CHILLER SCHEDULE

PLANT	DESIGNATION	CAPACITY (TONS)	EVAPORATOR					CONDENSER					COMPRESSOR/CHLLER ELECTRICAL DATA							BASIS OF DESIGN	NOTES
			GPM	PASSES	EWT (°F)	LWT (°F)	PD (FT H20)	GPM	PASSES	EWT (°F)	LWT (°F)	PD (FT H20)	VOLTS	PH	HZ	RLA	LRA	MOCP	MCA		
CWPA1	CH-1	350	1289	1	55.00	48.50	8.40	1059.00	2	85.00	94.30	17.10	460	3	60	282	155	450	317	DAIKIN WMCD60DD	1-14

NOTES:

1. PROVIDE WITH SPRING TYPE VIBRATION ISOLATION.
2. PROVIDE WITH CHILLED WATER FLOW INDICATOR.
3. WATER-COOLED, SEMI-HERMETIC OIL-FREE CENTRIFUGAL COMPRESSOR WATER CHILLER.
4. TWO MAGNETIC BEARING, COMPLETELY OIL-FREE CENTRIFUGAL COMPRESSORS ON CHILLER.
5. TOTAL CAPACITY OF CHILLERS OPERATING IN SERIES IS 700 TONS (350 X 2).
6. CHILLERS SHALL BE CHARGED WITH REFRIGERANT R-134A.
7. MOTORS SHALL BE LIQUID REFRIGERANT COOLED WITH INTERNAL THERMAL SENSING DEVICES IN THE STATOR WINDINGS.
8. THE CHILLER SHALL BE EQUIPPED WITH AN INTEGRATED VARIABLE FREQUENCY DRIVE (VFD) TO AUTOMATICALLY REGULATE COMPRESSOR SPEED IN RESPONSE TO COOLING LOAD AND THE COMPRESSOR PRESSURE LIFT REQUIREMENT, OPERATING CONTROLS AND EQUIPMENT PROTECTION CONTROLS.
9. CHILLER CONTROLS SHALL COORDINATE COMPRESSOR SPEED AND GUIDE VANE POSITION TO OPTIMIZE CHILLER EFFICIENCY.
10. CHILLER SHALL BE EQUIPPED WITH MICROTECH II CONTROLLER OR EQUIVALENT AND SHALL INCLUDE REMOTE COMMUNICATIONS CARDS WITH MODBUS RTU CAPABILITY TO CONNECT THE I/O POINTS TO CHILLER PLANT MONITORING PANEL.
11. CHILLER CAPACITY BASED ON WATER.
12. CHILLER TOTAL OPERATING WEIGHT 13231 LBS.
13. CHILLER DIMENSIONS 178.19 IN X 55.17 IN (FOOTPRINT)
14. PROVIDE CHILLER WITH SINGLE POINT POWER CONNECTION.

PUMP SCHEDULE

MARK	SERVICE	TYPE	GPM	FT HEAD	INLET (IN)	OUTLET (IN)	IMPELLER DIA (IN)	OPERATING WEIGHT (LBS)	FOOTPRINT (IN)	MOTOR/ELECTRICAL DATA					BASIS OF DESIGN	NOTES
										RPM	HP	VOLTS	PH	HZ		
CHWP-1	CHILLED WATER	CENTRIFUGAL	1294	260	6	5	9.36	1959	64.00 X 19.00	3580	125	460	3	60	ARMSTRONG SERIES 4600	1-2
CHWP-2	CHILLED WATER	CENTRIFUGAL	1294	260	6	5	9.36	1959	64.00 X 19.00	3580	125	460	3	60	ARMSTRONG SERIES 4600	1-2

NOTES:

1. PROVIDE WITH INVERTER DUTY, VFD COMPATIBLE MOTOR.
2. PROVIDE WITH SPRING TYPE VIBRATION ISOLATION.

UNIT HEATER SCHEDULE

MARK	LOCATION	TYPE	kW	ELECTRICAL DATA					HORIZ. AIR THROW (FT)	WIDTH (IN)	HEIGHT (IN)	DEPTH (IN)	WEIGHT (LBS)	BASIS OF DESIGN	NOTES
				HP	VOLTS	PH	AMPS	RPM							
UH-1	CWPA1	ELECTRIC, SUSPENDED	10.0	1/30	480	3	12	1600	18	19	21.75	8.50	36	BERKO HUHAA1048	1-4
UH-2	CWPA1	ELECTRIC, SUSPENDED	10.0	1/30	480	3	12	1600	18	19	21.75	8.50	36	BERKO HUHAA1048	1-4

NOTES:

1. UNIT INSTALLED MOTOR STARTER.
2. DISCONNECT: FACTORY INSTALLED.
3. WALL/CEILING MOUNTED BRACKET.
4. INTEGRAL THERMOSTAT KIT, SET POINT 50°F.

EXISTING COOLING TOWER SCHEDULE

MARK	SERVICE	TYPE	GPM	EWT (°F)	LWT (°F)	AMB. AIR WET BULB TEMP	FAN/ELECTRICAL DATA							OPERATING WEIGHT (LBS)	BASIS OF DESIGN	NOTES
							NO.	CFM (EACH)	NO. MOTORS	HP PER MOTOR	V	PH	HZ			
(E) CT-1	CONDENSER WATER	AXIAL	2100	95.00	84.70	78.00	2	87500	2	25	460	3	60	21000	EVAPCO	1-6

NOTES:

1. SEPARATE STARTER PANELS FURNISHED FOR FIELD MOUNTING.
2. PROVIDE DIRECT DRIVE FAN WITH INVERTER DUTY MOTORS.
3. COOLING TOWER FAN MOTORS SHALL BE RATED VFD COMPATIBLE.
4. PROVIDE WITH NEW LOUVERS FOR EXISTING COOLING TOWER.
5. PROVIDE WITH NEW PLASTIC FILL FOR EXISTING COOLING TOWER.
6. NEW VFD CONTROLLER SHALL BE LOCATED AT SAME LOCATION AS THE EXISTING.

REFRIGERANT LEAK DETECTION SYSTEM:

1. PROVIDE TWO (2) R-134A REFRIGERANT SENSORS FOR LEAK DETECTION (SHERLOCK 60-0054 OR EQUAL). MOUNT SENSORS AT LOCATIONS AS SHOWN ON CWPA1-M-103. INSTALL ALL SENSORS PER MANUFACTURER RECOMMENDATIONS.
2. PROVIDE GAS LEAK DETECTION SYSTEM (SHERLOCK 402 NEMA 4X OR EQUAL).
   - 2.1. PROVIDE COMMUNICATIONS INTERFACE FOR REMOTE MONITORING AND CONTROL GENCOM COMMUNICATIONS WITH 'CHILLER PLANT MONITORING PANEL' THROUGH RS-485 PORT/ETHERNET CONNECTION PART 88-0541.
   - 2.2. CONNECT TO PRODUCTIVITY 3000, PAC IN CHILLER PLANT MONITORING PANEL.
   - 2.3. PROVIDE RELAY OUTPUT FOR FAN EF-1, EF-2, ALARM, AND STROBE OPERATION.

FLOW MONITORING SYSTEM:

1. NON-INTRUSIVE CLAMP-ON FLOW SENSORS.
2. MAINTENANCE FREE.
3. ACCURACY: 1% OF VELOCITY.
4. NO DEPENDENCY ON CONDUCTIVITY.
5. AUTOMATICALLY ADAPT TO PIPE MATERIAL AND LIQUID PROPERTY VARIATIONS.
6. BUILT-IN FLOW TOTALIZERS.
7. ISOLATED RS-485 INTERFACE WITH POWER SURGE PROTECTION. SUPPORTS THE MODBUS PROTOCOL - CONNECT TO PAC 3000 IN CHILLER PLANT MONITORING PANEL.
8. ABUNDANT INPUT/OUTPUT, ISOLATED 4-20MA OUTPUT, RELAY, PULSE OUTPUT, ALARM OUTPUT.
9. SELF-EXPLANATORY MENU-DRIVEN PROGRAMMING.
10. PIPE SIZE RANGE, 8" ~ 10"
11. NEMA 4X (IP65) WEATHER-RESISTANT ENCLOSURE.
12. SIEMENS SITRANS FUS 1010 (OR APPROVED EQUAL). PROVIDE CABLES OF SUFFICIENT LENGTH TO REACH ALL TERMINATION POINTS.

GFP A Gannett Fleming/Parsons JOINT VENTURE

DISTRICT OF COLUMBIA RICHARD A. SILVA 03/29/2018 No. 096926 REGISTERED PROFESSIONAL ENGINEER

DESIGNED	D. ROMNESS	08/11/17 DATE
DRAWN	D. ROMNESS	08/11/17 DATE
CHECKED	R. SILVA	03/23/18 DATE

REFERENCE DRAWINGS

NUMBER	TITLE

REVISIONS

DATE	NUM	DESCRIPTION
03/30/2018	0	FINAL CONTRACT DRAWINGS

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED Mark H. Magnussen 03/2018 DATE
MARK MAGNUSSEN
MANAGER, ENV. PLANNING AND COMP

APPROVED 03/2018 DATE
GRAHAM SPILLER
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
MECHANICAL EQUIPMENT SCHEDULES - SHEET 1 OF 2

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	NONE	CWPA1-M-600	21 of 173

AIR SEPARATOR SCHEDULE

MARK	LOCATION	ORIENTATION	GPM	MAX. WORKING PRESSURE (PSIG)	MAX. WORKING TEMP. (°F)	SYSTEM SERVED	INLET & OUTLET SIZE (IN)	DRY WEIGHT (LBS)	BASIS OF DESIGN	NOTES
AS-1	CWPA1	VERTICAL	1294	165	375	CHWR	10	547	ARMSTRONG VAS-10	1-3

NOTES:

1. PROVIDE WITH FABRICATED STEEL SHELL.
2. PROVIDE WITH BLOW DOWN CONNECTION.
3. PROVIDE WITH STAINLESS STEEL STRAINER.

EXPANSION TANK SCHEDULE

MARK	LOCATION	EQUIP. SERVED	TYPE	ORIENTATION	INITIAL FILL PRESSURE (PSIG)	TANK VOLUME (GAL)	SIZE		WEIGHT (LBS)	BASIS OF DESIGN	NOTES
							DIA (IN)	LENGTH (IN)			
ET-1	CWPA1	CHWS	COMPRESSION	HORIZONTAL	12	305	30	105	523	ARMSTRONG AET 30X105	1

NOTES:

1. PROVIDE CEILING HUNG TYPE EXPANSION TANK.

VALVE SCHEDULE

TYPE	SIZE (IN)	QUANTITY	SERVICE	BASIS OF DESIGN	NOTES
OS&Y GATE VALVE	10	9	CHILLED WATER	NIBCO F-617-0	1-2
OS&Y GATE VALVE	8	3	CONDENSER WATER	NIBCO F-617-0	1-2
CHECK VALVE	10	2	CHILLED WATER	NIBCO F-938-31	1-2
BALANCING VALVE	10	2	CHILLED WATER	NIBCO F-738-31	1-2

NOTES:

1. CONTRACTOR SHALL VERIFY ALL VALVE QUANTITIES AND SIZES IN FIELD PRIOR TO BEGINNING WORK.
2. PROVIDE WITH CHAIN ACTUATOR TO ALLOW ACCESS TO VALVES ABOVE FROM FLOOR LEVEL.

EXHAUST FAN SCHEDULE

MARK	TYPE	FAN				ELECTRICAL DATA					dBA	DIMENSIONS		WEIGHT (LBS)	BASIS OF DESIGN	NOTES
		CFM	EXT. SP (IN. W.G.)	RPM	BHP	MOTOR HP	VOLTS	PH	HZ	MOTOR RPM		LENGTH (IN)	DIA. (IN)			
EF-1	AXIAL	5004	0.900	3500	2.08	3	460	3	60	3500	84	23	21.5	142	GREENHECK AX-47-190-0412-M30	1-4
EF-2	AXIAL	5004	0.900	3500	2.08	3	460	3	60	3500	84	23	21.5	142	GREENHECK AX-47-190-0412-M30	1-4

NOTES:

1. PROVIDE TWO SPEED FAN.
2. DIRECT DRIVE FAN.
3. WALL HUNG WITH VIBRATION ISOLATION.
4. PROVIDE WITH HAND/OFF/AUTOMATIC SWITCH.

AIR HANDLING UNIT SCHEDULE

MARK	NOMINAL CAPACITY (TONS)	EVAPORATOR							ELECTRICAL DATA				DIMENSIONS			WEIGHT (LBS)	BASIS OF DESIGN	NOTES
		GPM	ROWS	EWT °F	LWT °F	CFM	EAT °F (DB / WB)	LAT °F (DB / WB)	HP	VOLTS	PH	HZ	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)			
AHU-1	10	24.6	6	42	56.7	1500	80 / 67	52.2 / 52.0	3	460	3	60	58	63	32	627.2	DAIKIN LAH010A	1-2

NOTES:

1. FACTORY MOUNTED COILS, CONTROLS, MOTORS, DRIVE KITS.
2. PIPING PACKAGE WITH SINGLE 3-WAY MODULATING VALVE OPTION.

INSTANTANEOUS WATER HEATER SCHEDULE

MARK	INLET SIZE (IN.)	TURN ON FLOW (GPM)	kW	VOLTS	AMPS	MAX TEMPERATURE (°F)	BASIS OF DESIGN	NOTES
IWH-1	1/2	0.3	2.4	120	20A	90	EEMAX EX2412T	1

NOTES:

1. PROVIDE WITH THERMOSTATIC MIXING VALVE: BRADLEY MODEL S19-2000.

GFP A Gannett Fleming/Parsons JOINT VENTURE

DISTRICT OF COLUMBIA RICHARD A. SILVA 03/29/2018 No. 096926 MECHANICAL PROFESSIONAL ENGINEER

DESIGNED D. ROMNESS 08/11/17 DATE
DRAWN D. ROMNESS 08/11/17 DATE
CHECKED R. SILVA 03/23/18 DATE

REFERENCE DRAWINGS

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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED Mark H. Magnussen 03/2018 DATE
MARK MAGNUSSEN
MANAGER, ENV. PLANNING AND COMP

APPROVED 03/2018 DATE
GRAHAM SPILLER
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
MECHANICAL EQUIPMENT SCHEDULES - SHEET 2 OF 2

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	NONE	CWPA1-M-601	22 of 173

CHILLED WATER PLANT SEQUENCE OF OPERATION:

GENERAL FOR CHILLER PLANT CWPA1 – FARRAGUT NORTH (A02)

THE CHILLER PLANT CONSISTS OF TWO (2) CHILLERS WITH TWO (2) VARIABLE CAPACITY COMPRESSORS EACH, TWO (2) COOLING TOWERS WITH ONE (1) VARIABLE SPEED FAN EACH, ONE (1) DUTY CHILLED WATER PUMP, ONE (1) STANDBY CHILLED WATER PUMP, ONE (1) DUTY CONDENSER WATER PUMP, AND ONE (1) STANDBY CONDENSER WATER PUMP.

THE CHILLER PLANT IS DESIGNED FOR CONSTANT FLOW (GPM) FOR CHILLED WATER AND CONDENSER WATER.

THE CHILLER PLANT OPERATION IS PROGRAMMABLE.

DURING THE COOLING SEASON, THE CHILLERS OPERATE CONTINUOUSLY DURING DAY AND NIGHT IN AUTOMATIC MODE.

THE CHILLED WATER SUPPLY TEMPERATURE SETPOINT (42°F) IS SET TO THE CHILLER PLANT DESIGN TEMPERATURE AND THE SETPOINT TEMPERATURE CAN BE MANUALLY RESET BY THE OPERATOR. THE ENTERING CONDENSER WATER TEMPERATURE SHALL BE 85°F.

THE CHILLED WATER SYSTEM ENABLE POINT IS CONTROLLED EITHER MANUALLY BY THE OPERATOR OR PROGRAMMABLE. IF THE CHILLED WATER SYSTEM ENABLE POINT IS ON AND THERE IS A CALL FOR COOLING (I.E. THE CHILLED WATER RETURN TEMPERATURE EXCEEDS 55°F):

1. CHILLED WATER PUMP (CHWP–1 OR CHWP–2) AND CONDENSER WATER PUMP (CWP–1 OR CWP–2), WHICH ARE MANUALLY SELECTED BY THE PLANT OPERATOR, SHALL START. THE PUMPS SHALL OPERATE FOR CONSTANT WATER FLOW. THE ASSOCIATED VARIABLE FREQUENCY DRIVES SHALL BE UTILIZED TO ADJUST PUMP SPEED FOR DESIGN FLOW RATE AND SET.
2. THE CHILLER START OR STOP POINT SHALL TURN ON.
3. AFTER CHILLED WATER AND CONDENSER WATER FLOW ARE VERIFIED VIA FLOW SWITCHES, THE CHILLER SHALL OPERATE UNDER ITS OPERATING AND SAFETY CONTROLS. THE CHILLER'S INTEGRATED VARIABLE FREQUENCY DRIVE SHALL ADJUST ITS CAPACITY IN ORDER TO MAINTAIN THE CHILLER'S CHILLED WATER SUPPLY TEMPERATURE SETPOINT.

THE CHILLER STOP SEQUENCE SHALL INITIALLY STOP THE CHILLER. AFTER A TIME DELAY (ADJUSTABLE), THE CONDENSER WATER PUMP AND THE CHILLED WATER PUMP SHALL STOP.

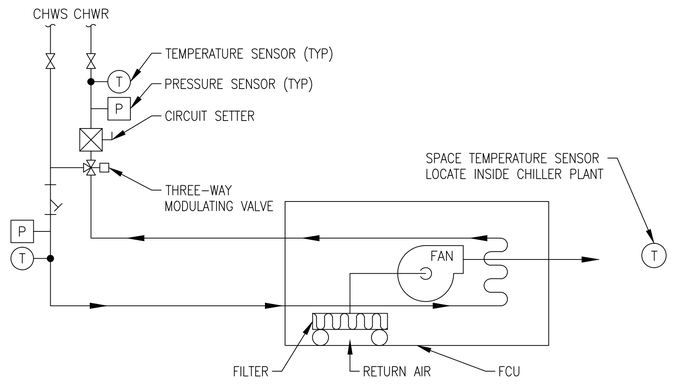
THE COOLING TOWER SHALL BE ENABLED WHEN THE CONDENSER WATER PUMP IS OPERATING. WHEN THE CONDENSER WATER SUPPLY TEMPERATURE INCREASES FROM THE SET POINT (TYPICALLY 85°F, ADJUSTABLE), THE COOLING TOWER FAN SHALL START AT LOW SPEED. THE FAN SPEED SHALL BE INCREASED OR DECREASED BY THE VARIABLE FREQUENCY DRIVE IN ORDER TO MAINTAIN THE CONDENSER WATER SUPPLY TEMPERATURE SETPOINT.

COOLING TOWER FAN SPEED SHALL BE CONTROLLED BY THE LOCAL CONTROLLER INSTALLED IN CLOSE PROXIMITY TO THE COOLING TOWER.

THE DESIRED STATE OF THE PUMPS (I.E. ON OR OFF) SHALL BE CONFIRMED FROM THEIR ASSOCIATED VARIABLE FREQUENCY DRIVES. AN ALARM STATUS SHALL BE GENERATED IF THE STATUS DEVIATES FROM START OR STOP CONTROL.

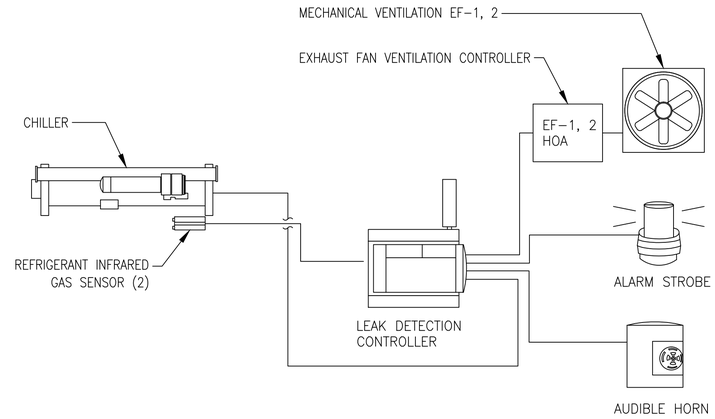
CHILLER EMERGENCY SHUTDOWN:

CHILLER EMERGENCY SHUTDOWN SHALL BE ENABLED THROUGH THE CHILLER MONITORING PANEL.



AIR HANDLING UNIT (AHU–1) SEQUENCE OF OPERATION:

THE AHU FAN AND THE CHILLED WATER FLOW CONTROL VALVE SHALL BE CONTROLLED BY THE SPACE TEMPERATURE SENSOR VIA THE PRODUCTIVITY 3000, PAC AT THE CHILLER PLANT MONITORING PANEL. WHEN THE SPACE TEMPERATURE RISES ABOVE 82°F, THE FCU FAN SHALL BE STARTED. THE THREE WAY VALVE SHALL CONTROL THE CHILLED WATER FLOW TO MAINTAIN THE SPACE SETPOINT TEMPERATURE OF 80°F. WHEN THE SPACE TEMPERATURE FALLS BELOW 78°F, THE AHU FAN SHALL TURN OFF. UPON ACTIVATION OF THE EXHAUST FANS (EF–1, EF–2), THE AHU SHALL SHUT DOWN.



MECHANICAL REFRIGERANT ALARM SYSTEM SEQUENCE OF OPERATION:

NORMAL OPERATION:

1. PROVIDE A LOCAL HAND–OFF–AUTOMATIC (HOA) SWITCH INSIDE THE CHILLER PLANT FOR FAN TEST AND INCIDENTAL FAN OPERATION. THE LOCAL FAN HOA SWITCH SHALL INTEGRATE WITH A 1–HOUR TIMER (ADJUSTABLE).
2. IN AUTOMATIC MODE, EF–1, EF–2 SHALL OPERATE FOR REFRIGERANT LEAK PURGING AS DESCRIBED IN THE SEQUENCE.
3. EF–1, EF–2 SHALL OPERATE WHEN THE INSIDE SPACE TEMPERATURE OF THE SPACE REACHES 90°F.
4. DURING NORMAL OPERATION, TWO–SPEED FANS SHALL OPERATE AT LOW–SPEED MINIMUM FLOW OF 1,500 CFM (NOMINAL).

REFRIGERANT LEAK PURGING OPERATION:

1. REFRIGERANT INFRARED GAS SENSOR SHALL MONITOR FOR R–134A LEVELS.
2. WHEN 250 PPM IS DETECTED, THE FIRST ALARM LEVEL (LOW) SHALL STAGE THE MECHANICAL VENTILATION. EF–1, EF–2 SHALL BE SET TO RUN AT LOW–SEED MINIMUM FLOW OF 1,500 CFM (NOMINAL), AND THE WARNING STROBE LIGHT (AMBER) SHALL BE ACTIVATED.
3. WHEN 500 PPM IS DETECTED, THE SECOND ALARM LEVEL (HIGH) SHALL STAGE THE MECHANICAL VENTILATION. EF–1, EF–2 SHALL BE SET TO RUN AT MAXIMUM EXHAUST FLOW OF 10,000 CFM (NOMINAL), AND THE WARNING STROBE LIGHT (AMBER) AND AUDIBLE ALARM HORN SHALL BE ACTIVATED.
4. ALARM STATUS SHALL BE CONTINUOUSLY COMMUNICATED VIA THE REMOTE COMMUNICATIONS SOFTWARE.

GENERAL:

1. PROVIDE NEW EXHAUST FAN VENTILATION CONTROLLER FOR EF–1, EF–2. VENTILATION CONTROLLER SHALL BE PROVIDED WITH INPUT AND OUTPUT FOR OPERATION WITH THE REFRIGERANT MONITORING PANEL AND THERMOSTAT, PER THE SEQUENCE OF OPERATION.
2. CONTRACTOR SHALL VERIFY IN FIELD ANY EXISTING AUTOMATIC DAMPER(S) IN THE EXISTING TO REMAIN DUCTWORK. IF AUTOMATIC DAMPER(S) ARE FOUND, ARE OPERATIONAL, AND ARE IN GOOD CONDITION, CONTRACTOR SHALL INTEGRATE AUTOMATIC DAMPER(S) WITH EF–1, EF–2 FOR ACTUATION WHEN FANS ARE ON. IF AUTOMATIC DAMPER(S) ARE FOUND, BUT ARE NON–OPERATIONAL AND/OR IN POOR CONDITION, AUTOMATIC DAMPER(S) SHALL BE REPLACED IN–KIND AND THE REPLACEMENT AUTOMATIC DAMPER(S) SHALL BE INTEGRATED WITH EF–1, EF–2 FOR ACTUATION WHEN FANS ARE ON.

ALARM CONDITIONS:

GENERAL:

SEND ALL EQUIPMENT STATUS AND ALARM CONDITIONS TO CHILLER PLANT CONTROL PANEL WITHIN THE CHILLER PLANT. REFER TO CHILLER SPECIFICATION 15625 FOR ALL THE CHILLER, PUMP RELATED ANALOG POINT, STATUS POINT, CONTROL POINT, AND ALARM POINT REQUIREMENTS. PROVIDE CAPABILITY FOR THE CONTROL POINTS TO BE CONNECTED TO THE AEMS SYSTEM. IN ADDITION TO THE ABOVE, ALSO PROVIDE THE FOLLOWING:

HAND/OFF/AUTO:

CHILLER PLANT AHU
CHILLER PLANT EXHAUST FANS
CHILLER PLANT UNIT HEATERS

EQUIPMENT STATUS WITH VISUAL INDICATING LAMPS (ON/OFF/FAULT):

CHILLER PLANT AHU
CHILLER PLANT EXHAUST FANS
CHILLER PLANT UNIT HEATERS

ALARMS:

FAN FAILURE ALARM (AHU, EXHAUST FANS): INITIATE AN ALARM UPON SENSING A LOSS OF POWER FROM THE CURRENT SENSOR WHEN THE UNITS ARE COMMANDED TO RUN.

HIGH TEMPERATURE ALARM: INITIATE AN ALARM WHEN THE SPACE TEMPERATURE RISES ABOVE SETPOINT. INITIAL SET POINT SHALL BE 90 DEG F (ADJUSTABLE).

LOW TEMPERATURE ALARM: INITIATE AN ALARM WHEN THE SPACE TEMPERATURE FALLS BELOW SETPOINT. INITIAL SETPOINT SHALL BE 45 DEG F (ADJUSTABLE).

UNIT COMMON ALARM: INITIATE AN ALARM UPON RECEIVING A COMMON ALARM FROM THE UNIT FACTORY CONTROLS OF THE AHU. THIS INCLUDES THE FILTER CHANGE ALARM.

GFP A Gannett Fleming/Parsons JOINT VENTURE

DISTRICT OF COLUMBIA
RICHARD A. SILVA
03/29/2018
No. 096926
MECHANICAL
PROFESSIONAL ENGINEER

DESIGNED	D. ROMNESS	10/03/17 DATE
DRAWN	D. ROMNESS	10/03/17 DATE
CHECKED	R. SILVA	03/23/18 DATE

REFERENCE DRAWINGS

NUMBER	TITLE

REVISIONS

DATE	NUM	DESCRIPTION
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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

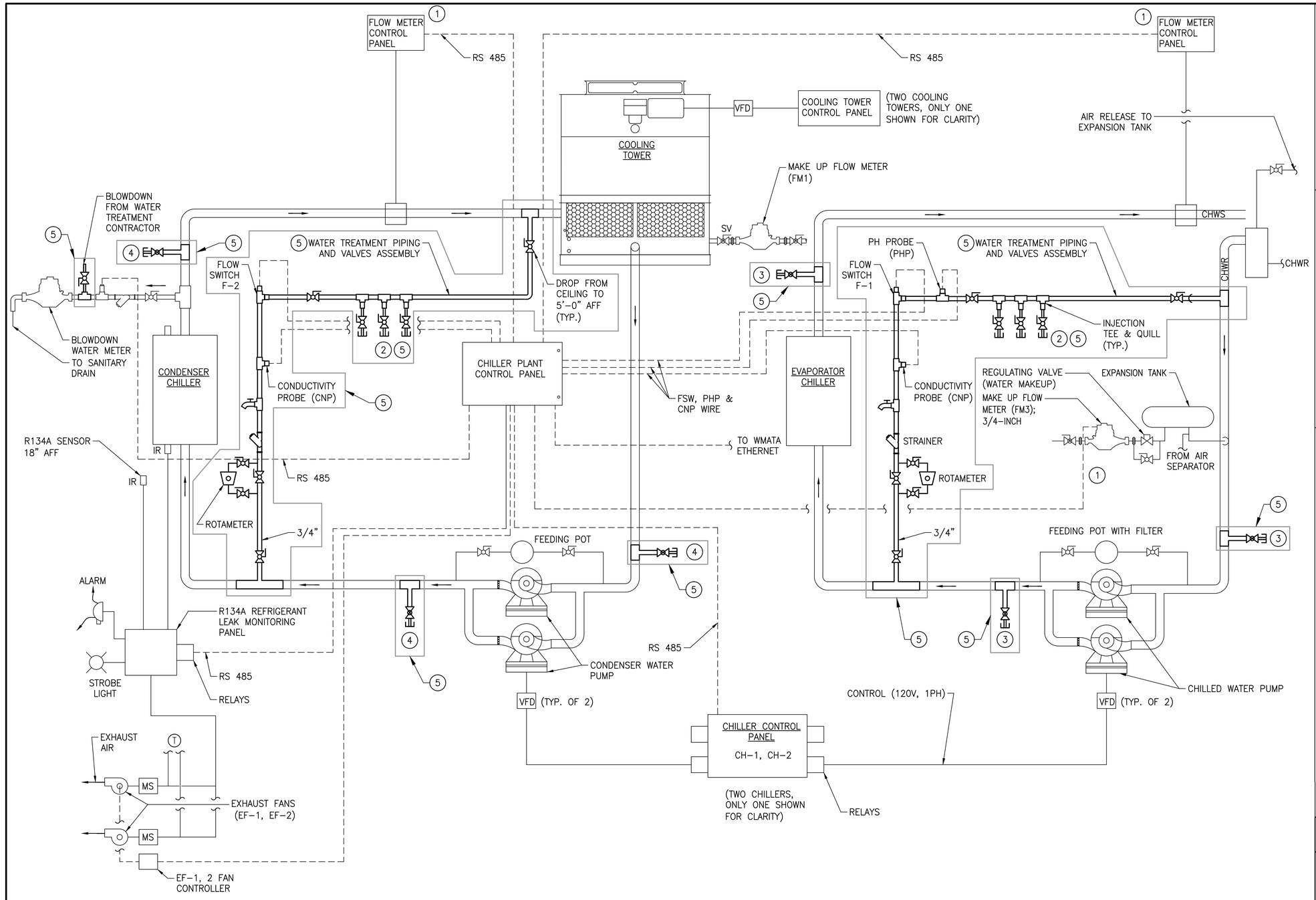
DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED Mark H. Magnussen 03/2018 DATE
MARK MAGNUSSEN
MANAGER, ENV. PLANNING AND COMP

APPROVED 03/2018 DATE
GRAHAM SPILLER
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
MECHANICAL SEQUENCE OF OPERATION

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	NONE	CWPA1-M-610	23 of 173



GENERAL NOTES:

A. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION AND QUANTITIES OF EQUIPMENT, PIPING, VALVES, DUCTWORK, ELECTRICAL AND CONTROL WIRING PRIOR TO DEMOLITION. ITEMS SHOWN ON THIS PLAN ARE APPROXIMATE.

B. REFER TO LEGEND SHEET FOR GENERAL ABBREVIATIONS AND SYMBOLS.

C. COOLING TOWER IS LOCATED ON THE PENTHOUSE LEVEL OF BUILDING 1101 CONNECTICUT AVENUE NW, WASHINGTON, DC.

KEYNOTES:

(1) COMMUNICATIONS WIRING SHALL BE IN RIGID CONDUIT FROM FLOW METER MONITORING PANEL TO THE CHILLER PLANT CONTROL PANEL, UTILIZING BELDEN 89842 MULTI-CONDUCTOR – LOW CAPACITANCE COMPUTER AND COMPUTER POS CABLE OR EQUIVALENT.

(2) TAPS FOR FUTURE CHEMICAL INJECTION PUMPS.

(3) TAPS FOR CHILLED WATER SYSTEM WATER MONITORING/TREATMENT.

(4) TAPS FOR CONDENSER WATER SYSTEM WATER MONITORING/TREATMENT.

(5) REFER TO WMATA REFERENCE DRAWINGS DD-ME-HVAC-007, DD-ME-HVAC-008, AND DD-ME-HVAC-009.

LEGEND:

- GATE VALVE (GV)
- GLOBE VALVE (GB)
- BALL VALVE (1/4 TURN) SHUT OFF TYPE (SV), NORMALLY OPEN, UNLESS OTHERWISE NOTED
- STRAINER (STN)
- SAMPLE PET COCK (SPC)
- SOLENOID VALVE (SOL)
- IR — REFRIGERANT GAS LEAK SENSOR
- MS — MOTOR STARTER (FOR FANS)
- VFD — VARIABLE FREQUENCY DRIVE CONTROLLER
- FSW — FLOW SWITCH
- FLOW METER (FM 1 TO 3) PULSE OUTPUT
- FLOW METER (FM 4 & 5) ULTRASONIC FLOW METER
- CENTRIFUGAL PUMP

A Gannett Fleming/Parsons JOINT VENTURE

DISTRICT OF COLUMBIA
RICHARD A. SILVA
03/29/2018
No. 096926
MECHANICAL
PROFESSIONAL ENGINEER

DESIGNED B. VISWANATHAN 01/17/18 DATE
DRAWN D. ROMNESS 01/18/18 DATE
CHECKED R. SILVA 03/23/18 DATE

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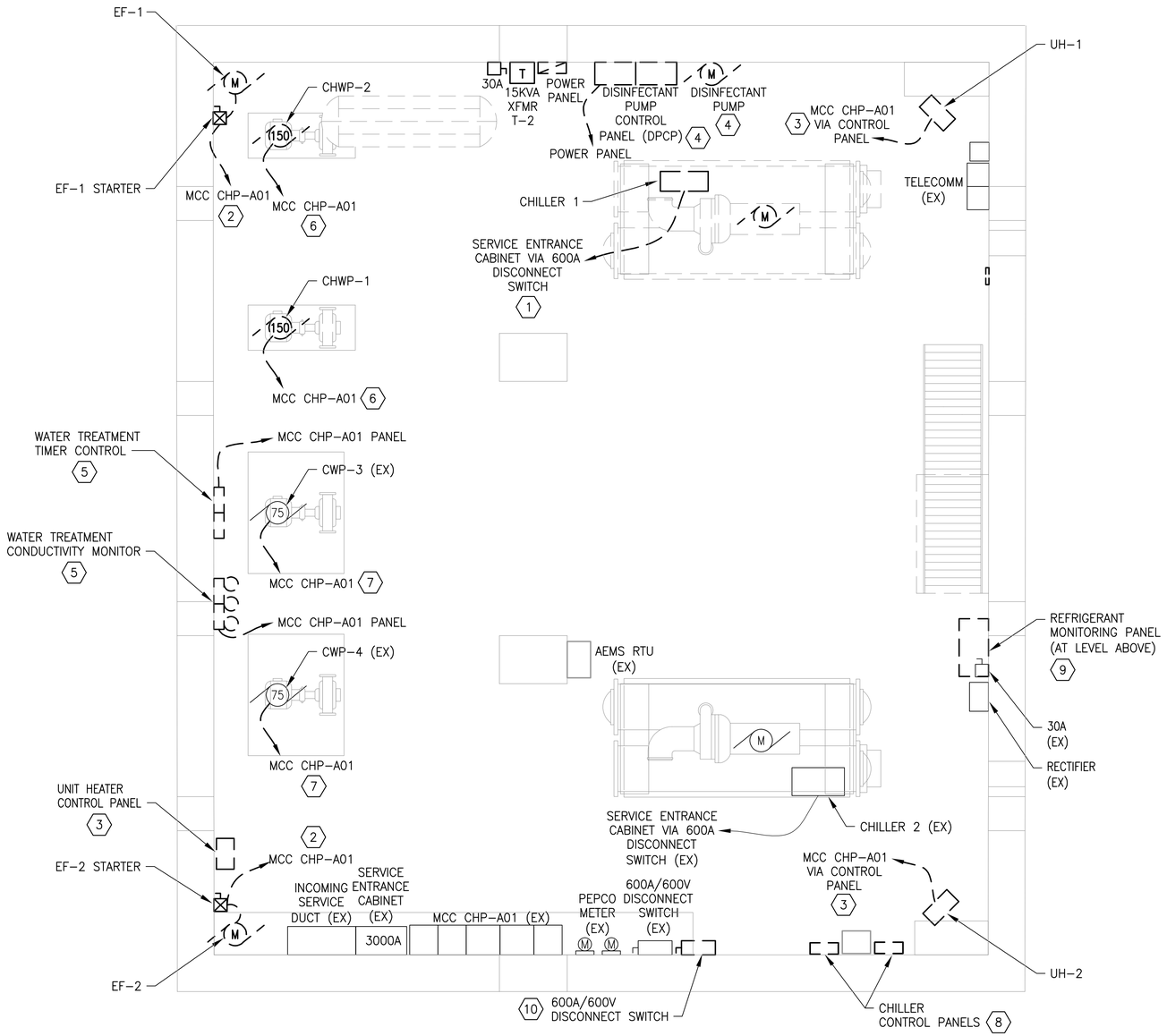
MARK MAGNUSSEN
MANAGER, ENV. PLANNING AND COMP

APPROVED 03/2018 DATE
GRAHAM SPILLER
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
CHILLER PLANT MONITORING DIAGRAM

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	NONE	CWPA1-M-611	24 of 173



1 ELECTRICAL PLAN - DEMOLITION
CWPA1-E-100

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

GENERAL NOTES:

A. ALL SHOWN EQUIPMENT IS EXISTING TO REMAIN UNLESS SHOWN OTHERWISE.

B. FOR EQUIPMENT TO BE DEMOLISHED: ALL EXISTING CONDUIT AND WIRING SHALL BE REMOVED BACK TO SOURCE OR AS INDICATED.

KEYNOTES:

1. EXISTING CHILLER CONTROLLER EQUIPMENT TO BE DEMOLISHED. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO 600A DISCONNECT SWITCH.
2. EXISTING EXHAUST FAN AND STARTER TO BE DEMOLISHED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO MCC CHP-A01.
3. EXISTING UNIT HEATERS AND ASSOCIATED CONTROL PANEL TO BE DEMOLISHED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE CONDUIT AND WIRING BACK TO SOURCE.
4. DISINFECTANT PUMP AND CONTROL PANEL EQUIPMENT TO BE REMOVED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE ASSOCIATED POWER CONDUIT AND WIRING BACK TO SOURCE.
5. WATER TREATMENT EQUIPMENT TO BE REMOVED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE ASSOCIATED POWER CONDUIT AND WIRING BACK TO POWER PANEL IN MCC CHP-A01.
6. EXISTING PUMP MOTOR TO BE DEMOLISHED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO MCC CHP-A01.
7. EXISTING PUMP FEEDER TO BE DEMOLISHED. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO MCC CHP-A01.
8. CHILLER CONTROL EQUIPMENT TO BE REMOVED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE ASSOCIATED POWER CONDUIT AND WIRING BACK TO SOURCE (MCC CHP-A01 PANEL).
9. REFRIGERANT MONITORING PANEL TO BE REMOVED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE ASSOCIATED POWER CONDUIT AND WIRING BACK TO SOURCE (MCC CHP-A01 PANEL).
10. 600A/600V DISCONNECT SWITCH (SERVING CHILLER 1) TO BE REMOVED. REMOVE ASSOCIATED POWER CONDUIT AND WIRING BACK TO SERVICE ENTRANCE CABINET.

GFP A Gannett Fleming/Parsons JOINT VENTURE

DISTRICT OF COLUMBIA DESDAS GHOSAL 03/29/2018 PE7983 ELECTRICAL PROFESSIONAL ENGINEER

DESIGNED	R. LAUFER	03/16/18 DATE
DRAWN	O. FAYEMI	03/16/18 DATE
CHECKED	D. KHAN	03/23/18 DATE

REFERENCE DRAWINGS

NUMBER	TITLE

REVISIONS

DATE	NUM	DESCRIPTION
03/30/2018	0	FINAL CONTRACT DRAWINGS

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

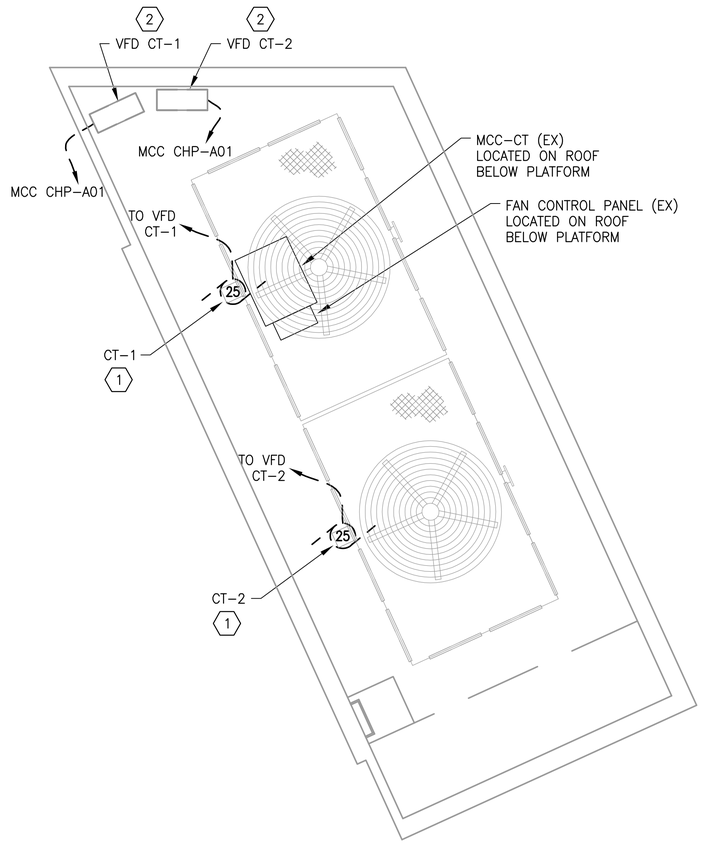
DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED Mark H. Magnussen 03/2018 DATE
MARK MAGNUSSEN
MANAGER, ENV. PLANNING AND COMP

APPROVED 03/2018 DATE
GRAHAM SPILLER
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
ELECTRICAL PLAN - DEMOLITION

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	AS NOTED	CWPA1-E-100	25 of 173



1 ELECTRICAL PLAN - DEMOLITION
CWPA1-E-101

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

GENERAL NOTES:

A. ALL SHOWN EQUIPMENT IS EXISTING TO REMAIN UNLESS SHOWN OTHERWISE.

B. FOR EQUIPMENT TO BE DEMOLISHED:
ALL EXISTING CONDUIT AND WIRING SHALL BE REMOVED BACK TO SOURCE OR AS INDICATED.

KEYNOTES:

1 EXISTING COOLING TOWER FAN MOTOR TO BE REMOVED AND SALVAGED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO ASSOCIATED VFD.

2 EXISTING VFD TO BE DEMOLISHED. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO COOLING TOWER FEEDER SPLICE INSIDE FAN CONTROL PANEL.

GFP A Gannett Fleming/Parsons JOINT VENTURE

DISTRICT OF COLUMBIA
DEBDAS GHOSAL
03/29/2018
PE7983
ELECTRICAL
PROFESSIONAL ENGINEER

DESIGNED	R. LAUFER	03/16/18 DATE
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OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED Mark H. Magnussen 03/2018
MARK MAGNUSSEN DATE
MANAGER, ENV. PLANNING AND COMP

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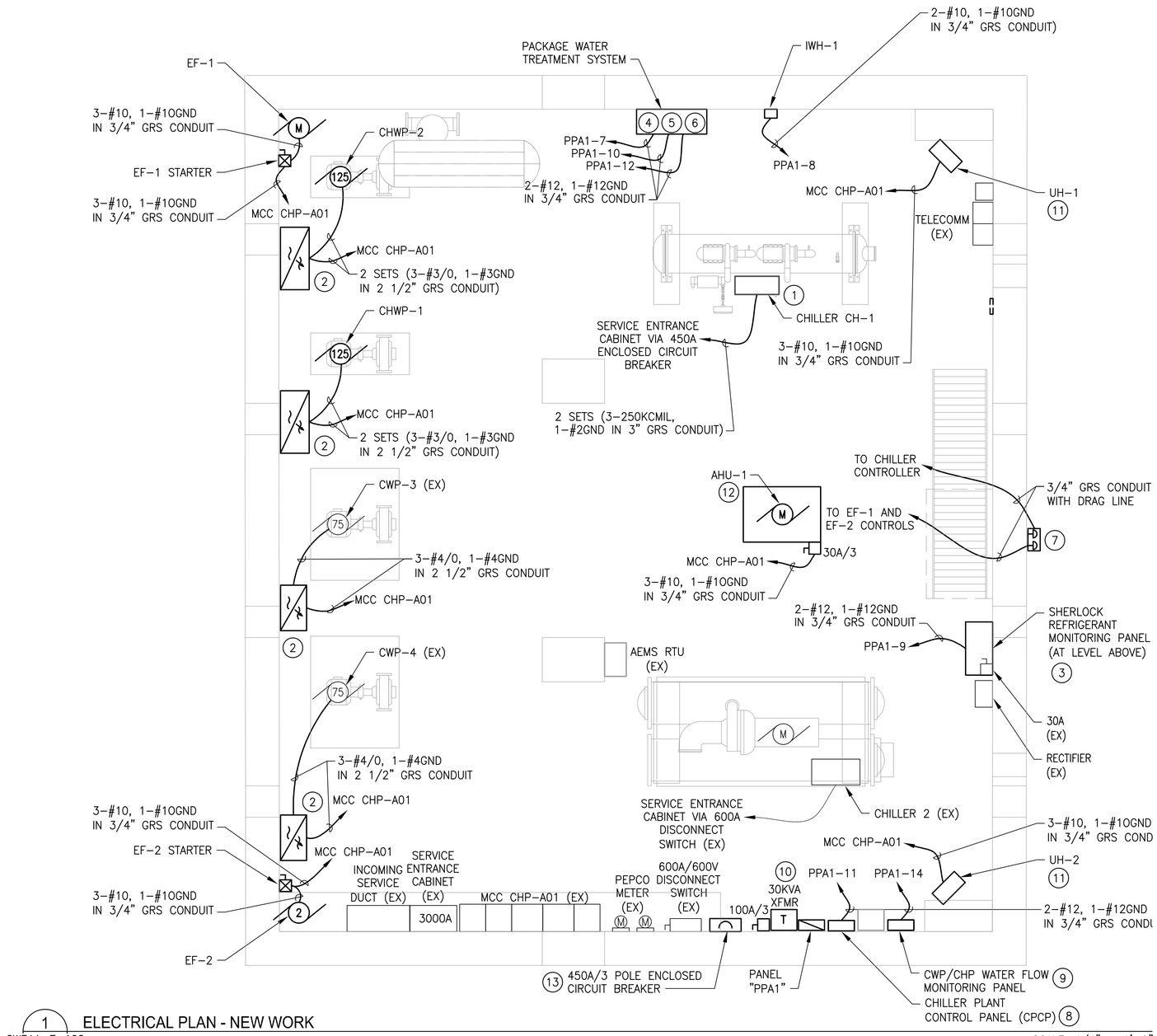
GRAHAM SPILLER DATE
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
ELECTRICAL PLAN - DEMOLITION

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	AS NOTED	CWPA1-E-101	26 of 173



1 ELECTRICAL PLAN - NEW WORK
CWPA1-E-102

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

GENERAL NOTES:

A. SEE DWG. E-602 FOR ONE-LINE DIAGRAM.

B. ALL WIRING FROM VFDs SHALL BE VFD RATED CABLE.

C. RUN A 3/4" EMPTY CONDUIT FOR COMMUNICATION CABLES FROM THE WATER TREATMENT CONTROLLER TO INHIBITOR DISPENSERS. VERIFY DISPENSER LOCATION WITH MECHANICAL CONTRACTOR.

KEYNOTES:

(1) CHILLER CONTROLLER SUPPLIED WITH CHILLER. INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.

(2) PROVIDE AND INSTALL VFD/DISCONNECT FOR CHILLED WATER AND CONDENSER WATER PUMPS. PROVIDE AND INSTALL WIRING FROM MOTOR TO VFD AND FROM VFD TO MCC CHP-A01.

(3) NEW REFRIGERANT LEAK MONITORING AND CONTROL SYSTEM, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR TO PANEL "PPA1". RUN EMPTY 3/4" GRS WITH DRAG LINE CONDUIT FROM THE MONITORING PANEL TO THE LOCATION OF THE STROBE LIGHT AND HORN. COORDINATE ALARM LOCATION WITH HVAC/OWNER PRIOR TO DOING ANY WORK.

(4) WATER TREATMENT CONTROL PANEL; 2#12, 1#12 GND IN 3/4"C TO 20A/1P GFCI BREAKER. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.

(5) BIOCIDE FEEDERS; 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.

(6) INHIBITOR FEED PUMP; 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER. RUN EMPTY 3/4" GRS WITH DRAG LINE CONDUIT FOR COMMUNICATION TO AEMS. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.

(7) EMERGENCY PUSH BUTTONS IN A TAMPER PROOF BOX. ONE FOR SHUTTING DOWN THE CHILLER, AND THE OTHER FOR TURNING ON THE VENTILATION FAN. REFER TO MECHANICAL DRAWINGS FOR MORE INFORMATION. INSTALL NEAR ENTRANCE DOOR (OUTSIDE).

(8) CHILLER PLANT CONTROL PANEL (CPCP); 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER.

(9) CHILLER WATER AND CONDENSER WATER FLOW MONITORING SYSTEM; 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER.

(10) 30KVA TRANSFORMER, MOUNT ABOVE PANEL "PPA1".

(11) ELECTRIC UNIT HEATER BY MECHANICAL CONTRACTOR; WIRED BY ELECTRICAL CONTRACTOR.

(12) AIR HANDLING UNIT BY MECHANICAL CONTRACTOR; WIRED BY ELECTRICAL CONTRACTOR.

(13) 450A/3 POLE ENCLOSED CIRCUIT BREAKER IN NEMA 12 ENCLOSURE (SERVING CHILLER 1); 2 SETS (3-250KCMIL, 1-#2GND IN 3" GRS CONDUIT) TO SERVICE ENTRANCE CABINET.

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DISTRICT OF COLUMBIA DEBDAS GHOSAL 03/29/2018 PE7983 ELECTRICAL PROFESSIONAL ENGINEER

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