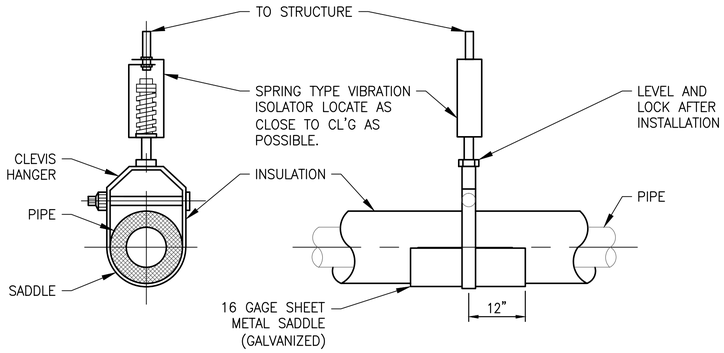
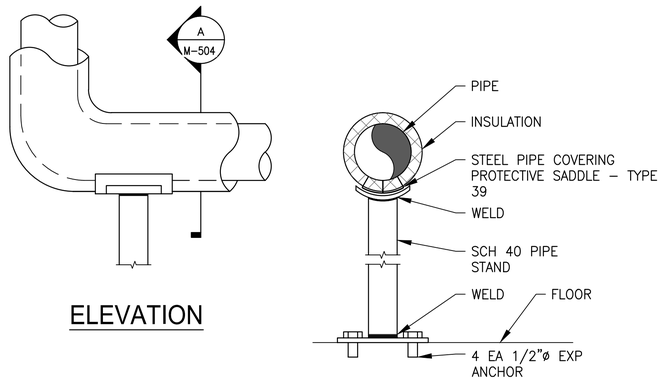


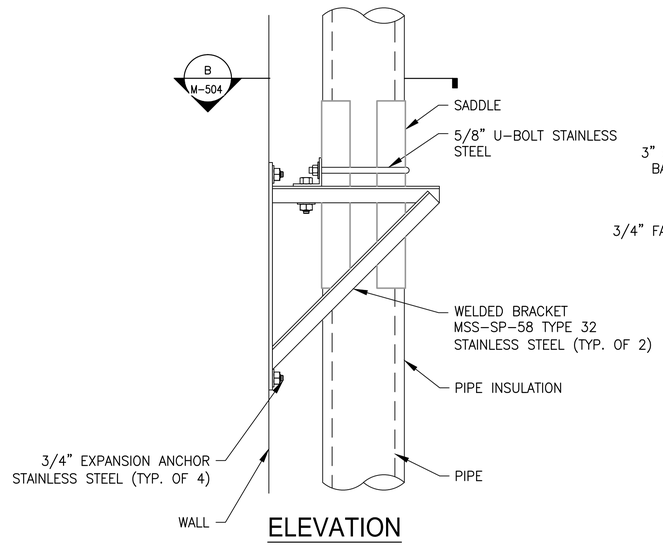
1 M-504 PIPE HANGERS

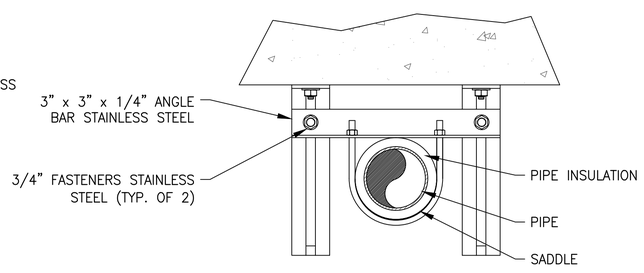
NOT TO SCALE



2 M-504 PIPE STAND WITH SADDLE SUPPORT

NOT TO SCALE



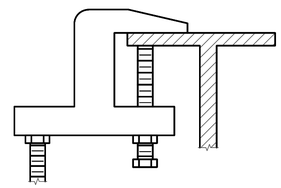


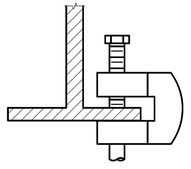
NOTE:

1. PROVIDE SADDLE AT POINT OF PIPE HANGER/U-BOLT INSTALLATION.

3 M-504 VERTICAL PIPE LATERAL SUPPORT - WALL

NOT TO SCALE





4 M-504 TYPICAL PIPE SUPPORT UPPER ATTACHMENT

NOT TO SCALE

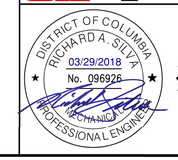
State of Maryland Professional Certification. I hereby certify that these documents were prepared or **approved** by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 041715, Expiration Date: 03/08/2020

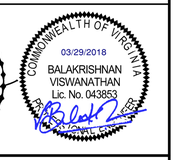
03/29/2018

State of Maryland 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. 030749, Expiration Date: 06/27/2018

03/29/2018

GFP A Gannett Fleming/Parsons JOINT VENTURE





DESIGNED	B. VISWANATHAN	01/26/18
DRAWN	C. LOOSE	01/26/18
CHECKED	B. VISWANATHAN	03/23/18

REFERENCE DRAWINGS		REVISIONS		
NUMBER	TITLE	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

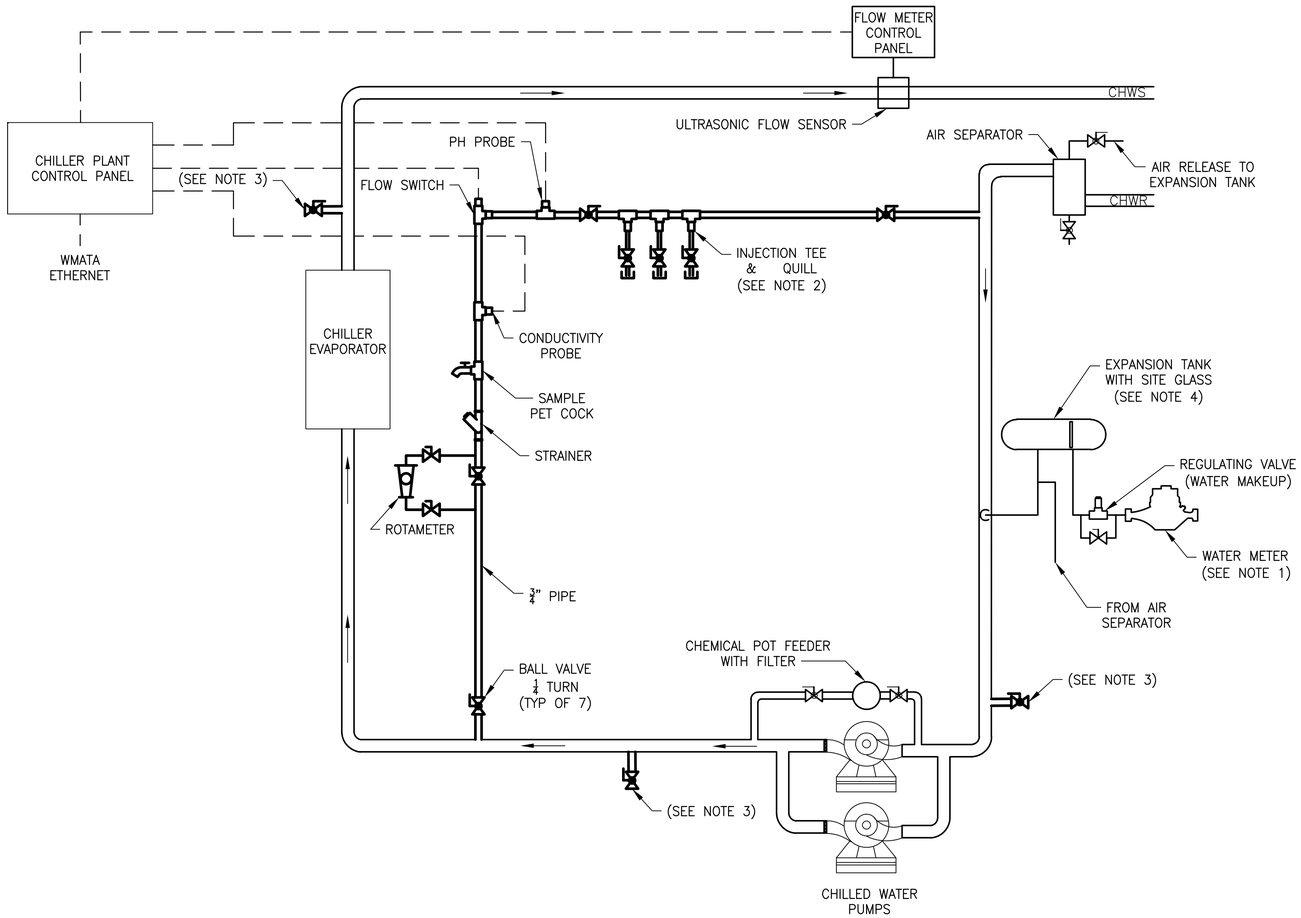
APPROVED Mark H. Magnussen 03/2018
MARK MAGNUSSEN DATE
MANAGER, ENV. PLANNING AND COMP

APPROVED 03/2018
GRAHAM SPILLER DATE
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS

MECHANICAL DETAILS SHEET 5 OF 5

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	NONE	M-504	173 of 173



NOTES

1. WATER METER SUPPLIED BY JURISDICTION HAVING AUTHORITY.
2. PROVIDE AND INSTALL INJECTION TEES, QUILLS, ISOLATION VALVES, AND CAPS. TAPS ARE FOR FUTURE CONNECTION OF CHEMICAL INJECTION PUMPS.
3. CHILLED WATER TAPS FOR FUTURE USE BY WATER TREATMENT/MONITORING CONTRACTOR. INSTALL ¾" ø TAPS WITH BALL VALVES AND CAPS.
4. INSTALL EXPANSION TANK AT HIGH POINT OF SYSTEM.

General Notes

1. PROVIDE SHOP FABRICATED WATER TREATMENT PIPING AND VALVE ASSEMBLY WITH SUPPORT PLATE. INSTALL AT EYE LEVEL.
2. PROVIDE AND INSTALL ULTRASONIC FLOW SENSOR AND FLOW METER CONTROL PANEL. PROVIDE AND INSTALL SHIELDED TWO PAIR TWISTED CABLE WITH GROUND FROM FLOW METER TO THE CHILLER PLANT CONTROL PANEL. PROVIDE AND INSTALL POWER CONNECTION TO FLOW METER CONTROL PANEL
3. CONDUCTIVITY PROBE, FLOW SWITCH, AND PH PROBE TO BE SUPPLIED BY CHILLER PLANT PANEL MANUFACTURER.

CHILLED WATER TREATMENT & FLOW MONITORING SYSTEMS

DESIGNED R HERD 1/2018 DATE
DRAWN R HERD 1/2018 DATE
CHECKED - - DATE

REFERENCE DRAWINGS		REVISIONS		
NUMBER	TITLE	DATE	NUM	DESCRIPTION

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

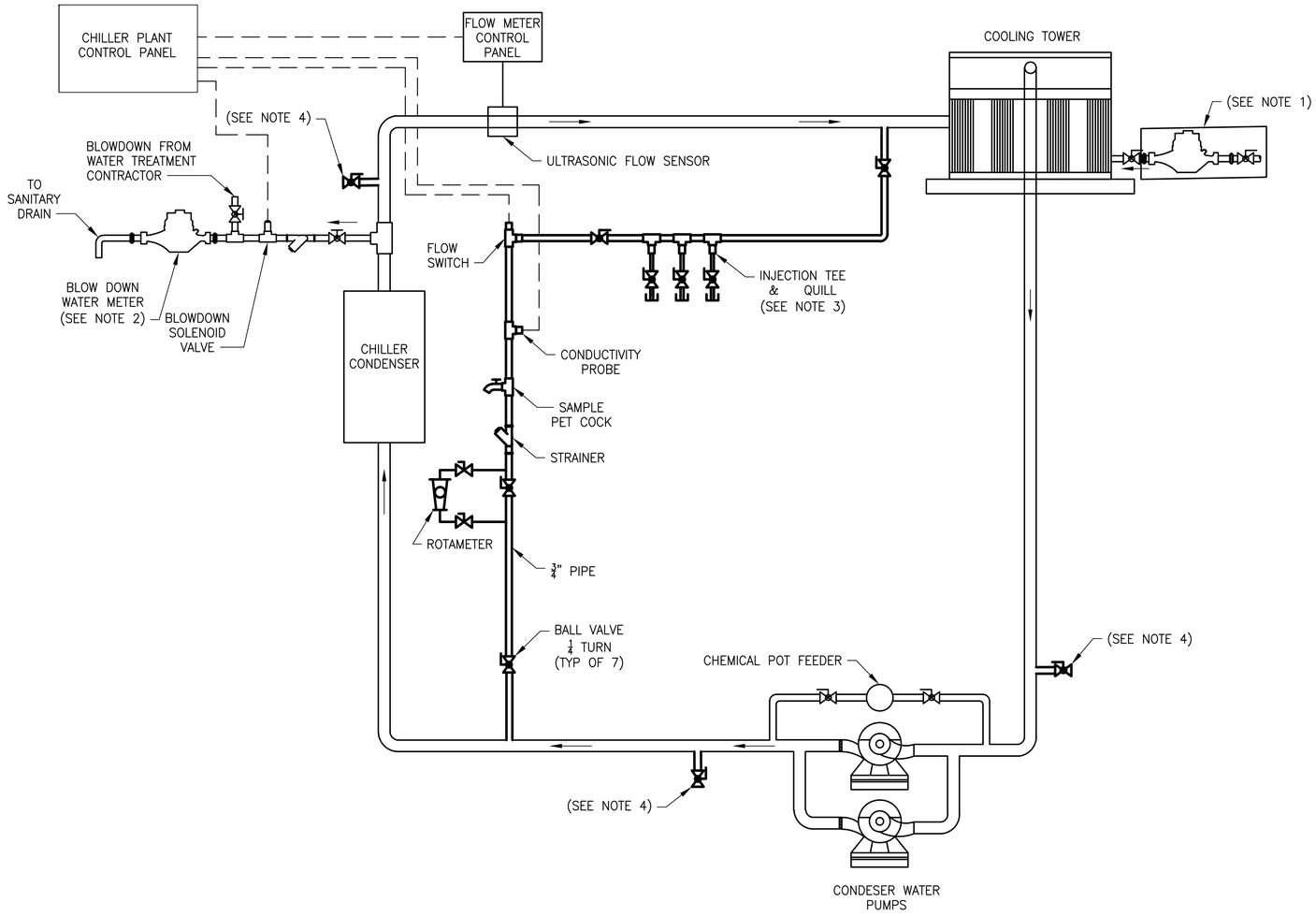
OFFICE OF DESIGN AND CONSTRUCTION
ENGA - MECHANICAL ENGINEERING

APPROVED
PAUL PETERSEN
ENGINEER OF RECORD
DATE

APPROVED
-
DIRECTOR
DATE

MECHANICAL DESIGN DRAWING
HVAC
CHILLED WATER PLANT
CHILLED WATER TREATMENT SYSTEM

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M-	FQ-	AS NOTED	DD-ME-HVAC-007	1 of 1



NOTES

1. MAKEUP WATER MAY REQUIRE SEPARATE WATER METER, SEE CONTRACT DRAWINGS. WATER METER SUPPLIED BY JURISDICTION HAVING AUTHORITY.
2. BLOW DOWN WATER METER SUPPLIED BY AUTHORITY HAVING JURISDICTION.
3. PROVIDE AND INSTALL INJECTION TEES, QUILLS, AND ISOLATION VALVES. TAPS ARE FOR FUTURE CONNECTION OF CHEMICAL INJECTION PUMPS. PROVIDE AND INSTALL QUAD RECEPTACLE OUTLET WITHIN 4 FEET OF BALL VALVE & CAPS.
4. CONDENSER WATER TAPS FOR FUTURE USE BY WATER TREATMENT/MONITORING CONTRACTOR. INSTALL ¾" ø TAPS WITH BALL VALVES AND CAPS.

GENERAL NOTES

1. PROVIDE SHOP FABRICATED WATER TREATMENT PIPING AND VALVE ASSEMBLY WITH SUPPORT PLATE. INSTALL AT EYE LEVEL.
2. CONDUCTIVITY PROBE AND FLOW SWITCH TO BE SUPPLIED BY CHILLER PLANT CONTROL PANEL MANUFACTURER.
3. PROVIDE AND INSTALL ULTRASONIC FLOW SENSOR AND FLOW METER CONTROL PANEL. PROVIDE AND INSTALL SHIELDED TWO PAIR TWISTED CABLE WITH GROUND FROM FLOW METER CONTROL PANEL TO THE CHILLER PLANT CONTROL PANEL. PROVIDE AND INSTALL POWER CONNECTION TO FLOW METER CONTROL PANEL.

CHILLER PLANT CONDENSER WATER TREATMENT & FLOW MONITORING SYSTEMS

DESIGNED R HERD 1/2018 DATE
DRAWN R HERD 1/2018 DATE
CHECKED . . DATE

REFERENCE DRAWINGS		REVISIONS		
NUMBER	TITLE	DATE	NUM	DESCRIPTION

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

OFFICE OF DESIGN AND CONSTRUCTION
ENGA - MECHANICAL ENGINEERING

APPROVED
PAUL PETERSEN
ENGINEER OF RECORD
DATE

APPROVED
-
DIRECTOR
DATE

MECHANICAL DESIGN DRAWING
HVAC
CHILLED WATER PLANT
CONDENSER WATER TREATMENT SYSTEM

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M-	.	AS NOTED	DD-ME-HVAC-008	1 of 1

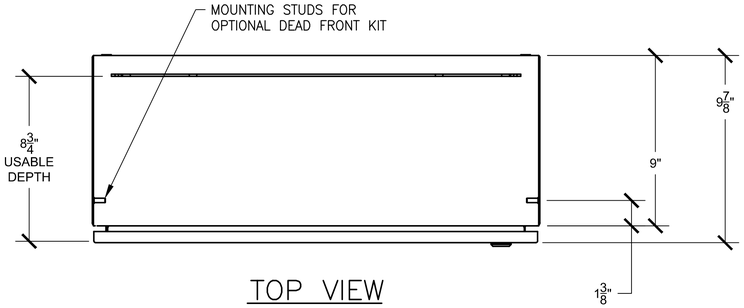
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

CHILLER WATER PLANT-
CONDENSER WATER TREATMENT CONTROL PANEL

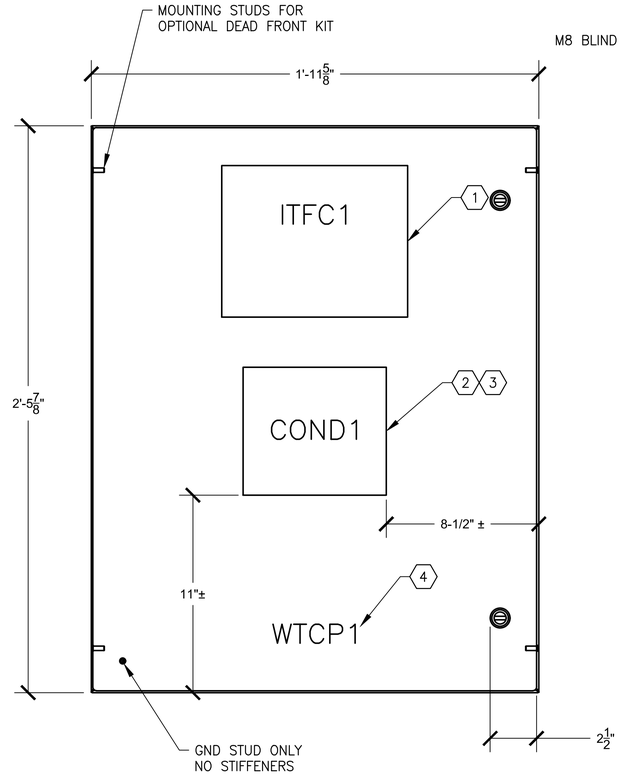
COVER SHEET

January 17, 2018
REVISION 1.0

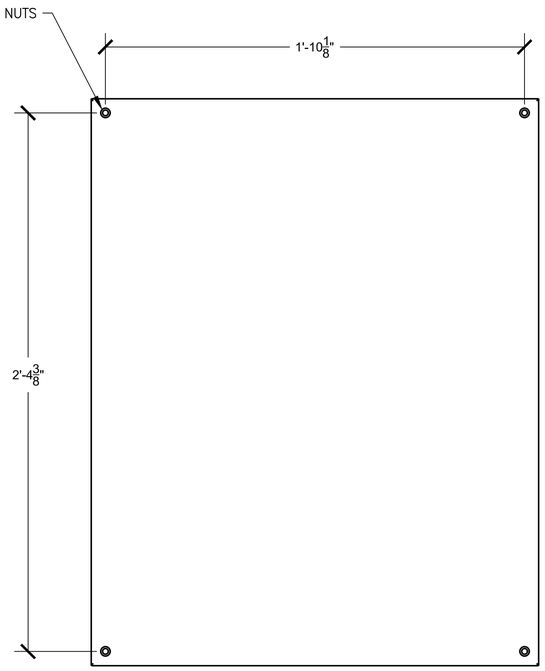
OFFICE OF DESIGN AND CONSTRUCTION
ENGA - MECHANICAL ENGINEERING



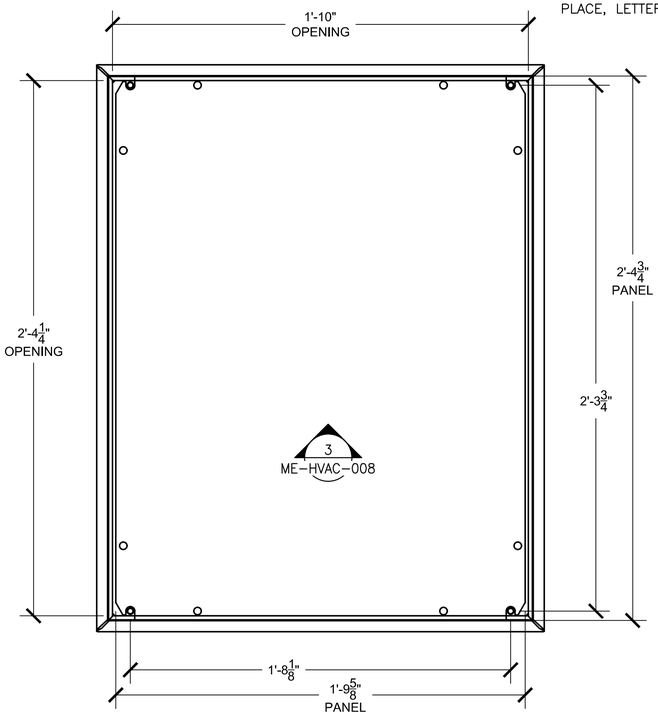
TOP VIEW



FRONT VIEW



REAR VIEW



OPEN VIEW

KEY NOTES

1. TOUCH PANEL (LABEL: ITFC1), C-MORE MODEL NUMBER EA9-T8CL WITH 15 PIN VGA CONNECTOR MALE, OR EQUIVALENT.
2. CONDUCTIVITY CONTROLLER (LABEL: COND1), MANUFACTURER: HACH UNIVERSAL CONTROLLER MODEL NUMBER SC200 (P/N LXV404.99.71552) WITH MODBUS RS232/RS485 CONNECTIVITY, TWO (2) DIGITAL SENSOR INPUTS, AND TWO (2) 4-20 mA OUTPUTS.
3. SUPPLY AND INSTALL HACH ANALOG CONDUCTIVITY SENSOR INPUT MODULE FOR SC200 UNIVERSAL CONTROLLER MODEL 9013000. MODULE TO BE INSTALLED INTERNALLY IN HACH UNIVERSAL CONTROLLER.
4. EXTERNAL CABINET LABELING TO BE SCREWED AND GLUED IN PLACE ON WHITE BACKGROUND WITH BLACK ENGRAVED LETTERING. ALL EQUIPMENT AND INTERNAL COMPONENTS SHALL BE IDENTIFIED USING MACHINE PRINTED LABEL ON BACK PLATE, VISIBLE WITH COMPONENT IN PLACE, LETTER TO BE MINIMUM ¼" TALL.

1 ME-HVAC-009 — CONDENSER WATER TREATMENT CONTROL PANEL (WTCP1)
SCALE: 3" = 1'-0"

"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: .

- COMAR 09.23.03.10

DESIGNED	R. HERD	08/01/12 DATE
DRAWN	Y. LIU	08/15/12 DATE
CHECKED	P. PETERSEN	08/31/12 DATE

REFERENCE DRAWINGS

NUMBER	TITLE

REVISIONS

DATE	NUM	DESCRIPTION

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

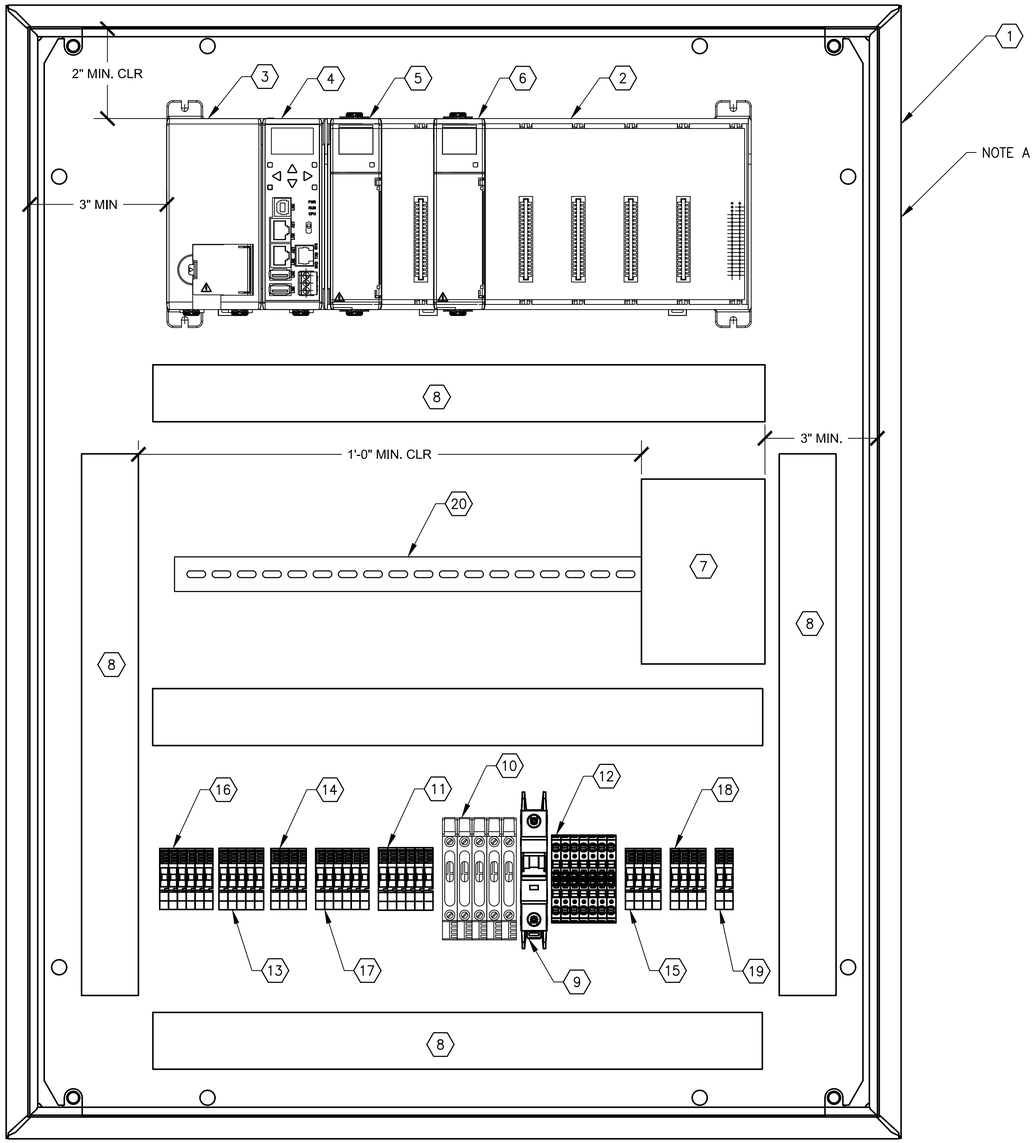
OFFICE OF DESIGN AND CONSTRUCTION
ENGA - MECHANICAL ENGINEERING

APPROVED
- DATE
ENGINEER OF RECORD

APPROVED
PAUL PETERSEN DATE
DIRECTOR

MECHANICAL DESIGN DRAWING
HVAC
CHILLER WATER PLANT
CONDENSER WATER TREATMENT SYSTEM

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M-	FQ-	AS NOTED	ST-ME-HVAC-009	01 of 06



CABINET EQUIPMENT

ITEM	EQUIP. LABEL	DESCRIPTION
1	WTCP1	NEMA 4X ENCLOSURE
2	BASE	8-SLOT I/O BASE
3	CPS	POWER SUPPLY 24-48VDC FOR PLC CNTROLLER
4	CPU	266 MHZ CPU PROCESSOR FOR CONTROLLER
5	16CIP	16PT INPUT SINK/SOURCE FOR CONTROLLER
6	8COP	8CH RELAY OUTPUT ISOLATED FOR CNTROLLER
7	PS	POWER SUPPLY 10-24-100P
8	-	WIRING DUCT W/ COVER
9	CB	CIRCUIT BREAKER
10	FTB	FUSE TERMINAL BLOCK W/ LED
11	TB5	TERMINAL BLOCKS, GRAY
12	TB6	TERMINAL BLOCKS, BLUE
13	TB2	TERMINAL BLOCKS, BLACK
14	TB3	TERMINAL BLOCKS, GREEN
15	TB7	TERMINAL BLOCKS, ORANGE
16	TB1	TERMINAL BLOCKS, RED
17	TB4	TERMINAL BLOCKS, WHITE
18	TB8	TERMINAL BLOCKS, YELLOW
19	TB9	TERMINAL BLOCKS, GREEN
20	-	SLOTTED STEEL DIN RAIL

GENERAL NOTES:

A. WIRINGS NOT SHOWN FOR CLARITY. SEE CONTROL WIRING SCHEMATICS.

B. ALL WIRES TO BE IDENTIFIED WITH HEAT SHRINK MACHINE LABELED SLEEVES.

C. CONTROL PANEL WIRE TO BE STRANDED WIRES, EITHER MTW(MACHINE TOOL WIRE) OR THHN (THERMOPLASTIC HIGH HEAT–RESITANT NYLON–COATED).

D. ALL ANALOG WIRE SHALL BE SHIELDED TWISTED PAIR WITH SINGLE POINT GROUND.

E. BACK PANEL TO BE GROUNDED TO ENCLOSURE.

F. ALL CONNECTIONS TO THE PANEL BOARD WILL BE WITH FASTENERS AND THREADED HOLES, PANEL BOARD HOLES TO BE THREADED.

G. TERMINAL BLOCKS TO BE MOUNTED ON DIN RAILS, THESE DIN RAILS WILL BE MOUNTED TO THE PANEL WITH BRACKET SUPPORTS, ANGLED BRACKET SUPPORTS WILL BE USED FOR TERMINAL BLOCKS REQUIRING FIELD WIRING, 10% SPARE TERMINAL BLOCKS TO BE INSTALLED.

H. TERMINAL STRIP TO HAVE GROUNDING LUG TO BACK PANEL.

I. ALL DIMENSIONS SHOWN ARE APPROXIMATE, DIMENSIONS CAN VARY BASED ON ACTUAL LOCATION OF EQUIPMENT.

J. PANEL MANUFACTURER TO SUPPLY THE FOLLOWING COMPONENTS FOR INSTALLATION INTO THE CHILLER PLANT TREAMENT LOOPS: TWO (2) FLOW SWITCHES (GEM SENSOR MODEL FS–500–170231 OR EQUAL), TWO (2) ELECTRODELESS CONDUCTIVITY SENORS (HACH MODEL 3725E2T OR EQUAL), AND ONE pH SENSOR (HACH MODEL DPC1R2A OR EQUAL).

3 OPENING VIEW - CONDENSER WATER TREATMENT CONTROL PANEL (WTCP1)
ME–HVAC–009 SCALE: 6" = 1'–0"

"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: _____.

- COMAR 09.23.03.10

DESIGNED R. HERD 08/01/12 DATE
DRAWN Y. LIU 08/15/12 DATE
CHECKED P. PETERSEN 08/31/12 DATE

REFERENCE DRAWINGS		REVISIONS		
NUMBER	TITLE	DATE	NUM	DESCRIPTION

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

OFFICE OF DESIGN AND CONSTRUCTION
ENGA - MECHANICAL ENGINEERING

APPROVED - DATE
ENGINEER OF RECORD

APPROVED PAUL PETERSEN DATE
DIRECTOR

MECHANICAL DESIGN DRAWING
HVAC
CHILLER WATER PLANT
CONDENSER WATER TREATMENT SYSTEM

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M-	FQ-	AS NOTED	ST-ME-HVAC-009	02 of 06