

**DRAWING INDEX**

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**GENERAL NOTES**

- WIRINGS SHALL BE IN CONCEALED CONDUIT/ TRUNKING UNLESS OTHERWISE SPECIFIED.
- THE POSITION OF ALL ELECTRONICS EQUIPMENT AS SHOWN IN THE DRAWINGS ARE APPROXIMATE ONLY. THE EXACT POSITIONS SHALL BE DETERMINED ON SITE.
- THE SPECIALTY CONTRACTOR SHALL BE RESPONSIBLE FOR THE LABELING OF ALL EQUIPMENT THRU-OUT THE INSTALLATION.
- THE SPECIALTY CONTRACTOR SHALL BE RESPONSIBLE TO LIAISE WITH THE LOCAL GOVERNMENT FOR ALL CLEARANCES, CABLE JOINTING, AND TESTING FOR THE INSTALLATION.
- THE SPECIALTY CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING OF ALL CABLE/CONDUIT PENETRATION OPENINGS BETWEEN FLOOR SLAB AND WALLS ETC. WITH APPROVED FIRE RATING MATERIAL/SEALANT.
- ALL CABLES TO BE LAID IN HD UPVC PIPES SHALL BE ENCASED IN CONCRETE WHEN LAID ACROSS THE DRIVEWAY.
- THE SPECIALTY CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPOTENTIAL GROUNDING/ALL METAL PARTS COMPLETED BY THE OTHER CONTRACTORS TO THE NEAREST BONDING TO ELECTRICAL PANEL.
- THE SPECIALTY CONTRACTOR SHALL FURNISH ALL NECESSARY LABOR, MATERIALS AND EQUIPMENT FOR SATISFACTORY COMPLETION OF THE ENTIRE CHILLER PLANT MANAGER SYSTEM INSTALLATION AS GENERALLY DESCRIBED IN THE SPECIFICATION AND/OR SHOWN ON DRAWINGS.
- ALL LOCATIONS OF EQUIPMENT AND CABLE ROUTES SHOWN ON THE DRAWING ARE INDICATIVE ONLY. THE EXACT LOCATIONS MUST BE COORDINATED ON SITE BEFORE INSTALLATION. FULLY COORDINATED SHOP DRAWINGS MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE COMMENCEMENT OF WORK.
- ALL CONDUITS WHICH ARE EXPOSED SHALL BE PAINTED WITH A COAT OF RUST-RESISTING PRIMER AND TWO COATS OF ELECTRIC ORANGE OR AS SPECIFIED BY THE ARCHITECT.
- EACH CIRCUIT SHALL BE TESTED FOR GROUNDS AND SHORTS BY MEANS OF INSULATION RESISTANCE TESTING INSTRUMENT APPLYING A VOLTAGE OF NOT LESS THAN 500V D.C. ON CIRCUIT UNDER TEST.
- CABLES FOR ESSENTIAL CIRCUITS SUCH AS EMERGENCY LIGHTING CIRCUITS & FIRE FIGHTING EQUIPMENT CIRCUITS ETC SHALL NOT BE DRAWN INTO THE SAME CONDUIT INTENDED FOR NORMAL CIRCUITS AS PER PEC.
- THE SPECIALTY CONTRACTOR SHALL LIAISE WITH OTHER CONTRACTOR TO ENSURE THAT POWER SUPPLIES FOR ALL EQUIPMENT ARE ADEQUATELY PROVIDED TO SUIT THE SYSTEM REQUIREMENTS.
- ALL ELECTRONICS EQUIPMENT, LOCATIONS SHOWN ARE INDICATIVE ONLY AND THE ELECTRICAL CONTRACTOR MUST COORDINATE WITH THE ARCHITECT AND OR THE INTERIOR DESIGNER, AS WELL AS EQUIPMENT SUPPLIERS.
- THE SPECIALTY CONTRACTOR SHALL OBTAIN APPROVAL FROM STRUCTURAL ENGINEERS FOR PENETRATION THROUGH RC. BEAMS AND FLOOR SLABS PRIOR TO CONSTRUCTION.
- ALL CONDUIT LAYOUT AND INSTALLATION METHODS SHALL BE IDENTICAL IN ALL ROOMS AS MUCH AS POSSIBLE.
- TESTING CERTIFICATES SHALL BE PROVIDED BY THE SPECIALTY CONTRACTOR PRIOR TO FINAL TURN OVER.
- ALL MATERIALS/CABLES TO BE USED AND INSTALLATION METHOD SHALL COMPLY WITH THE TECHNICAL SPECIFICATION, STANDARDS, CODE OF PRACTICE AND AUTHORITY REQUIREMENT.
- THE SPECIALTY CONTRACTOR IS REQUIRED TO SUBMIT DETAILS OF FINAL ARRANGEMENT AND DIMENSIONAL LAYOUT OF ALL ITEMS EQUIPMENT IN RESPECTIVE ROOMS TO SUIT SITE CONDITIONS, ETC. FOR REVIEW BY THE CONSULTANT BEFORE COMMENCEMENT OR INSTALLATION.
- ENGINEER IN-CHARGE SUPERVISING WORK SHALL BE A DULY REGISTERED ELECTRONICS ENGINEER SUPERVISED BY A PROFESSIONAL ELECTRONICS ENGINEER AS REQUIRED BY R.A. 9292 AND THE IRR OF REVISED NATIONAL BUILDING CODE.
- ALL ELECTRONICS SYSTEM PROVIDED IN THIS PLAN SHALL BE CAPABLE TO ACCOMMODATE FUTURE FIT-OUT EXPANSION REQUIREMENTS.

**CHILLER PLANT MANAGER SYSTEM**

- CHILLER PLANT MANAGER SYSTEM (CPMS) NETWORK SHALL BE UTILIZING BACNET AND/OR LOWWORKS PROTOCOL THAT ARE ONLY CERTIFIED INTEROPERABLE BETWEEN OTHER SYSTEMS FROM MULTIPLE BRANDS AND VENDORS.
- HIGH LEVEL INTERFACE VIA RS 232/485 COMMUNICATION LINK SHALL BE REQUIRED FOR TO EASE INSTALLATION AND ACQUIRE ACCURACY IN DATA GATHERING.
- THIRD PARTY INTERFACES SHALL BE REQUIRED FOR INTEGRATION/INTERFACING WITH VARIOUS SYSTEM SUCH AS FIRE ALARM AND SECURITY SYSTEM FOR ACCURATE DATA GATHERING.
- CPMS CONTRACTOR SHALL PROVIDE/SUBMIT ACTUAL CONTROL/MONITORING DIAGRAMS (SHOP DRAWINGS) FOR EACH SYSTEM OR EQUIPMENT FOR APPROVAL OF THE CONSULTANTS PRIOR TO INSTALLATION.
- CPMS CONTRACTOR SHALL DETERMINE SIZES OF DDC ENCLOSURES WITH CONSULTANTS APPROVAL PRIOR TO INSTALLATION.
- DIRECT DIGITAL CONTROLLERS (DDC'S) TO BE USED SHALL BE FULLY STAND-ALONE DEFINED BY HAVING ITS OWN INTERNAL CLOCK, DATA GATHERING MEMORY BANK AND CENTRAL PROCESSING UNIT (CPU).
- EACH DDC PANEL SHALL BE CAPABLE OF ACTING INDEPENDENTLY FROM THE CPMS NETWORK CONTROL AND MONITORING PROGRAMS OF EACH DDC POINT SHALL STILL BE IN EFFECT EVEN IN CASES OF DISCONNECTION FROM THE NETWORK DUE TO TECHNICAL/INCIDENTAL MATTERS.
- CPMS TERMINAL BOXES SHALL INCLUDE REPEATER CIRCUITS. CPMS CONTRACTOR SHALL DETERMINE EXACT QUANTITY OF REPEATERS, WHENEVER NECESSARY.
- THE UNIT RATE OF EACH CPMS POINT SHALL INCLUDE THE FOLLOWING WORKS:
  - DIRECT DIGITAL CONTROLLER'S (DDC'S) AND ALL ASSOCIATED ACCESSORIES.
  - ALL COMMUNICATION/CONTROL SIGNAL CABLES, CONDUITS/TRUNKING, TERMINATION, ETC.
  - ALL FIELD SENSORS, DEVICES (INCLUDING FLOW METERS).
  - SOFTWARE AND PROGRAMMING.
  - GRAPHIC GENERATION AND TREND LOGGING
  - ELECTRICAL TERMINALS, CONTRACTORS, MARSHALING BOX, ETC.
  - TESTING AND COMMISSIONING
- SPARE QUANTITIES HAVE BEEN INCLUDED IN THE POINTS LIST. THE BMS CONTRACT PRICE SHALL INCLUDE ALL QUANTITIES SPECIFIED IN THE POINT SCHEDULE.
- THE SUPPLY OF ALL NECESSARY INTERFACE/TRANSDUCERS/MODULE/ACCESSORIES FOR EFFECTIVE BMS/FA INTERLOCK/CONTROLS/MONITORING AS DEFINED IN THE RELEVANT SPECIFICATION CLAUSES SHALL BE INCLUDED IN THE BMS CONTRACTORS SCOPE OF WORK.

	DESCRIPTIONS		DESCRIPTIONS
AC	AIR CONDITIONING	GFE	GOVERNMENT FURNISH EQUIPMENT
AI	ANALOG INPUT	IMC	INTERMEDIATE METALLIC CONDUIT
AO	ANALOG OUTPUT	IV	ISOLATION VALVE
AP	ACCESS PANEL	KW	KILOWATT
AV	AIR VENT	L	LITERS
AWG	AMERICAN WIRE GAUGE	l/s	LITERS PER SECOND
BMS	BUILDING MANAGEMENT SYSTEM	m <sup>3</sup>	CUBIC METER
BOP	BOTTOM OF PIPE	MAX	MAXIMUM
C	DEGREE CELCIUS	MCC	MECHANICAL CONTROL CENTER
CAP	CAPACITY	MM	MILLIMETER
CAT	CATEGORY	MOV	MOTORIZED ON/OFF VALVE
CD	CONDENSATE DRAIN	NC	NORMALLY CLOSED
CDP	CONDENSATE DRAIN PIPE	NO	NORMALLY OPEN
CP	CONDENSATE WATER PUMPS	P	PHASE
CPMS	CHILLER PLANT MANAGER SYSTEM	PCWP	PRIMARY CHILLED WATER PUMPS
CPF	CHEMICAL POT FEEDER	PCWS/R	PRIMARY CHILLED WATER SUPPLY/ RETURN
CT	COOLING TOWER	PD	PRESSURE DROP
CV	CHECK VALVE	PG	PRESSURE GAUGE
C/W	COMPLETE WITH	PS	PRESSURE SENSOR/TRANSMITTER
CS/CR	CONDENSER WATER SUPPLY/ RETURN	SCHWS/R	CHILLED WATER SUPPLY/ RETURN
DB	DRY BULB	SCWP	SECONDARY CHILLED WATER PUMPS
dB	DECOIBEL	SFU	SAND FILTRATION UNIT
DDC	DIRECT DIGITAL CONTROLLER	S.S	STAINLESS STEEL
DI	DIGITAL INPUT	STR	STRAINER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	UPS	UNINTERRUPTIBLE POWER SUPPLY
DO	DIGITAL OUTPUT	T/A	TO ABOVE
EE	ELECTRICAL	T/B	TO BELOW
ET	EXPANSION TANK	TEMP.	TEMPERATURE
ELV	EXTRA LOW VOLTAGE	TF	THERMOPLASTIC COVERED FIXTURE WIRE
F/A	FROM ABOVE	THHN	HEAT RESISTANT THERMOPLASTIC WIRE
F/B	FROM BELOW	TP	TEST PORT
FC	FLEXIBLE CONNECTOR (PIPE & DUCT)	TR	TONS OF REFRIGERATION
FR	FIRE RATED	V	VOLTS
FM	FLOW TRANSMITTER (CHILLER)	VFD	VARIABLE FREQUENCY DRIVE
GV	GATE VALVE	WB	WET BULB
H/L	HIGH LEVEL	WP	WEATHER PROOF
HLI	HIGH LEVEL INTERFACE	CH	WATER COOLED CHILLERS
Hz	HERTZ	ø	DIAMETER
VSD	VARIABLE SPEED DRIVE	⊙	AT
BTU	BRITISH THERMAL UNIT		

**LEGEND & SYMBOLS**

SYMBOLS	DESCRIPTIONS	SYMBOLS	DESCRIPTIONS
<b>BUILDING MANAGEMENT SYSTEM</b>			
	DIRECT DIGITAL CONTROL		FLOW SENSOR/ SWITCH
	HIGH LEVEL INTERFACE		FLOW METER
	VARIABLE FREQUENCY DRIVE		MOTOR STARTER
	STATIC PRESSURE TRANSMITTER		MOTOR
	MODULATING VALVE		KILO-WATT HOUR MONITORING
	DIFFERENTIAL PRESSURE TRANSMITTER		250mm (W) x 150mm (D) x 250mm (H) PULLBOX
	WATER COOLED CHILLER		UNINTERRUPTIBLE POWER SUPPLY
	COOLING TOWER		CHILLER PLANT MANAGEMENT SYSTEM LAYOUT
	EXPANSION TANK		POC (POINT OF CONNECTION)
	PUMPS		AIR VENT W/ STOP COCK
	MODULATING CONTROL VALVE		DRAIN VALVE C/W PLUG
	CLOSE-COUPLED COMMISSIONING SET		NON- RETURN VALVE
	GATE VALVE		THERMOMETER
	BALANCING VALVE		FLEXIBLE PIPE CONNECTOR
	TEMPERATURE SENSOR/TRANSMITTER		FLOW SWITCH
	UNIVERSAL TEST PLUG		DIFFERENTIAL PRESSURE GAGE
	MOTORIZED VALVE		AUTOMATIC AIR VENT
	TWO-PORT MOTORIZED MODULATING CONTROL VALVE		DRAIN CAP
	PRESSURE GAUGE		CHECK VALVE
	BUTTERFLY VALVE		CONDENSER WATER SUPPLY/RETURN
	RELIEF VALVE		CHILLED WATER SUPPLY
	FLOW METER		SECONDARY CHILLED WATER SUPPLY/RETURN
	SUCTION DIFFUSER		FLOW
	PRESSURE SENSOR		CONDENSATE DRAIN PIPE
	TEST PLUG		SOLENOID VALVE
			BALL VALVE
			WATER METER
			UNION
			GLOBE VALVE

UNITED STATES EMBASSY  
MANILA, PHILIPPINES



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APPROVED BY :			
DISCIPLINE	INITIAL	SIGNATURE	DATE
SFM	PLS		
DFM	RLW		
CIVIL/STRL			
ELECT'L			
MECH'L			

RevNo	Revision note	Date	Sign.

Project Title  
**US EMBASSY  
MAIN CHILLER  
PLANT ADDITION**

Location  
ROXAS BOULEVARD, PHILIPPINES

Release For Construction:  
FMM FMS

SHEET CONTENT  
**ELECTRONICS SERVICES  
DRAWING INDEX, GENERAL NOTES,  
ABBREVIATIONS AND LEGEND & SYMSBOLS**

Phase  
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**FOR TENDER**