

**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 TOWERS LOCATED ON THE ROOF OF BUILDING 1825 EYE STREET NW, WASHINGTON, DC.

**KEYNOTES:**

- ① PROVIDE AND INSTALL NEW LOWER GRILLES ON COOLING TOWER. COORDINATE WITH COOLING TOWER MANUFACTURER FOR EXACT PART. THE LOWER DIMENSION SHALL MATCH EXISTING.
- ② PROVIDE AND INSTALL NEW PLASTIC FILL IN THE COOLING TOWER. COORDINATE WITH COOLING TOWER MANUFACTURER FOR EXACT PART. THE NEW FILL DIMENSION AND TYPE SHALL MATCH EXISTING.
- ③ PROVIDE AND INSTALL NEW DIRECT DRIVE FAN MOTOR, DRIVE ASSEMBLY, AND MOUNTING HARDWARE. FAN MOTOR SHALL BE INVERTER DUTY RATED. COORDINATE WITH COOLING TOWER MANUFACTURER FOR EXACT PARTS.
- ④ PROVIDE AND INSTALL NEW DISCONNECT AND CONTROLS.
- ⑤ PROVIDE AND INSTALL NEW VARIABLE FREQUENCY DRIVE CONTROLLER FOR COOLING TOWER FAN. VFD SHALL BE LOCATED ON THE ROOF IN THE SAME LOCATION AS EXISTING, AND INSIDE A NEMA 4X WEATHERPROOF ENCLOSURE.
- ⑥ COOLING TOWER FAN MODULATION SHALL BE INTEGRATED WITH THE CHILLER CONTROL PANEL.
- ⑦ PROVIDE NEW SUMP PUMP, ULTRASONIC FLOW LEVEL DETECTOR/FLOAT VALVE OR ANY MOVING PART OF THE COOLING TOWER. IF FOUND NON-FUNCTIONAL DURING CONSTRUCTION, COORDINATE WITH OWNER.

**COOLING TOWER - PARTIAL ROOF PLAN - NEW WORK**  
SCALE: 3/16" = 1'-0"



CONTRACT NO.  
FQ17162

DESIGNED	B. VOKANATHAN	05/17
DRAWN	A. PINKOWSKI	05/17
CHECKED	B. SILVA	05/17
APPROVED	B. SILVA	05/17

NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION

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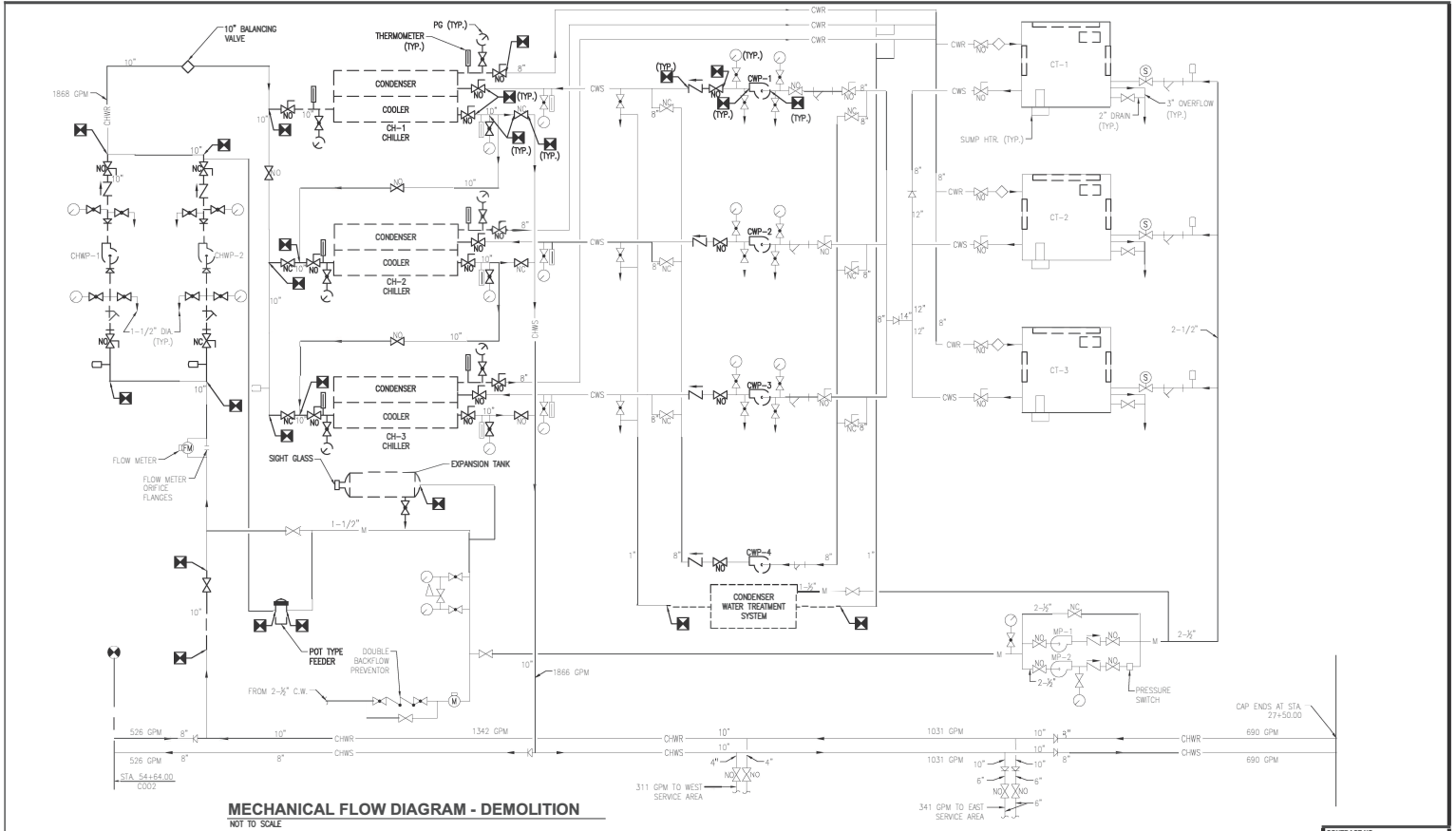


**WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY**  
DEPARTMENT OF TRANSIT INFRASTRUCTURE  
AND ENGINEERING SERVICES  
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM  
APPROVED: *Mark H. Kapperman*

**GFP** A GARRETT FINANCIAL/PARSONS  
JOINT VENTURE  
SUBMITTED: *[Signature]*  
PROJECT MANAGER

**REPLACEMENT OF CHILLERS AND COOLING TOWERS AT THREE METRO-RAIL STATIONS**  
CWPC03 - FARRAGUT WEST  
MECHANICAL ROOF PLAN - NEW WORK  
SCALE: 3/16"=1'-0" 1 0 1 3 5 7  
DRAWING NO. CWPC03-M-104 M1299-025





CONTRACT NO.  
FQ17162

DESIGNED	B. VOKHANNAN	05/17
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APPROVED	J. SILVA	05/17

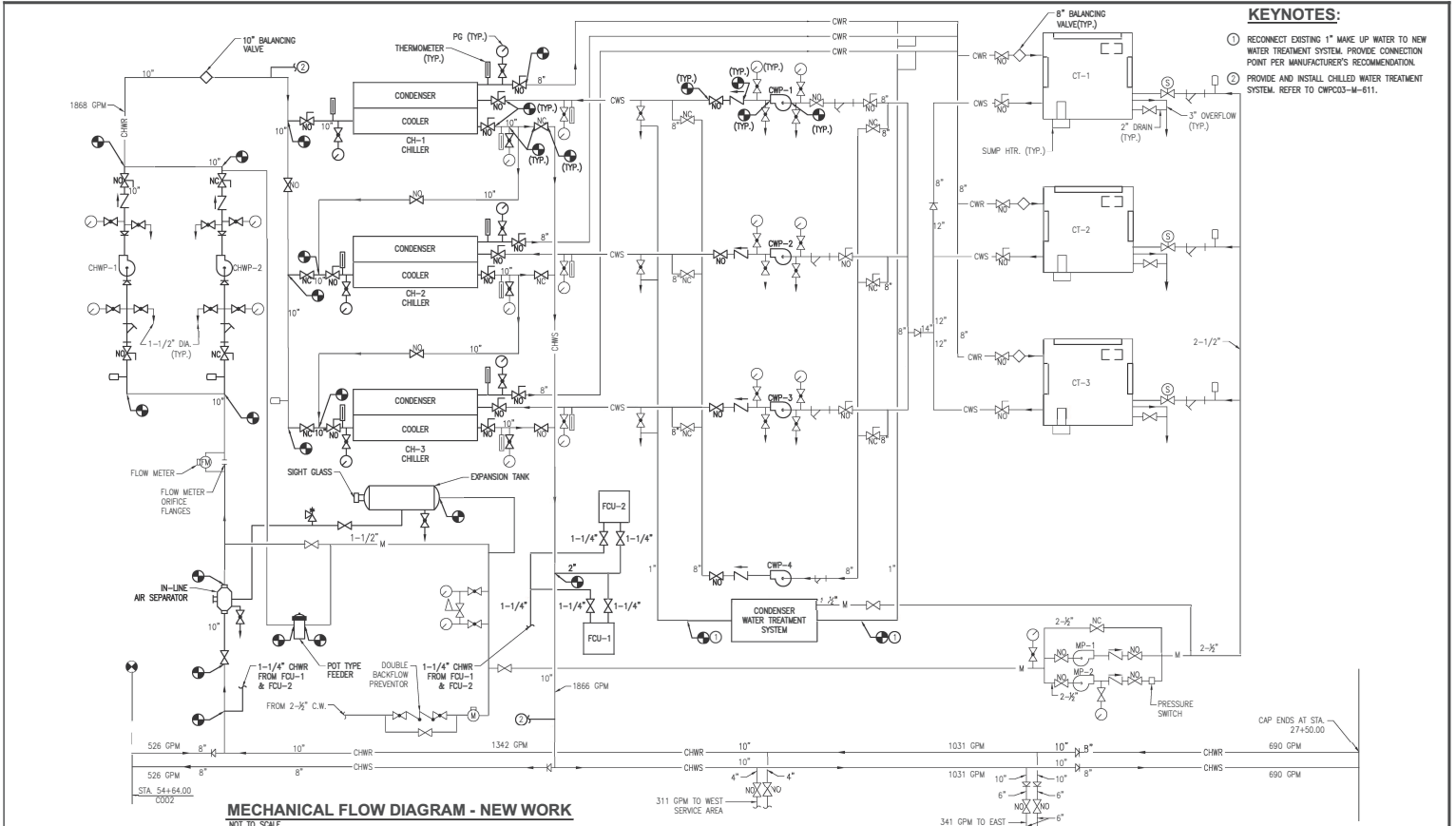
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NUMBER	DESCRIPTION	DATE	BY



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DEPARTMENT OF TRANSIT INFRASTRUCTURE  
AND ENGINEERING SERVICES  
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM  
APPROVED *Debra H. Kasper*

**GFP** A GARRETT FIRMING/PARSONS  
JOINT VENTURE  
SUBMITTED *[Signature]*  
PROJECT MANAGER

**REPLACEMENT OF CHILLERS AND COOLING TOWERS AT THREE METRO-RAIL STATIONS**  
CWPC03 - FARRAGUT WEST  
MECHANICAL FLOW DIAGRAM - DEMOLITION  
SCALE: NOT TO SCALE  
DRAWING NO. CWPC03-M-500  
M1299-027



**KEYNOTES:**

- RECONNECT EXISTING 1" MAKE UP WATER TO NEW WATER TREATMENT SYSTEM. PROVIDE CONNECTION POINT PER MANUFACTURER'S RECOMMENDATION.
- PROVIDE AND INSTALL CHILLED WATER TREATMENT SYSTEM. REFER TO CWP03-M-611.

**MECHANICAL FLOW DIAGRAM - NEW WORK**  
NOT TO SCALE

DESIGNED <u>B. VEDARATHAN</u> 05/17 DRAWN <u>K. RICHARD</u> 05/17 CHECKED <u>J. SILVA</u> 05/17 APPROVED <u>J. SILVA</u> 05/17	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>NUMBER</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION																<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	DATE	BY	DESCRIPTION											<b>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY</b> DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM APPROVED <u>[Signature]</u>	SUBMITTED <u>[Signature]</u> PROJECT MANAGER	CONTRACT NO. <b>FQ17162</b>	<b>REPLACEMENT OF CHILLERS AND COOLING TOWERS AT THREE METRO-RAIL STATIONS</b> CWP03 - FARRAGUT WEST <b>MECHANICAL FLOW DIAGRAM - NEW WORK</b>	SCALE NOT TO SCALE	DRAWING NO. <b>CWP03-M-501</b>	<b>M1299-028</b>
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CHILLER SCHEDULE																				
PLANT	DESIGNATION	CAPACITY (TONS)	EVAPORATOR				CONDENSER				COMPRESSOR/ CHILLER ELECTRICAL						BASIS OF DESIGN			
			GPM	PASSES	ENT °F	LWT °F	PD FT H <sub>2</sub> O	GPM	PASSES	ENT °F	LWT °F	PD FT H <sub>2</sub> O	VOLT	PH	HZ	RLA		LRA	MOC <sup>2</sup>	MCA
CWPC03	CH-1	350	1868	1	55.5	51.0	14.2	1050	2	85.0	94.3	21.0	460	3	60	288	147	400	302	DAIKIN WMC0600D
CWPC03	CH-2	350	1868	1	51.2	46.7	14.2	1050	2	85.0	94.4	21.0	460	3	60	296	163	450	333	DAIKIN WMC0600D
CWPC03	CH-3	350	1868	1	46.5	42.0	11.5	1050	2	85.0	94.5	14.1	460	3	60	318	175	500	358	DAIKIN WMC0600D

- NOTES:
- PROVIDE WITH SPRING TYPE VIBRATION ISOLATION.
  - PROVIDE WITH CHILLED WATER FLOW INDICATOR.
  - WATER-COOLED, SEMI-HERMETIC OIL-FREE CENTRIFUGAL COMPRESSOR WATER CHILLER.
  - TWO MAGNETIC BEARING, COMPLETELY OIL-FREE CENTRIFUGAL COMPRESSORS ON EACH CHILLER.
  - TOTAL CAPACITY OF CHILLERS OPERATING IN SERIES IS 1,050 TONS.
  - CHILLERS SHALL BE CHARGED WITH REFRIGERANT R-134A.
  - MOTORS SHALL BE LIQUID REFRIGERANT COOLED WITH INTERNAL THERMAL SENSING DEVICES IN THE STATOR WINDINGS.
  - 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.
  - CHILLER CONTROLS SHALL COORDINATE COMPRESSOR SPEED AND GUIDE VANE POSITION TO OPTIMIZE CHILLER EFFICIENCY.
  - 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.
  - CHILLER CAPACITY BASED ON WATER.
  - CHILLER TOTAL OPERATING WEIGHT 13848 LB
  - CHILLER DIMENSIONS 178.19 IN X 55.17 IN (FOOT PRINT)
  - PROVIDE EACH CHILLER WITH SINGLE POINT POWER CONNECTION.

### LEAK DETECTION SYSTEM

- PROVIDE (7)(0) R-134A REFRIGERANT SENSORS FOR LEAK DETECTION (SHERLOCK 60-0054 OR EQUAL), UNDER-MOUNT THE REFRIGERANT MONITORING PANELS.
- PROVIDE GAS LEAK DETECTION SYSTEM (SHERLOCK 402 NEMA 4X OR EQUAL).
- PROVIDE COMMUNICATIONS INTERFACE FOR REMOTE MONITORING AND CONTROL, GENCOM COMMUNICATIONS WITH CHILLER PLANT MONITORING PANEL THROUGH RS-485 PORT/ETHERNET CONNECTION PART 88-0541.
- CONNECT TO PRODUCTIVITY 3000, PAC IN CHILLER PLANT MONITORING PANEL.
- REFRIGERANT GAS DETECTION INFRARED SENSOR SHALL BE MOUNTED UNDERNEATH REFRIGERANT MONITORING PANEL AND PER MANUFACTURER'S RECOMMENDATION.

### FLOW MONITORING SYSTEM

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

FAN COIL UNIT SCHEDULE														
PLANT	DESIGNATION	CAPACITY (TONS)	EVAPORATOR				ELECTRICAL			BASIS OF DESIGN				
			GPM	ROWS	ENT °F	LWT °F	CFM	EAT °F (DB/WB)	LAT °F (DB/WB)		HP	VOLT	PH	HZ
CWPC03	FCU-1	6	11.5	6	42	55	1870	80/67	55.7/54.5	0.75	115	1	60	DAIKIN HCB8120
CWPC03	FCU-2	6	11.5	6	42	55	1870	80/67	55.7/54.5	0.75	115	1	60	DAIKIN HCB8120


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

PUMP SCHEDULE															
ITEM NO.	SERVICE	TYPE	GPM	FT HEAD	INLET (IN)	OUTLET (IN)	IMPELLER DA (IN)	OPERATING WEIGHT (LB)	FOOTPRINT (IN)	MOTOR			BASIS OF DESIGN		
										RPM	HP	VOLTS		PH	HZ
CWP-1	CONDENSER WATER	CENTRIFUGAL	1150	90	6	5	14.46	978	64X19	1190	40	460	3	60	ARMSTRONG 4600 (6x5x15H)
CWP-2	CONDENSER WATER	CENTRIFUGAL	1150	90	6	5	14.46	978	64X19	1190	40	460	3	60	ARMSTRONG 4600 (6x5x15H)
CWP-3	CONDENSER WATER	CENTRIFUGAL	1150	90	6	5	14.46	978	64X19	1190	40	460	3	60	ARMSTRONG 4600 (6x5x15H)
CWP-4	CONDENSER WATER	CENTRIFUGAL	1150	90	6	5	14.46	978	64X19	1190	40	460	3	60	ARMSTRONG 4600 (6x5x15H)
CWP-1	CHILLED WATER	CENTRIFUGAL	1866	227	8	6	14.19	2866	70x25	1790	150	460	3	60	ARMSTRONG 4600 (8x6x15H)
CWP-2	CHILLED WATER	CENTRIFUGAL	1866	227	8	6	14.19	2866	70x25	1790	150	460	3	60	ARMSTRONG 4600 (8x6x15H)

- NOTES:
- PROVIDE WITH INVERTER DUTY, VFD COMPATIBLE MOTOR.
  - PROVIDE WITH SPRING TYPE VIBRATION ISOLATION.
  - PROVIDE WITH STRAINER, ECCENTRIC REDUCER/INCREASER AT PUMP INLET/OUTLET FOR CHILLED WATER PUMPS.

COOLING TOWER SCHEDULE															
DESIGNATION	SERVICE	TYPE	GPM	ENT °F	LWT °F	AMB. AIR WET BULD TEMP	FAN				OPERATING WEIGHT (LBS)	BASIS OF DESIGN			
							NO.	CFM	NO. OF MOTORS	HP			V	PH	HZ
(E) CT-1	CONDENSER WATER	AXIAL	1050	95	85	78F	1	95,800	1	25	460	3	60	18,500	EWAPCO USS-112-112
(E) CT-2	CONDENSER WATER	AXIAL	1050	95	85	78F	1	95,800	1	25	460	3	60	18,500	EWAPCO USS-112-112
(E) CT-3	CONDENSER WATER	AXIAL	1050	95	85	78F	1	95,800	1	25	460	3	60	18,500	EWAPCO USS-112-112

- NOTES:
- SEPARATE STARTER PANELS FURNISHED FOR FIELD MOUNTING.
  - PROVIDE DIRECT DRIVE FAN WITH INVERTER DUTY MOTORS.
  - COOLING TOWER FAN MOTORS SHALL BE RATED VFD COMPATIBLE.
  - PROVIDE WITH NEW LOUVERS FOR EXISTING COOLING TOWERS.
  - PROVIDE WITH NEW PLASTIC FILL FOR EXISTING COOLING TOWERS.

DESIGNED <b>B. YOKAWA</b> 05/17		DRAWN <b>K. RICHARD</b> 05/17		CHECKED <b>B. SILVA</b> 05/17		APPROVED <b>B. SILVA</b> 05/17				<b>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY</b> DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM APPROVED <i>Debra H. [Signature]</i>		<b>GFP</b> A SARGENT & Lundy PARTNERS JOINT VENTURE SUBMITTED <i>[Signature]</i> PROJECT MANAGER		REPLACEMENT OF CHILLERS AND COOLING TOWERS AT THREE METRO-RAIL STATIONS CWPC03 - FARRAGUT WEST MECHANICAL EQUIPMENT SCHEDULES SHEET 1 OF 2 SCALE: NONE DRAWING NO. <b>CWPC03-M-600</b> M1299-029	
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CONTRACT NO.  
FQ17162