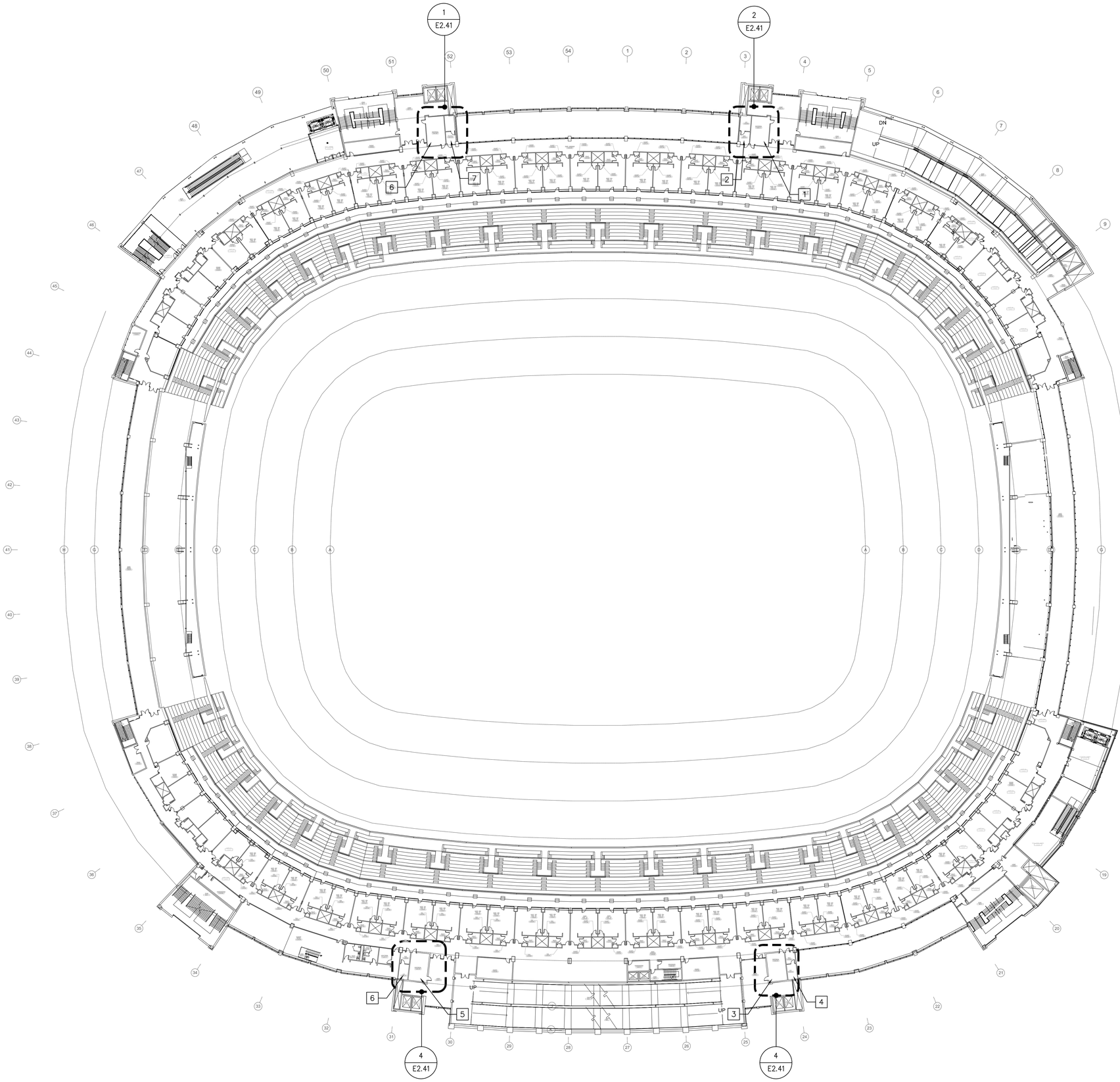
SHEET TITLE:

CLUB LEVEL OVERALL PLAN

DRAWING NO:

E1.31

Plotted By: Brad Mahon | 2/11/2021 3:57 PM ARL: P:\2020\062\Current\E1.31 Club Level Overall Plan



DRAWING NOTES

1. REFER TO ENLARGED QUADRANT A ELECTRICAL ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUADRANT A IT/AV ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.
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4. REFER TO ENLARGED QUADRANT B IT/AV ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.
5. REFER TO ENLARGED QUADRANT C ELECTRICAL ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.
6. REFER TO ENLARGED QUADRANT C IT/AV ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.
7. REFER TO ENLARGED QUADRANT D ELECTRICAL ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.
8. REFER TO ENLARGED QUADRANT D IT/AV ROOM ON DRAWING E2.41 FOR ADDTIONAL INFORMATION.

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

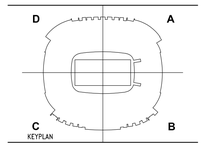
M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

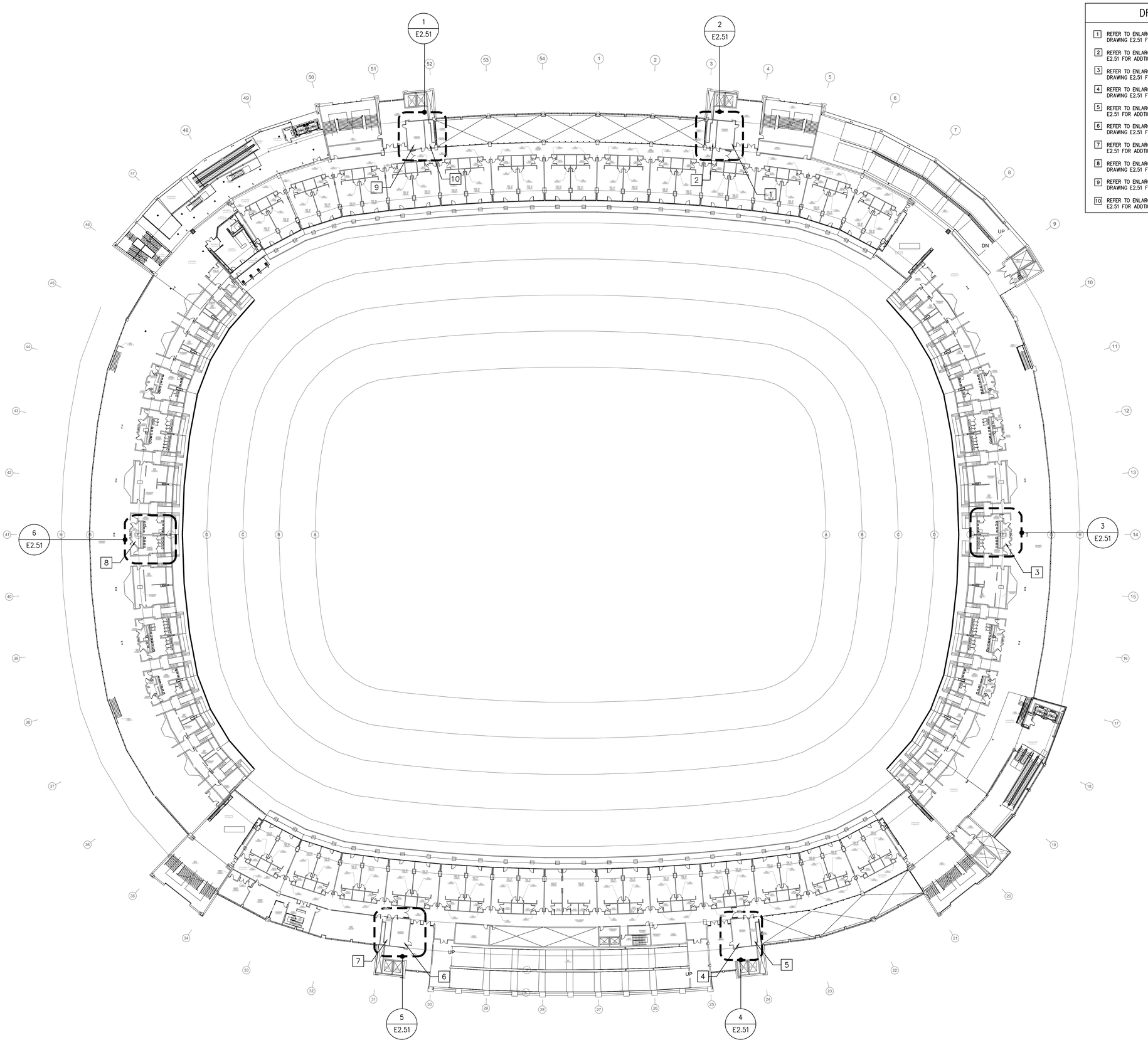
SHEET TITLE:

LOWER SUITE LEVEL OVERALL PLAN

DRAWING NO:

E1.41

Plotted By: Brad Mahon | 2/12/2021 11:19 AM
ARL: P:\2020\062\Current\E1.41 Lower Suite Level Overall Plan



DRAWING NOTES

1. REFER TO ENLARGED QUADRANT A ELECTRICAL ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUADRANT A IT/AV ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
3. REFER TO ENLARGED QUADRANT A/B ELECTRICAL ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
4. REFER TO ENLARGED QUADRANT B ELECTRICAL ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
5. REFER TO ENLARGED QUADRANT B IT/AV ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
6. REFER TO ENLARGED QUADRANT C ELECTRICAL ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
7. REFER TO ENLARGED QUADRANT C IT/AV ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
8. REFER TO ENLARGED QUADRANT D/C ELECTRICAL ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
9. REFER TO ENLARGED QUADRANTT D ELECTRICAL ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.
10. REFER TO ENLARGED QUADRANT D IT/AV ROOM ON DRAWING E2.51 FOR ADDTIONAL INFORMATION.

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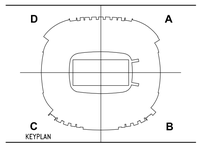

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WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

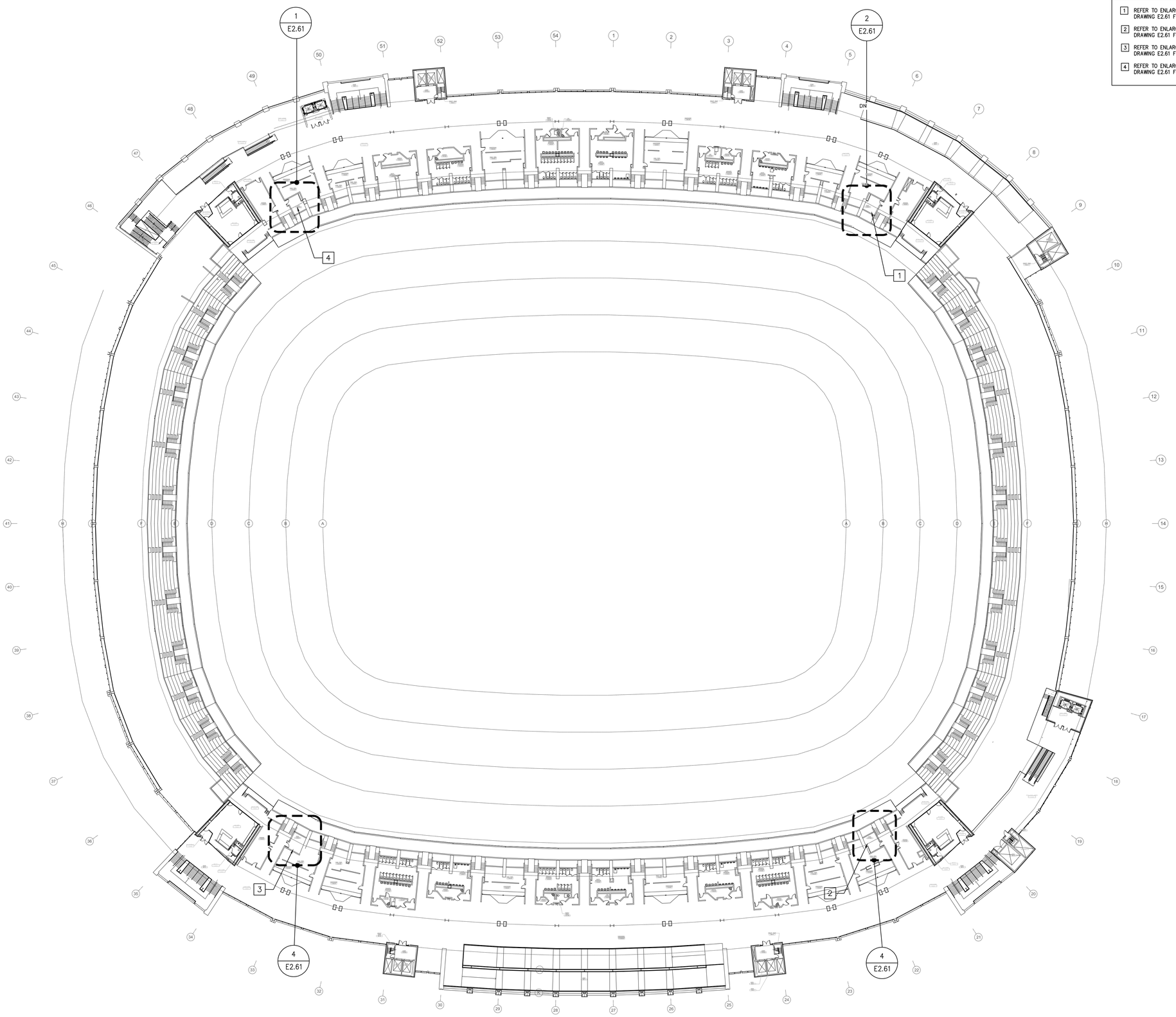
SHEET TITLE:

UPPER SUITE LEVEL OVERALL PLAN

DRAWING NO:

E1.51

Plotted By: Brad Mahon | 2/11/2021 4:00 PM ARL: P:\2020\062\Current\E1.51 Upper Suite Level Overall Plan



DRAWING NOTES

1. REFER TO ENLARGED QUADRANT A ELECTRICAL ROOM ON DRAWING E2.61 FOR ADDTIONAL INFORMATION.
2. REFER TO ENLARGED QUADRANT B ELECTRICAL ROOM ON DRAWING E2.61 FOR ADDTIONAL INFORMATION.
3. REFER TO ENLARGED QUADRANT C ELECTRICAL ROOM ON DRAWING E2.61 FOR ADDTIONAL INFORMATION.
4. REFER TO ENLARGED QUADRANTT D ELECTRICAL ROOM ON DRAWING E2.61 FOR ADDTIONAL INFORMATION.

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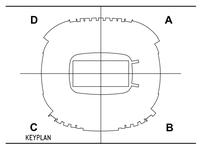

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

UPPER CONCOURSE LEVEL OVERALL PLAN

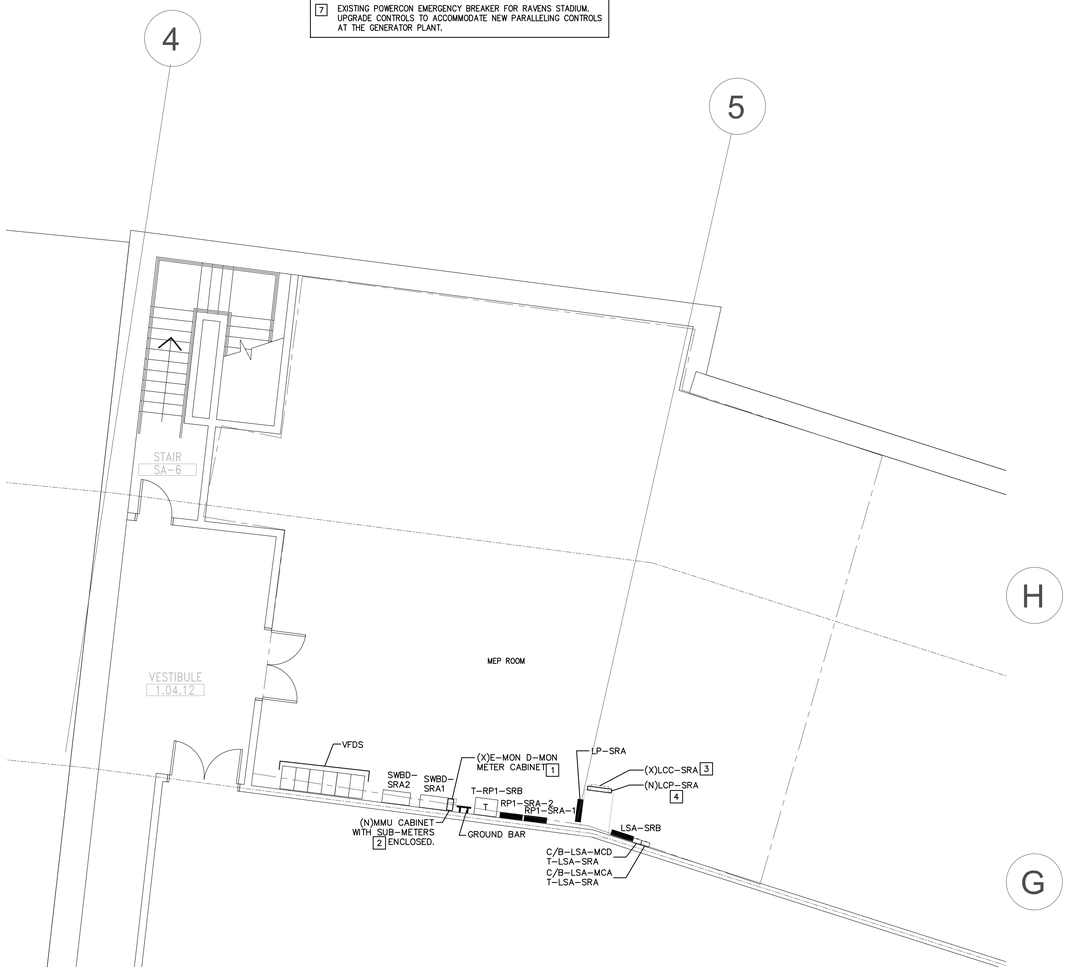
DRAWING NO:

E1.61

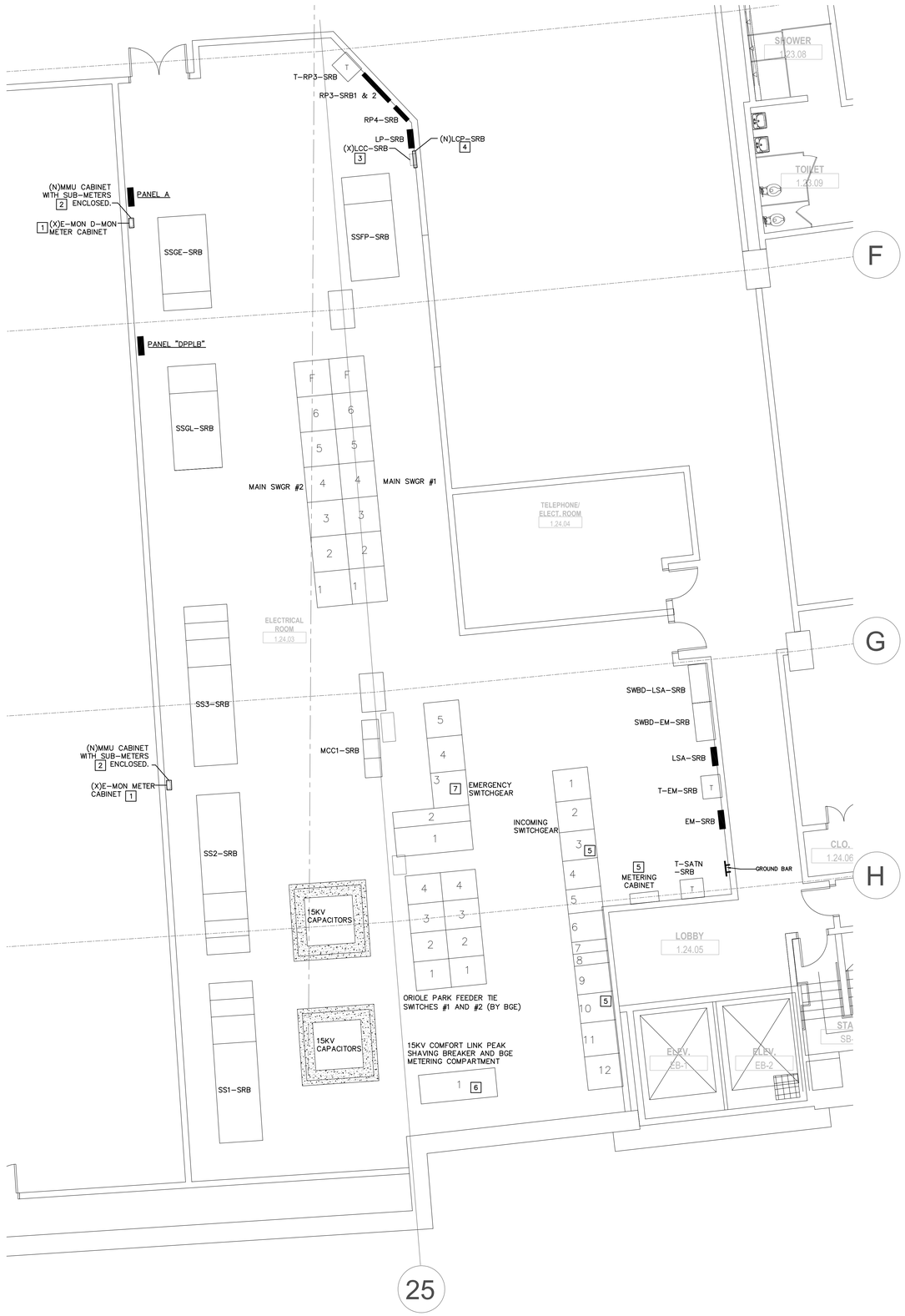
Plotted By: Brad Mahon | 2/11/2021 4:02 PM
APL: P:\2020\062\Current\E1.61 Upper Concourse Level Overall Plan

DRAWING NOTES

1. EXISTING SUB-METER CABINET SHOWN AS DASHED LINE TO BE REMOVED IN ITS ENTIRETY WITH ALONG ASSOCIATED CT's. REFER TO THE METER RISER DIAGRAM OR DRAWING E4.11 FOR EXISTING SUB-METER QUANTITY TO BE REPLACED.
2. SUB-METER CABINET TO BE REPLACE WITH AN NEW SMART METERING CABINET AND CT'S SHOWN AS SOLID LINE. NEW SUB-METERS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A RS-485 CABLE FROM EACH SUB-METER TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. PROVIDE INTERFACE DEVICE FOR CONNECTION TO ETHERNET, SCHNEIDER LINK 150 GATEWAY OR EQUAL. CABLES SHALL BE ROUTED IN CONDUIT.
3. EXISTING MICROLITE LIGHTING CONTROLS TO BE REPLACED.
4. EXISTING CONTROL PANEL TO BE REPLACED WITH EITHER NEW INTERIOR COMPONENTS OR A NEW LIGHTING CONTROL PANEL LCP SHOWN AS SOLID LINE. NEW LIGHTING CONTROLS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A CAT 6 CABLE IN CONDUIT FROM CONTROL PANEL TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. REFER TO LIGHTING CONTROL RISER DIAGRAM NEW WORK DRAWING E4.02 FOR MORE INFORMATION.
5. LOCATION OF EXISTING BGE MAIN SERVICE FEEDER #1 & #2 CUSTOMER METERING INTERFACE. PROVIDE TWO IEM 3000 SERIES METERS AND PROVIDE NEW INSTRUMENT TRANSFORMERS AND RELATED COMPONENTS IN OR ON THE EXISTING SWITCHGEAR AS REQUIRED TO CONNECT TO THE SCHNEIDER POWERLOGIC PLATFORM NEW TRANSFORMERS SHALL BE 0.5% ACCURACY CLASS FOR REVENUE METERING. DELEGATED DESIGNER SHALL DETERMINE APPROPRIATE CT TYPE (WINDOW OR WRAP-AROUND) AND LOCATION. PTs WILL LIKELY NEED TO BE MOUNTED ON TOP OF EXISTING UTILITY CABINETS 3 & 10.
6. EXISTING POWERCON PEAK SHAVING BREAKER FOR RAVENS STADIUM. UPGRADE CONTROLS TO ACCOMMODATE NEW PARALLELING CONTROLS AT THE GENERATOR PLANT. PROVIDE SIMILAR UPGRADE AT ORIOLES PARK.
7. EXISTING POWERCON EMERGENCY BREAKER FOR RAVENS STADIUM. UPGRADE CONTROLS TO ACCOMMODATE NEW PARALLELING CONTROLS AT THE GENERATOR PLANT.



1 PARTAL PLAN - ELECTRICAL ROOM - SERVICE LEVEL - QUAD A
SCALE: 3/16" = 1'-0"



2 PARTAL PLAN - ELECTRICAL ROOM - SERVICE LEVEL - QUAD B
SCALE: 3/16" = 1'-0"

0 2' 4' 8' 16'
SCALE: 3/16" = 1'-0"

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MSA PROJECT NO. 20-071

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CONSULTANTS:

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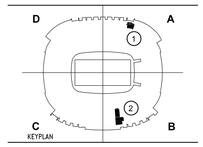
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



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LICENSE NO. _____.
EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **3/16" = 1'-0"**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

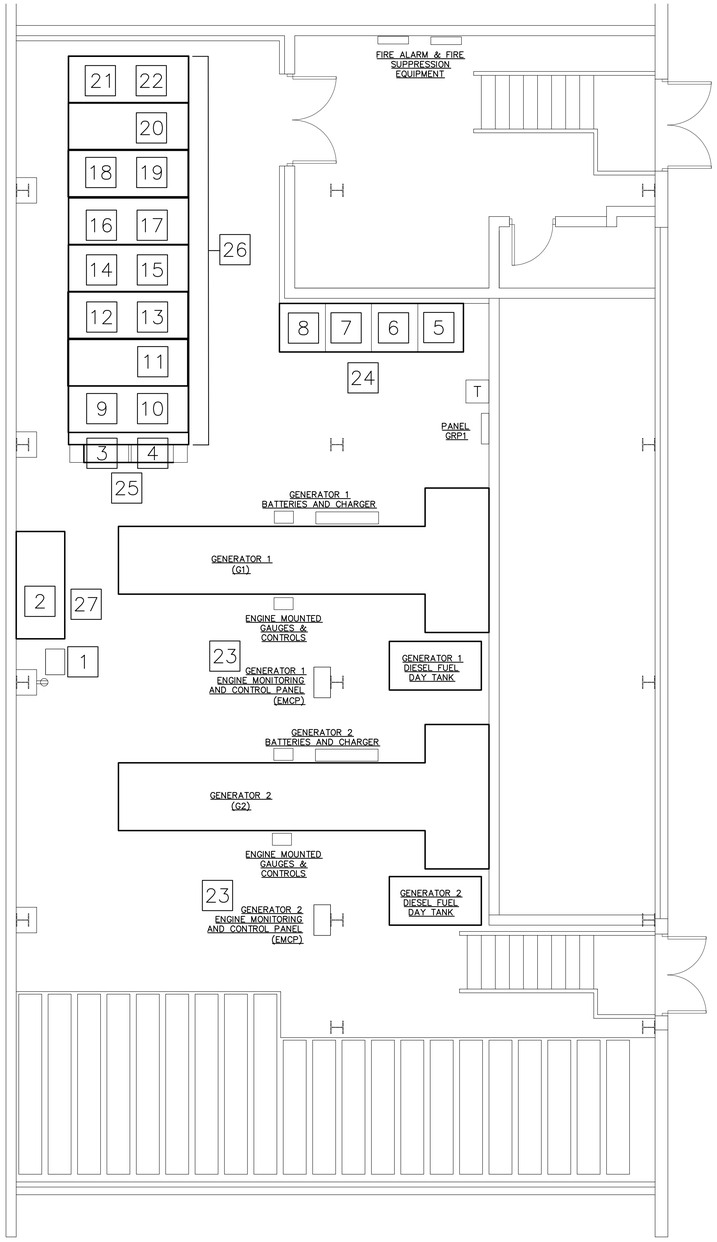
SHEET TITLE:

ELECTRICAL ROOMS
SERVICE LEVEL
QUAD A & B

DRAWING NO:

E2.01

Plotted By: Brad Mahon | 2/26/2021 4:59 PM ARL: P:\2020\062\Current\E2.01 Electrical Rooms Service Level Quad A & B



DRAWING NOTES – ITEMS 1 TO 22 CORRESPOND TO FIELD MARKING OF EQUIPMENT

1. BATTERY CHARGER FOR STATION BATTERIES
2. STATION BATTERIES
3. TIEDER EMERGENCY CONTROL CABINET
4. POWERCON EMERGENCY CONTROL CABINET
5. GENERATOR MASTER CONTROL CABINET
6. UTILITY METERING CABINET
7. GENERATOR 2 CONTROL CABINET
8. GENERATOR 1 CONTROL CABINET
9. BREAKER 52G1/O – ORIOLES PARK GENERATOR 1 BREAKER
10. BREAKER 52G2/O – ORIOLES PARK GENERATOR 2 BREAKER
11. METER CUBICLE FOR 52HP/O – ORIOLES PARK PEAK SHAVING
12. ORIOLES PARK BUS DIFFERENTIAL RELAYS AND VOLTAGE TRANSFORMERS
13. BREAKER 52HP/O – ORIOLES PARK PEAK SHAVING
14. AUXILIARY CUBICLE
15. BREAKER 52G1/R – RAVENS STADIUM GENERATOR 1 BREAKER
16. AUXILIARY CUBICLE
17. BREAKER 52G2/R – RAVENS STADIUM GENERATOR 2 BREAKER
18. AUXILIARY CUBICLE
19. BREAKER 52/HEM – RAVENS STADIUM EMERGENCY BREAKER
20. METER CUBICLE FOR 52HP/R – RAVENS STADIUM PEAK SHAVING
21. RAVENS STADIUM BUS DIFFERENTIAL RELAYS AND VOLTAGE TRANSFORMERS
22. BREAKER 52HP/R RAVENS STADIUM PEAK SHAVING

UPGRADE ENGINE–GENERATOR CONTROLS TO PROVIDE COMMUNICATION WITH BAS AND PROVIDE DELEGATED DESIGN AND IMPLEMENTATION FOR THE RENEWAL AND UPGRADE OF THE GENERATOR PLANT DISTRIBUTION CONTROL SYSTEM. COORDINATE SYSTEM OUTAGES WITH OWNER AND ELECTRICAL UTILITY AS REQUIRED TO MEASURE AND VERIFY EXISTING SWITCHGEAR CONDITIONS AND TO PERFORM SWITCHGEAR RENEWAL.

23. REPLACE EXISTING CATERPILLAR ENGINE MONITORING AND CONTROL PANEL EMCP II WITH EMCP 4.3. PROVIDE DELEGATED DESIGN AND IMPLEMENTATION FOR NEW SENSORS AND TRANSDUCERS AS REQUIRED FOR THE UPDATED COMMUNICATION PROTOCOL. REFER TO SPECIFICATION FOR REQUIRED MONITOR AND CONTROL POINTS.
24. REPLACE GENERATOR CONTROLS, MASTER CONTROLLER AND UTILITY METERING CABINETS, ITEMS 5–8, WITH NEW GENERATOR MANAGEMENT SYSTEM CONSISTING OF NEW PROGRAMMABLE LOGIC CONTROLLERS, VOLTAGE AND SPEED REGULATORS AND HUMAN MACHINE INTERFACE (HMI) PANEL TO PROVIDE REQUIRED SEQUENCE OF OPERATION PER ITEM 26.
25. REPLACE EMERGENCY POWER SYSTEM CONTROL CABINET, ITEMS 3 & 4, WITH EMERGENCY CONTROL CAPABILITY INTEGRATED INTO UPGRADED GENERATOR MANAGEMENT AND SWITCHGEAR CONTROLS.
26. UPDATE MEDIUM VOLTAGE GENERATOR MANAGEMENT AND SWITCHGEAR CONTROLS TO PROVIDE THE FOLLOWING OPERATIONS:

    GENERATORS PARALLELED WITH EACH OTHER AND WITH BGE VIA RAVENS STADIUM PEAK SHAVING FEEDER. MANUALLY INITIATED FROM MASTER CONTROLLER.

    GENERATORS PARALLELED WITH EACH OTHER AND WITH BGE VIA ORIOLES PARK PEAK SHAVING FEEDER. MANUALLY INITIATED FROM MASTER CONTROLLER.

    ONE GENERATOR PARALLELED WITH BGE VIA RAVENS STADIUM PEAK SHAVING FEEDER AND THE OTHER GENERATOR PARALLELED WITH BGE VIA ORIOLES PARK PEAK SHAVING FEEDER. MANUALLY INITIATED FROM MASTER CONTROLLER.

    UPON LOSS OF NORMAL POWER, THE PREFERRED GENERATOR (AUTO SELECTED, BASED ON RUNTIME) STARTS AND ASSUMES THE EMERGENCY LOAD VIA RAVENS STADIUM EMERGENCY FEEDER. EMERGENCY OPERATION SHALL OVERRIDE PEAK SHAVING OR GENERATOR EXERCISE OPERATIONS. EMERGENCY CONTROLS SHALL PERMIT CLOSED–TRANSITION RE–TRANSFER FROM GENERATOR TO LIVE UTILITY SOURCE

INCLUDE ALL MODIFICATIONS TO EXISTING SWITCHGEAR ENCLOSURE TO ACCOMMODATE RELAYING AND CONTROLS. PROVIDE NEW SWITCHGEAR DOORS WHERE REMOVAL OF EXISTING DEVICES WILL LEAVE AN OPENING IN THE ENCLOSURE. PROVIDE TEMPORARY GENERATOR, REFER TO SHEET E4.23 FOR CAPACITY. NO OUTAGES ARE ALLOWED DURING FOOTBALL SEASON.

27. REPLACE EXISTING 130VDC, 50A STATION BATTERY STRING AND BATTERY CHARGER, ITEMS 1 & 2. BASIS OF DESIGN IS ENER–GENIUS–IQ ELIMINATOR PLUS 514 CHARGER WITH C&D WET CELL BATTERIES. PROVIDE ALARMS FOR MONITORING BY BMS, TO INCLUDE AC FAIL, CHARGER FAIL, LOW DC VOLTS, LOW AC VOLTS GROUND FAULT.

2 LOT C GENERATOR PLAN - NEW WORK

SCALE: 1/4" = 1'-0"

0 2' 4' 8' 12'

SCALE: 1/4" = 1'-0"

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ISSUED FOR:

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WFT PROJECT NO: **20062.BKM.A**

SCALE: **AS NOTED**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

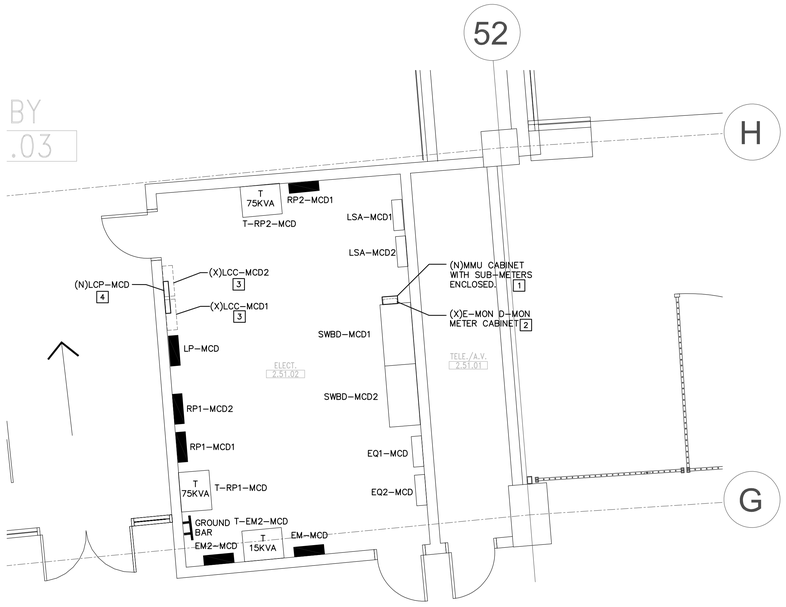
SHEET TITLE:

LOT C GENERATOR PLAN - NEW WORK

DRAWING NO:

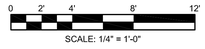
E2.02

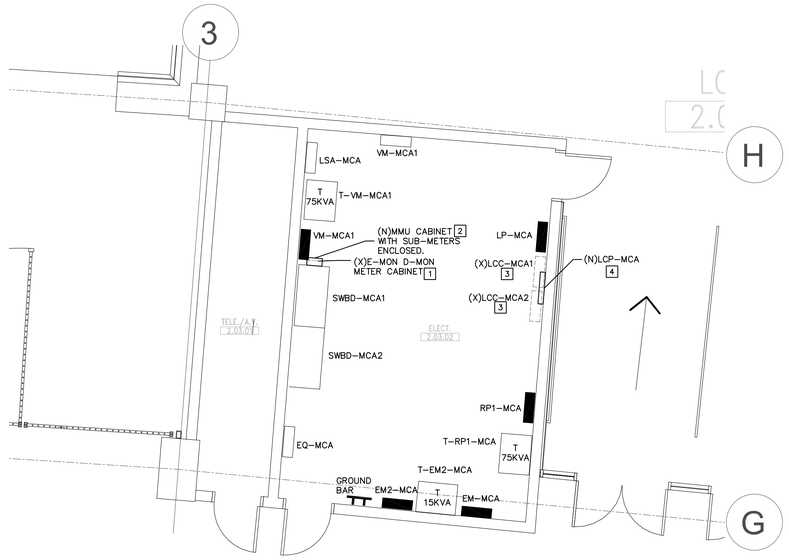
Plotted By: Brad Mahon | 3/1/2021 5:39 PM
ARL: P:\2020\062\Current\E2.02 Lot C Generator Plant



1 PARTAL PLAN - ELECTRICAL ROOM - MAIN CONCOURSE LEVEL - QUAD D

SCALE: 1/4" = 1'-0"





2 PARTAL PLAN - ELECTRICAL ROOM - MAIN CONCOURSE LEVEL - QUAD A

SCALE: 1/4" = 1'-0"



DRAWING NOTES

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3. EXISTING MICROLITE LIGHTING CONTROLS TO BE REPLACED.
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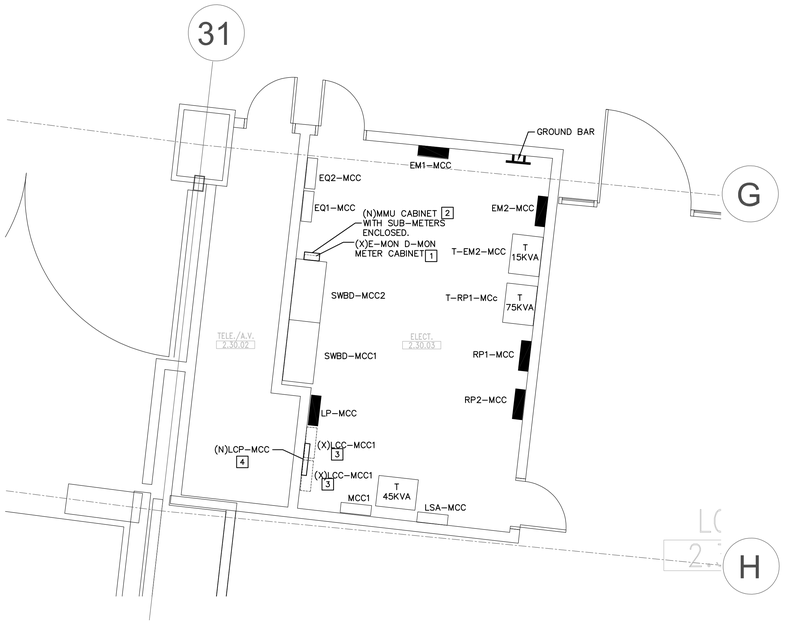
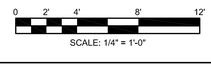
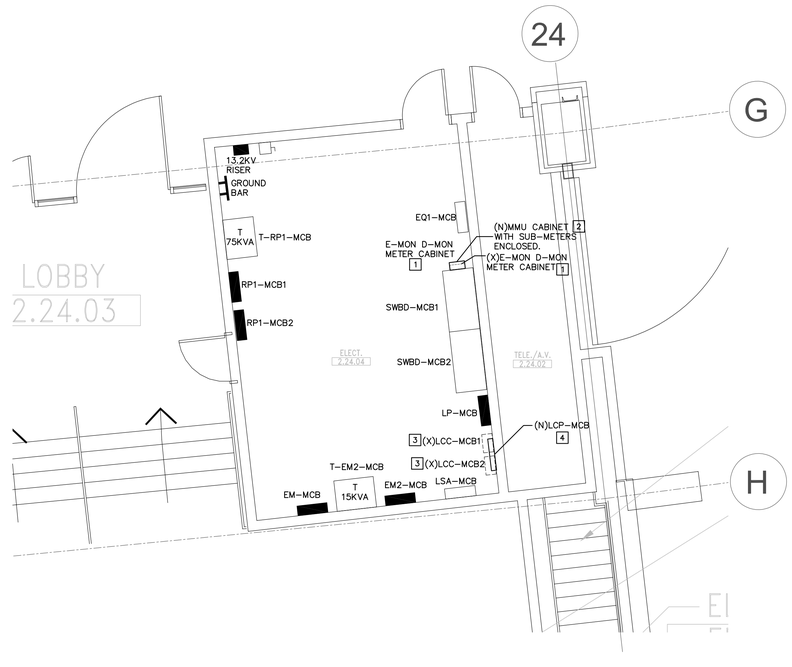


3 PARTAL PLAN - ELECTRICAL ROOM - MAIN CONCOURSE LEVEL - QUAD C

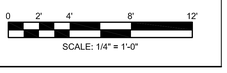
SCALE: 1/4" = 1'-0"





4 PARTAL PLAN - ELECTRICAL ROOM - MAIN CONCOURSE LEVEL - QUAD B

SCALE: 1/4" = 1'-0"



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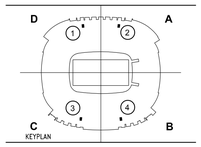
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____. EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **1/4" = 1'-0"**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

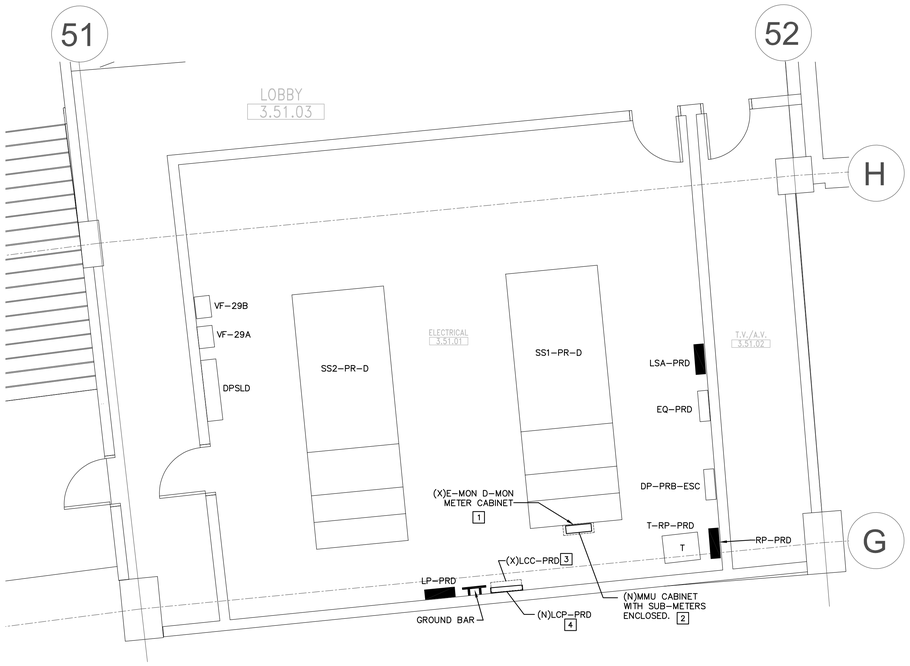
SHEET TITLE:

ELECTRICAL ROOMS
MAIN CONCOURSE LEVEL
QUADS A, B, C & D

DRAWING NO:

E2.11

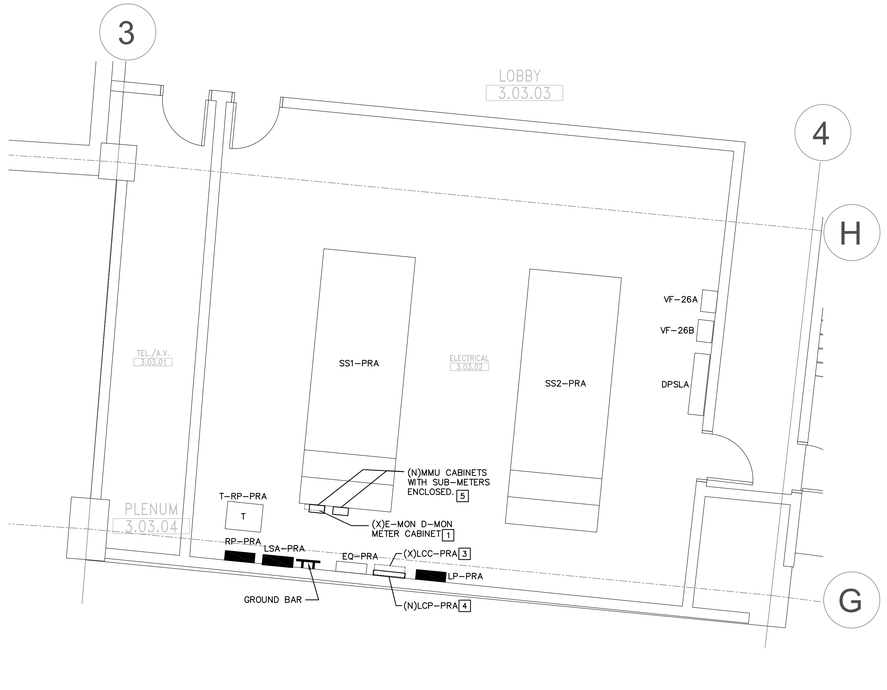
Plotted By: Brad Mahon | 2/12/2021 11:42 AM ARL: P:\2020\062\Current\E2.11 Electrical Rooms Main Concourse Level Quads A, B, C & D



1 PARTAL PLAN - ELECTRICAL ROOM - PRESS LEVEL - QUAD D

SCALE: 1/4" = 1'-0"

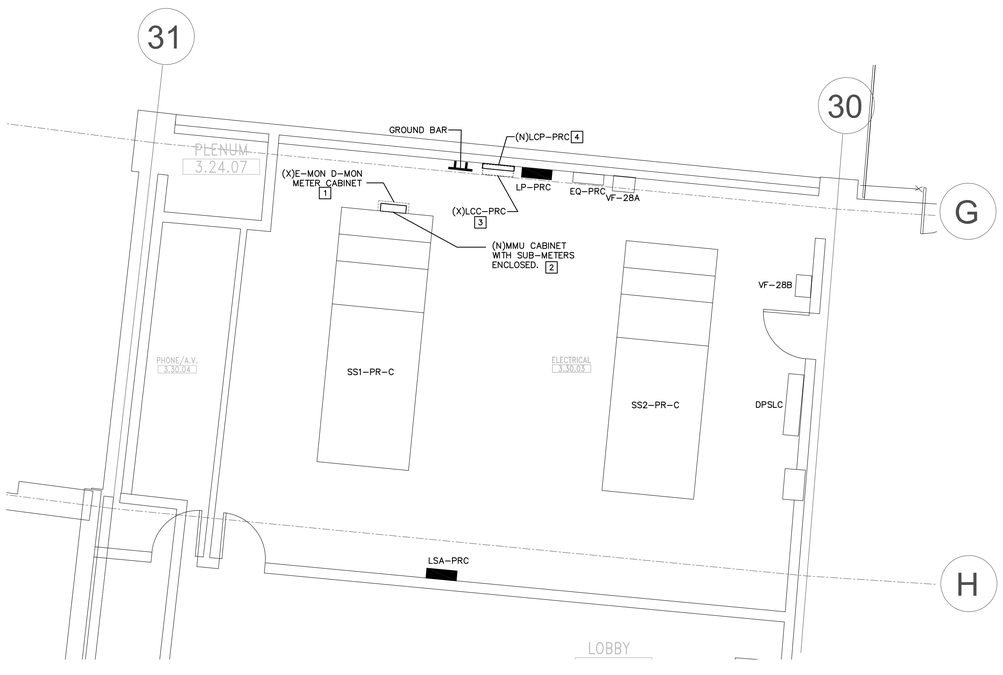




2 PARTAL PLAN - ELECTRICAL ROOM - PRESS LEVEL - QUAD A

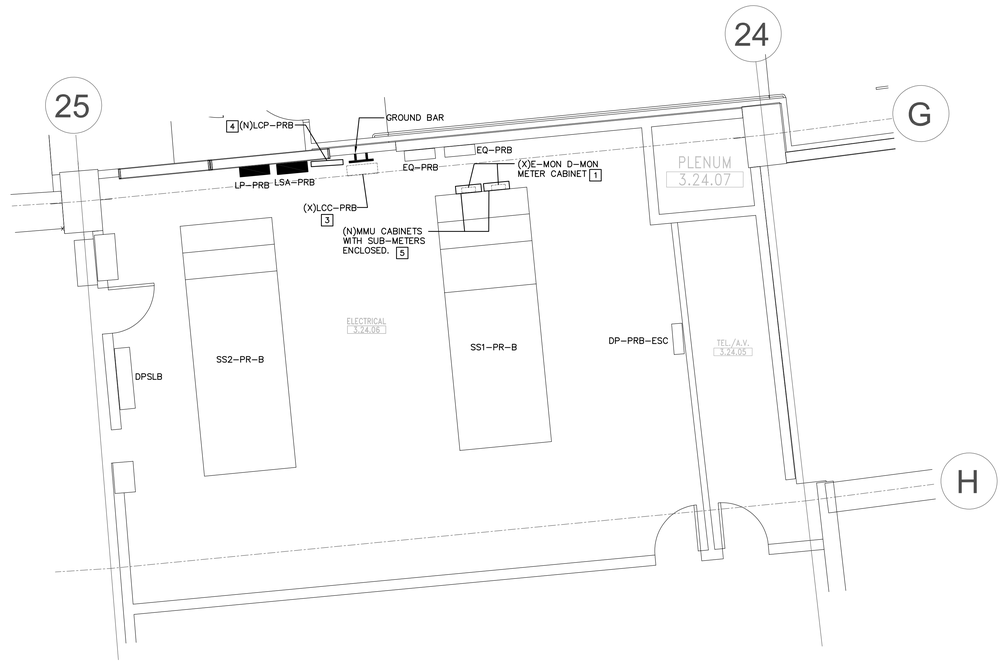
SCALE: 1/4" = 1'-0"





3 PARTAL PLAN - ELECTRICAL ROOM - PRESS LEVEL - QUAD C

SCALE: 1/4" = 1'-0"



4 PARTAL PLAN - ELECTRICAL ROOM - PRESS LEVEL - QUAD B

SCALE: 1/4" = 1'-0"

DRAWING NOTES

1. EXISTING SUB-METER CABINET SHOWN AS DASHED LINE TO BE REMOVED IN ITS ENTIRETY WITH ALONG ASSOCIATED CT's. REFER TO THE METER RISER DIAGRAM OR DRAWING E4.11 FOR EXISTING SUB-METER QUANTITY TO BE REPLACED.
2. SUB-METER CABINET TO BE REPLACE WITH AN NEW SMART METERING CABINET AND CT'S SHOWN AS SOLID LINE. NEW SUB-METERS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A RS-485 CABLE FROM EACH SUB-METER TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. PROVIDE INTERFACE DEVICE FOR CONNECTION TO ETHERNET, SCHNEIDER LINK 150 GATEWAY OR EQUAL. CABLES SHALL BE ROUTED IN CONDUIT.
3. EXISTING MICROLITE LIGHTING CONTROLS TO BE REPLACED.
4. EXISTING CONTROL PANEL TO BE REPLACED WITH EITHER NEW INTERIOR COMPONENTS OR A NEW LIGHTING CONTROL PANEL LCP SHOWN AS SOLID LINE. NEW LIGHTING CONTROLS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A CAT 6 CABLE IN CONDUIT FROM CONTROL PANEL TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. REFER TO LIGHTING CONTROL RISER DIAGRAM NEW WORK DRAWING E4.02 FOR MORE INFORMATION.
5. SUB-METER CABINET TO BE REPLACE WITH AN NEW SMART METERING CABINET SHOWN AS SOLID LINE. NEW SUB-METERS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A RS-485 CABLE FROM EACH SUB-METER TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. PROVIDE INTERFACE DEVICE FOR CONNECTION TO ETHERNET, SCHNEIDER LINK 150 GATEWAY OR EQUAL. CABLES SHALL BE ROUTED IN CONDUITS.

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS,
LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

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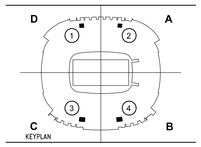

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02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **1/4" = 1'-0"**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

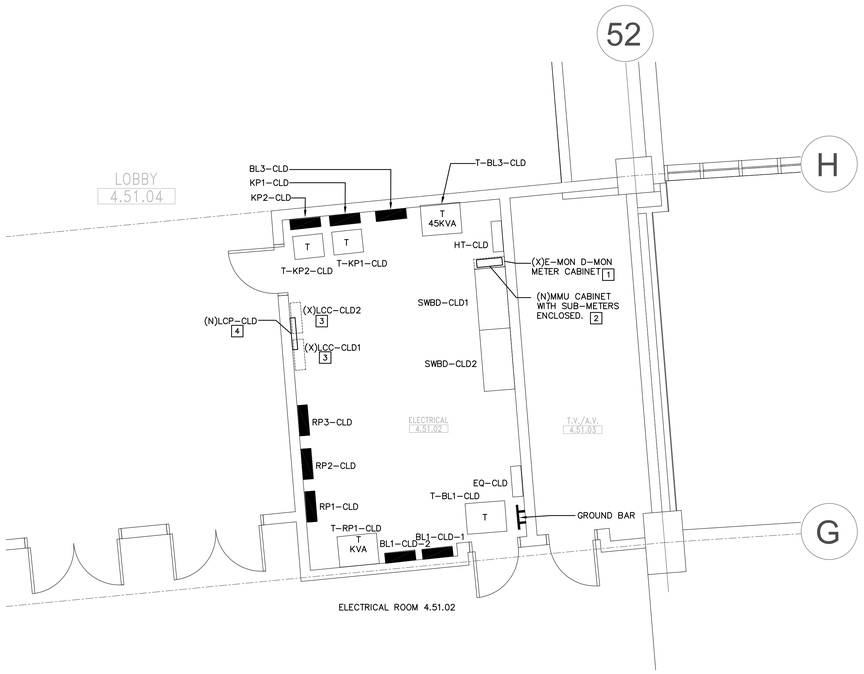
SHEET TITLE:

ELECTRICAL ROOMS
PRESS LEVEL
QUADS A, B, C & D

DRAWING NO:

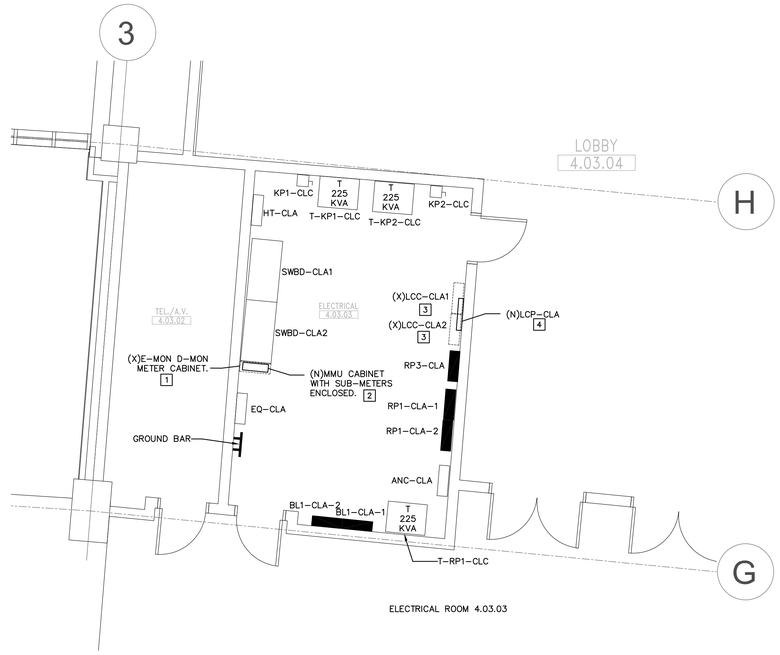
E2.21

Plotted By: Brad Mahon | 3/1/2021 3:48 PM ARL: P:\2020\062\Current\E2.21 Electrical Rooms Press Level Quads A, B, C & D



1 PARTAL PLAN - ELECTRICAL ROOM - CLUB LEVEL - QUAD D

SCALE: 1/4" = 1'-0"



2 PARTAL PLAN - ELECTRICAL ROOM - CLUB LEVEL - QUAD A

SCALE: 1/4" = 1'-0"

DRAWING NOTES

1. EXISTING SUB–METER CABINET SHOWN AS DASHED LINE TO BE REMOVED IN ITS ENTIRETY WITH ALONG ASSOCIATED CT's. REFER TO THE METER RISER DIAGRAM OR DRAWING E4.11 FOR EXISTING SUB–METER QUANTITY TO BE REPLACED.
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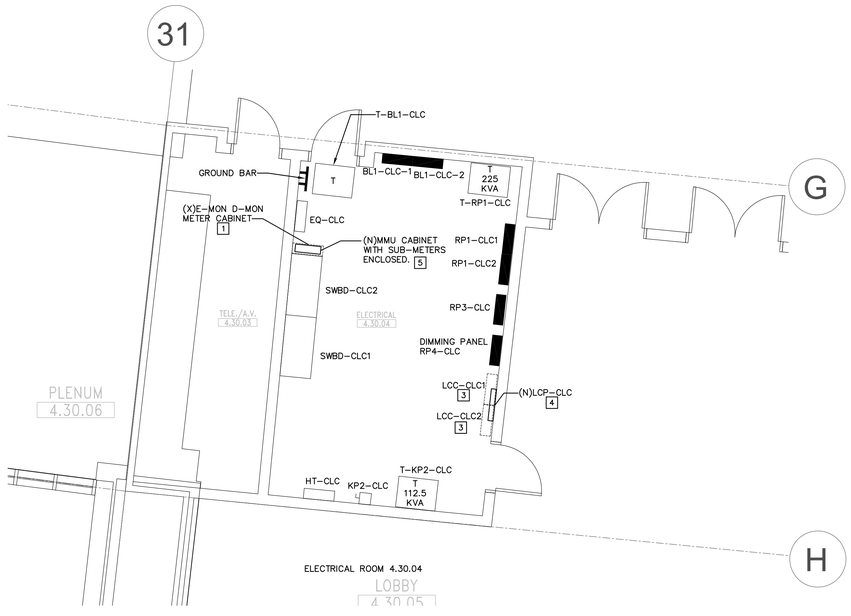
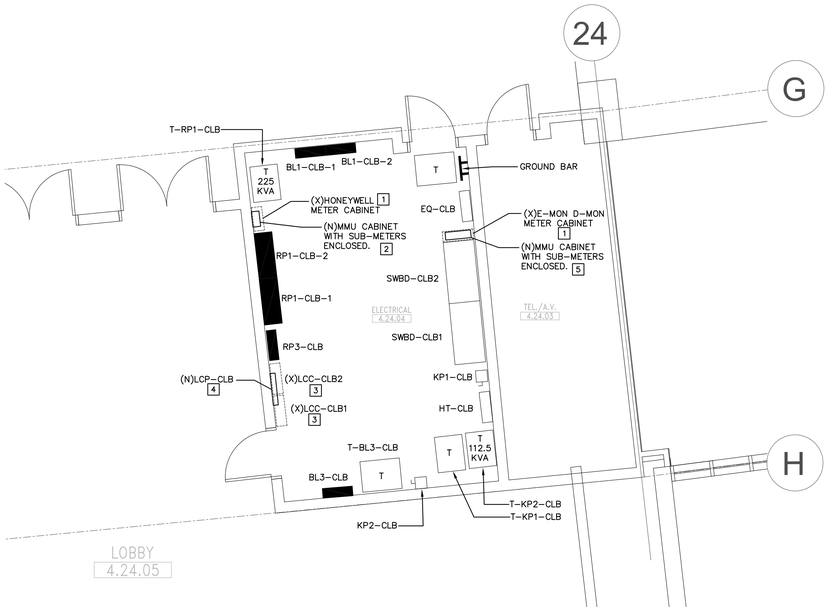


3 PARTAL PLAN - ELECTRICAL ROOM - CLUB LEVEL - QUAD C

SCALE: 1/4" = 1'-0"



4 PARTAL PLAN - ELECTRICAL ROOM - CLUB LEVEL - QUAD B

SCALE: 1/4" = 1'-0"

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
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PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS,
LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

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1801 RESEARCH BOULEVARD, SUITE 100
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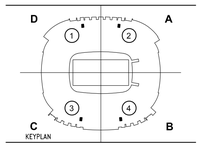

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **1/4" = 1'-0"**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

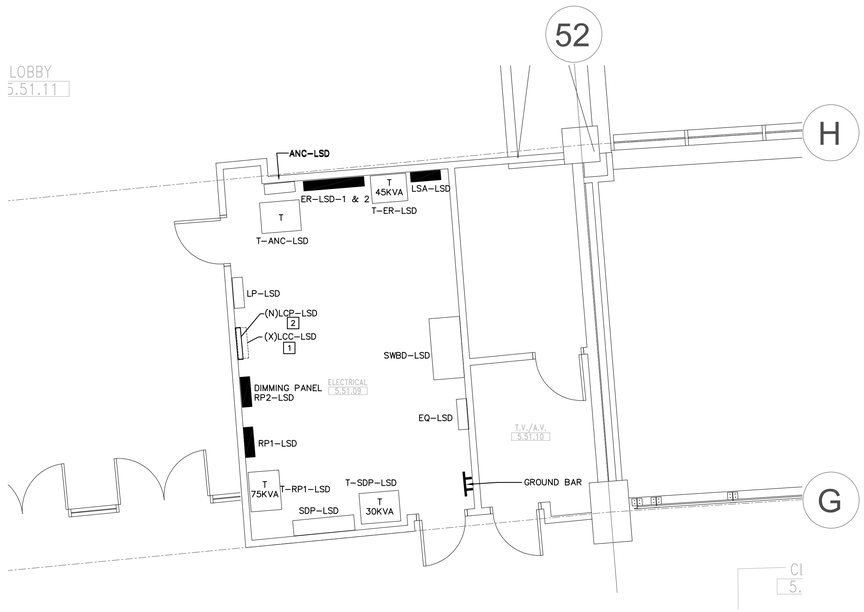
SHEET TITLE:

ELECTRICAL ROOMS
CLUB LEVEL
QUADS A, B, C & D

DRAWING NO:

E2.31

Plotted By: Brad Mahon | 3/1/2021 3:40 PM ARL: P:\2020\062\Current\E2.31 Electrical Rooms Club Level Quads A, B, C & D

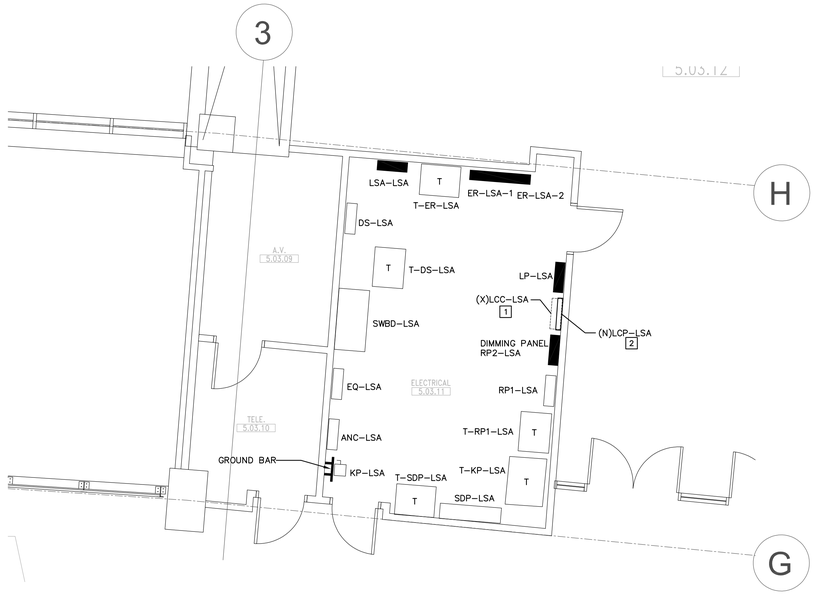


1 PARTAL PLAN - ELECTRICAL ROOM - LOWER SUITE LEVEL - QUAD D

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"



2 PARTAL PLAN - ELECTRICAL ROOM - LOWER SUITE LEVEL - QUAD A

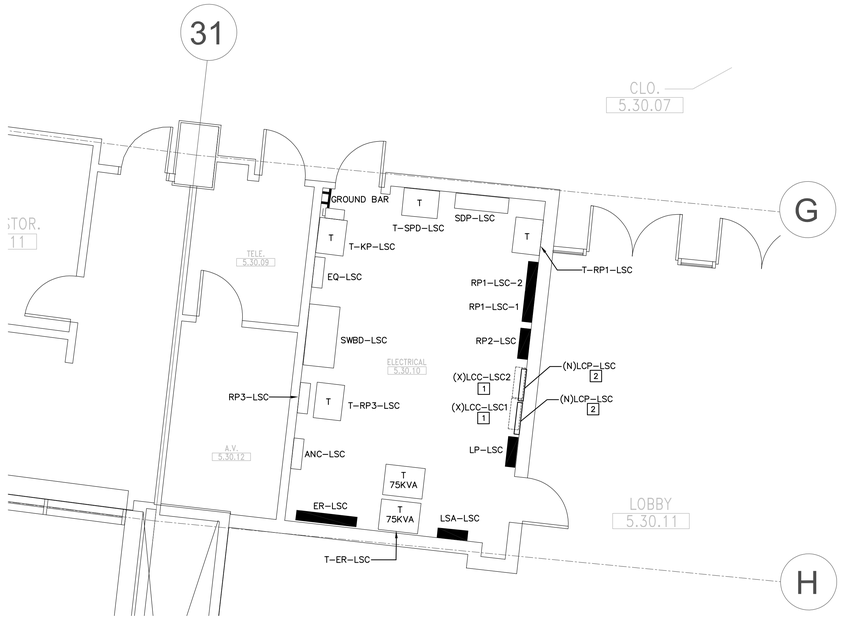
SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

DRAWING NOTES

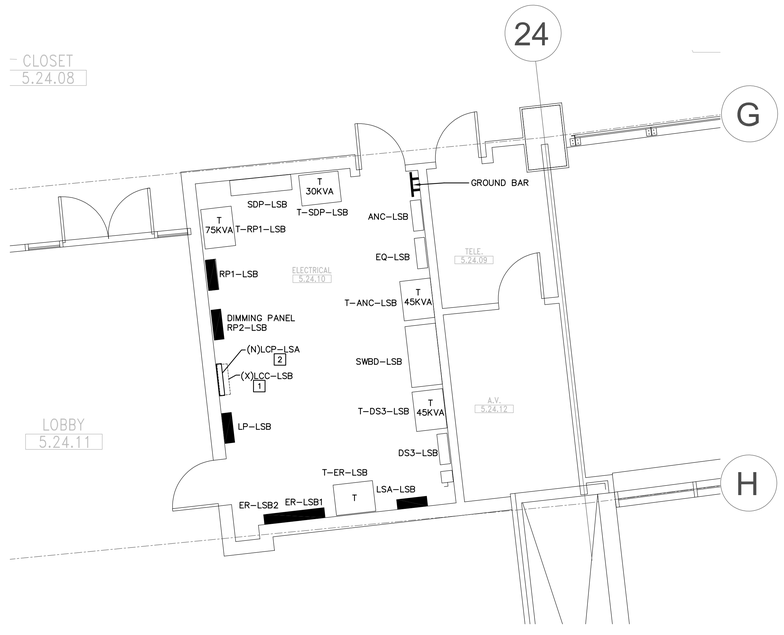
1. EXISTING MICROLITE LIGHTING CONTROLS TO BE REPLACED.
2. EXISTING CONTROL PANEL TO BE REPLACED WITH EITHER NEW INTERIOR COMPONENTS OR A NEW LIGHTING CONTROL PANEL LCP SHOWN AS SOLID LINE. NEW LIGHTING CONTROLS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A CAT 6 CABLE IN CONDUIT FROM CONTROL PANEL TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. REFER TO LIGHTING CONTROL RISER DIAGRAM NEW WORK DRAWING E4.02 FOR MORE INFORMATION.



3 PARTAL PLAN - ELECTRICAL ROOM - LOWER SUITE LEVEL - QUAD C

SCALE: 1/4" = 1'-0"

SCALE: 1/4" = 1'-0"



4 PARTAL PLAN - ELECTRICAL ROOM - LOWER SUITE LEVEL - QUAD B

SCALE: 1/4" = 1'-0"

SCALE: 1/4" = 1'-0"

bkm
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Mechanical / Electrical Engineers
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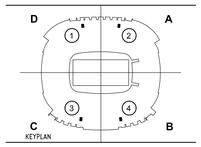

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LICENSE NO. _____.
EXPIRATION DATE: _____.

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	DATE	DESCRIPTION
	02/12/21	BID DOCUMENTS
A	10/28/20	ADDENDUM #1

WFT PROJECT NO: 20062.BKM.A

SCALE: 1/4" = 1'-0"

DRAWN BY: DE

CHECKED BY: BEM

DATE: FEBRUARY 12, 2021

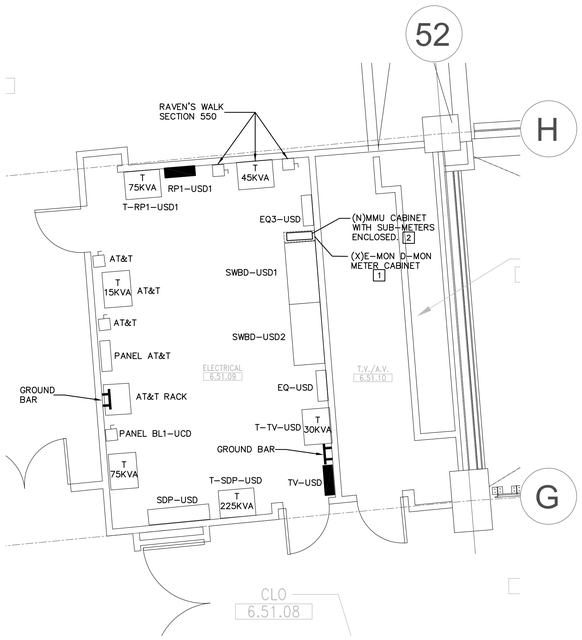
SHEET TITLE:

ELECTRICAL ROOMS
LOWER SUITE LEVEL
QUADS A, B, C & D

DRAWING NO:

E2.41

Plotted By: Brad Mahon | 2/12/2021 11:39 AM
ARL - P:\2020\062\Current\E2.41 Electrical Rooms Lower Suite Quads A, B, C & D

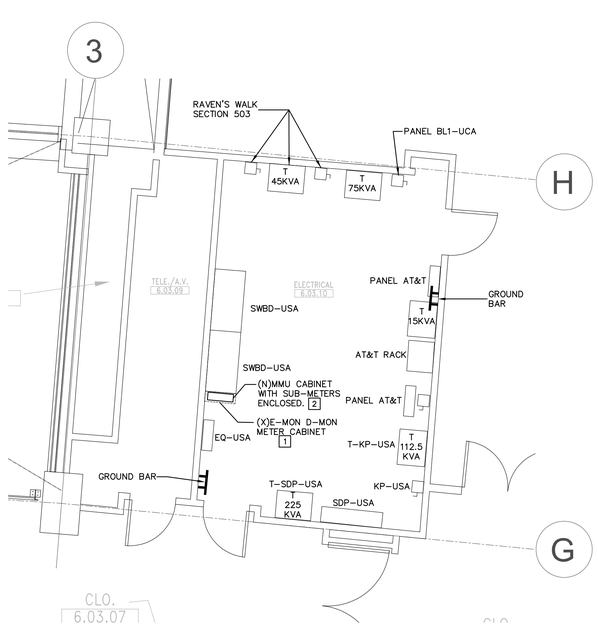


1 PARTAL PLAN - ELECTRICAL ROOM - UPPER SUITE LEVEL - QUAD D

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

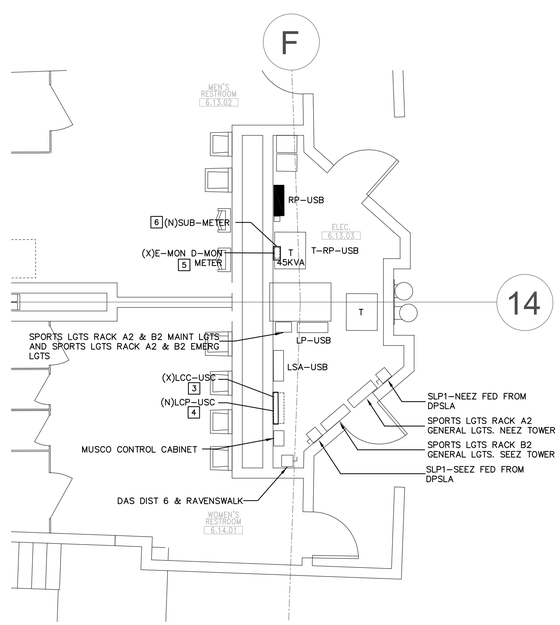


2 PARTAL PLAN - ELECTRICAL ROOM - UPPER SUITE LEVEL - QUAD A

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"



3 PARTAL PLAN - ELECTRICAL ROOM - UPPER SUITE LEVEL - QUAD A/B

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

DRAWING NOTES

1. EXISTING SUB–METER CABINET SHOWN AS DASHED LINE TO BE REMOVED IN ITS ENTIRETY WITH ALONG ASSOCIATED CT's. REFER TO THE METER RISER DIAGRAM OR DRAWING E4.11 FOR EXISTING SUB–METER QUANTITY TO BE REPLACED.
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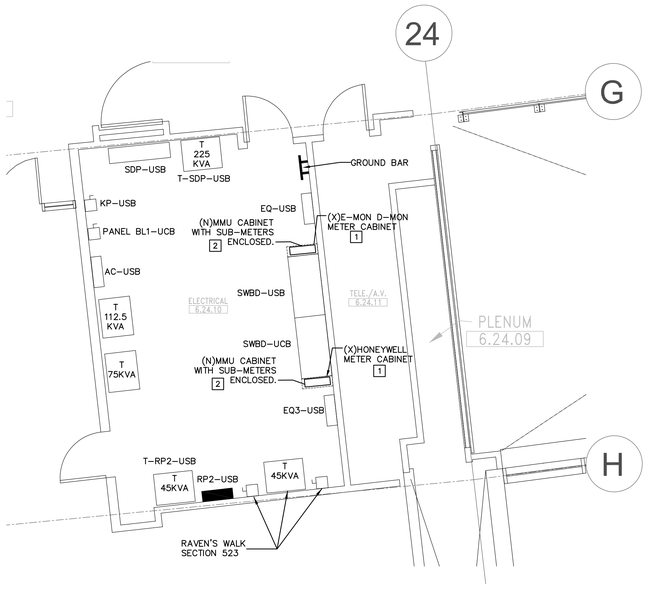
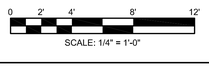
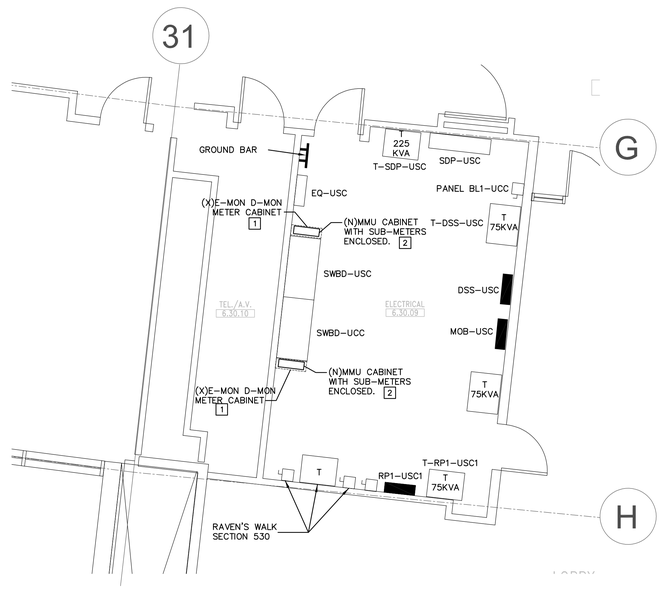


4 PARTAL PLAN - ELECTRICAL ROOM - UPPER SUITE LEVEL - QUAD B

SCALE: 1/4" = 1'-0"

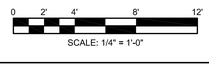


SCALE: 1/4" = 1'-0"

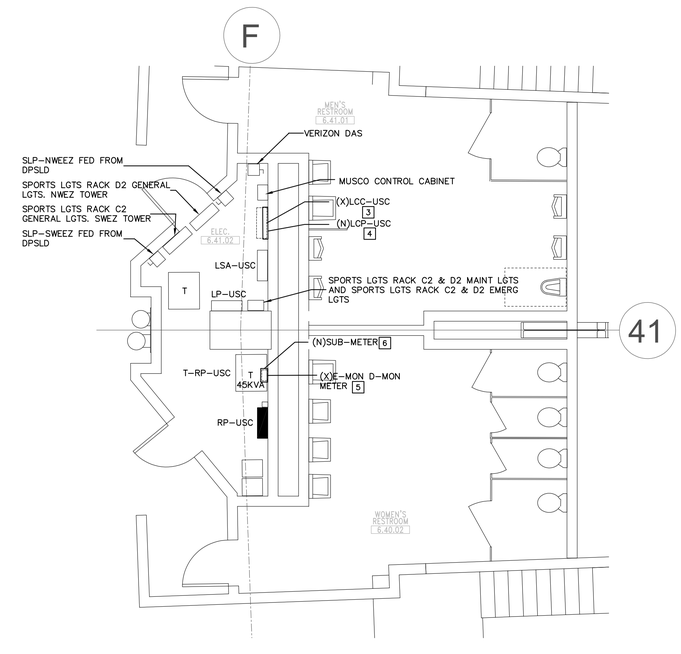


5 PARTAL PLAN - ELECTRICAL ROOM - UPPER SUITE LEVEL - QUAD C

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"



6 PARTAL PLAN - ELECTRICAL ROOM - UPPER SUITE LEVEL - QUAD D/C

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

bkm
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Mechanical / Electrical Engineers
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PROJECT NAME:

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MSA PROJECT NO. 20-071

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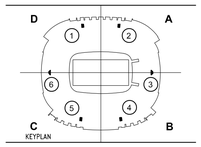

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **1/4" = 1'-0"**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

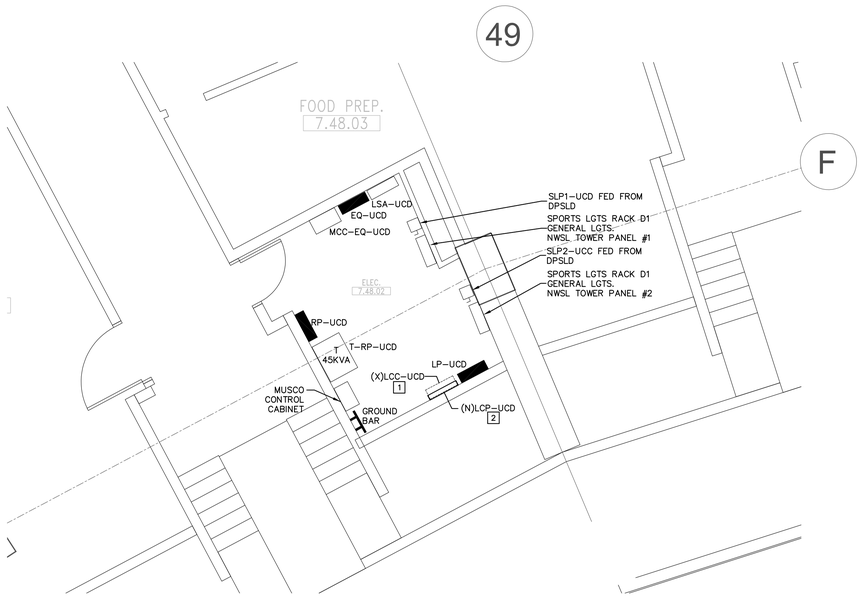
SHEET TITLE:

ELECTRICAL ROOMS
UPPER SUITE LEVEL
QUADS A, B, C & D

DRAWING NO:

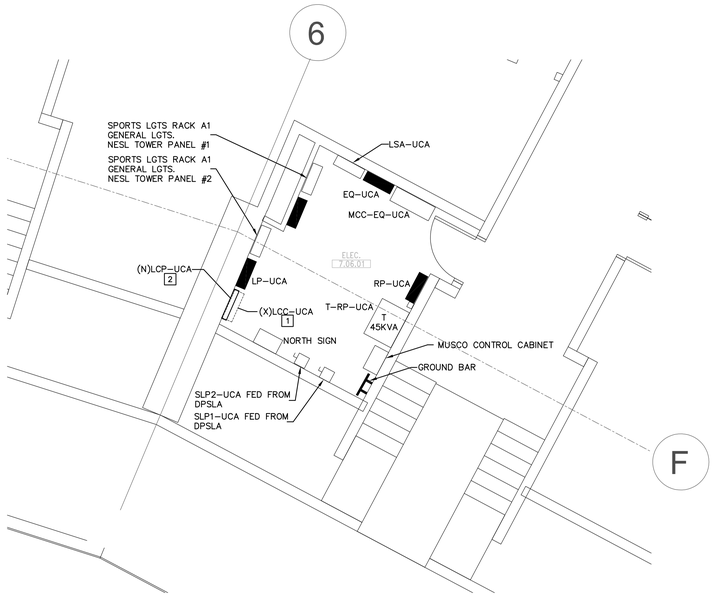
E2.51

Plotted By: Brad Mahon | 2/12/2021 11:39 AM
ARL: P:\2020\062\Current\E2.51 Electrical Rooms Upper Suite Quads A, B, C & D



1 PARTAL PLAN - ELECTRICAL ROOM - UPPER CONCOURSE LEVEL - QUAD D
SCALE: 1/4" = 1'-0"



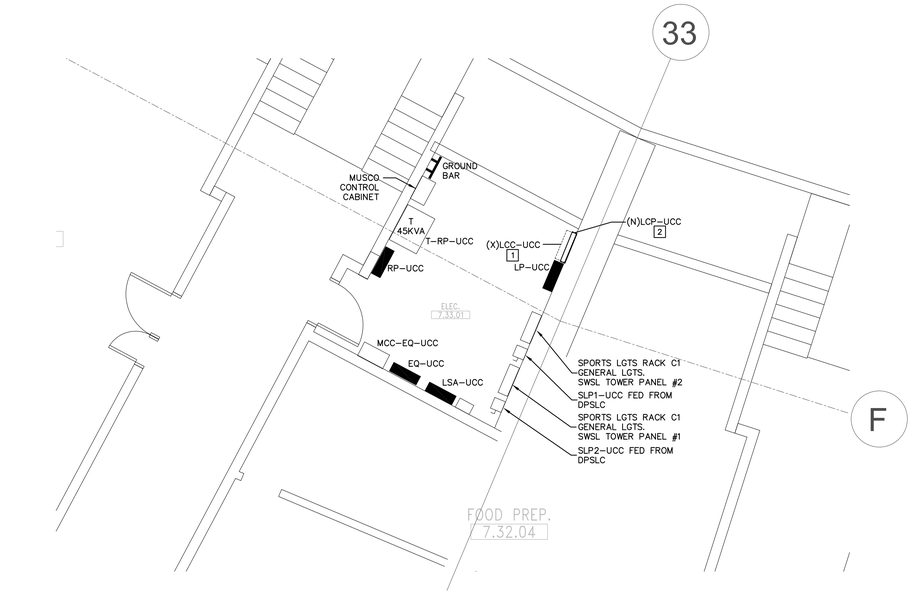


2 PARTAL PLAN - ELECTRICAL ROOM - UPPER CONCOURSE LEVEL - QUAD A
SCALE: 1/4" = 1'-0"

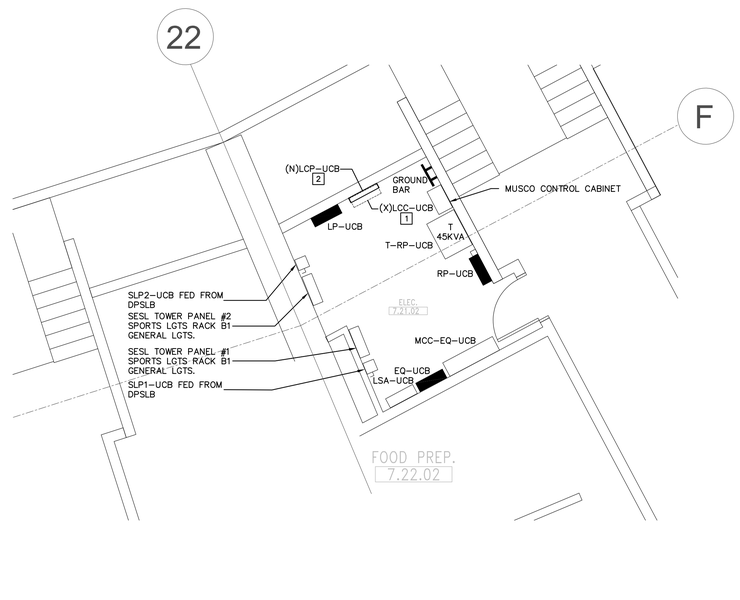


DRAWING NOTES

1. EXISTING MICROLITE LIGHTING CONTROLS TO BE REPLACED.
2. EXISTING CONTROL PANEL TO BE REPLACED WITH EITHER NEW INTERIOR COMPONENTS OR A NEW LIGHTING CONTROL PANEL LCP SHOWN AS SOLID LINE. NEW LIGHTING CONTROLS SHALL COMMUNICATE OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE A CAT 6 CABLE IN CONDUIT FROM CONTROL PANEL TO THE NETWORK SWITCH PROVIDED UNDER THIS CONTRACT. REFER TO LIGHTING CONTROL RISER DIAGRAM NEW WORK DRAWING E4.02 FOR MORE INFORMATION.



3 PARTAL PLAN - ELECTRICAL ROOM - UPPER CONCOURSE LEVEL - QUAD C
SCALE: 1/4" = 1'-0"



4 PARTAL PLAN - ELECTRICAL ROOM - UPPER CONCOURSE LEVEL - QUAD B
SCALE: 1/4" = 1'-0"

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

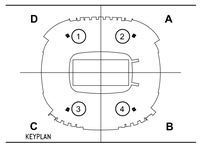
M&T BANK STADIUM
HVAC CONTROLS,
LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811



SEAL:

PROFESSIONAL CERTIFICATION:

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WFT PROJECT NO: **20062.BKM.A**

SCALE: **1/4" = 1'-0"**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

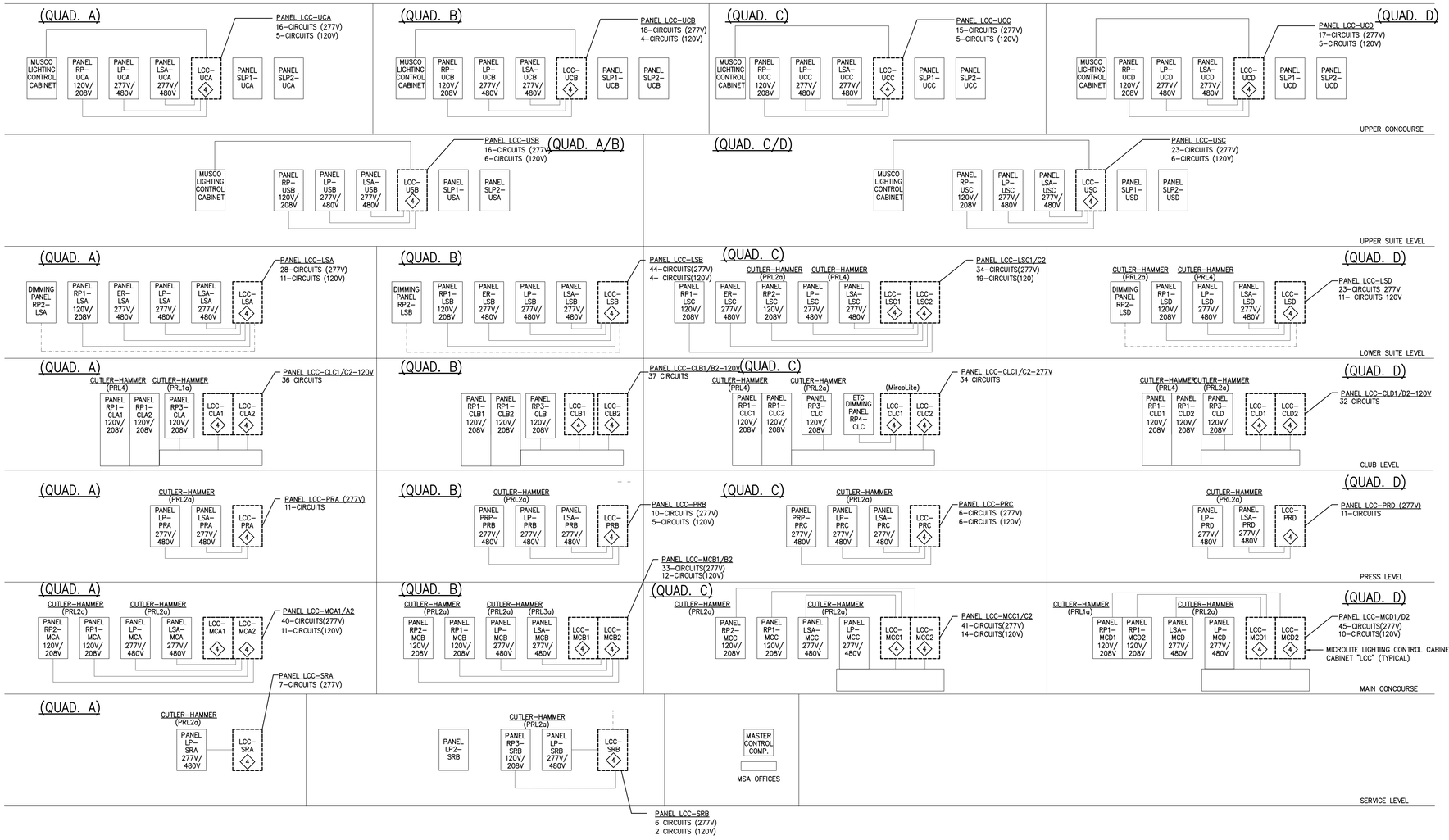
SHEET TITLE:

ELECTRICAL ROOMS
UPPER CONCOURSE LEVEL
QUADS A, B, C & D

DRAWING NO:

E2.61

Plotted By: Brad Mahon | 2/12/2021 11:39 AM
ARL: P:\2020\062\Current\E2.61 Electrical Rooms Upper Concourse Level Quads A, B, C & D



LIGHTING CONTROL SYSTEM RISER DIAGRAM –DEMOLITION PLAN

SCALE: NOT TO SCALE

LEGEND

POWER WIRING

GENERAL LIGHTING CONTROL WIRING

DRAWING NOTES

1. EXISTING CABINET FOR SPORTS CONTROL SWITCHES TO REMAIN.
2. NOT USED
3. NOT USED
4. EXISTING MICROLITE LIGHTING CONTROL RELAYS TO BE REPLACED WITH EITHER NEW INTERIOR COMPONENTS OR A NEW LIGHTING CONTROL PANEL LCP. INTERCEPT THE EXISTING POWER, LIGHTING AND CONTROL CIRCUITS AND REROUTE THEM TO THE NEW LIGHTING CONTROL ELECTRONICS.

bkm
Burdette, Koehler, Murphy & Associates, Inc.
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6300 Blair Hill Lane, Suite 400
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P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811

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ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

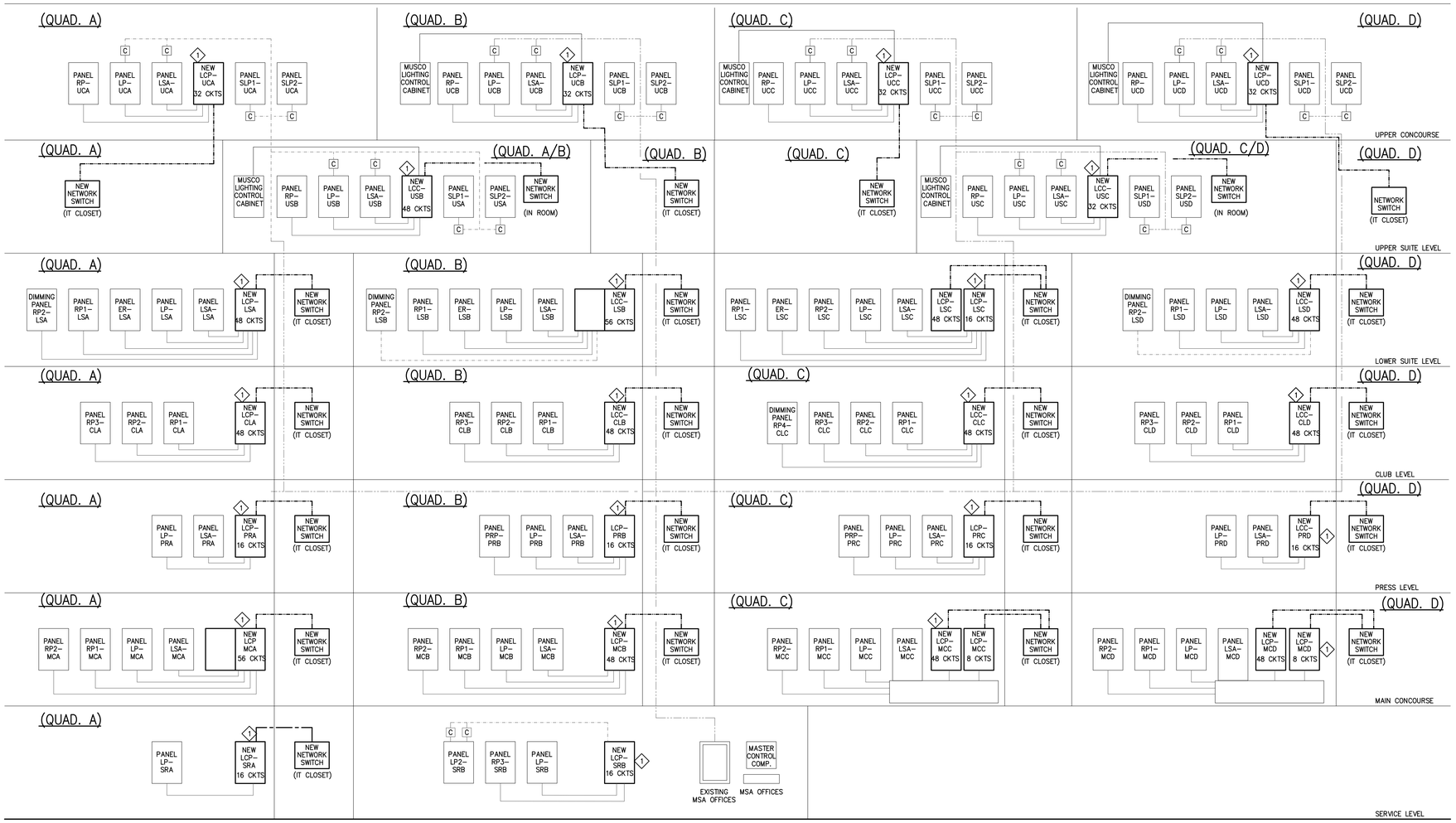
SHEET TITLE:

LIGHTING CONTROL SYSTEM RISER DIAGRAM - DEMOLITION

DRAWING NO:

E4.01

Plotted By: Brad Mahon | 2/11/2021 6:12 PM ARL: P:\2020\062\Current\E4.01 Lighting Control System Riser Diagram - Demolition



LIGHTING CONTROL SYSTEM RISER DIAGRAM – NEW WORK

SCALE: NOT TO SCALE

LEGEND

POWER WIRING

NEW CAT 6 CABLE

DRAWING NOTE

1. NEW LIGHTING CONTROL RELAYS IN EXISTING OR NEW CABINET. ACTIVE RELAY QUANTITIES FOR THE CIRCUITS NOTED ARE BASED ON EXISTING FIELD SURVEY AND AS–BUILT DOCUMENTS.

BASIS OF DESIGN:
SPECIFIED LIGHTING CONTROL SYSTEM SHALL COMMUNICATE VIA BACNET TCP/IP OVER THE NEW NETWORK INFRASTRUCTURE. PROVIDE CAT 6 COMMUNICATIONS CABLING FROM EACH PANEL SHOWN TO THE NETWORK SWITCH IN THE AV/IT CLOSETS ADJACENT TO, OR LOCAL TO, THE EXISTING ELECTRICAL ROOMS ON EACH LEVEL. REFER TO THE NETWORK INFRASTRUCTURE RISER DIAGRAM.

bkm
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HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

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DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

LIGHTING CONTROL SYSTEM RISER DIAGRAM - NEW WORK

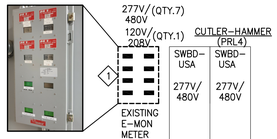
DRAWING NO:

E4.02

Plotted By: Brad Mahon | 2/11/2021 5:39 PM ARL: P:\2020\062\Current\E4.02 Lighting Control System Riser Diagram - New Work

UPPER CONCOURSE

(QUAD. A)



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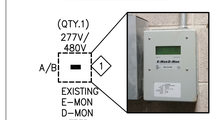
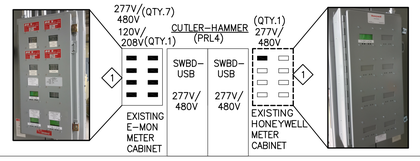
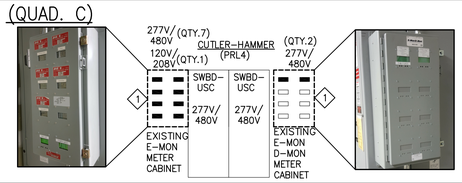


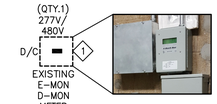
(QUAD. B)



(QUAD. C)



(QUAD. D/C)



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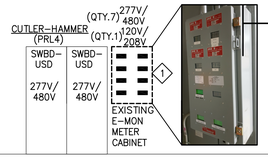
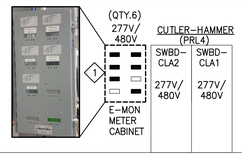


UPPER SUITE LEVEL

LOWER SUITE LEVEL

(QUAD. A)



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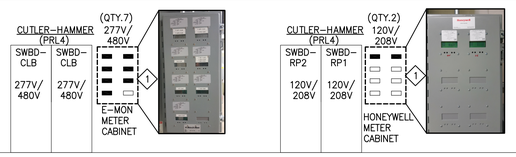

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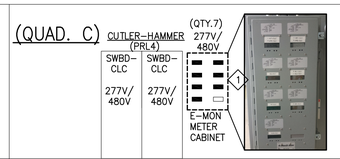

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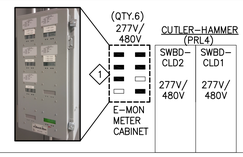
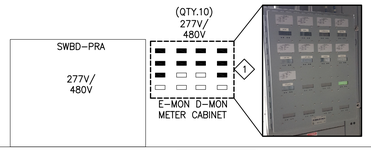


CLUB LEVEL

(QUAD. A)



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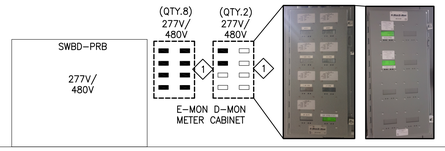

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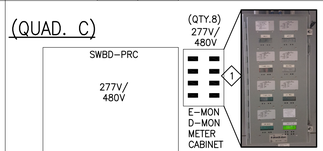

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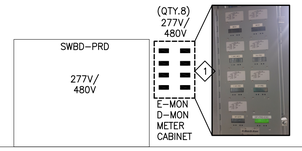
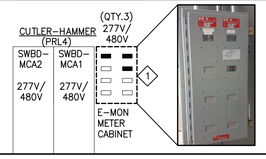


PRESS LEVEL

(QUAD. A)



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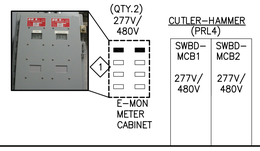

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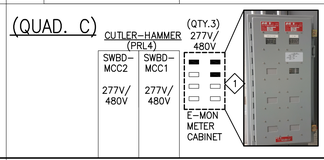

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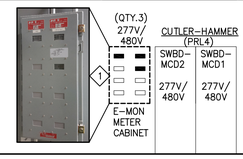
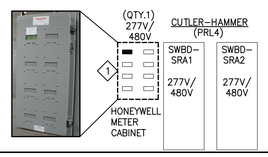
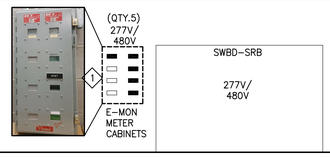


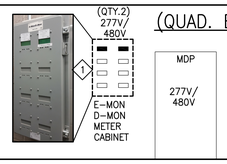
MAIN CONCOURSE

(QUAD. A)



(QUAD. B)

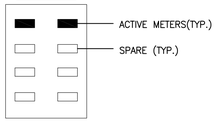




SERVICE LEVEL

METERING SYSTEM RISER DIAGRAM– DEMOLITION WORK

LEGEND



DRAWING NOTE

1. REMOVE EXISTING EMON SUB-METERS, CABINETS AND CURRENT TRANSFORMERS (CTs).

GENERAL NOTES

1. COORDINATE ALL SYSTEM OUTAGES WITH THE OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMTION.

bkm
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MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
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CONSULTANTS:

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LICENSE NO. _____,
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DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

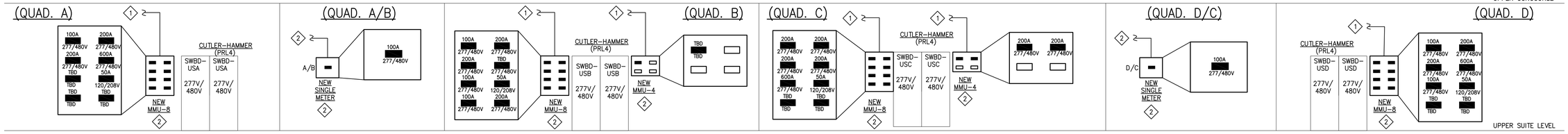
METERING DIAGRAM

DRAWING NO:

E4.11

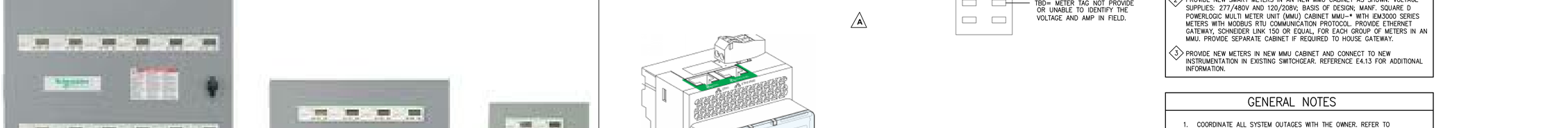
ARL-P:\2020\062\Current\E4.11 Metering Riser Diagram Demolition Work
Plotted By: Brad Mahon | 2/11/2021 5:39 PM

UPPER CONCOURSE



UPPER SUITE LEVEL

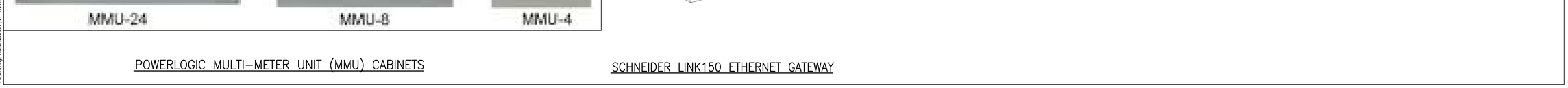
LOWER SUITE LEVEL



CLUB LEVEL



PRESS LEVEL



MAIN CONCOURSE

MAIN ELEC ROOM

SERVICE LEVEL

POWERLOGIC MULTI–METER UNIT (MMU) CABINETS

METERING SYSTEM RISER DIAGRAM – NEW WORK

SCHNEIDER LINK150 ETHERNET GATEWAY

LEGEND

DRAWING NOTES

1. EXTEND CONDUIT AND COMMUNICATION CABLE(S) TO NETWORK SWITCH IN LOCAL IT/AV CLOSET. COORDINATE FINAL LOCATION AND TERMINATION POINTS WITH IT CONTRACTOR PRIOR ROUGH–INS.
2. PROVIDE NEW SMART METERS IN AN NEW MMU CABINET AS SHOWN. VOLTAGE SUPPLIES: 277/480V AND 120/208V. BASIS OF DESIGN: MANF. SQUARE D POWERLOGIC MULTI METER UNIT (MMU) CABINET MMU–* WITH IEM3000 SERIES METERS WITH MODBUS RTU COMMUNICATION PROTOCOL. PROVIDE ETHERNET GATEWAY, SCHNEIDER LINK 150 OR EQUAL, FOR EACH GROUP OF METERS IN AN MMU. PROVIDE SEPARATE CABINET IF REQUIRED TO HOUSE GATEWAY.
3. PROVIDE NEW METERS IN NEW MMU CABINET AND CONNECT TO NEW INSTRUMENTATION IN EXISTING SWITCHGEAR. REFERENCE E4.13 FOR ADDITIONAL INFORMATION.

GENERAL NOTES

1. COORDINATE ALL SYSTEM OUTAGES WITH THE OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. FOR ALL METERING BEYOND 300FT FROM THE NETWORK RACK LOCATION, PROVIDE DUPLEX FIBER CABLE IN LIEU OF CATEGORY 6 CABLE. PROVIDE MEDIA CONVERTERS, PATCH CORDS AND OTHER COMPONENTS AS REQUIRED.

bkm
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PROJECT NAME:

M&T BANK STADIUM HVAC CONTROLS, LIGHTING CONTROLS AND SUBMETERING SYSTEMS IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	**BID DOCUMENTS**

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

METERING DIAGRAM

DRAWING NO:

E4.12

ARL-P:\2020\062\Current\E4.12 Metering Riser Diagram New Work
Plotted By: Brad Mahon | 2/12/2021 11:43 AM

GENERAL NOTES

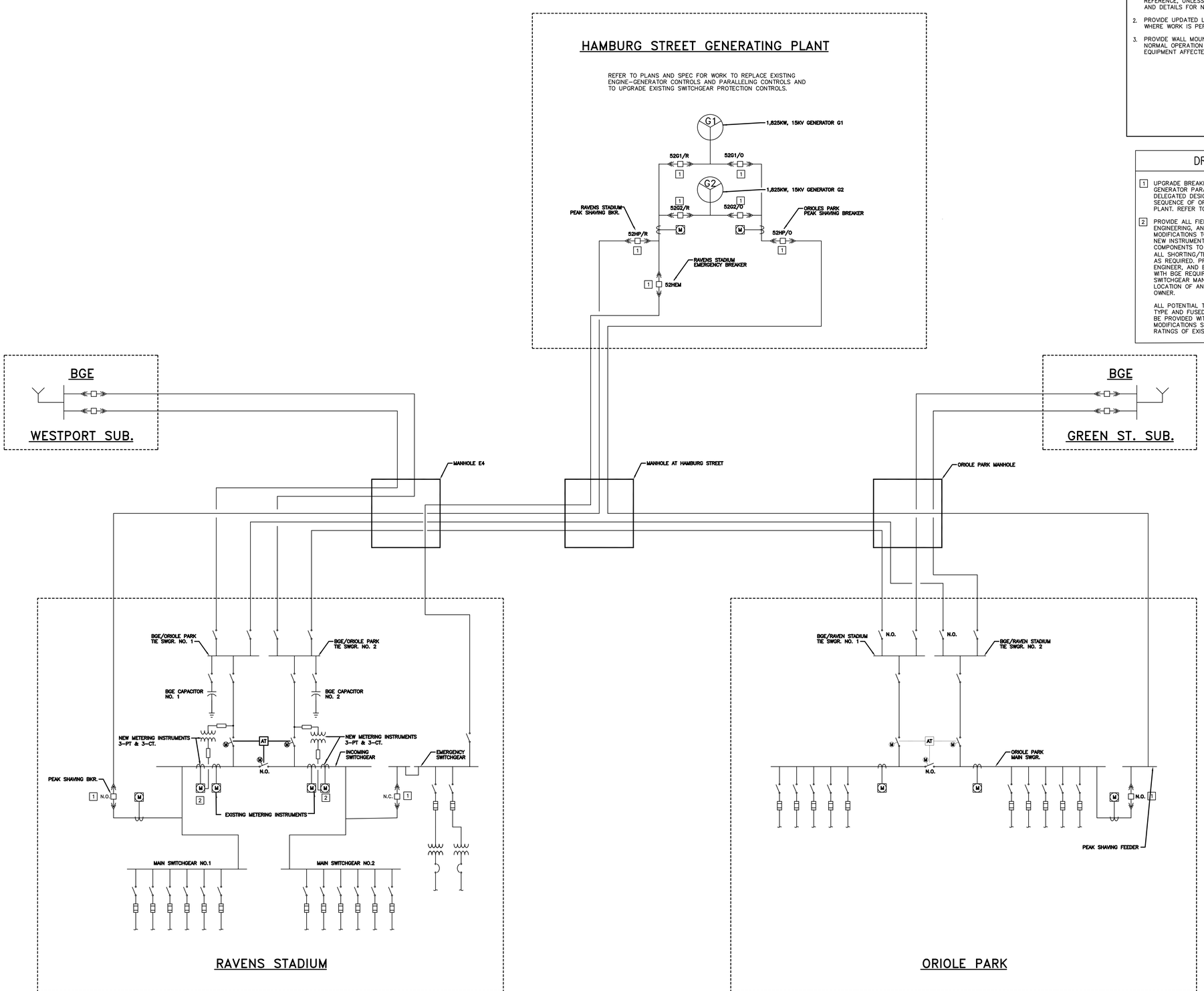
1. ALL EQUIPMENT IS EXISTING TO REMAIN AND SHOWN FOR REFERENCE, UNLESS OTHERWISE NOTED. REFER TO FLOOR PLANS AND DETAILS FOR NEW WORK REQUIREMENTS.
2. PROVIDE UPDATED LABELS AND DIRECTORIES FOR ALL EQUIPMENT WHERE WORK IS PERFORMED.
3. PROVIDE WALL MOUNTED SIGNAGE THAT CLEARLY IDENTIFIES NORMAL OPERATION AND EMERGENCY PROCEDURES FOR ALL EQUIPMENT AFFECTED BY UPDATED CONTROLS.

DRAWING NOTES

[1] UPGRADE BREAKER CONTROLS TO ACCOMMODATE NEW GENERATOR PARALLELING CONTROLS. PROVIDE DELEGATED DESIGN AND IMPLEMENTATION TO ACHIEVE SEQUENCE OF OPERATION FOR THE LOT C GENERATOR PLANT. REFER TO SHEET E2.02.

[2] PROVIDE ALL FIELD SURVEY, MEASUREMENT, DESIGN, ENGINEERING, AND CONSTRUCTION AS REQUIRED FOR MODIFICATIONS TO EXISTING SWITCHGEAR TO PROVIDE NEW INSTRUMENT TRANSFORMERS AND RELATED COMPONENTS TO ACCOMMODATE NEW METERING. PROVIDE ALL SHORTING/TERMINAL BLOCKS, WIRING, FUSES, ETC. AS REQUIRED. PROVIDE SHOP DRAWINGS FOR OWNER, ENGINEER, AND BGE APPROVAL. COORDINATE ALL WORK WITH BGE REQUIREMENTS AND LATEST CUSTOMER SWITCHGEAR MANUAL. COORDINATE CONFIGURATION AND LOCATION OF ANY REQUIRED NEW ENCLOSURES WITH OWNER.

ALL POTENTIAL TRANSFORMERS SHALL BE DRAW-OUT TYPE AND FUSED. ALL CURRENT TRANSFORMERS SHALL BE PROVIDED WITH SHORTING BLOCKS. ALL SWITCHGEAR MODIFICATIONS SHALL MAINTAIN B.I.L. AND SCCR RATINGS OF EXISTING SWITCHGEAR.



GENERATOR POWER ONE-LINE DIAGRAM

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WFT PROJECT NO: 20062.BKM.A

SCALE: NOT TO SCALE

DRAWN BY: DE

CHECKED BY: BEM

DATE: FEBRUARY 12, 2021

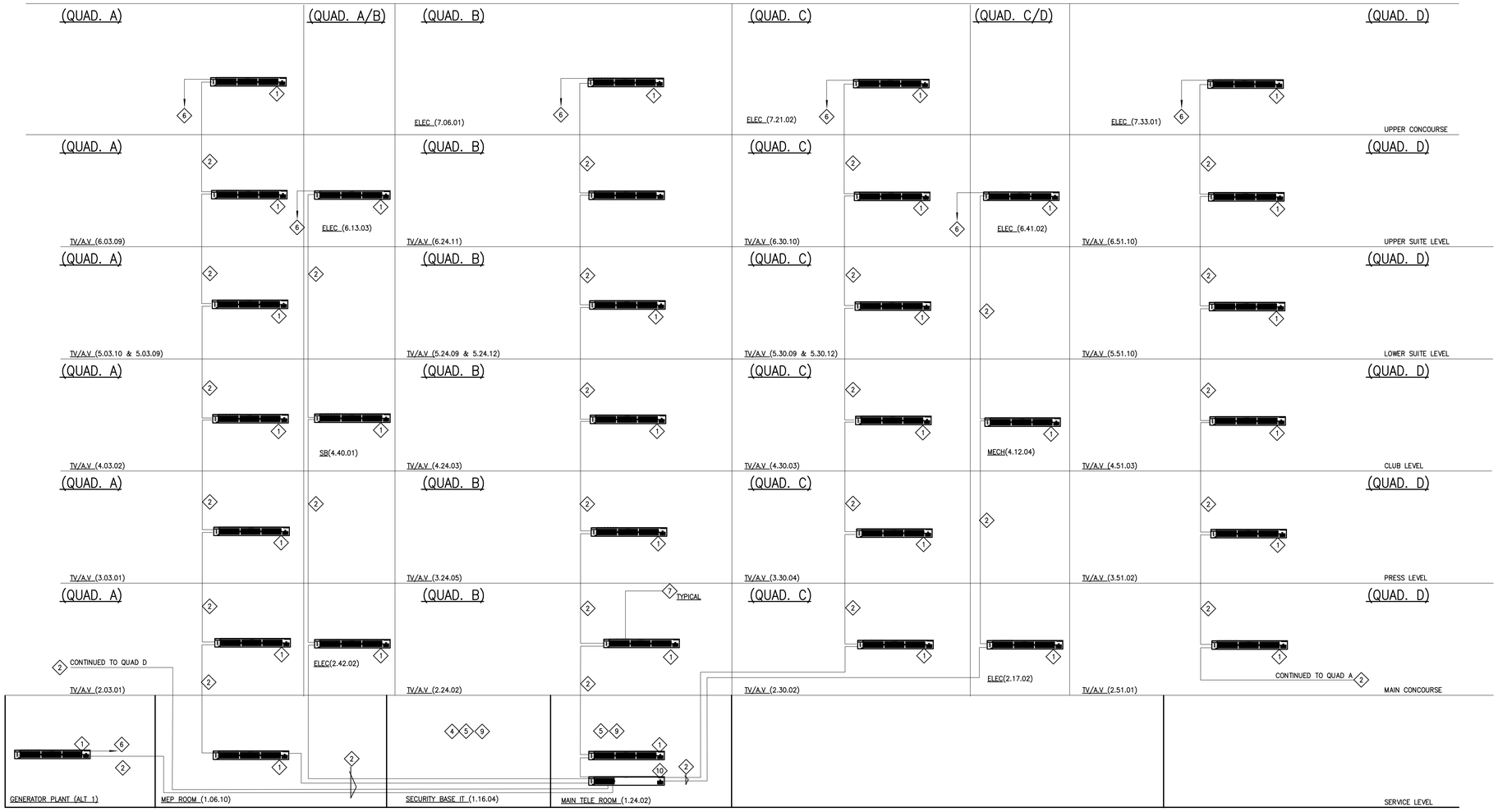
SHEET TITLE:

GENERATOR POWER ONE-LINE DIAGRAM

DRAWING NO:

E4.13

Plotted By: Brad Mahon | 1/1/2021 8:22 PM ARL-P:\2020\062\Current\E4.13 Generator Power Riser Diagram



NETWORK INFRASTRUCTURE RISER DIAGRAM – NEW WORK

SCALE: NOT TO SCALE

DRAWING NOTES

1. NEW NETWORK SWITCH. BASIS OF DESIGN IS ARUBA 2930F, 24 PORT. FOR LOCATIONS THAT WILL UTILIZE MORE THAN 18 PORTS, OR 75% OF THE SWITCH CAPACITY, PROVIDE 48 PORT SWITCH. IN NO CASE SHALL MORE THAN 75% OF PORTS BE USED. PROVIDE ADDITIONAL SWITCHES, PATCH PANELS, JUMPER CORDS, ETC. AS REQUIRED. PROVIDE LOCKABLE WALL MOUNTED CABINET FOR ALL NEW SWITCHES, SMART–RACK 10U LOW–PROFILE, SWITCH–DEPTH, WALL–MOUNTED RACK ENCLOSURE CABINET, MODEL SRW10US, OR EQUAL. LABEL RACK "BUILDING AUTOMATION SYSTEM – AUTHORIZED ACCESS ONLY". PROVIDE RACK MOUNTED LIU FIBER PATCH PANELS AND CAT 6 COPPER PATCH PANELS FOR EACH NEW SWITCH. ALL CABINETS SHALL BE PROVIDED WITH MINIMUM 4U SPARE MOUNTING SPACE. PROVIDE HIGHER CAPACITY RACK WHERE REQUIRED.
2. FIBER OPTIC CABLE
3. NOT USED
4. LOCATION OF NEW BAS SERVERS IN SERVICE LEVEL SECURITY BASE IT ROOM.
5. PROVIDE TWO FIBER OPTIC CABLES FOR REDUNDANT CONNECTION FOR SELF–HEALING LOOP BETWEEN THE EXISTING MSA SWITCH IN THE MAIN TELEPHONE ROOM FOR RAVENS STADIUM AND THE EQUIPMENT IN THE SERVICE LEVEL SECURITY BASE IT CLOSET.
6. ALL FIBER OPTIC RISERS SHALL BE CONNECTED AS SELF–HEALING LOOPS. PROVIDE 6 STRAND FIBER FROM THE TOP OF EACH RISER TO THE FIBER SWITCH IN THE MAIN TELE ROOM. FIBER SHALL BE ROUTED IN ELECTRICAL ROOM OR OTHER DIVERSE PATHWAY FROM IT CLOSET RISER.
7. CAT 6 CONNECTION TO BAS, LIGHTING CONTROL PANELS AND SUB–METERING EQUIPMENT WITHIN 300 FEET.
8. NOT USED
9. PROVIDE UPS UNIT FOR BAS SYSTEM SERVERS LOCATED IN SECURITY BASE IT ROOM AND FOR THE MSA SWITCHES IN THE EXISTING MAIN TELEPHONE ROOM FOR RAVENS STADIUM. SIZE UPS AS REQUIRED TO PROVIDE 10 MINUTE RUN–TIME AT FULL LOAD OF SERVERS/SWITCHES UNDER NORMAL OPERATING CONDITIONS. BASIS OF DESIGN IS TRIPPLITE SU SERIES OR EQUAL. COORDINATE FORM FACTOR AND MOUNTING OF UPS WITH OWNER AND EXISTING RACK SPACE. PROVIDE BRANCH CIRCUIT AND RECEPTACLE, SIZED AS RECOMMENDED BY THE UPS MANUFACTURER, FROM PANEL EM–SRB LOCATED IN THE MAIN ELECTRICAL ROOM FOR EACH OF THE UPS UNITS. PROVIDE NEW CIRCUIT BREAKER, WIRING AND CONDUIT AS RECOMMENDED BY THE MANUFACTURER.
10. PROVIDE NEW FIBER OPTIC SWITCH. BASIS OF DESIGN IS 48 PORT ARUBA 5406R ZL2 WITH (36) SFP+ PORTS.

GENERAL NOTES

1. ALL EQUIPMENT AND CABLING IS NEW.
2. PROVIDE NEW 20A, 120V BRANCH CIRCUIT AND QUAD RECEPTACLE IN EACH NEW NETWORK EQUIPMENT RACK. EXTEND 2#12+1#12G IN ¾" CONDUIT TO EXISTING PANELBOARD IN ELECTRICAL ROOM ADJACENT TO THE IT ROOM. PROVIDE NEW 20A, 1 POLE CIRCUIT BREAKER AS REQUIRED. SUBMIT PROPOSED CIRCUITING FOR ALL RACKS FOR APPROVAL PRIOR TO ROUGH–IN..
3. CONFIGURE NETWORK SWITCHES BASED ON PROTOTYPE PROVIDED BY MSA.
4. REFER TO DIVISION 27 SPECS FOR COMMUNICATIONS MEDIA SPEC.
5. FOR ALTERNATE 1, UNDERGROUND PATHWAYS ARE EXISTING BETWEEN RAVENS STADIUM AND THE GENERATOR PLANT AND SHALL BE UTILIZED FOR NEW COMMUNICATIONS MEDIA. COORDINATE EXACT LOCATION AND ROUTING IN FIELD.
6. EXACT LOCATION OF ALL RACKS SHALL BE DETERMINED BY THE CONTRACTOR WITHIN EACH AV/IT CLOSET. SUBMIT PROPOSED LOCATIONS FOR APPROVAL PRIOR TO ROUGH–IN.
7. FOR BAS, LIGHTING CONTROL PANELS AND SUB–METERS BEYOND 300FT FROM THE NETWORK RACK LOCATION, PROVIDE DUPLEX FIBER CABLE IN LIEU OF CATEGORY 6 CABLE. PROVIDE MEDIA CONVERTERS, PATCH CORDS AND OTHER COMPONENTS AS REQUIRED.

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WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:
NETWORK INFRASTRUCTURE RISER DIAGRAM - NEW WORK

DRAWING NO:
E4.14

Plotted By: Brad Mahon | 2/26/2021 5:11 PM ARL: P:\2020\062\Current\E4.14 Network Infrastructure Riser Diagram

(N)LCP-USB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	ENDZONE COLOR LED	16		21	ENDZONE COLOR LED	2
3	ENDZONE COLOR LED	22		23	ENDZONE COLOR LED	4
5	ENDZONE COLOR LED	24		17	UPPER SUITE FLOOD UPLIT	6
7	EMERG US TOILET VOM	18		19	ENDZONE COLOR LED	8
9	ENDZONE COLOR LED	20		45	M T SIGN EAST	10
11	M T SIGN EAST	46		47	M T SIGN EAST	12
13	M T SIGN EAST	48		1	UPPER SUITES TOILETS	14
15	PPER SUITE ACCENT FLOO	9		10	VIDEO CAM BOX	16
17	UPPER SUITE CONCESSION	2		3	UPPER SUITE TOILETS	18
19	UPPER SUITE CONCESSION	4		5	UPPER SUITE FLOODLIGHTS	20
21	UPPER SUITE CONCESSION	6		7	UPPER SUITE FLOODLIGHTS	22
23	PPER SUITE ACCENT FLOO	8		11	ESP CONTACTOR CONTRO	24
25	E EZ SPORT LIGHTS	30		25	TVS QUAD A	26
27	TVS QUAD B	26		29	E EZ SPORT LIGHTS	28
29	E EZ HOUSE LIGHTS	27		28	E EZ EMERG LIGHTS	30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-USC

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	UPPER SUITE TEAM OFFICE	25		27	UPPER SUITE TEAM OFFICE	2
3	UPPER SUITE TEAM OFFICE	26		28	UPPER SUITE TEAM OFFICE	4
5	UPPER SUITE CONCESSION	2		1	UPPER SUITE TOILETS	6
7	PPER SUITE ACCENT FLOO	9		2	UPPER SUITE CONCESSION	8
9	M T SIGN WEST	45		3	UPPER SUITE TOILETS	10
11	M T SIGN WEST	46		47	M T SIGN WEST	12
13	M T SIGN WEST	48		4	UPPER SUITE CONCESSION	14
15	PPER SUITE FLOODLIGHTS	5		6	PPER SUITE CONCESSION	16
17	PPER SUITE FLOODLIGHTS	7		8	PPER SUITE ACCENT FLOO	18
19	ENDZONE COLOR LED	16		21	ENDZONE COLOR LED	20
21	ENDZONE COLOR LED	22		23	ENDZONE COLOR LED	22
23	ENDZONE COLOR LED	24		17	ENDZONE COLOR LED	24
25	EMERG US TOILET VOM	18		19	ENDZONE COLOR LED	26
27	ENDZONE COLOR LED	20		25	TVS QUAD D	28
29	TVS QUAD C	26		28	W EZ EMERG LIGHTS	30
31	W EZ SPORT LIGHTS	30		27	W EZ HOUSE LIGHTS	32
33	W EZ SPORT LIGHTS	29				34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-SRA

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	TRUCK DRIVE	5		1	SERVICE DRIVE	2
3	SAFE OFFICE	9		10	SPONSOR BAR	4
5	SERVICE DRIVE	2		3	TRUCK DOCK	6
7	TRASH DOCK DRIVE	4				8
9						10
11						12
13						14
15						16
17						18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCC-SRB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	TRUCK DRIVE	5		6	TRUCK DRIVE	2
3	SERVICE DRIVE	1		2	SERVICE DRIVE	4
5	SERVICE DRIVE	3		4	SERVICE DRIVE	6
7	TVS ELEVATORS	24		23	LT RAIL WALKWAY LTS	8
9						10
11						12
13						14
15						16
17						18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-MCA

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	COLUMN LEDS A QUAD	26		27	COLUMN LEDS A QUAD	2
3	COLUMN LEDS A QUAD	28		39	ARCH LEDS A QUAD	4
5	ARCH LEDS A QUAD	41		1	SIGN PANELS	6
7	TOILETS	10		11	HIGH BAYS	8
9	TOILETS	12		13	HIGH BAYS	10
11	TRASH TICKET ROOMS	14		15	HIGH BAYS	12
13	ENTRANCE GRAPHICS	16		17	ENTRANCE PENDANTS	14
15	VOMITORY GRAPHICS	18		19	ENTRANCE SPOTLIGHTS	16
17	CONCESSIONS	2		20	ENTRANCE GRAPHICS	18
19	ENTRANCE FLOODLIGHTS	21		22	ENTRANCE FLOODLIGHTS	20
21	SITE LTS PEDESTRIAN WALK	29		32	SITE LTS PEDESTRIAN WALK	22
23	SITE LTS PEDESTRIAN WALK	30		33	SITE LTS PEDESTRIAN WALK	24
25	SITE LTS CORPORATE WALK	31		34	SITE LTS NORTH PLAZA	26
27	SIGN PANELS	3		35	SITE LTS NORTH PLAZA	28
29	SITE LTS NORTH PLAZA	36		4	CONCESSIONS	30
31	SIGN PANELS	5		6	CONCESSIONS	32
33	HIGH BAYS	7		8	CONCESSIONS	34
35	HIGH BAYS	9		18	HIGHBAYS	36
37	SUITE ENTRANCE CANOPY	23		46	EMERG HIGH BAYS	38
39	EMERG NORTH ENTRANCE	47		48	EMERG TOILETS AND VOM	40
41	TV VIDEO PANEL	1		2	TVS COL 2 4	42
43	SITE PSL PYLONS	9		10	SITE PSL PYLONS	44
45	FAN ACCOM ROOM	7		11	SITE PSL PYLONS	46
47	TV VIDEO PANEL	3		4	TVS ELEVATOR FIRST AID	48
49	TV VIDEO PANEL	5		6	TV VIDEO PANEL	50
51	CONT REMOTE TV VIDEO PNL	8				52
53						54
55						56
57						58

(N)LCP-MCB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	ARCH LEDS B QUAD	20		17	COLUMN LEDS B QUAD	2
3	COLUMN LEDS B QUAD	23		22	COLUMN LEDS B QUAD	4
5	SIGN PANELS	1		10	TOILETS	6
7	HIGH BAY	11		12	TRASH TICKET ROOMS	8
9	HIGH BAY	13		14	ENTRANCE GRAPHICS	10
11	HIGH BAY	15		16	VOMITORY GRAPHICS	12
13	CONCESSIONS	2		3	SIGNS PANELS	14
15	CONCESSIONS	4		5	SIGN PANELS	16
17	CONCESSIONS	6		7	HIGH BAY	18
19	TOILETS	8		9	HIGH BAY	20
21	SUITE ENTRANCE CANOPY	37		25	SITE LIGHTING PARKING	22
23	SITE LIGHTING ROADWAY	31		26	SITE LIGHTING PARKING	24
25	SITE LIGHTING PARKING	32		27	SITE LIGHTING PARKING	26
27	SITE PEDESTRIAN WALK	33		28	SITE LIGHTING PARKING	28
29	SITE LIGHTING PARKING	29		30	SITE PEDESTRIAN WALK	30
31	SE ESCALATOR BM	21		47	EMERG HIGH BAY	32
33	EMERG TOILETS AND VOM	48		1	TVS COL 21 24 25	34
35	TV VIDEO PANEL	9		2	TV VIDEO PANEL	36
37	TVS ELEVATOR FIRST AID	3		10	TV VIDEO PANEL	38
39	TV VIDEO PANEL	4		5	TV VIDEO PANEL	40
41	TV VIDEO PANEL	6		7	TV VIDEO PANEL	42
43	TV VIDEO PANEL	8		12	SITE PSL PYLONS	44
45	CONT REMOTE TV VIDEO PNL	11				46
47						48
49						50
51						52
53						54
55						56
57						58

(N)LCP-MCC

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	SUITE ENTRANCE CANOPY	46		25	BLUE POINT BAR	2
3	COLUMN LEDS C QUAD	41		26	ARCH LEDS C QUAD	4
5	COLUMN LEDS C QUAD	36		39	COLUMN LEDS C QUAD	6
7	COLUMN LEDS C QUAD	38		40	COLUMN LEDS C QUAD	8
9	SIGN PANEL	1		10	CONCESSIONS FA GS	10
11	HIGH BAYS	11		12	TOILETS	12
13	HIGH BAY	13		14	TOILETS	14
15	HIGH BAY	15		17	ENTRANCE	16
17	VOMITORY GRAPHICS	18		19	ENTRANCE	18
19	CONCESSIONS	2		20	TRASH TICKET ROOMS	20
21	ENTRANCE	21		22	TRASH TICKET ROOM	22
23	ENTRANCE	23		29	SITE LIGHTING PARKING	24
25	SITE LIGHTING PARKING	32		30	SITE LIGHTING PARKING	26
27	SITE LIGHTING PARKING	33		31	SITE LIGHTING PARKING	28
29	SITE PEDESTRIAN WALK ROAD	34		3	SIGN PANELS	30
31	SITE PEDESTRIAN WALK ROAD	35		4	CONCESSIONS	32
33	SIGN PANELS	5		6	CONCESSIONS	34
35	HIGH BAYS	7		8	CONCESSIONS	36
37	HIGH BAY	9		37	WESP CONTACTOR CONTROL	38
39	EMERG HIGH BAYS	45		47	EMERG HIGH BAYS	40
41	EMERG TOILETS AND VOM	48		1	VIDEO PANEL	42
43	TVS CONCESSIONS ELEVATOR	9		2	VIDEO PANEL	44
45	VIDEO PANEL	3		10	FAN ACCOM	46
47	SITE PSL PYLONS	12		4	VIDEO PANEL	48
49	VIDEO PANEL	6		8	VIDEO PANEL	50
51	BLUE POINT BAR TV	14		5	VIDEO PANEL	52
53	CONT TV VIDEO BOOTH	11				54
55						56
57						58

(N)LCP-MCD

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	ENTRANCE SPOTLIGHTS	18		4	CONCESSIONS	2
3	SIGN PANELS	5		8	CONCESSIONS	4
5	TALON PUB	33		37	TALON PUB	6
7	COLUMN LEDS D QUAD	21		22	COLUMN LEDS D QUAD	8
9	COLUMN LEDS D QUAD	24		38	ARCH LEDS D QUAD	10
11	COLUMN LEDS D QUAD	23		36	ARCH LEDS D QUAD	12
13	SIGN PANELS	1		10	TOILETS	14
15	HIGH BAY	11		12	TOILETS	16
17	HIGH BAY	13		14	ENTRANCE GRAPHICS	18
19	VOMITORY GRAPHICS	15		16	ENTRANCE PENDANTS	20
21	TRASH TICKET ROOM	17		2	CONCESSIONS	22
23	PEDESTRIAN WALKS	25		19	ENTRANCE FLOODLIGHTS	24
25	PEDESTRIAN WALKS	26		30	NORTH PLAZA	26
27	PEDESTRIAN WALKS	27		31	NORTH PLAZA	28
29	CORPORATE TENTS	28		32	NORTH PLAZA	30
31	PEDESTRIAN WALKS	29		3	SIGN PANELS	32
33	SE ESCALATOR	35		44	SUITE ENTRANCE CANOPY	34
35	CONCESSIONS	6		7	HIGH BAY	36
37	HIGH BAY	9		40	NW ESCALATOR	38
39	A GATE ARCHS	45		46	EMERG HIGH BAY	40
41	NW ESCALATOR BM	39		47	EMERG HIGH BAY	42
43	EMERG TOILETS AND VOM	48		34	148 NEW NW STAIRS	44
45	148 NEW NW STAIRS	35		11	PUB TVS	46
47	TV VIDEO PANEL	1		2	TVS COL 51 53 ELEVATOR	48
49	TV VIDEO PANEL	3		7	SITE PSL PYLONS	50
51	SITE PSL PYLONS	8		9	SITE PSL PYLONS	52
53	TV VIDEO PANEL	4		5	TV VIDEO PANEL	54
55	CONT REMOTE TVS	6				56
57						58

(N)LCP-PRA

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	RAMP	1		2	STAIRS	2
3	RAMP	3		4	STAIRS	4
5	EMERG RAMP	6		20	EMERG STAIRS	6
7	EMERG STAIRS	23		22	EMERG STAIRS	8
9	RAMP	11		7	EMERG RAMP	10
11	EMERG RAMP	8				12
13						14
15						16
17						18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-PRB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	RAMP	1		2	STAIRS	2
3	RAMP	3		4	EMERG BRIDGE	4
5	EMERG RAMP	18		19	EM. STAIRS EB4 5 Lobby	6
7	STAIRS	22		20	EMERG RAMP	8
9	EMERG STAIRS	21		23	EMERG RAMP	10
11	TV PRESS DINING	15		11	TVS COL 26 27	12
13	TVS COL 25 26	12		13	TV PRESS DINING	14
15	TV PRESS DINING	14				16
17						18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-PRC

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	STAIRS	1		22	EMERG PRESS BOX	2
3	EMERG STAIRS	23		24	EMERG STAIRS	4
5	EMERG STAIRS	17		9	TVS 1ST PRESS ROW	6
7	TVS COL 29 30	10		11	TVS COL 31 32 ELEVATOR	8
9	TVS COL 28 29	12		13	TVS COL 30 31	10
11	TVS COACHES BOOTH	14				12
13						14
15						16
17						18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-PRD

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	RAMP	1		2	STAIRS	2
3	RAMP	3		5	RAMPS	4
5	EMERG RAMP	21		22	EMERG STAIRS	6
7	EMERG STAIRS RAMPS	23		24	EMERG STAIRS	8
9	EMERG STAIRS	6		20	EMERG STAIRS	10
11						12
13						14
15						16
17						18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

bkm
Burdette, Koehler, Murphy & Associates, Inc.
Mechanical / Electrical Engineers
6300 Blair Hill Lane, Suite 400
Baltimore, Maryland 21209
P: 410.323.0600 | www.bkma.com

PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS,
LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS:

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

LIGHTING CONTROL SCHEDULES

DRAWING NO:

E4.21

Plotted By: Brad Mahon | 2/12/2021 11:54 AM
ARL: P:\2020\062\Current\E4.21 Lighting Control Schedules

(N)LCP-CLA

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	TVS COL 1	1		16	TV CONCESSIONS	2
3	TVS SMALL BAR	2		3	TVS BIG BAR	4
5	TV 203 207 INNER BOWL	17		14	TV CONCESSIONS	6
7	TV MENUBOARDS	15		5	TVS CONCESSION	8
9	TVS BIG BAR	4			TVS CONCESSIONS	10
11	TV MENUBOARDS			35	TEAM STORE 204	12
13	VOMITORY	1		8	CORRIDOR UPLIGHTS	14
15	CORRIDOR UPLIGHTS	9		10	VOMITORY	16
17	CORRIDOR UPLIGHTS	11		12	VOMITORY	18
19	CORRIDOR UPLIGHTS	13		14	CORRIDOR UPLIGHTS	20
21	VOMITORY	15		2	SEATING AREA	22
23	CORRIDOR UPLIGHTS	16		17	CONCESSION TRACK	24
25	CORRIDOR	18		20	CORRIDOR	26
27	CORRIDOR	21		22	CORRIDOR	28
29	BAR DOWNLIGHTS	24		25	BAR DOWNLIGHTS	30
31	SEATING AREA	3		4	SEATING AREA	32
33	VOMITORY	5		6	CORRIDOR UPLIGHTS	34
35	VOMITORY	7		34	VOMITORY	36
37	VOMITORY	33				38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-CLB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	VOMITORY	1		10	CORRIDOR UPLIGHTS	2
3	CORRIDOR UPLIGHTS	11		12	VOMITORY	4
5	CORRIDOR UPLIGHTS	13		14	CORRIDOR UPLIGHTS	6
7	CORRIDOR UPLIGHTS	15		16	VOMITORY	8
9	SEATING AREA	2		17	CORRIDOR UPLIGHTS	10
11	CORRIDOR	18		19	CORRIDOR	12
13	CONCESSION TRACK	20		21	CORRIDOR	14
15	BAR PENDANTS	22		23	CORRIDOR	16
17	VOMITORY	3		24	BAR DOWNLIGHTS	18
19	CORRIDOR	25		26	BAR DOWNLIGHTS	20
21	CORRIDOR	27		28	CORRIDOR	22
23	SEATING AREA	4		5	VOMITORY	24
25	CORRIDOR UPLIGHTS	6		7	VOMITORY	26
27	CORRIDOR UPLIGHTS	8		9	VOMITORY	28
29	TVS CONCESSION	1		5	TVS COL 22 23	30
31	TVS CONCESSION	13		2	TVS BIG BAR	32
33	TVS CONCESSION	14		3	TVS SMALL BAR	34
35	TV BIG BAR	4		12	TV MENUBOARDS	36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-CLC

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	VOMITORY	1		9	CORRIDOR UPLIGHTS	2
3	CORRIDOR UPLIGHTS	10		11	VOMITORY	4
5	CORRIDOR UPLIGHTS	12		13	CORRIDOR UPLIGHTS	6
7	CORRIDOR UPLIGHTS	14		15	VOMITORY	8
9	SEATING AREA	2		16	CORRIDOR UPLIGHTS	10
11	CONCESSIONS TRACK	17		18	CORRIDOR	12
13	CORRIDOR	19		20	BAR DOWNLIGHTS	14
15	CORRIDOR	21		22	CORRIDOR	16
17	CORRIDOR	23		3	VOMITORY	18
19	CORRIDOR	24		25	BAR DOWNLIGHTS	20
21	BAR DOWNLIGHTS	27		4	SEATING AREA	22
23	VOMITORY	5		6	CORRIDOR UPLIGHTS	24
25	VOMITORY	7		8	CORRIDOR UPLIGHTS	26
27	VOMITORY	34		1	TVS CONCESSION	28
29	TVS COL 36	5		2	TVS SMALL BAR	30
31	TV CONCESSIONS	19		21	TV MENUBOARDS	32
33	TVS BIG BAR	3		4	TVS BIG BAR	34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-CLD

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	VOMITORY	1		9	CORRIDOR UPLIGHTS	2
3	CORRIDOR UPLIGHTS	10		11	VOMITORY	4
5	CORRIDOR UPLIGHTS	12		13	CORRIDOR UPLIGHTS	6
7	CORRIDOR UPLIGHTS	14		15	VOMITORY	8
9	SEATING AREA	2		16	CORRIDOR UPLIGHTS	10
11	CONCESSIONS TRACK	17		18	CORRIDOR	12
13	CORRIDOR	19		20	BAR DOWNLIGHTS	14
15	CORRIDOR	21		22	CORRIDOR	16
17	CORRIDOR	23		3	VOMITORY	18
19	CORRIDOR	24		25	BAR DOWNLIGHTS	20
21	BAR DOWNLIGHTS	27		4	SEATING AREA	22
23	VOMITORY	5		6	SEATING AREA	24
25	CORRIDOR UPLIGHTS	7		8	VOMITORY	26
27	VOMITORY	34		5	TVS BIG BAR	28
29	TVS BIG BAR	1		2	TVS COL 45 BAR	30
31	TVS CONCESSION	4		14	TV CONCESSIONS	32
33	TV MENUBOARDS	15		16	TV CONCESSIONS	34
35	TV 246 249 INNER BOWL	17				36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-LSA

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	EMERG CLUB CORRIDOR	45		47	EMERG CLUB CORRIDOR	2
3	E SCOREBOARD Interior	16		1	LOWER SUITE CORRIDOR	4
5	CLUB CORRIDOR	8		9	CLUB EXT WALK	6
7	CLUB KITCHEN	10		11	CLUB CORRIDOR COVE	8
9	CLUB KITCHEN	12		13	NEON	10
11	UPPER SUITE CORRIDOR	2		3	LOWER SUITE EXT WALK	12
13	CLUB TOILETS	4		17	CLUB TOILETS	14
15	ELEVATOR LOBBIES	5		6	CLUB TOILETS	16
17	CLUB CORRIDOR	7		16	Track lighting 300 level	18
19	Track lighting 300 level	15		42	A QUAD FACADE COLOR LED	20
21	A QUAD FACADE COLOR LED	43		44	A QUAD FACADE COLOR LED	22
23	A QUAD FACADE COLOR LED	45		20	EMERG LS CORRIDOR	24
25	EMERG US CORRIDOR	21		22	EMERG LS EXT WALK	26
27	EMERG CL CORR AND TOILETS	23		24	EMERG CLUB EXT WALK	28
29	LS CORRIDOR SCONCES	37		25	TVS LOWER SUITE COL 1 3	30
31	TVS LOWER SUITE COL 3 5	26		27	TVS UPPER SUITE COL 1 3	32
33	TVS LOWER SUITE COL 5 75	28		29	TVS UPPER SUITE COL 5 7	34
35	TVS LOWER SUITE COL 75 10	30		31	TVS UPPER SUITE COL 5 7	36
37	US CORRIDOR SCONCES	39		38	LS CORRIDOR SCONCES	38
39	US CORRIDOR SCONCES	40				40
41						42
43						44
45						46
47						48
49						50

(N)LCP-LSB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	LOWER SUITE CORRIDOR	1		8	CLUB CORRIDOR	2
3	CLUB CORRIDOR	9		10	ESCALATOR LOBBY	4
5	NEON	11		12	CLUB CORRIDOR COVE	6
7	UPPER SUITE CORRIDOR	2		14	E SCOREBOARD Interior	8
9	CLUB TOILETS	4		5	ELEVATOR LOBBIES	10
11	CLUB TOILETS	6		7	STORAGE SERVICE ELEVATOR	12
13	Track lighting 400 level	41		42	Track lighting 300 level	14
15	Track lighting 300 level	44		19	RAMPS	16
17	RAMPS	20		22	EMERG LS CORRIDOR	18
19	EMERG US CORRIDOR	23		24	EMERG CL TOILETS CORRIDOR	20
21	RAMP B1 EMER	3		25	TVS LOWER SUITE COL 25 27	22
23	TVS LOWER SUITE COL 22 25	26		27	TVS UPPER SUITE COL 25 27	24
25	TVS LOWER SUITE COL 20 22	28		29	TVS UP SUITE COL 225 245	26
27	TVS LOWER SUITE COL 18 20	30		31	TVS UPPER SUITE COL 21 22	28
29	LS CORRRIDOR SCONCES	37		38	LS CORRRIDOR SCONCES	30
31	US CORRRIDOR SCONCES	39		40	US CORRRIDOR SCONCES	32
33	EMERG CLUB CORRIDOR	46		47	EMERG CLUB CORRIDOR	34
35	EMERG CLUB CORRIDOR	48				36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-LSC

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	EMERG CLUB CORRIDOR	27		28	EMERG CLUB CORRIDOR	2
3	EMERG CLUB CORRIDOR	29		37	Track lighting 300 level	4
5	Track lighting 400 level	39		1	LOWER SUITE CORRIDOR	6
7	CLUB TOILETS	8		9	LS TEAM OFFICE RR	8
9	CLUB CORRIDOR	10		11	CLUB STORAGE PANTRY	10
11	CLUB CORRIDOR	12		13	CLUB CORRIDOR COVE	12
13	CLUB EXT WALK	14		15	SPARE	14
15	CLUB NEON	16		2	UPPER SUITE CORRIDOR	16
17	W SCOREBOARD	17		18	m t sign w est ref reaily	18
19	W SCOREBOARD	19		3	LOWER SUITE EXT WALK	20
21	ELEVATOR LOBBIES	5		6	CLUB TOILET	22
23	LOWER SUITE TEAM OFFICE	7		38	Track lighting 300 level	24
25	RAMPS	31		30	RAMPS	26
27	EMERG LS CORRIDOR	21		22	EMERG US CORRIDOR	28
29	EMERG LS EXT WALK	23		24	EMERG CL TOILETS AND CORR	30
31	EMERG CLUB EXT WALK	25		33	EMERG RAMPS	32
33	EMERG RAMPS	32		21	RAMP C1 EMER	34
35	TVS LOW SUITE COL 275 30	1		2	TVS LOWER SUITE COL 22 25	36
37	TVS UPP SUITE COL 275 30	3		4	TVS LOWER SUITE COL 20 22	38
39	TVS UPP SUITE COL 305 325	5		6	TVS LOWER SUITE COL 18 22	40
41	TVS UPPER SUITE COL 33 34	7		10	LOW SUITE CORR SCONCE	42
43	UPPER SUITE TEAM OFFICE	15		16	UPPER SUITE TEAM OFFICE	44
45	LS CORRIDOR SCONCE	17		18	UPPER SUITE TEAM OFFICE	46
47	UPPER SUITE TEAM OFFICE	19		11	UPPER SUITE CORR SCONCE	48
49	UP SUITE CORR SCONCE	12		29	UPPER SUITE TEAM OFFICE	50
51	UPPER SUITE TEAM OFFICE	13		30	UPPER SUITE TEAM OFFICE	52
53	UPPER SUITE TEAM OFFICE	14				54
55						56
57						58

(N)LCP-LSD

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	EMERG CLUB CORRIDOR	46		47	EMERG CLUB CORRIDOR	2
3	EMERG CLUB CORRIDOR	48		1	LOWER SUITE CORRIDOR	4
5	CLUB PANTRY	8		9	CLUB CORRIDOR COVE	6
7	CLUB NEON	10		2	UPPER SUITE CORRIDOR	8
9	ELEVATOR LOBBIES	3		4	CLUB TOILETS	10
11	CLUB CORRIDOR	5		6	CLUB TOILETS	12
13	CLUB CORRIDOR	7		12	CLUB DOWN LIGHTS	14
15	Track lighting 300 level	14		42	D QUAD FACADE COLOR LED	16
17	D QUAD FACADE COLOR LED	43		44	D QUAD FACADE COLOR LED	18
19	D QUAD FACADE COLOR LED	45		22	EMERG LS CORRIDOR	20
21	EMERG CL CORRIDOR	23		24	EMERG US CORRIDOR	22
23	TVS LOWER SUITE COL 52 54	25		26	TVS LOWER SUITE COL 50 52	24
25	LS CORRIDOR SCONCES	37		27	TVS UPPER SUITE COL 50 52	26
27	LS CORRIDOR SCONCES	38		39	US CORRIDOR SCONCES	28
29	US CORRIDOR SCONCES	40		28	TVS LOW SUITE COL 475 495	30
31	TVS UPP SUITE COL 475 495	29		30	TVS LOWER SUITE COL 45 47	32
33	TVS UPPER SUITE COL 45 47	31				34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-UCA

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	UPPER CONC TOILETS	1		2	UPPER CONC CONCESSION	2
3	NE SUITES COLOR LED	44		46	NE SUITES	4
5	UPPER CONC FLOODLIGHT	3		48	NE SUITES	6
7	UPPER CONC CONCESSION	4		5	UPPER CONC ACCENT FLOO	8
9	COLOR CHANGE LED	23		45	NE Corner Board Interior	10
11	NE Corner Board Interior	47		20	EMERG UC TOILETS VOMIT	12
13	TV CONCESSIONS	12		14	NE SL EMERG LIGHTS	14
15	NE SL HOUSE LIGHTS	13		15	NE SL SPORT LIGHTS	16
17	NE SL SPORT LIGHTS	16				18
19						20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-UCB

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	UPPER CONC TOILETS	1		2	UPPER CONC CONCESSIONS	2
3	SE SUITES COLOR LED	44		46	SE Corner Board Interior	4
5	UPPER CONC FLOODLIGHTS	3		48	SE SUITES	6
7	UPPER CONC CONCESSIONS	4		5	UPPER CONC ACCENT FLOOD	8
9	VIDEO CAM BOX	6		23	UPPER CONC FLOOD UPLITE	10
11	UPPER CONC FLOOD UPLITE	24		45	SE SUITES	12
13	SE Corner Board Interior	47		20	EMERG UC TOILETS VOMIT	14
15	UPPER CONC FLOOD UPLITE	21		22	UPPER CONC FLOOD UPLITE	16
17	SE SL EMERG LIGHTS	14		16	SE SL SPORT LIGHTS	18
19	SE SL HOUSE LIGHTS	13		15	SE SL SPORT LIGHTS	20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-UCC

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	UPPER CONC TOILETS	1		2	UPPER CONC CONCESSION	2
3	UPPER CONC FLOODLIGHT	3		44	SW SUITES	4
5	SW Corner Board Interior	46		48	SW SUITES COLOR LED	6
7	UPPER CONC CONCESSION	4		5	UPPER CONC ACCENT FLOO	8
9	UPPER CONC FLOOD UPLIT	23		24	UPPER CONC FLOOD UPLIT	10
11	SW SUITES	45		47	SW Corner Board Interior	12
13	EMERG UC TOILETS VOMIT	20		21	UPPER CONC FLOOD UPLIT	14
15	UPPER CONC FLOOD UPLIT	22		12	TVS CONCESSIONS	16
17	SW SL HOUSE LIGHTS	13		14	SW SL EMERG LIGHTS	18
19	SW SL SPORT LIGHTS	16		15	SW SL SPORT LIGHTS	20
21						22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

(N)LCP-UCD

Ckt #	Load description	LOAD#	Note	LOAD#	Load description	Ckt #
1	UPPER CONC TOILETS	1		2	UPPER CONC CONCESSION	2
3	NW SUITES COLOR LED	44		46	NW Corner Board Interior	4
5	NW SUITES	48		3	UPPER CONC FLOODLIGHT	6
7	UPPER CONC CONCESSION	4		5	UPPER CONC ACCENT FLOO	8
9	UPPER CONC FLOOD UPLIT	23		24	UPPER CONC FLOOD UPLIT	10
11	NW SUITES	45		47	NW Corner Board Interior	12
13	UPPER CONC FLOOD UPLIT	21		22	UPPER CONC FLOOD UPLIT	14
15	EMERG UC TOILETS VOMIT	20		12	TVS CONCESSIONS	16
17	NW SL HOUSE LIGHTS	13		14	NW SL EMERG LIGHTS	18
19	NW SL SPORT LIGHTS	15		16	NW SL SPORT LIGHTS	20
21	TVS CONCESSIONS	12				22
23						24
25						26
27						28
29						30
31						32
33						34
35						36
37						38
39						40
41						42
43						44
45						46
47						48
49						50

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Burdette, Koehler, Murphy & Associates, Inc.
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Baltimore, Maryland 21209
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PROJECT NAME:

M&T BANK STADIUM
HVAC CONTROLS,
LIGHTING CONTROLS
AND SUBMETERING
SYSTEMS
IMPROVEMENTS

MSA PROJECT NO. 20-071

THE MARYLAND STADIUM AUTHORITY
333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

CONSULTANTS;

WFT ENGINEERING, INC.
1801 RESEARCH BOULEVARD, SUITE 100
ROCKVILLE, MARYLAND 20850
P: 301-230-0811

SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. _____, EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

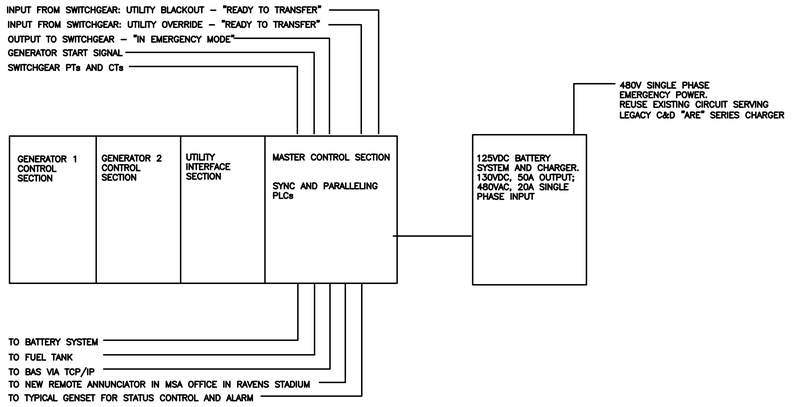
SHEET TITLE:

LIGHTING CONTROL SCHEDULES

DRAWING NO:

E4.22

Plotted By: Brad Mahon | 2/11/2021, 5:15 PM ARL-P:\2020\062\Current\E4.22 Lighting Control Schedules



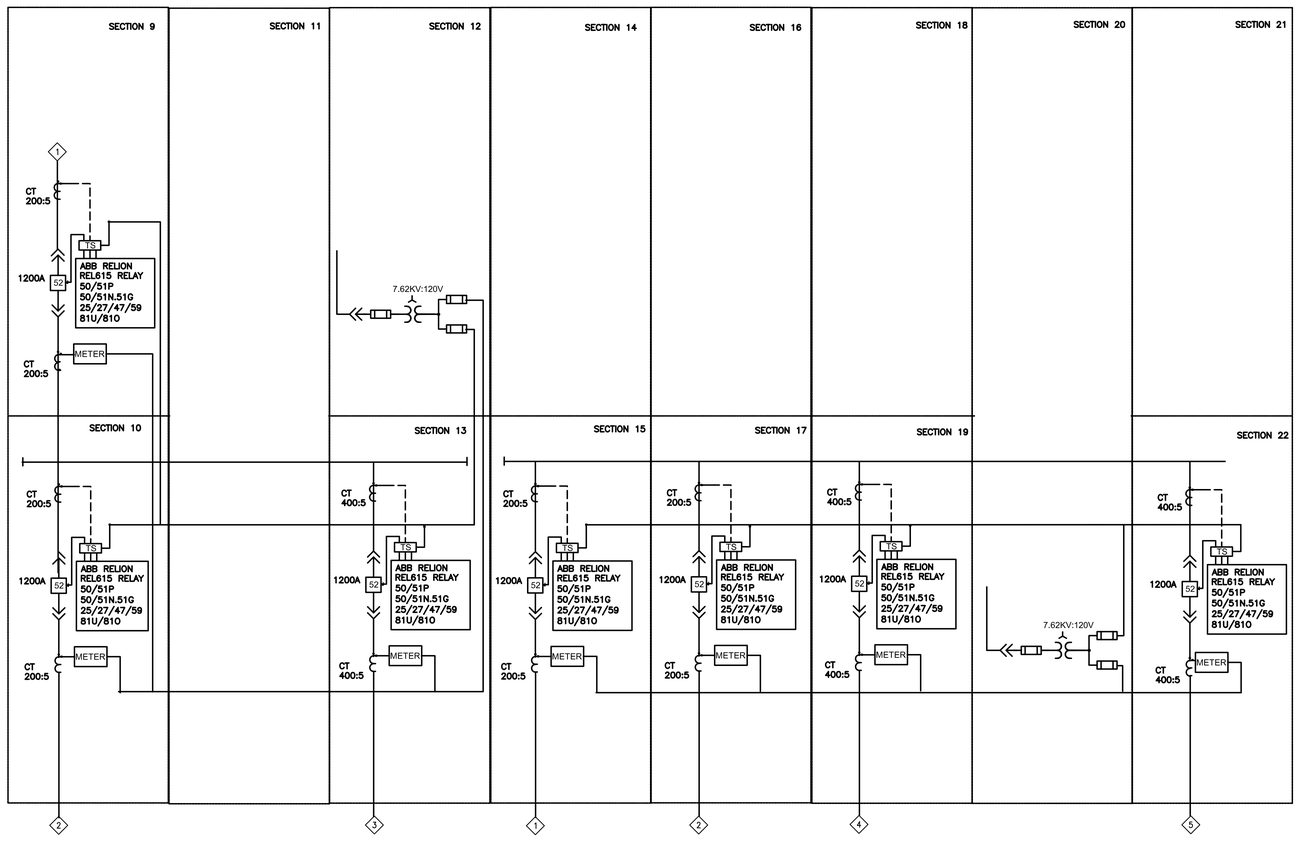
PARALLELING AND GENERATOR CONTROL

GENERAL NOTES

1. REPLACE EXISTING MASTER CONTROL CABINET, UTILITY INTERFACE CABINET, GENERATOR 1 & 2 CONTROL CABINETS, EMERGENCY CONTROL CABINET, SWITCHGEAR BATTERIES AND BATTERY CHARGER.
2. EXISTING MEDIUM VOLTAGE SWITCHGEAR, ABB CIRCUIT BREAKERS AND ABB RELION REL615 RELAYS TO REMAIN. REMOVE DISCRETE MICROSHIELD RELAYS AND PROVIDE ALL RELAY FUNCTIONALITY, WITH THE EXCEPTION OF HARDWIRED LOCK–OUTS, THROUGH THE RELION RELAYS.
3. PROVIDE A TEMPORARY GENERATOR TO SERVE RAVENS STADIUM EMERGENCY POWER REQUIREMENTS DURING THE PLANT REVITALIZATION. EMERGENCY REQUIREMENTS ARE 20A AT 13.2KV, OR APPROXIMATELY 500KW. PROVIDE MEANS TO AUTOMATICALLY ENERGIZE THE TWO EXISTING MEDIUM VOLTAGE EMERGENCY SUB–STATIONS UPON LOSS OF NORMAL POWER.

DRAWING NOTES

1. FROM GENERATOR 1
2. FROM GENERATOR 2
3. TO ORIOLES PARK PEAK SHAVING BREAKER
4. TO RAVENS STADIUM PEAK SHAVING BREAKER
5. TO RAVENS STADIUM EMERGENCY SWITCHBOARDS.



SWITCHGEAR ELEVATION & CONTROL SCHEMATIC

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MSA PROJECT NO. 20-071

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333 WEST CAMDEN STREET, SUITE 500
BALTIMORE, MD 21201

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SEAL:

PROFESSIONAL CERTIFICATION:

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. _____.
EXPIRATION DATE: _____.

ISSUED FOR:

DATE	DESCRIPTION
02/12/21	BID DOCUMENTS

WFT PROJECT NO: **20062.BKM.A**

SCALE: **NOT TO SCALE**

DRAWN BY: **DE**

CHECKED BY: **BEM**

DATE: **FEBRUARY 12, 2021**

SHEET TITLE:

GENERATOR CONTROLS DETAILS

DRAWING NO:

E4.23

Plotted By: Brad Mahon | 2/26/2021 4:31 PM ARL-P:\2020\062\Current\E4.23 Generator Controls Details