LEGEND AND ABBREVIATIONS

SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION	SYMBOL	ABBR	DESCRIPTION
AHU	AHU	AIR HANDLING UNIT		A/P	ACCESS PANEL		FAD	FRESH AIR DUCT		RAD	RETURN AIR DUCT
AS	AS	AIR SEPARATOR		APPROX	APPROXIMATE		FT	FEET		RAR	RETURN AIR REGISTER WITH OPPOSED BLADE DAMPER
CH	CH	CHILLER		ATFP	ANTI-TERRORIST/FORCE PROTECTION		GPM	GALLON PER MINUTE		RG	RETURN GRILLE
CHP	CHWP	CHILLED WATER PUMP		BTUH	BRITISH THERMAL UNITS PER HOUR		HP	HORSEPOWER		RPM	REVOLUTIONS PER MINUTE
EF	EF	EXHAUST FAN		CD	CEILING DIFFUSER		HVAC	HEATING, VENTILATION, AND AIR CONDITIONING		SA	SUPPLY AIR
FCU	FCU	FAN COIL UNIT		CFM	CUBIC FEET PER MINUTE		HZ	HERTZ		SAD	SUPPLY AIR DUCT
				CHW	CHILLED WATER		L	LOUVER		SAR	SUPPLY AIR REGISTER
MD	MD	MOTORIZED DAMPER		CHWR	CHILLED WATER PIPE, RETURN		LD	LINEAR DIFFUSER, TITUS		SP	STATIC PRESSURE
FD	FD	FIRE DAMPER		CHWS	CHILLED WATER PIPE, SUPPLY		LVG	LEAVING		SSTL	STAINLESS STEEL
	VD	MANUAL VOLUME DAMPER		COND	CONDENSER		LWT	LEAVING WATER TEMPERATURE		TEMP	TEMPERATURE
PS		PRESSURE SENSOR		DB	DRY BULB		MAD	MAKE-UP AIR DUCT		TSP	TOTAL STATIC PRESSURE
SD		SMOKE DETECTOR		D.L.	DOOR LOUVER		MUW	MAKE-UP WATER		V	VOLTAGE
T		THERMOSTAT AND FAN SWITCH MOUNTED 60" ABOVE FINISH FLOOR		EAD	EXHAUST AIR DUCT		OA	OUTSIDE AIR		WB	WET BULB
		REMOVAL HATCH		EAR	EXHAUST AIR REGISTER		OAD	OUTSIDE AIR DUCT			
	°F	DEGREES FAHRENHEIT		ESP	EXTERNAL STATIC PRESSURE		OD	OUTSIDE DIAMETER			
	ø	DIAMETER		EWT	ENTERING WATER TEMPERATURE		PD	PRESSURE DROP			
	ACD	AIR CONDITIONING DRAIN		EXT	EXTERNAL		PH	PHASE			

GENERAL NOTES

1. CONFORM TO ALL REQUIREMENTS OF THE 2009 INTERNATIONAL BUILDING, MECHANICAL AND ELECTRICAL CODES, GOVERNMENT OF GUAM HAVING JURISDICTION, AND OTHER APPLICABLE REGULATIONS FOR THE PROJECT.
2. INSTALLATION SHALL BE GUARANTEED TO BE FREE FROM DEFECTS FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THE PROJECT AS A WHOLE.
3. CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. COORDINATE ALL WORK WITH OTHER TRADES TO AVOID INTERFERENCES AND DELAYS.
5. PAY FOR ALL PERMIT FEES AND APPLICATIONS.
6. PROVIDE ADDITIONAL MATERIALS AND LABOR FOR A COMPLETE OPERABLE SYSTEM AS PER SCOPE OF WORKS.
7. PROVIDE ACCESS PANELS FOR ALL ITEMS UNDER THIS SECTION REQUIRING SERVICING, INSPECTION, MAINTENANCE AND ADJUSTMENT.
8. CONTRACTOR SHALL OBTAIN ALL NECESSARY INFORMATION FROM THE OWNER OR DOE TO MAKE ALL FINAL EQUIPMENT CONNECTIONS. FINAL CONNECTIONS SHALL INCLUDE BUT NOT BE LIMITED TO HOT AND COLD WATER SHUT-OFF VALVES, P-TRAPS, VACUUM BREAKERS, UNIONS, WASTE AND INDIRECT WASTE CONNECTIONS, REGULATORS, ETC..
9. OMISSIONS: IT IS THE INTENT OF THE PLANS AND SPECIFICATIONS TO PROVIDE A COMPLETE INSTALLATION. SHOULD THERE BE OMISSIONS, THE CONTRACTOR SHALL CALL THE ATTENTION OF THE ENGINEER TO SUCH OMISSIONS TEN (10) DAYS IN ADVANCE OF THE DATE OF CONSTRUCTION SO THAT THE NECESSARY CORRECTIONS CAN BE MADE.
10. THE INSTALLATION SHALL CONFORM TO THE LATEST APPLICABLE INDUSTRY STANDARDS UNLESS SPECIFICALLY NOTED OTHERWISE.
11. ADDITIONAL WORK: THE DESIGN IS BASED ON EQUIPMENT AS DESCRIBED IN THE DRAWINGS. ANY CHANGE IN ELECTRICAL, WIRING, CONDUIT, CONNECTIONS, PIPING, CONTROLS, AND OPENINGS REQUIRED BY ALTERNATE EQUIPMENT SPECIFIED AND SUBMITTED AND APPROVED SHALL BE PAID FOR BY THIS CONTRACTOR.
12. PRODUCT DELIVERY, STORAGE AND HANDLING: FURNISH NEW FIXTURES, MATERIALS AND ACCESSORIES BEARING THE MANUFACTURER IDENTIFICATION. COORDINATE DELIVERIES TO AVOID INTERFERENCES OF CONSTRUCTION DELAYS. PROTECT PRODUCTS DURING DELIVERY, STORAGE, INSTALLATIONS, AND THE REMAINDER OF THE CONSTRUCTION PERIOD AFTER INSTALLATION.
13. ADEQUATE PROTECTION SHALL BE PROVIDED TO EXISTING BUILDING AND/OR EQUIPMENTS WITHIN THE WORK AREA TO AVOID AND/OR MINIMIZE DAMAGE. ANY DAMAGES THAT IS DUE TO NEGLIGENCE OF CONTRACTOR SHALL BE REPAIRED & RESTORED TO MATCH EXISTING AT NO ADDITIONAL COST TO THE CONTRACT.
14. PROTECT THE WORK AREA AS PER OSHA REQUIREMENT.
15. DISPOSE ALL DEBRIS AT AN APPROVED GOVERNMENT OF GUAM DISPOSAL SITE.

INSTALLATION:

1. PREPARATION: VISIT THE WORKSITE AND BECOME FULLY AWARE OF ALL EXISTING CONDITIONS. INVESTIGATE THE CONTRACT DOCUMENTS AND MAKE PROPER PROVISIONS TO AVOID INTERFERENCES OR CONSTRUCTION DELAYS. FURNISH OTHER TRADES WITH INFORMATION TO PROPERLY LOCATE AND SIZE OPENINGS IN THE STRUCTURE REQUIRED FOR THIS WORK. FURNISH ANCHOR BOLTS, SLEEVES, INSERTS AND SUPPORT REQUIRED FOR THIS WORK.
2. COORDINATION: COORDINATE ALL WORK WITH DOE MAINTENANCE AND THE SCHOOL MAINTENANCE STAFF AND ADMISTRATION. REQUEST FOR SHUTDOWN SHALL BE MADE IN WRITING SEVEN(7) DAYS IN ADVANCE. SCHEDULE ALL WORK TO MINIMIZE DISRUPTION OF SCHOOL ACTIVITIES.
3. INSTALLATION: PERFORM WORK USING PERSONNEL SKILLED IN THE TRADE INVOLVED. PROVIDE COMPETENT SUPERVISION. FURNISH NEW EQUIPMENT, MATERIALS, AND ACCESSORIES BEARING THE MANUFACTURER'S IDENTIFICATION, AND CONFORMING TO THE RECOGNIZED COMMERCIAL STANDARDS. PROVIDE EXTRA MATERIALS AND LABOR FOR A COMPLETE OPERABLE SYSTEM AT NO EXTRA COST TO THE OWNER.
4. FIELD QUALITY CONTROL: TEST SYSTEMS IN ACCORDANCE WITH APPLICABLE STANDARDS, CODES AND MANUFACTURER'S RECOMMENDATIONS. PERFORM TESTS IN THE PRESENCE OF, AND TO THE SATISFACTION OF INSPECTORS HAVING JURISDICTION OVER THE WORK. ASK FOR FINAL INSPECTION BY THE ENGINEER AFTER ALL TESTS, ADJUSTMENTS AND BALANCING HAS BEEN PERFORMED PER SPECIFICATION.
5. BALANCING, ADJUSTMENT AND CLEANING: CLEAN UP WORK AREAS AND FIXTURES. ADJUST SYSTEM FOR PROPER OPERATION, READY FOR USE. TOUCH UP WITH MATCHING PAINT ALL DAMAGED FACTORY FINISHES PER SPECIFICATION OR TO MATCH EXISTING FINISHES..
6. CLEANING AND ADJUSTING: AT THE COMPLETION OF THE WORK, ALL PARTS OF THE INSTALLATION SHALL BE THOROUGHLY CLEANED. PIPE, VALVES, AND FITTINGS SHALL BE CLEANSED OF GREASE AND METAL CUTTINGS, AND SLUDGE THAT MAY HAVE ACCUMULATED BY OPERATION OF THE SYSTEM FOR TESTING. ANY STOPPAGE OR DISCOLORATION OR OTHER DAMAGE TO PARTS OF THE BUILDING, ITS FINISH, OR FURNISHING, DUE TO THE CONTRACTOR FAILURE TO PROPERLY CLEAN THE PIPING SYSTEM SHALL BE REPAIRED BY THE CONTRACTOR WITHOUT COST TO THE OWNER.

MECHANICAL SUMMARY SCOPE OF WORK:

1. INSTALL OUTDOOR AIR COOLED CHILLER WITH PRIMARY/SECONDARY PUMPING ARRANGEMENT. SECONDARY PUMPING WILL BE VARIABLE SPEED DRIVES TO CONTROL THE SECONDARY FLOW TO THE BUILDING LOAD AND FOR PUMP ENERGY SAVINGS. TWO NEW PRIMARY PUMPS (ONE STANDBY) AND THREE SECONDARY PUMPS (ONE STANDBY)
2. CONVERT CONSTANT FLOW CHILLED WATER SYSTEM TO VARIABLE FLOW. REPLACE EXISTING 3-WAY VALVE WITH TWO WAY VALVES. CROSS CONNECT THE LEFT WING AND RIGHT WING CHILLED WATER CIRCUITS.
3. PROVIDE NEW DEDICATED OUTSIDE AIR UNITS
4. REFURBISH EXISTING AIR HANDLING UNITS. REPLACE AHU BLOWERS, MOTORS AND DRIVES. REPLACE BROKEN BELTS, CORRODED SHEAVES.
5. CLEAN EXISTING AIR-DISTRIBUTION SYSTEM (DUCTWORK, REGISTERS, GRILLES, FILTERS, LOUVERS, ETC..) IN ACCORDANCE WITH NADCA STANDARD.
6. PRESSURE AND FLOW TEST THE EXISTING CHILLER WATER PIPING SYSTEM PRIOR TO STARTING RENOVATION WORK. COORDINATE THIS ACTIVITY WITH ENGINEER IN CHARGE. CUT AND CAP PIPING FROM THE EXISTING CENTRAL PLANT PRIOR TO PRESSURE TESTING. FLOW TEST THE SYSTEM TO DETERMINE SYSTEM PRESSURE BLOCKAGE AND RESTRICTION AFTER PRESSURE TEST.
7. REPLACE ALL EXISTING CHILLED WATER STRAINERS, PRESSURE GAGES, THERMOMETERS, CIRCUIT SETTER BALANCING VALVES AND ANY SHUTOFF VALVES THAT LEAKS. CLEAN EXISTING PIPING AND REPAIR/REPLACE DAMAGE INSULATION.
8. PROVIDE NEW EXPANSION TANK, CHEMICAL POT FEEDER, MAKE-UP WATER METER, PRESSURE REDUCING VALVE, AIR SEPARATORS.
9. PROVIDE NEW AIR DISTRIBUTION SYSTEM AS SHOWN ON DESIGN DRAWING INCLUDING FABRIC AIR DUCT.
10. NEW DUCTWORK WILL BE GALVANIZED SHEET METAL; GAGES, CONSTRUCTION & INSTALLATION SHALL BE IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARD. NEW DUCTWORK LOCATED IN EXPOSED AREAS WILL BE INSULATED WITH 2 INCHES THICK EXTERNAL DUCT WRAP INSULATION WITH VAPOR BARRIER, AND STAINLESS STEEL JACKET.
11. PROVIDE DIRECT DIGITAL CONTROL (DDC) SYSTEM TO MONITOR AND CONTROL THE NEW/EXISTING AHU'S AND CHILLED WATER PUMPS.
12. MODIFY EXISTING CONCRETE PADS TO SUIT NEW EQUIPMENT (CHILLER, AHU & PUMPS).
13. START-UP AND COMMISSIONING OF NEW AHU'S AND CHILLED WATER PUMPS BY FACTORY AUTHORIZED REPRESENTATIVES.
14. TEST, ADJUST, AND BALANCE (TAB) THE NEW AIR DISTRIBUTION AND CHILLED WATER SYSTEM. TAB WORKS SHALL BE IN ACCORDANCE WITH NEBB OR AABC STANDARDS.
15. RESTORE AND/OR REPLACE EXISTING BUILDING FINISHES AFFECTED BY RENOVATION WORKS. WALLS AND FLOOR FINISHES SHALL MATCH EXISTING.
16. CLEAN-UP AND DISPOSE CONSTRUCTION DEBRIS TO APPROVED GOVERNMENT DISPOSAL SITE.

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SHEET TITLE: **PROJECT TITLE** GENERAL NOTES LEGEND AND ABBREVIATIONS

PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

Guam Department of Education GUAM

STA. RITA

REVISION	DESCRIPTION	DATE
1	AS-BUILT NOTATION	10-13-14

DESIGNED BY: EDS
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SHEET NO:

M-1

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EQUIPMENT SCHEDULE

PACKAGED AIR COOLED WATER CHILLER

MARK NO.	CAPACITY TONS	COOLER					COMPRESSOR		CONDENSER		MAX. OPER. WEIGHT LBS	BASIS OF EQUIPMENT SELECTION
		CHW FLOW GPM	ENT. WATER TEMP. °F	LEAVING WATER TEMP. °F	MAXIMUM PRESSURE DROP FT	FOULING FACTOR	RLA	ELEC. CHARACTERISTICS (V–ø–HZ)	FANS (FLA)	AMBIENT AIR TEMP. °F (°C)		
CH 1	225	450	55	45	10	0.00010	3 X 41.6 3 X 41.6 3 X 41.6	460–3–60	4 X 5.4 4 X 5.4 4 X 5.4	90	20,783	225 TONS NOMINAL CAPACITY MODEL: YORK AIR COOLED SCREW LIQUIED PACKAGED CHILLER UNIT "YCIV0227PA46VABSXT"

CHILLED WATER PUMP

MARK NO.	QUANTITY	TYPE	AREA SERVED	CAPACITY (GPM)	TDH (FT.)	MOTOR			PUMP EFFICIENCY	REMARKS
						HP	RPM	ELEC. CHARACTERISTICS (V–ø–HZ)		
CHWP 1	1	END SUCTION BASE MOUNTED	CHILLED WATER SYSTEM PRIMARY	450	20	5.0	1750	460–3–60	60%	MODEL: MARATHON "184TTDB6026"
CHWP 2	1	END SUCTION BASE MOUNTED	CHILLED WATER SYSTEM PRIMARY	450	20	5.0	1750	460–3–60	60%	MODEL: MARATHON "184TTDB6026"
CHWS 3	1	END SUCTION BASE MOUNTED	CHILLED WATER SYSTEM SECONDARY	225	100	10	3550	460–3–60	60%	MODEL: WEG "010360T3E213T"
CHWS 4	1	END SUCTION BASE MOUNTED	CHILLED WATER SYSTEM SECONDARY	225	100	10	3550	460–3–60	60%	MODEL: WEG "010360T3E213T"
CHWS 5	1	END SUCTION BASE MOUNTED	CHILLED WATER SYSTEM SECONDARY	225	100	10	3550	460–3–60	60%	MODEL: WEG "010360T3E213T"

NEW AIR HANDLING UNITS AND OUTSIDE AIR PRE-COOLING UNITS

MARK NO.	AREA SERVED	COOLING CAPACITY (TONS)		SA (CFM)	OA (CFM)	TOTAL S.P. (IN)	ENTERING AIR TEMPERATURE (°F)		LEAVING AIR TEMPERATURE (°F)		ROWS	EWT (°F)	LWT (°F)	CHW FLOW (GPM)	PD (FT)	ELECTRICAL CHARACTERISTICS				REMARKS
		TOTAL	SENSIBLE				DB	WB	DB	WB						FAN (HP)	VOLTS	PHASE	HERTZ	
AHU 10–6	LOCKER ROOM WOMENS AND MENS	313,500	123,800	4,000	4,000	2	89.1	80.3	62.0	60.6	–	55	45	52	10	5	460	3	60	MODEL: YORK "XT1–033X063–BAHA046A"
PCAHU 10–2	AHU 10–2 OUTSIDE PRE–COOLING	166,200	63,500	3,000	3,000	0.3	89.1	80.3	70.0	67.2	–	55	45	33	10	3	460	3	60	MODEL: YORK "XT1–042X039–EACA046A"
PCAHU 10–3	AHU10–3 OUTSIDE PRE–COOLING	165,500	63,200	3,000	3,000	0.3	89.1	80.3	70.0	67.2	–	55	45	33	10	3	460	3	60	MODEL: YORK "XT1–042X039–EACA046A"
PCAHU 10–5	AHU10–5 OUTSIDE PRE–COOLING	166,200	63,500	3,000	3,000	0.3	89.1	80.3	70.0	67.2	–	55	45	33	10	3	460	3	60	MODEL: YORK "XT1–042X039–EACA046A"

AIR SEPARATOR

MARK NO.	LOCATION	SIZE (IN)	TANK VOLUME GAL	REMARKS
AS 1	INLINE TYPE WITH INTEGRAL WEIR TO MAXIMIZE AIR SEPARATOR	6	33.6	"B & G " CRSN COALESING REMOVAL SEPARATOR FOR AIR AND SEDIMENT

EXPANSION TANK

MARK NO.	LOCATION	TYPE	TANK VOLUME GAL	ACCEPTABLE VOLUME GAL	SIZE	REMARKS	WEIGHT AT 100% FULL (LBS)
ET 1	CHILLED WATER SYSTEM	HORIZONTAL COMPRESSION WITH GAUGE GLASS	55.7	18.26	16" DIA. X 69" LONG	"B & G " COMPRESSION TANK, COMPLETE WITH AIRTROL FITTINGS, ASME STAMPED MODEL NO.: SERIES "D" – D100	632

EXISTING AHU SCOPE OF WORKS

MARK NO.	CONDITION	AREA SERVED	REFURBISHMENT SCOPE
AHU 10–1	EXISTING	LEFT WING	CLEAN EXISTING FAN COIL REPLACE FAN WHEEL SHAFT, MOTOR DRIVE, COILS MATCH EXISTING FAN TYPE AND SIZE. MATCH EXISTING COIL SIZE WITH CAPACITIES. MOTOR PART NO.: 850008M05
AHU 10–3	EXISTING	LEFT WING	REPLACE FAN WHEEL SHAFT, MOTOR DRIVE, COILS MATCH EXISTING FAN TYPE AND SIZE. MATCH EXISTING COIL SIZE WITH CAPACITIES. MOTOR PART NO.: 850008M05
AHU 10–4	EXISTING	RIGHT WING	REPLACE FAN WHEEL SHAFT, MOTOR DRIVE, COILS MATCH EXISTING FAN TYPE AND SIZE. MATCH EXISTING COIL SIZE WITH CAPACITIES. CUT AND CAP OUTSIDE AIR DUCT. UNIT TO BE 100% RETURN AIR. MOTOR PART NO.: 850008M05
AHU 10–5	EXISTING	RIGHT WING	REPLACE FAN WHEEL SHAFT, MOTOR DRIVE, COILS MATCH EXISTING FAN TYPE AND SIZE. MATCH EXISTING COIL SIZE WITH CAPACITIES. MOTOR PART NO.: 850008M05
AHU 10–7	EXISTING	RIGHT WING 2ND FLOOR	REPLACE FAN WHEEL SHAFT, MOTOR DRIVE, COILS MATCH EXISTING FAN TYPE AND SIZE. MATCH EXISTING COIL SIZE WITH CAPACITIES. MOTOR PART NO.: 850008M05

EXISTING EXHAUST FAN SCOPE

MARK NO.	CONDITION	AREA SERVED	REFURBISHMENT SCOPE
EF	EXISTING	VARIOUS LOCATIONS	CHECK ALL EXISTING EXHAUST FANS FOR PROPER OPERATION. CHANGE OUT MOTORS, FANS, BELTS FOR PROPER OPERATION AND FUNCTION

WATER HEATER

MARK NO.	AREA SERVED	STORAGE CAPACITY (GALS)	RECOVERY RATE (GPH)	TEMP. RISE (°F)	ELECTRICAL CHARACTERISTICS				REMARKS
					kW	VOLTS	PHASE	HERTZ	
EWH 1	LOCKER ROOMS	120	245	60	36	480	3	60	BOCK WATER HEATER 120SF–36–480–3

NOTE:
ALL MODIFICATION, ALTERNATION, RE–ROUTING NOT COVER WITHIN THIS DESIGN SHALL BE EVALUATED AND CONTRACTOR TO PROVIDE SHOP DRAWING FOR APPROVAL

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SHEET TITLE: **PROJECT TITLE** EQUIPMENT SCHEDULES

PROJECT TITLE:
Design-Build of Southern High School
GYMNASIUM RENOVATION
Guam Department of Education
GUAM
STA. RITA

REVISION	DESCRIPTION	DATE
1	AS-BUILT NOTATION	10-13-14

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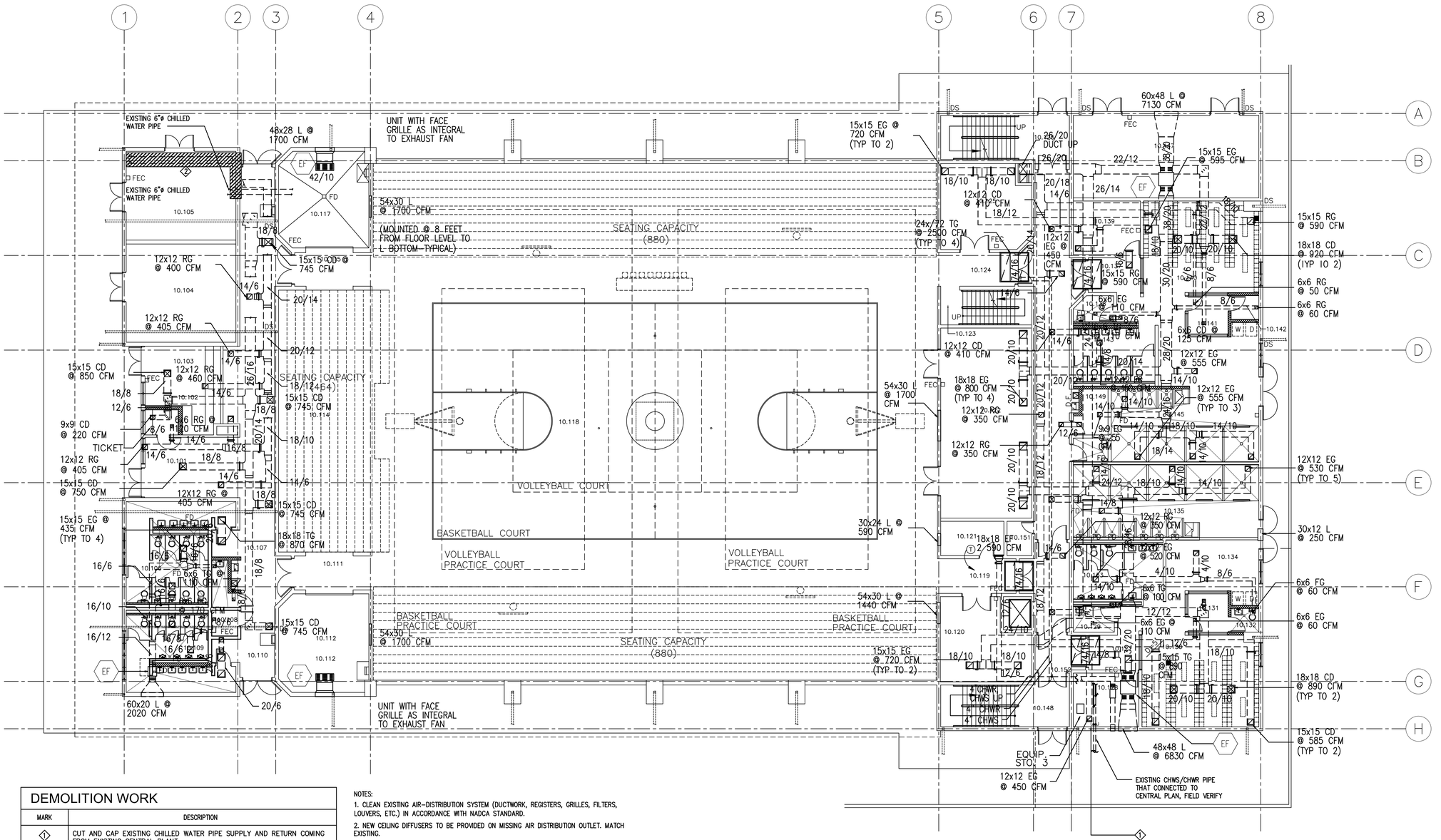

DEMOLITION WORK	
MARK	DESCRIPTION
1	CUT AND CAP EXISTING CHILLED WATER PIPE SUPPLY AND RETURN COMING FROM EXISTING CENTRAL PLANT.
2	CUT EXISTING PIPE AND PROVIDE NEW CHILLER, CHILLED WATER PUMPS, PRIMARY AND SECONDARY.PROVIDE NEW PIPING HEADER. CONNECT TO EXISTING CHILLED WATER SYSTEM

NOTES:

1. CLEAN EXISTING AIR-DISTRIBUTION SYSTEM (DUCTWORK, REGISTERS, GRILLES, FILTERS, LOUVERS, ETC.) IN ACCORDANCE WITH NADCA STANDARD.
2. NEW CEILING DIFFUSERS TO BE PROVIDED ON MISSING AIR DISTRIBUTION OUTLET. MATCH EXISTING.

1 M-3 GROUND FLOOR EXISTING MECHANICAL PLAN

SCALE: 3/32" = 1' – 0"

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SHEET TITLE: **PROJECT TITLE**
GROUND FLOOR EXISTING MECHANICAL PLAN

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PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

Guam Department of Education
GUAM
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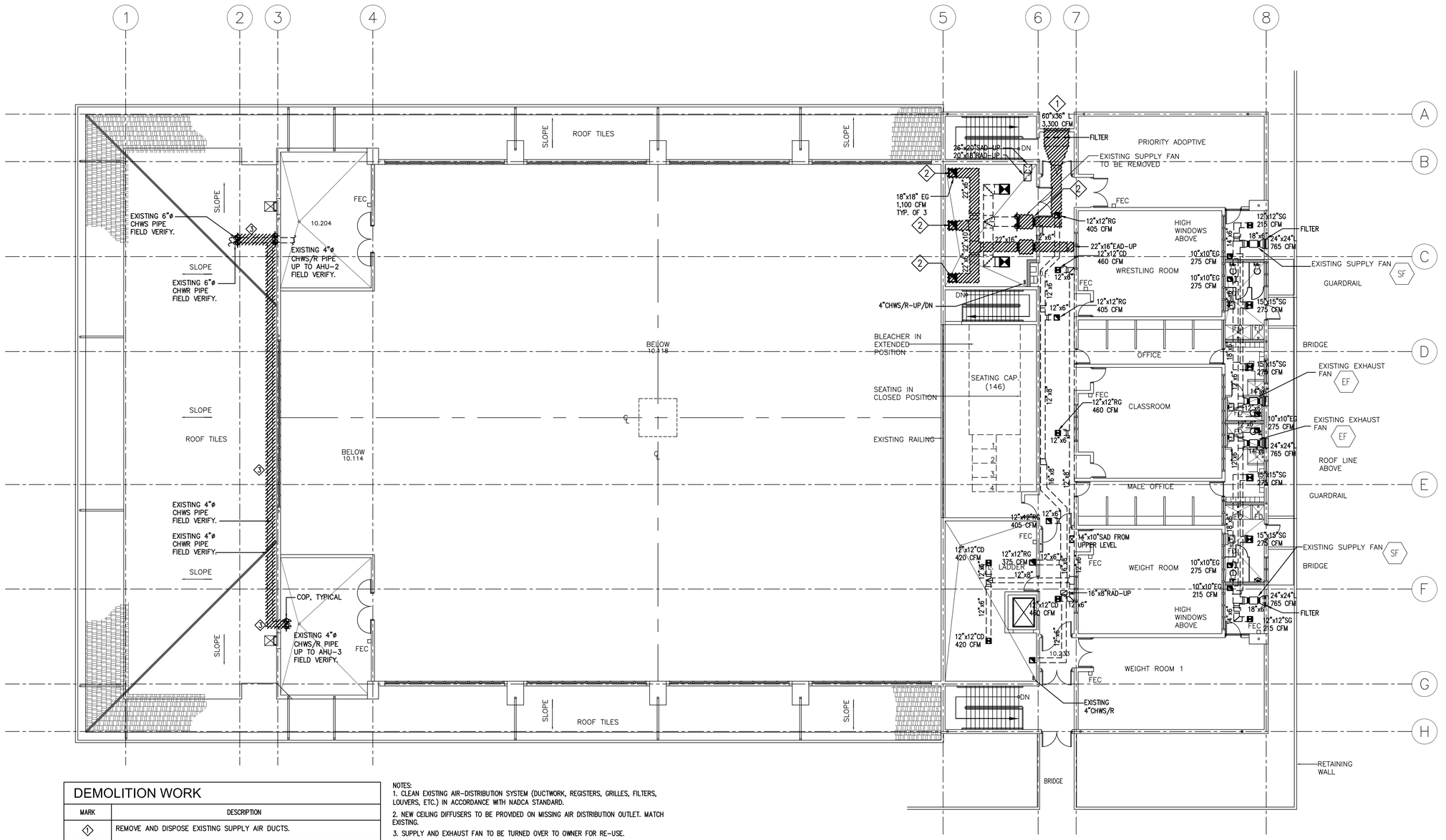

DEMOLITION WORK

MARK	DESCRIPTION
①	REMOVE AND DISPOSE EXISTING SUPPLY AIR DUCTS.
②	REMOVE AND DISPOSE EXISTING EXHAUST AIR DUCTS, GRILLES, FANS, HANGERS AND OTHER APPURTENCES..
③	REMOVE AND DISPOSE EXISTING CHILLED WATER PIPES SUPPLY AND RETURN. UPGRADE THE SIZE FROM 4" DIAMETER TO 6" DIAMETER. POINT OF CONNECTION IS ON 6"ø RISER PIPE.

NOTES:
1. CLEAN EXISTING AIR-DISTRIBUTION SYSTEM (DUCTWORK, REGISTERS, GRILLES, FILTERS, LOUVERS, ETC.) IN ACCORDANCE WITH NADCA STANDARD.
2. NEW CEILING DIFFUSERS TO BE PROVIDED ON MISSING AIR DISTRIBUTION OUTLET. MATCH EXISTING.
3. SUPPLY AND EXHAUST FAN TO BE TURNED OVER TO OWNER FOR RE-USE.

1 M-4 SECOND FLOOR EXISTING REMOVAL MECHANICAL PLAN

SCALE: 3/32" = 1' - 0"

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SHEET TITLE: **PROJECT TITLE** SECOND FLOOR EXISTING REMOVAL MECHANICAL PLAN

PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

Guam Department of Education
GUAM
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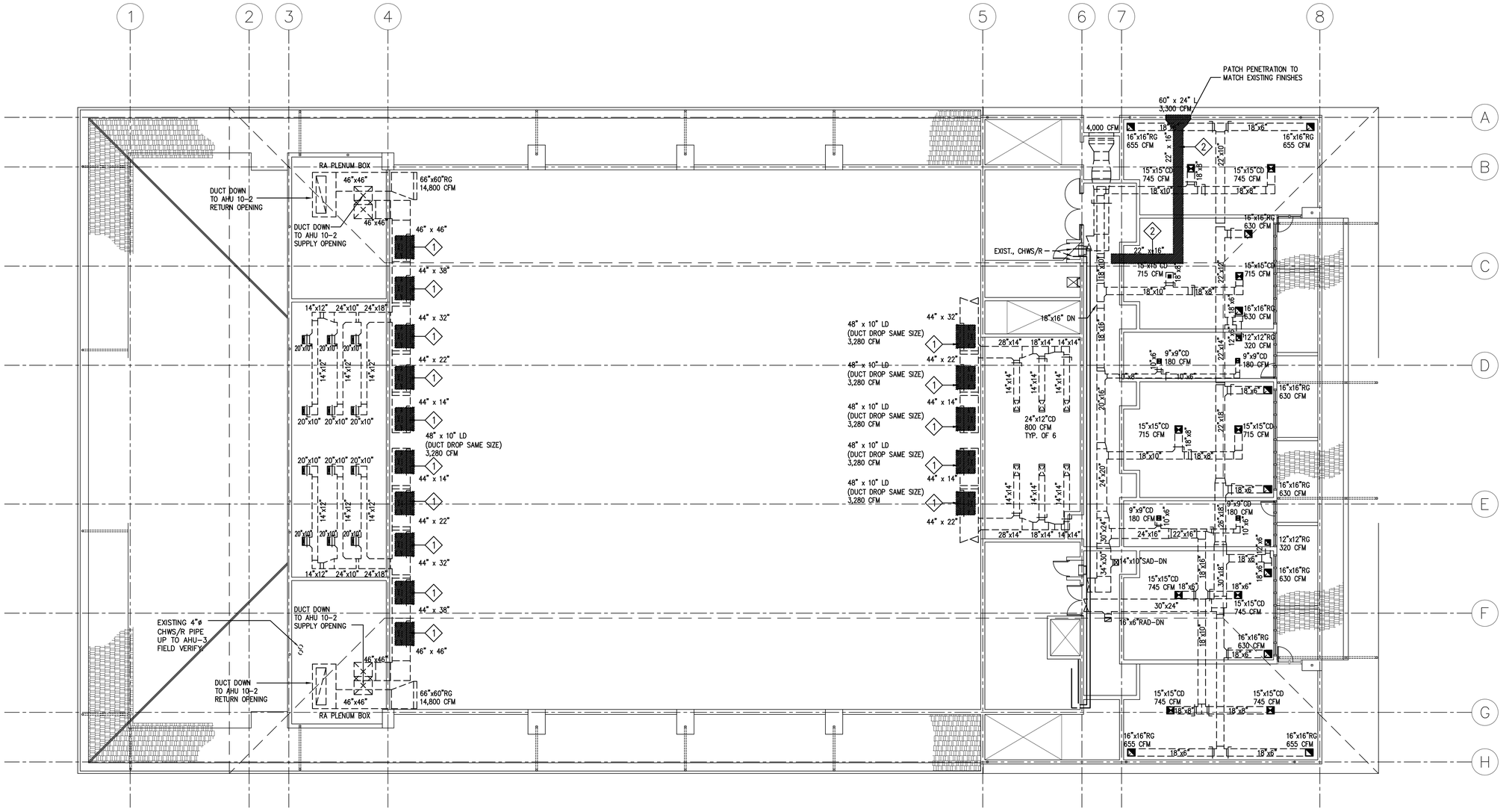

DEMOLITION WORK	
MARK	DESCRIPTION
①	REMOVE AND DISPOSE EXISTING GRILLES, TAPS, ELBOWS INSULATE AND SEAL DUCTWORK AT TAKEOFF FROM MAIN.
②	REMOVE AND DISPOSE EXISTING EXHAUST AIR DUCTS, GRILLES, FANS, HANGERS AND OTHER APPURTENCES..

NOTES:
1. CLEAN EXISTING AIR-DISTRIBUTION SYSTEM (DUCTWORK, REGISTERS, GRILLES, FILTERS, LOUVERS, ETC.) IN ACCORDANCE WITH NADCA STANDARD.
2. NEW CEILING DIFFUSERS TO BE PROVIDED ON MISSING AIR DISTRIBUTION OUTLET. MATCH EXISTING.
3. SUPPLY AND EXHAUST FAN TO BE TURNED OVER TO OWNER FOR RE-USE.
4. PATCH PENETRATION TO MATCH EXISTING FINISHES.

1 M-5 UPPER LEVEL MECHANICAL REMOVAL PLAN

SCALE: 3/32" = 1' - 0"

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ENGINEERING SERVICES, LLC
MARLON P. NOTARTE
CERTIFICATE
No 12864
(MECHANICAL)
EXP. 4-30-14
GUAM
PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

SHEET TITLE: **PROJECT TITLE** UPPER LEVEL MECHANICAL REMOVAL PLAN

PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

Guam Department of Education GUAM

STA. RITA

REVISION	DESCRIPTION	DATE
1	AS-BUILT NOTATION	10-13-14

DESIGNED BY: EDS
DRAWN BY: EDS
CHECKED BY: MPN
ACAD FILE NO:
DATE: OCTOBER 13, 2014

SHEET NO:

M-5

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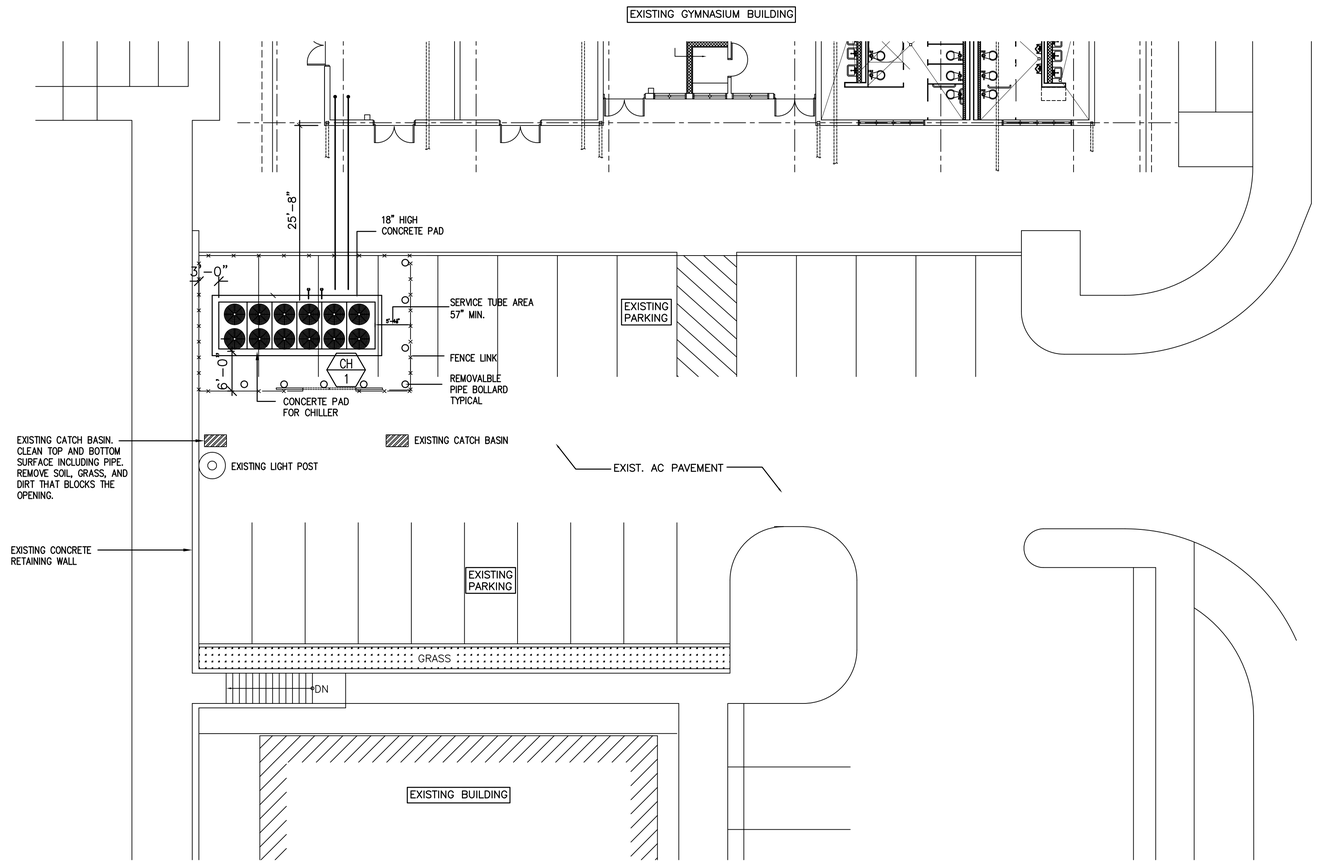
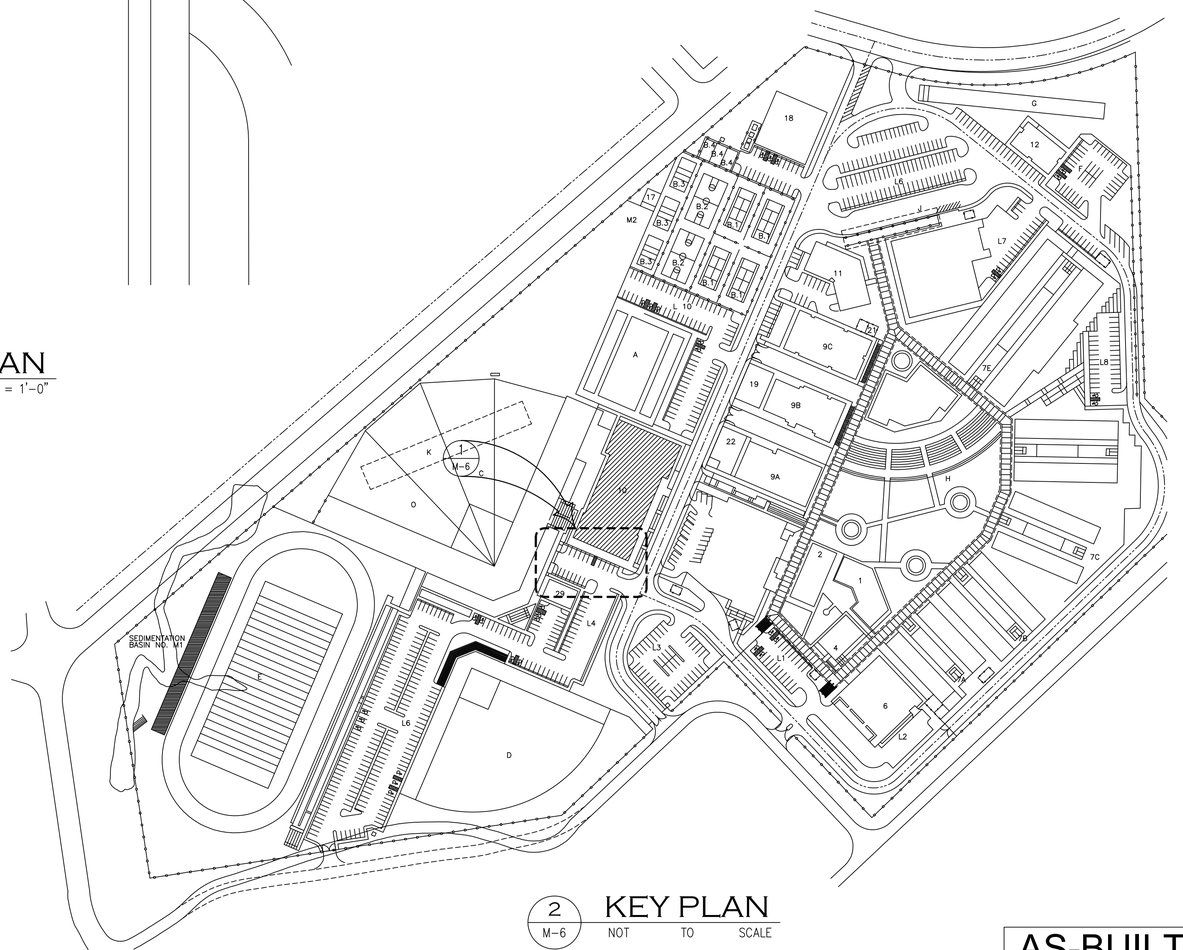


1 M-6 NEW CHILLER MECHANICAL SITE PLAN

SCALE: 3/32" = 1'-0"



2 M-6 KEY PLAN

NOT TO SCALE

AS-BUILT

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SHEET TITLE: **PROJECT TITLE**
NEW CHILLER MECHANICAL
SITE PLAN
KEY PLAN

PROJECT TITLE:
Design-Build of Southern High School
GYMNASIUM RENOVATION
Guam Department of Education
GUAM
STA. RITA

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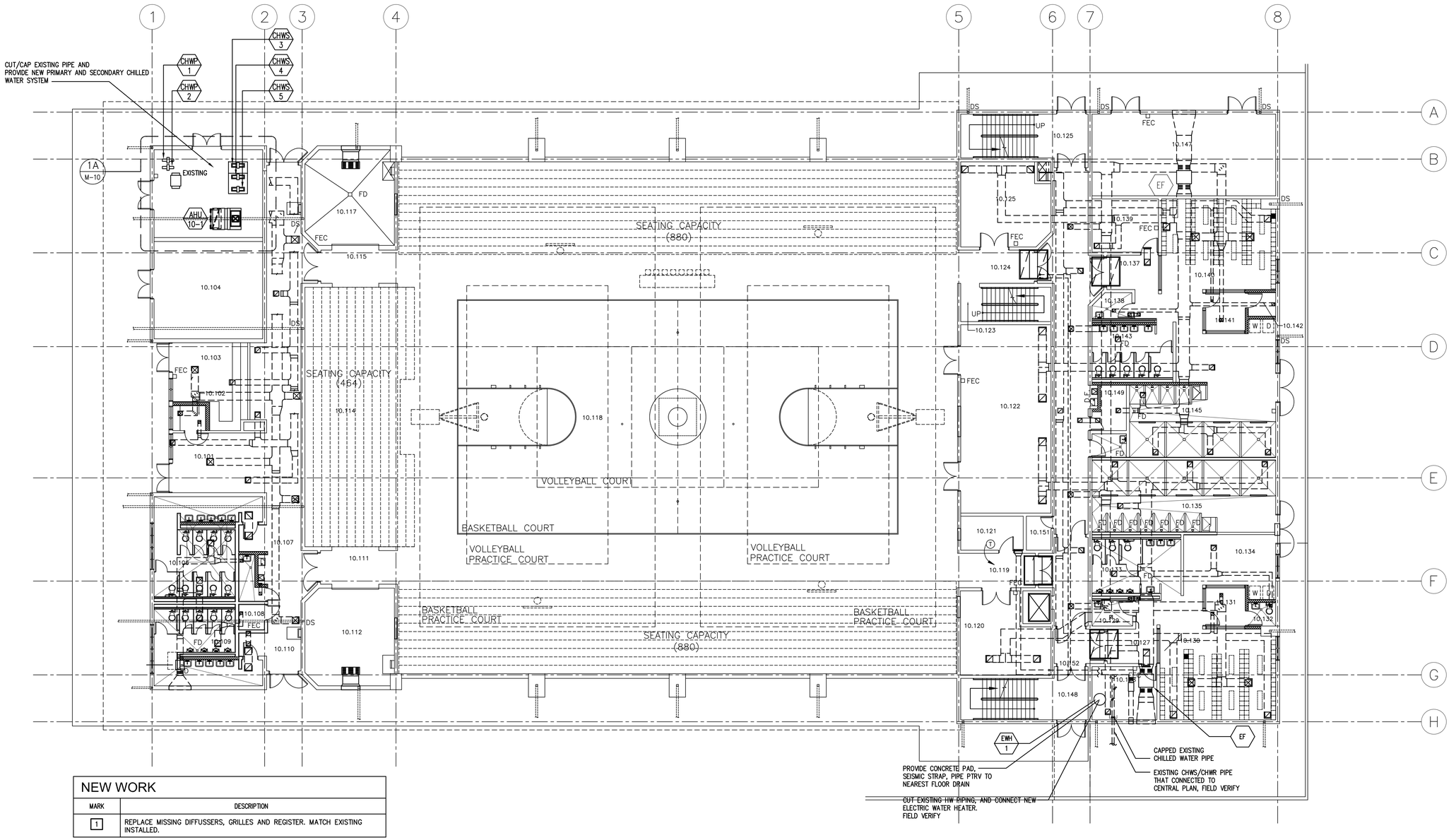

NEW WORK	
MARK	DESCRIPTION
1	REPLACE MISSING DIFFUSSERS, GRILLES AND REGISTER. MATCH EXISTING INSTALLED.

1 M-7 GROUND FLOOR NEW MECHANICAL PLAN

SCALE: 3/32" = 1' - 0"

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PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

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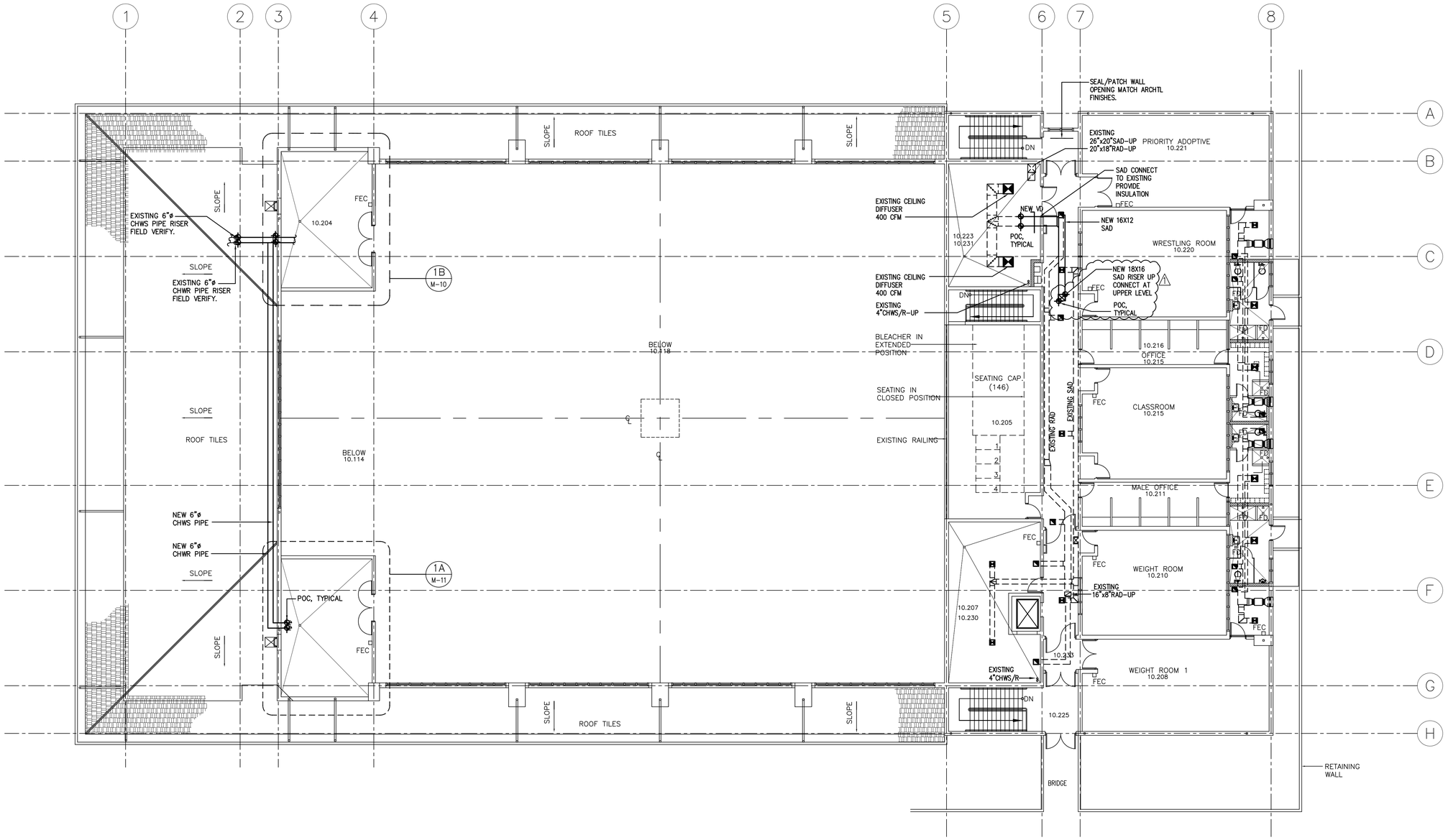

1 / M-8 SECOND FLOOR NEW MECHANICAL PLAN

SCALE: 3/32" = 1' – 0"

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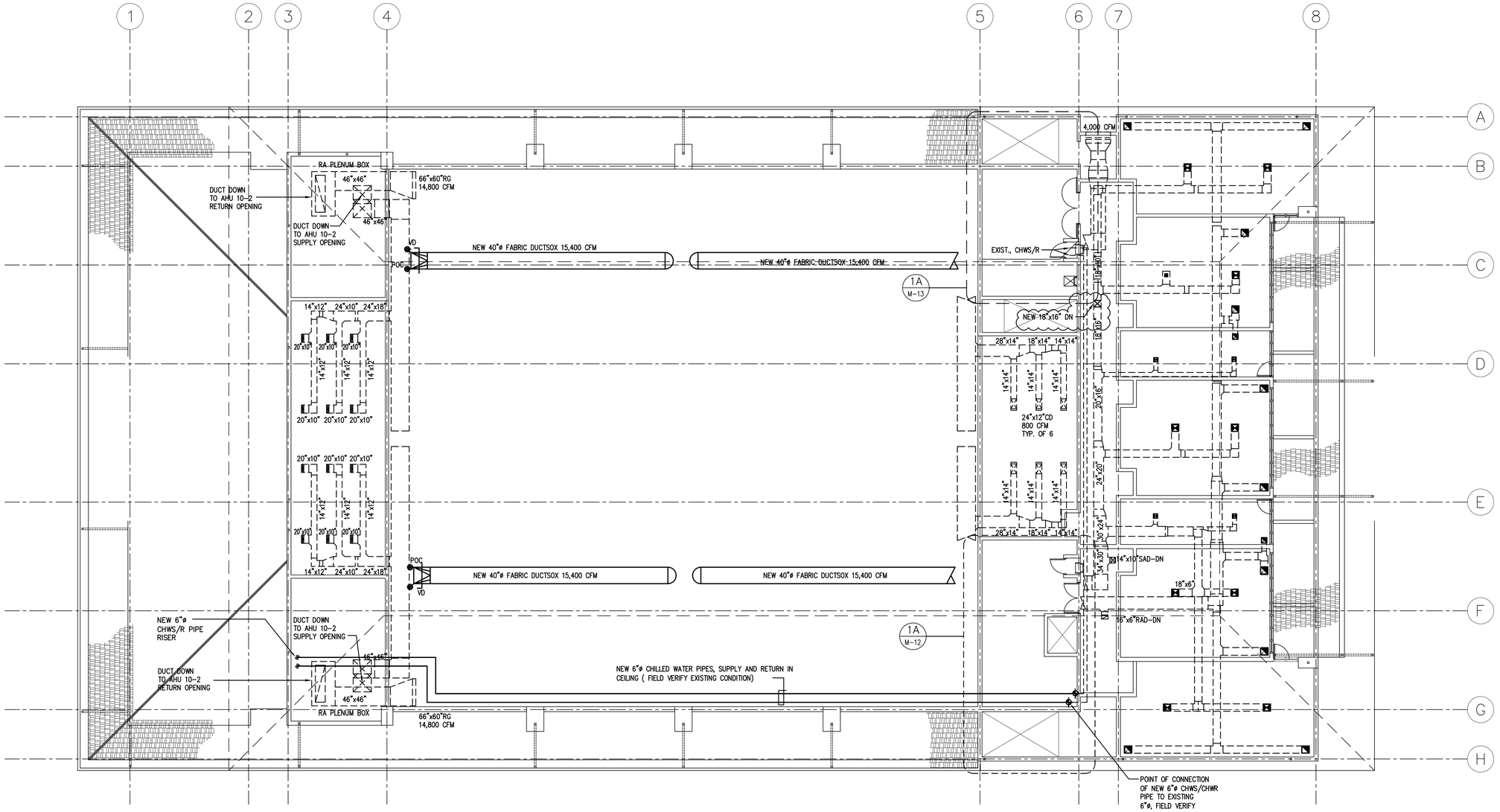

NEW WORK	
MARK	DESCRIPTION
1	PROVIDE (4) 40"ø DUCTSOX. 15400 CFM EACH, 0.75 SP ORIFICE DISTRIBUTION SIZED BY MANUF. FOR HANGING 40' AFF. COORDINATE COLOR WITH THE ARCHITECT
2	PROVIDE NEW CHILLED WATER PIPE SUPPLY AND RETURN. CONNECT TO EXISTING 6"ø RISER PIPE AT RIGHT WING

NOTES:
1. CLEAN EXISTING AIR-DISTRIBUTION SYSTEM (DUCTWORK, REGISTERS, GRILLES, FILTERS, LOUVERS, ETC.) IN ACCORDANCE WITH NADCA STANDARD.
2. NEW CEILING DIFFUSERS TO BE PROVIDED ON MISSING AIR DISTRIBUTION OUTLET. MATCH EXISTING.
3. SUPPLY AND EXHAUST FAN TO BE TURNED OVER TO OWNER FOR RE-USE.
4. PATCH PENETRATION TO MATCH EXISTING FINISHES.

1 / M-9 UPPER LEVEL NEW MECHANICAL PLAN

SCALE: 3/32" = 1' - 0"

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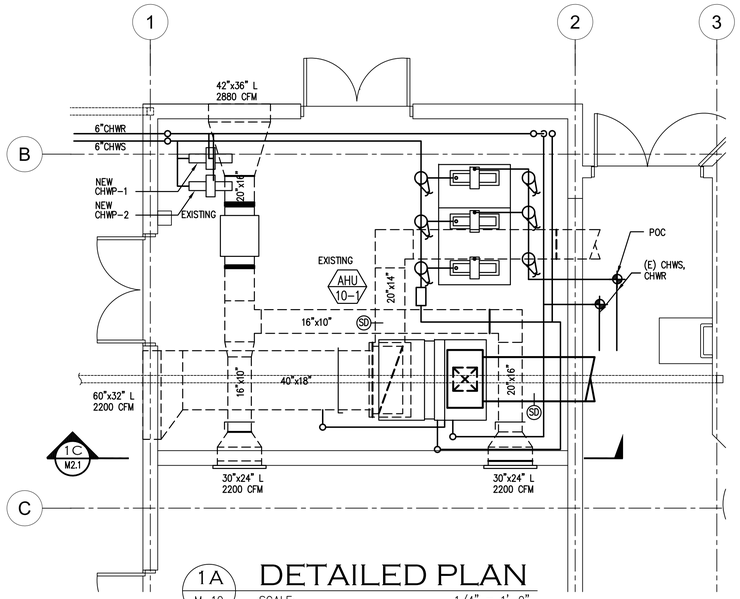
DEMOLITION NOTES:

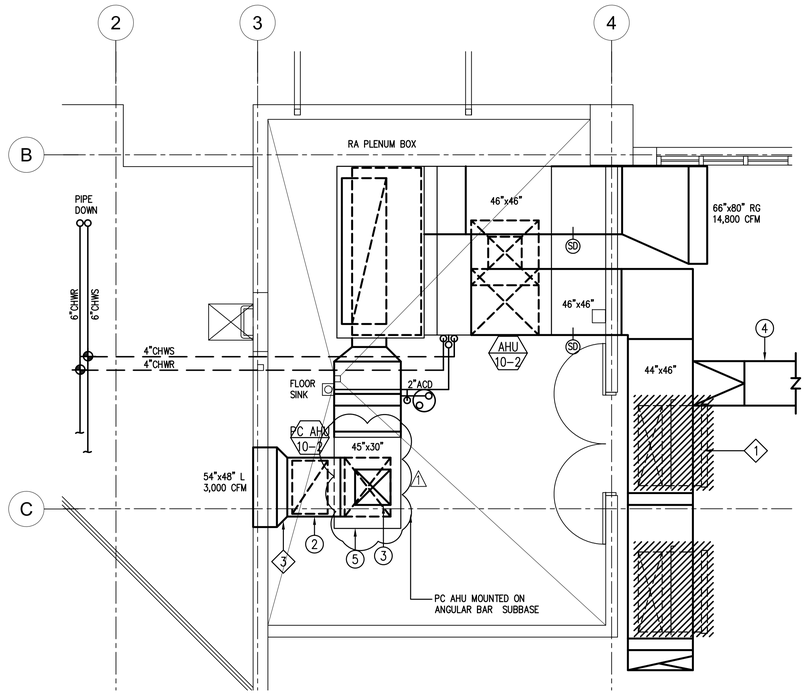
1. REMOVE SUPPLY GRILLE, TAKEOFF, AND SUPPLY DUCT. SEAL AND INSULATE OPENING.
2. CUT AND CAP CHWS/CHWR AT FLOOR AND AT TOP OF RISER. REMOVE RISER.
3. REMOVE EXISTING OSA DAMPER. CONNECT DUCT WORK.

NEW WORK NOTES:

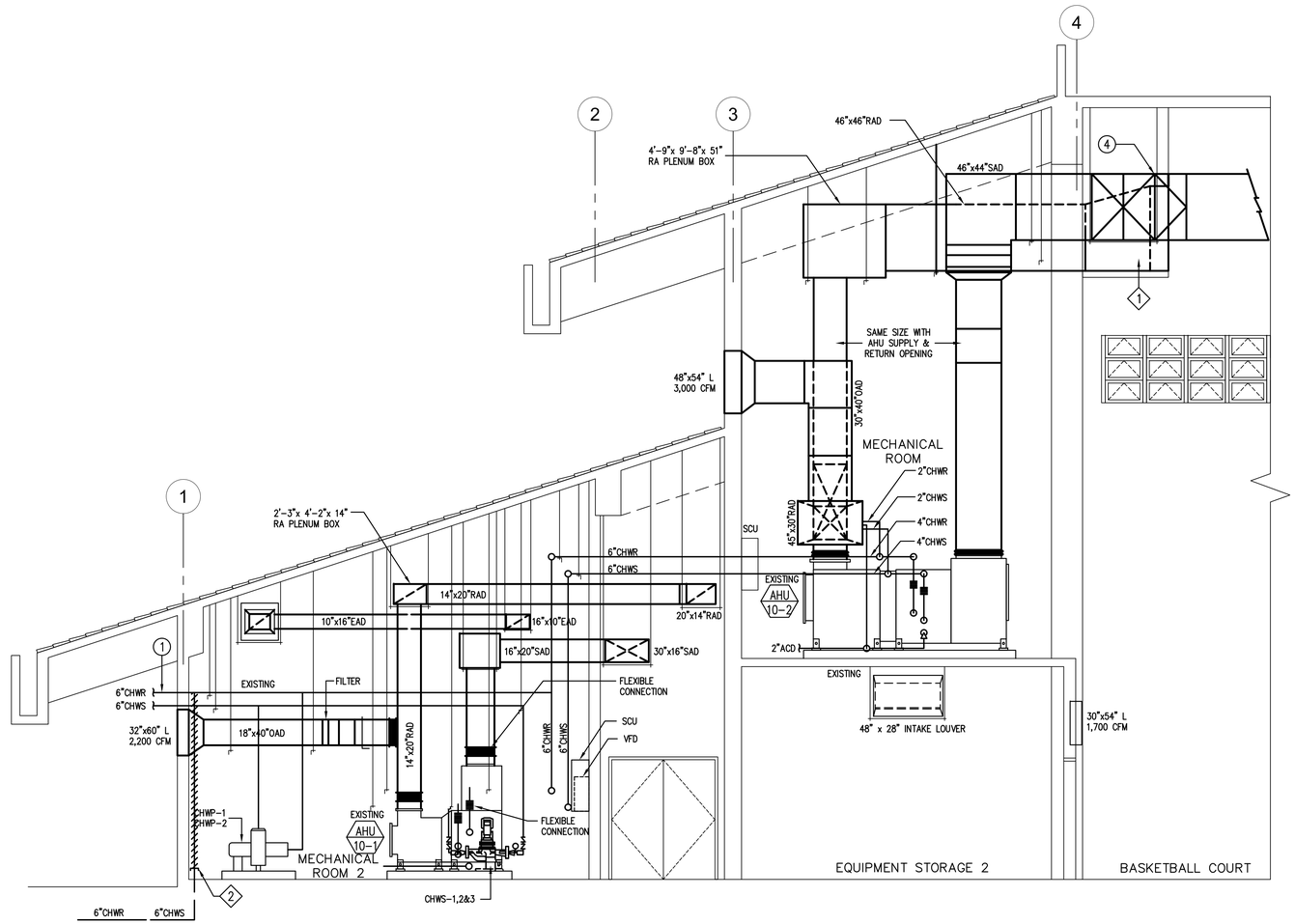
1. CONNECT NEW 6" CHWS/CHWR TO NEW AC-1 AIR COOLED CHILLER.
2. NEW 24" x 36" OSA DOWN TO PCAHU 10-2.
3. NEW 24" x 24" UP TO OSA DUCT. CUT AND CAP EXISTING OSA DUCT.
4. PROVIDE TRANSITION FOR DOCTSOX CONNECTION. NEW 40"ø DUCTSOX.
5. NEW PCAHU 10-2.



1A M-10 DETAILED PLAN
SCALE: 1/4" = 1'-0"



1B M-10 DETAILED PLAN
SCALE: 1/4" = 1'-0"



1C M-10 SECTION
SCALE: 1/4" = 1'-0"

1 M-10 ENLARGED MECHANICAL PLAN AND SECTION
SCALE: AS-SHOWN

AS-BUILT

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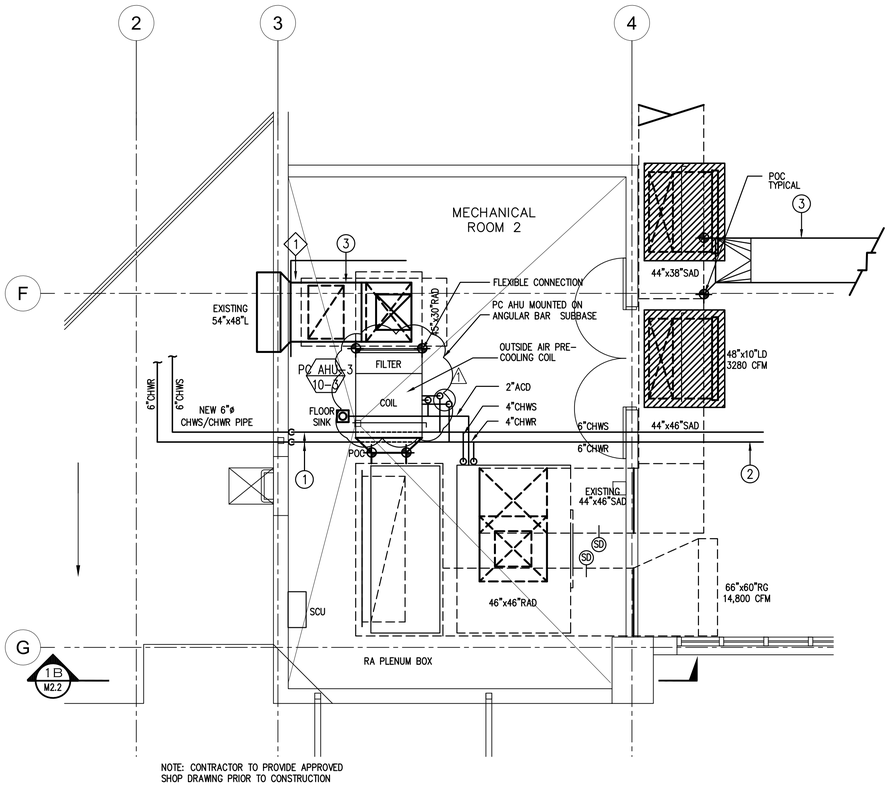
DEMOLITION NOTES:

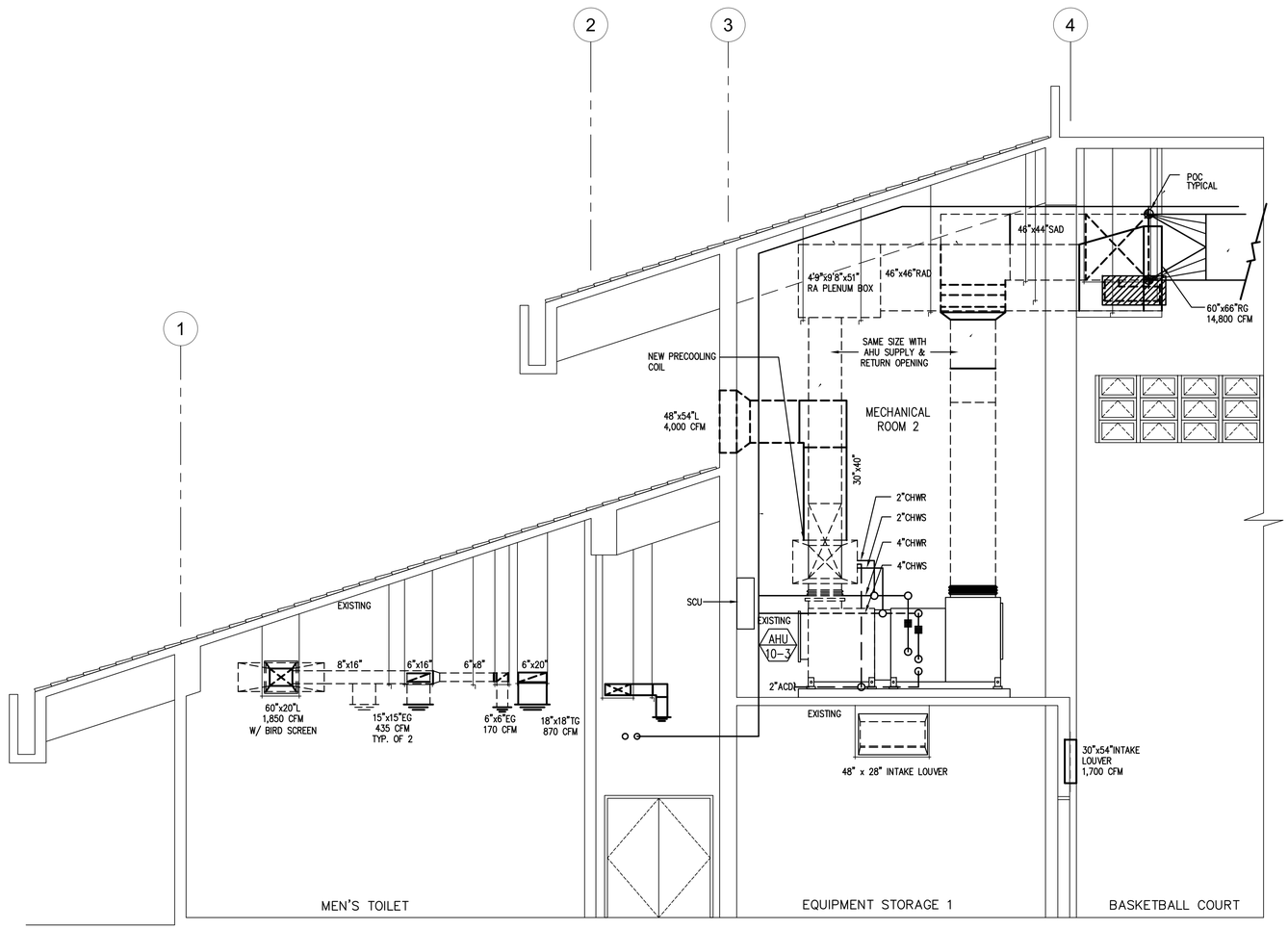
1. REMOVE EXISTING OSA DAMPER. CONNECT DUCTWORK.

NEW WORK NOTES:

1. CONNECT 6" CHWS/CHWR TO EXISTING CHWS/R RISERS., CROSS CONNECT TO MAINS IN RIGHT WING.
2. NEW 6" CHWS/R MAINS.
3. NEW PCAHU 10-3. PROVIDE PIPING AND DUCTWORK AS SHOWN.



1A M-11 **DETAILED PLAN**
SCALE: 1/4" = 1'-0"



1B M-11 **SECTION**
SCALE: 1/4" = 1'-0"

1 M-11 **ENLARGED MECHANICAL PLAN AND SECTION**
SCALE: AS-SHOWN

AS-BUILT

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M-11
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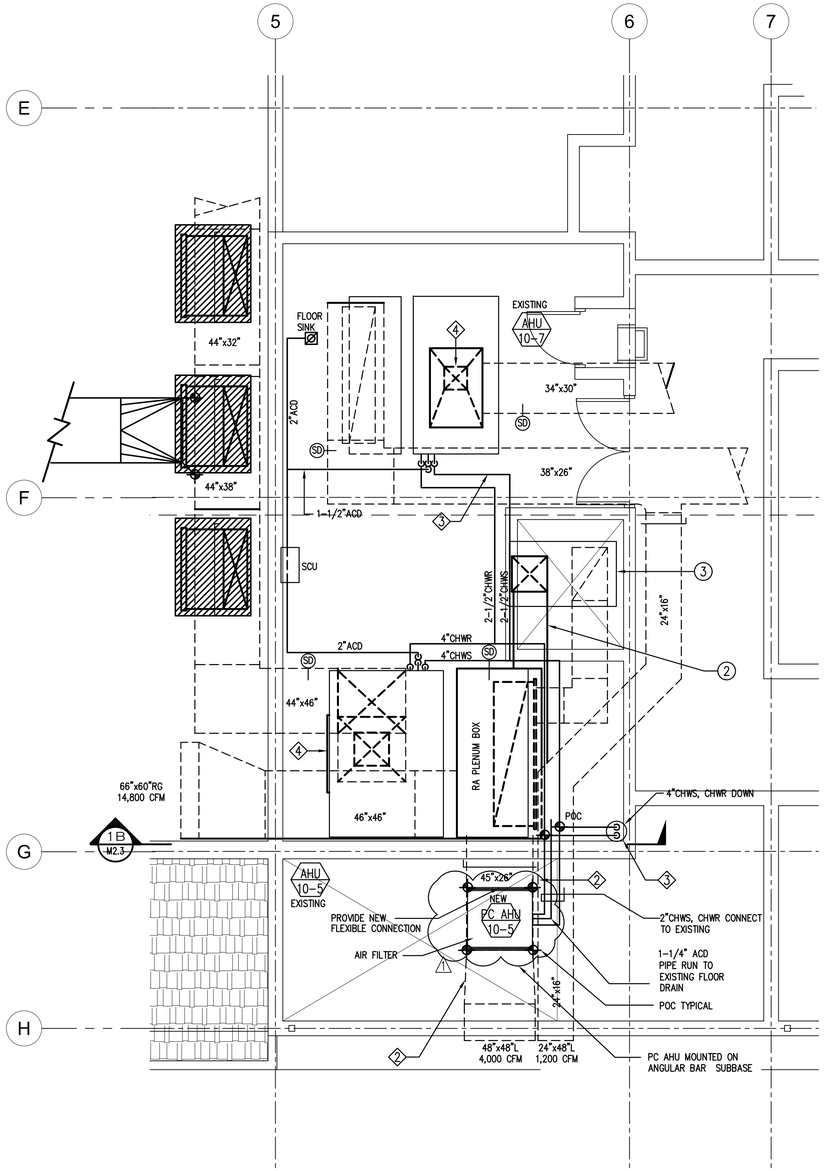
DEMOLITION NOTES:

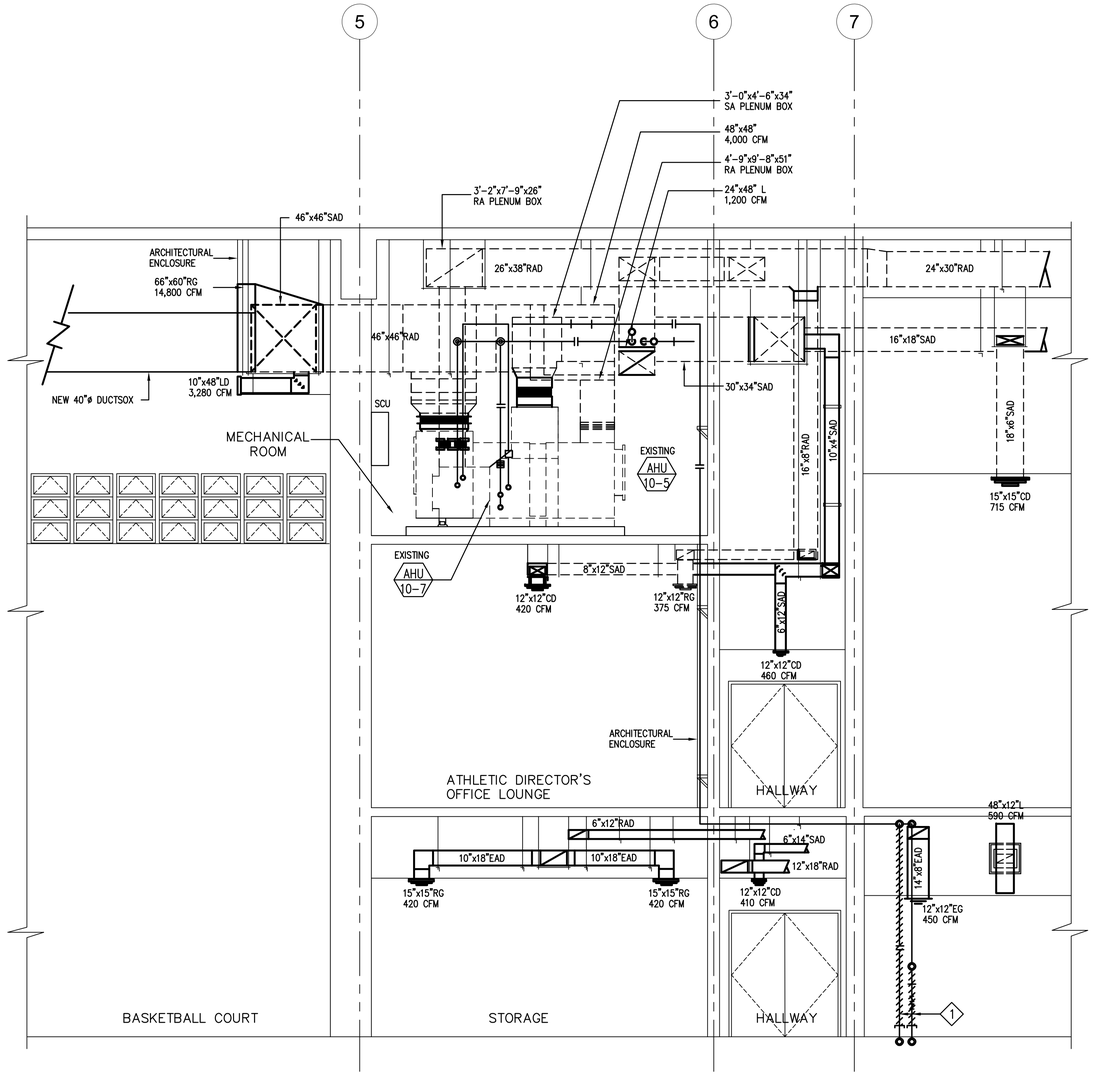
1. CUT AND CAP EXISTING CHWS & CHWR COMING THRU FLOOR. CONNECT NEW SAND FILTER TO MAINS WITH 2" CHWS/CHWR.
2. REMOVE OSA DAMPER. CONNECT DUCTWORK.
3. REMOVE CHWS/CHWR PIPING FROM COILS BACK TO REISERS. REPLACE WITH NEW PIPING, INSULATION, AND SUPPORTS.
4. REPLACE OUTLET DUCT WITH RADIUS ELBOWS IN THE DIRECTION OF THE AIR FLOW TO REDUCE AIR PRESSURE DROP AND FAN SYSTEM EFFECT FACTOR LOSSES.

NEW WORK NOTES:

1. PROVIDE NEW AIR HANDLING UNIT.
2. PROVIDE NEW OSA UNIT INLET AND SUPPLY DUCT FOR PCAHU 10-5.



1A M-12 **DETAILED PLAN**
SCALE: 1/4" = 1'-0"



1B M-12 **SECTION**
SCALE: 1/4" = 1'-0"

1 M-12 **ENLARGED MECHANICAL PLAN AND SECTION**
SCALE: AS-SHOWN

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Guam Department of Education GUAM
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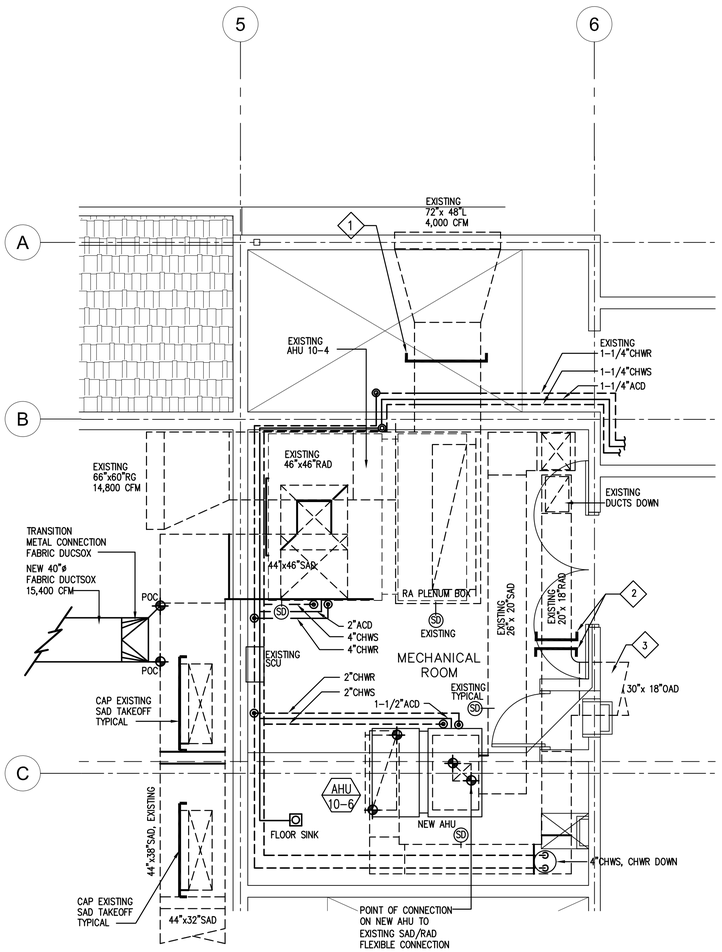
DEMOLITION NOTES:

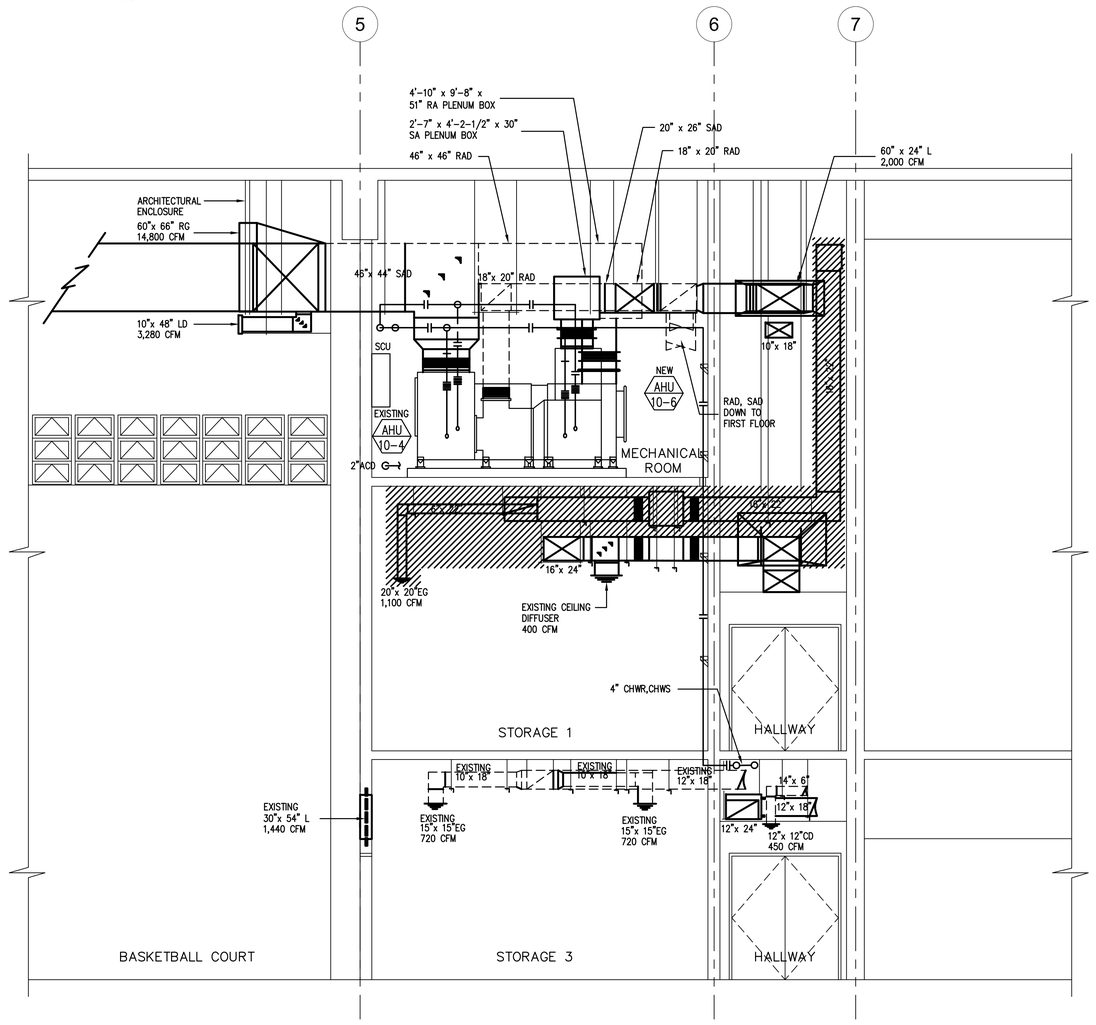
1. CUT AND CAP EXISTING OUTSIDE SUPPLY DUCT
2. CUT AND CAP EXISTING RETURN AIR DUCT
3. REMOVE OUTSIDE SUPPLY AIR DAMPER
4. REMOVE EXISTING EXHAUST DUCT, HANGERS, CONTROLS EXHAUST FAN, GRILLES.

NEW WORK NOTES:

1. PROVIDE NEW TRANSITION DUCT TO NEW 40"ø DUCTSOX
2. BALANCE EXISTING AIR DISTRIBUTION SYSTEM
3. PROVIDE NEW AIR HANDLING UNIT
4. REPLACE EXISTING RETURN DUCT FROM OSA CONNECTION TO NEW UNIT WITH 24"X24" OSA DUCT. SEAL WALL PENETRATION. MATCH EXISTING FINISHES



1A M-13 **DETAILED PLAN**
SCALE: 1/4" = 1'-0"



1B M-13 **SECTION**
SCALE: 1/4" = 1'-0"

1 M-13 **ENLARGED MECHANICAL PLAN AND SECTION**
SCALE: AS-SHOWN

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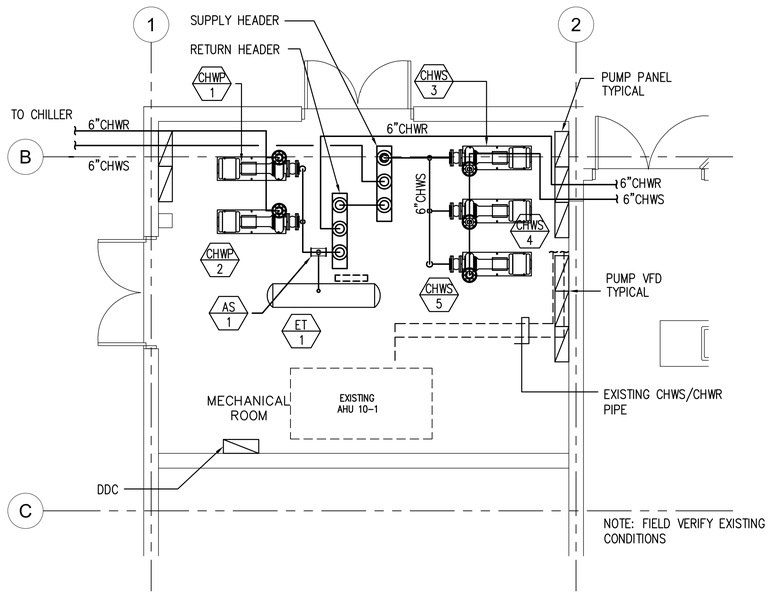

1A M-14 **DETAILED PLAN**
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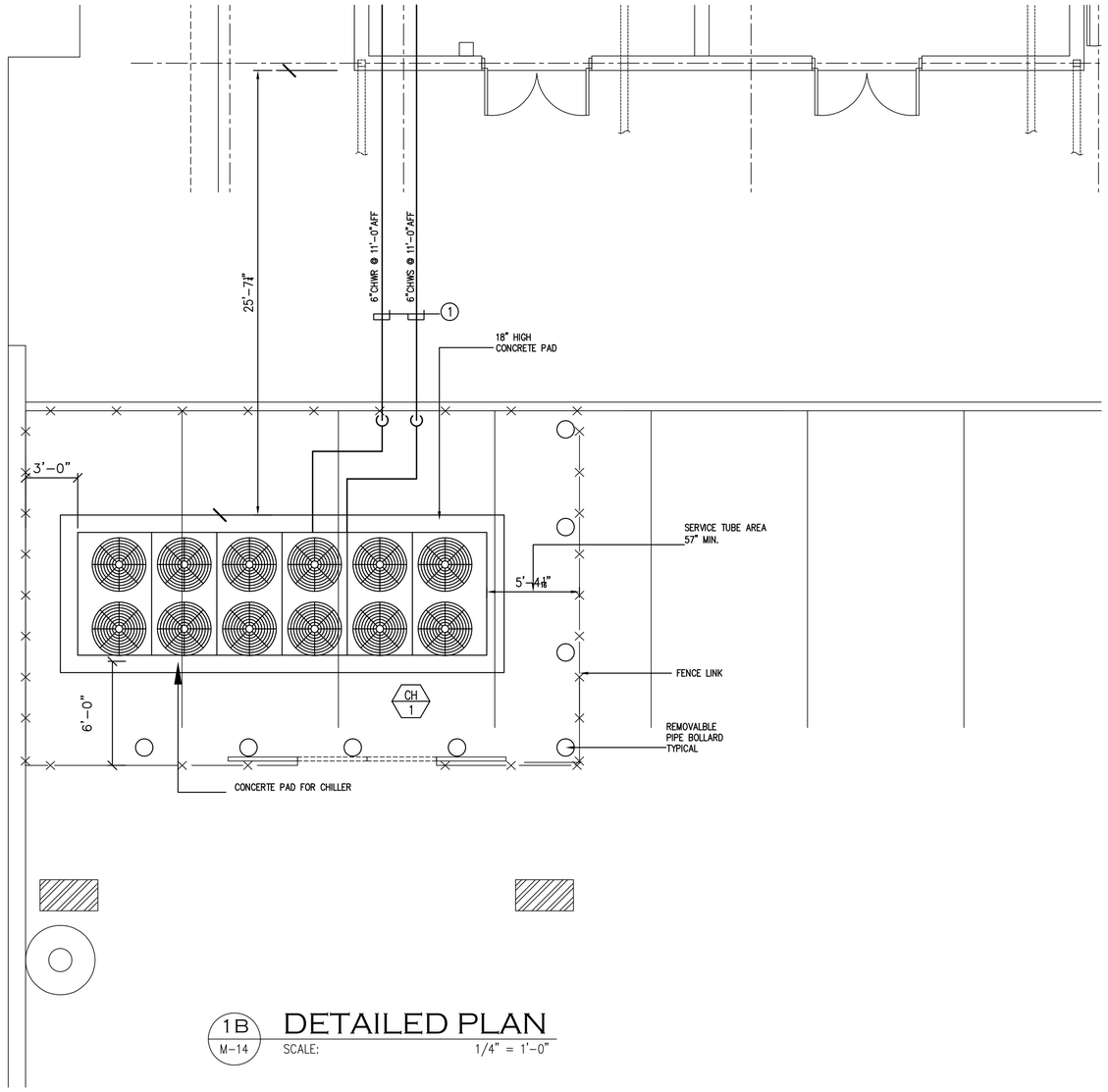

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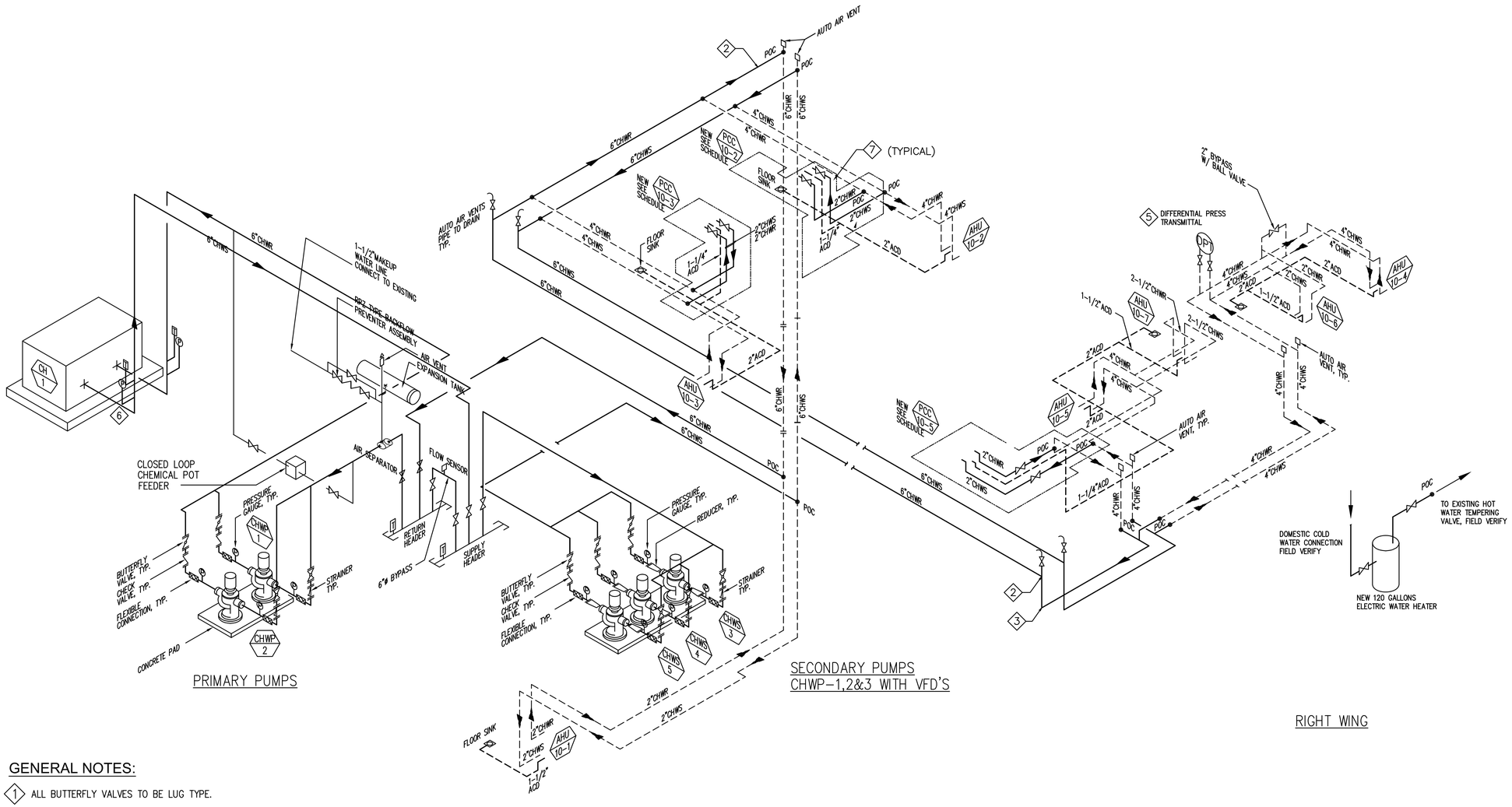

PRIMARY PUMPS

SECONDARY PUMPS
CHWP-1,2&3 WITH VFD'S

RIGHT WING

LEFT WING

NOTE: PROVIDE NEW CHILLED WATER SUPPLY/RETURN HEADER. CONTRACTOR TO PROVIDE FOR APPROVAL PRIOR TO COINSTRUCTION.

GENERAL NOTES:

1. ALL BUTTERFLY VALVES TO BE LUG TYPE.
2. CONNECT 6" CHWS & CHWR TO EXISTING MAINS TO PROVIDE NEW LEFT WING AND RIGHT WING INTER CONNECTION.
3. CUT AND CAP UNDERFLOOR PIPING AT LEFT AND RIGHT WINGS. CONNECT EXISTING TO NEW PIPING WHERE SHOWN WITH ④ . REOMVE ABANDONED ABOVE GROUND PIPING.
4. REDUCED PRESSURE BACKFLOW PREVENTER.
5. PROVIDE DIFF PRESSURE TRANSMITTER (INDICATING TYPE) TO CONGROL VFD'S FOR SEC.
6. INTERLOCK CHILLER WITH FLOW SWITCH
7. CHILLED WATER CONTROL VALVES. TWO POSITION, NORMALLY CLOSED SPRING RETURN. 50 PSIG CLOSE OFF MINIMUM. NON CAVITATING.
8. REPLACE (E) STRAINER, CIRCUIT SETTER AND LEAKING OR INOPERABOLE SHUTOFF VALVES.
9. 5-GALLON CHEMICAL POT FEEDER.

1 / M-15 CHILLED WATER PIPING DIAGRAM

SCALE: NOT-TO-SCALE

AS-BUILT

BME & SONS INC.
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SHEET TITLE: **PROJECT TITLE** CHILLED WATER PIPING DIAGRAM

ENGINEERING SERVICES, LLC

MARION P. NOTARTE CERTIFICATE No 12864 (MECHANICAL) EXP. 4-30-14 GUAM PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

Guam Department of Education GUAM STA. RITA

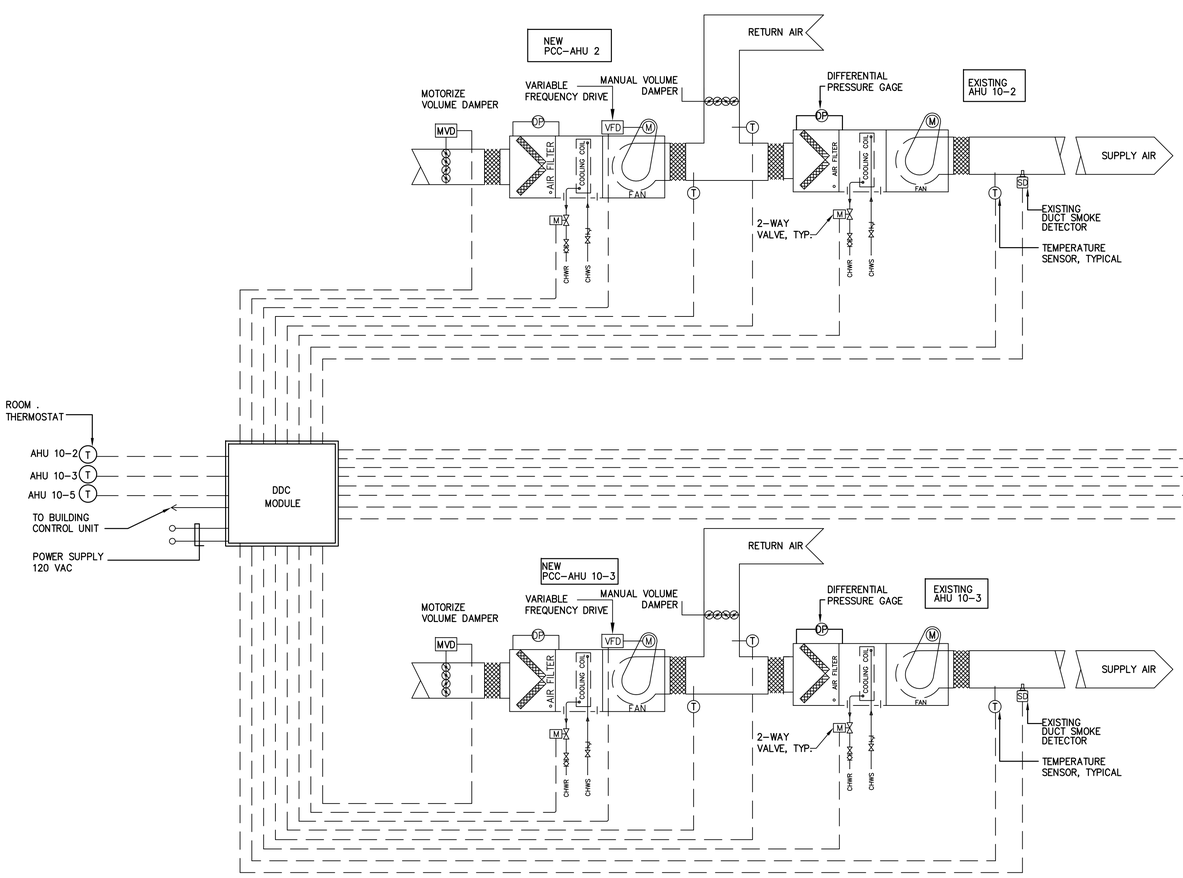
REVISION	DESCRIPTION	DATE
1	AS-BUILT NOTATION	10-13-14

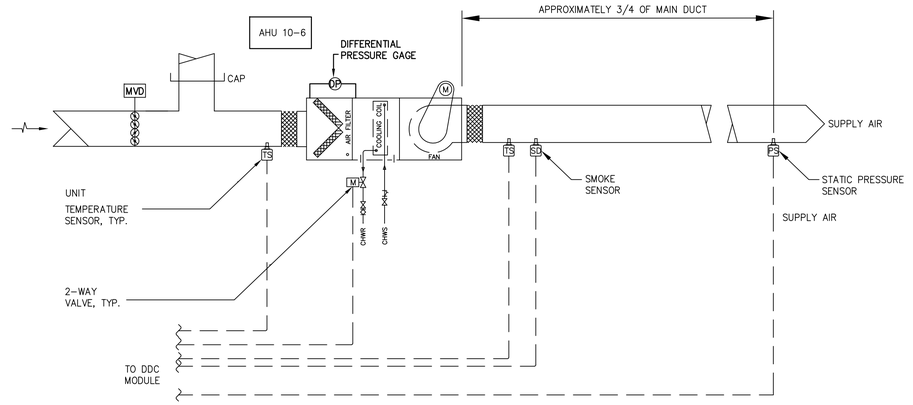
DESIGNED BY: EDS
DRAWN BY: EDS
CHECKED BY: MPN
ACAD FILE NO:
DATE: OCTOBER 13, 2014

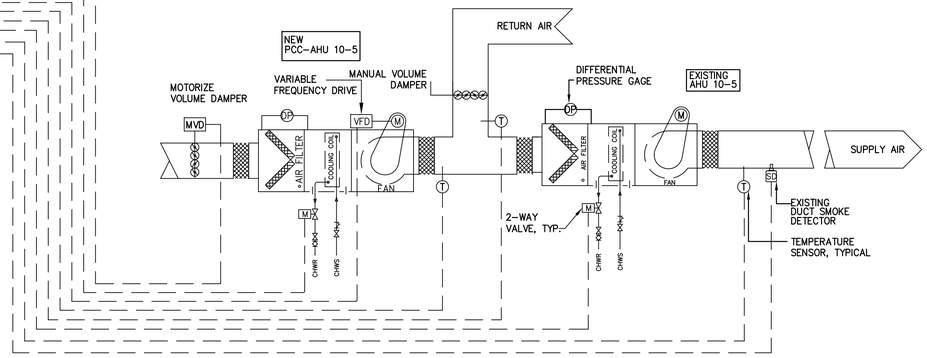
SHEET NO:

M-15

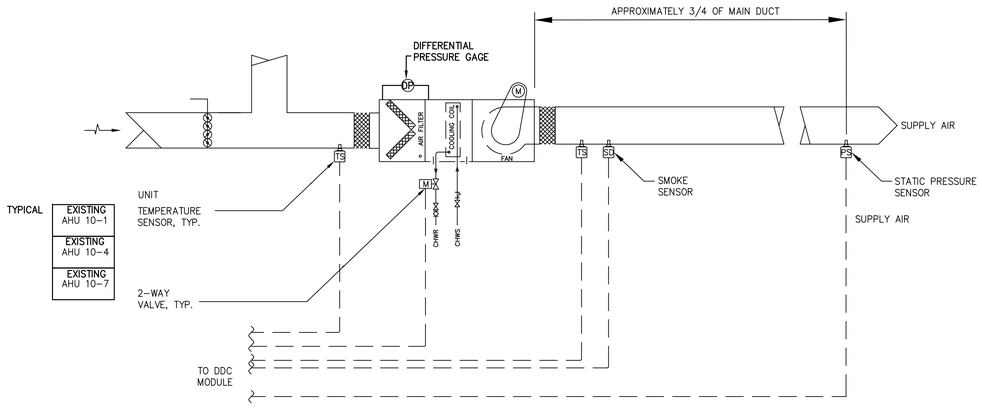
38 OF 61

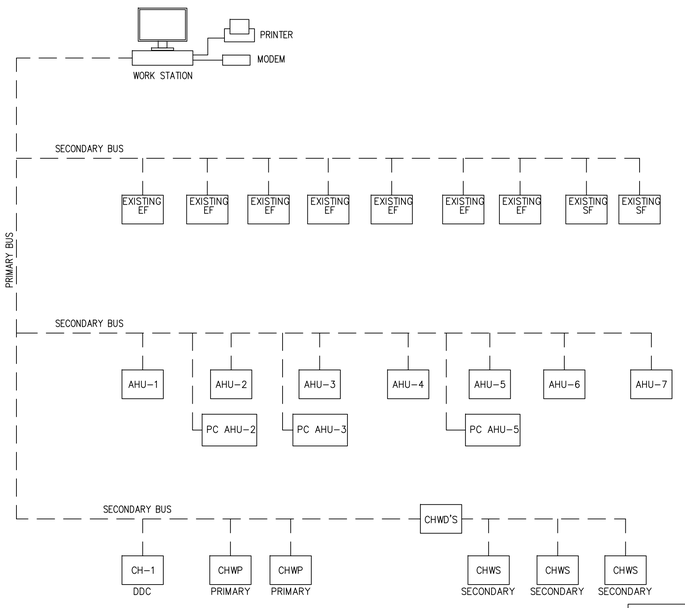






NOTES:
FOR EXISTING VENTILATION SYSTEM CONTROL
A. SUPPLY FAN CONTROLS: START FAN ON TIME CLOCK CONTROL
B. EXHAUST FAN: TIME CLOCK CONTROL FROM DDC SYSTEM CYCLLE FAN ALL EXHAUST FAN





1
M–16
NEW ANG EXISTING AHU DDC CONTROL DIAGRAM
SCALE: NOT–TO–SCALE

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SHEET TITLE:
PROJECT TITLE
AHU DDC CONRTOL DIAGRAM

ENGINEERING SERVICES, LLC

MARLON P. NOTARTE
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EXP. 4–30–14
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PROJECT TITLE:
Design-Build of Southern High School
GYMNASIUM RENOVATION
Guam Department of Education
GUAM
STA. RITA

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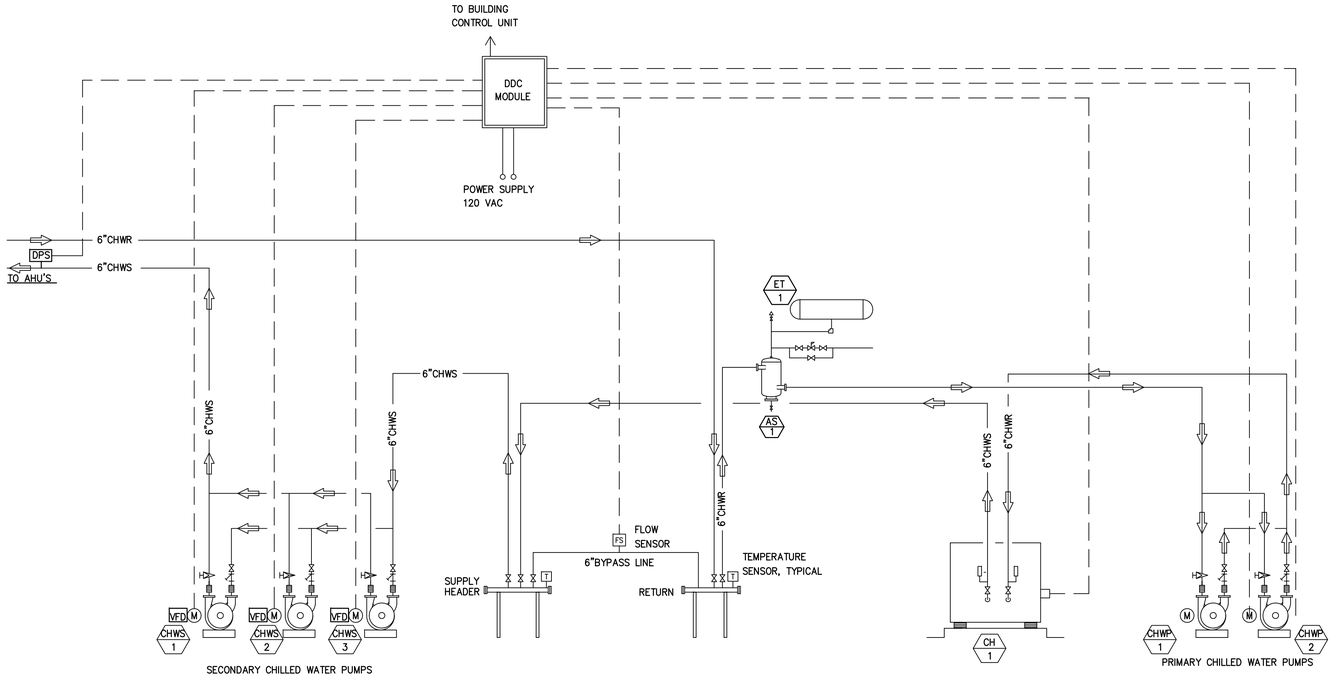

VARIABLE SPEED PUMPING CONTROL SEQUENCE

1. PRIMARY LOOP (CHILLER AND PUMPS) PROVIDES THE HEADER WITH CONSTANT FLOW OF CHILLED WATER. THE SECONDARY LOOP, SECONDARY PUMPING SYSTEM, TAKES WATER FROM THE PRIMARY LOOP AS NEEDED FOR HYDRONIC SYSTEM.

2. THE SECONDARY PUMPS ARE VARIABLE SPEED PUMPS CONTROLLED BY DIFFERENTIAL PRESSURE SENSOR, MOTORS SPEED ARE CONTROLLED THRU VARIABLE SPEED DRIVE.

3. DIFFERENTIAL PRESSURE CONTROL COOLING COIL VALVE IS 80 PERCENT OPEN SO THE PUMPS OPERATE AT THE LOWEST SPEED AND PRESSURE POSSIBLE TO SATISFY THE CURRENT LOAD. IF VALVE IS 80% MORE THAN OPEN THE DIFFERENTIAL PRESSURE SENSOR WILL BE ON UPWARD SETPOINT. THE VARIABLE FREQUENZY DRIVE (VFD) INCREASES THE PUMP MOTOR SPEED TO MEET THE RAISED PUMP DIFFERENTIAL (DISCHARGE) PRESSURE SETPOINT.

4. THE REMOTE DIFFERENTIAL PRESSURE SETPOINT WILL BE MAINTAINED BETWEEN MAX. AND MINIMUM PRESSURE. THE MAX. PRESSURE LIMIT IS THE PRESSURE REQUIRED TO PROVIDE FULL FLOW TO ALL COOLING COIL VALVE (PER TEST AND BALANCE). THE MINIMUM PRESSURE LIMIT CORRELATES TO THE LOWEST SPEED THE PUMP MOTOR IS ALLOWED TO BE OPERATED (PER MOTOR MANUFACTURER AND TEST AND BALANCE).

5. PRIMARY PUMPS: ALTERNATE TWO PUMPS MONTHLY FROM LEAD PUMP TO STANDY.

6. SECONDARY PUMPS: ALTERNATE THREE PUMPS MONTHLY FROM LEAD, LAG, AND STANDY. LEAD PUMP STARTS AND MAINTAIN THE CHILLED WATER DIFFERENTIAL PRESSURE (10 PSIG ADJUSTABLE) FOR THE FIRST 10 MINUTES OF STARTUP SEQUENCE. THE VFD MODULATES TO CONTROL SETPOINT. IF THE LEAD PUMP DOES NOT MAINTAIN SETPOINT, THE DDC SYSTEM STARTS THE LAG PUMP. IF THE LAG PUMP CANNOT MAINTAIN SETPOINT, THE DDC SYSTEM STARTS THE BYPASS PUMP AND SENDS AN ALARM TO THE CONTROL PANEL, LOCAL AND REMOTE. THE VFD ARE OPERATED WITH THE SAME INPUT SIGNAL. WHEN ONE OR TWO PUMPS ARE AT 90 OF FULL SPEED, THE NEXT PUMP WILL STARTED. A 15 MINUTE SHORT CYCLE CONTROL FOR PUMP START AND STOPS. WHEN TWO PUMPS ARE OPERATED AT LESS THAN 40% OF FULL SPEED FOR OVER 15 MINUTES, THE LAG PUMP IS DEACTIVATED FOR AT LEAST 15 MINUTES.

SEQUENCE OF OPERATION

CHILLER PLANT CONTROL

1. General System Capabilities

   A. The chiller plant control software shall have the ability to control chillers of any type including centrifugal, scroll, reciprocating machines.
   B. The software shall be able to control both constant and variable flow systems as well as parallel, series and decoupled piping configurations.

2. Control Strategies – The chiller plant control software shall perform the following control strategies:

   A. Chiller Start–up Sequence– The chiller plant control software will start and stop system water pumps and chillers based upon the loading of the operating chillers.

      1. When the chilled water system is enabled the chiller plant control program shall:
         a) start the system chilled water pump.
         b) allow the chiller to start the chilled water pump and prove flow through the evaporator.

   B. Chiller Rotation – The operator shall be able to designate normal, base, peak and swing chillers to increase system efficiency and equalize chiller run time. Manual or automatic rotation of the chiller sequence shall be allowed. Rotation time interval shall be operator adjustable.
   C. Chiller Soft Start – The chiller plant control software shall provide a user adjustable loading time at system start–up to limit system electrical demand during chilled water loop pulldown.

3. Custom Control Strategies – the chiller plant control program shall accept reference data from other programs/applications to perform custom programming strategies.

4. Chiller System Status Display – The chiller plant control software shall provide operating status for the system. The display shall include:

   A. System mode of the chiller plant
   B. Chiller enable/disable status
   C. System supply water setpoint
   D. System supply and return water temperature
   E. System Chilled water pump status
   F. System Chilled water flow
   G. Bypass pipe flow rate
   H. Current chiller plant control operation
   I. Add information
   J. Subtract information
   K. System failure information
   L. Chiller failure information
   M. Rotation information
   N. Override capabilities to force an add control, subtract control, or change of sequence.
   O. Remove a chiller from a sequence temporarily for service purposes.

5. Diagnostics/Protection – The chiller plant control program shall be able to integrate individual chiller diagnostics into control action decisions.

6. Event Processing – All chiller plant control and status events shall be recorded, at the operator's selection, in the building management system event log to facilitate troubleshooting.

7. System Security – The chiller plant control system shall allow program security to be designated for each operator with a choice of the following functions:
   A. View chiller plant status
   B. Change chiller plant status
   C. View chiller plant setup
   D. Change chiller plant setup

8. Alarm Indications – The chiller plant control status screens shall display chiller plant and individual chiller alarm messages.

9. Failure Recovery – Upon sensing a chiller failure the chiller plant control software shall lockout that chiller and pump and immediately initiate the start of the next chiller in the rotation sequence.

   A rapid powerfail recovery capability returns the chiller plant to its last state (before the building controller lost power) as quickly as possible after the building controller powers up. The chiller plant control program will retry chillers (an operator entered number of tries) if all chillers have been marked as failed.

1 / M–17 PRIMARY SECONDARY CHILLED WATER PUMPING CONTROL SYSTEM

SCALE: NOT–TO–SCALE

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No 12864
(MECHANICAL)
EXP. 4–30–14
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PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

SHEET TITLE: **PROJECT TITLE** CHILLED WATER PIPING DIAGRAM

PROJECT TITLE: Design-Build of Southern High School GYMNASIUM RENOVATION

Guam Department of Education GUAM

STA. RITA

REVISION	DESCRIPTION	DATE
1	AS–BUILT NOTATION	10–13–14

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ACAD FILE NO:
DATE: OCTOBER 13, 2014

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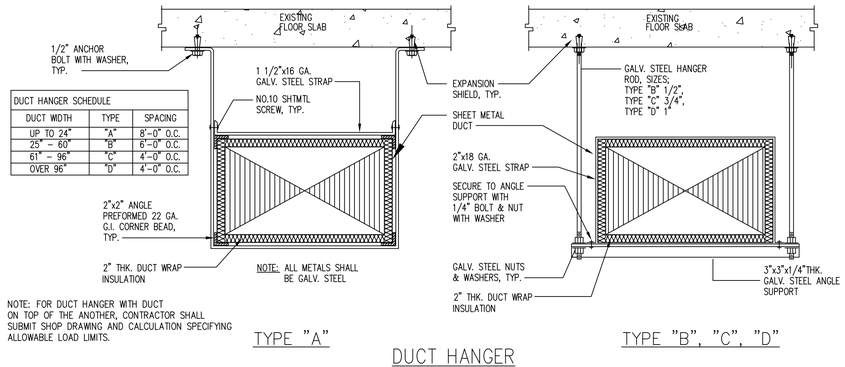
M-17

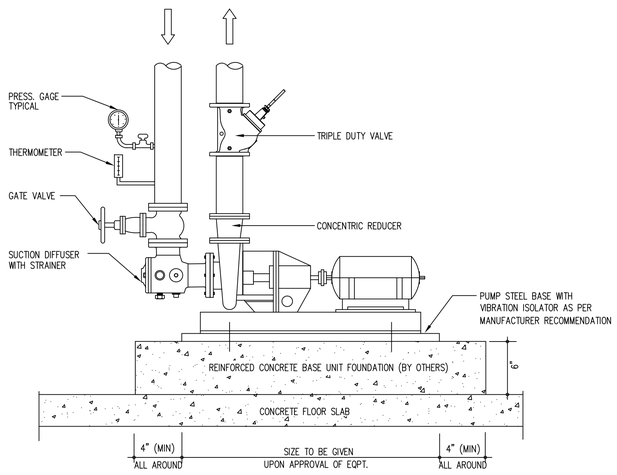
40 OF 61



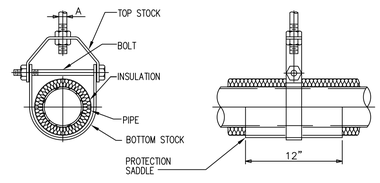
DUCT HANGER SCHEDULE		
DUCT WIDTH	TYPE	SPACING
UP TO 24"	"A"	8'-0" O.C.
25" – 60"	"B"	6'-0" O.C.
61" – 96"	"C"	4'-0" O.C.
OVER 96"	"D"	4'-0" O.C.

NOTE: FOR DUCT HANGER WITH DUCT ON TOP OF THE ANOTHER, CONTRACTOR SHALL SUBMIT SHOP DRAWING AND CALCULATION SPECIFYING ALLOWABLE LOAD LIMITS.

DUCT HANGER

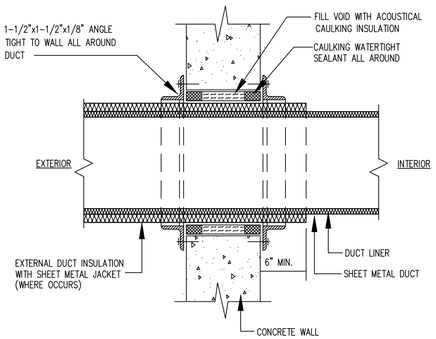


END-SUCTION PUMP DETAIL

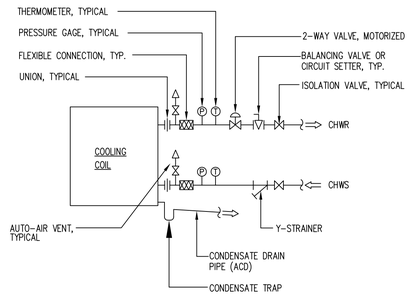


PIPE SIZE	A	BOLT SIZE	TOP STOCK	BOTTOM STOCK
1/2"	3/8"	3/8"	1/4"x1"	1/4"x1"
3/4"	3/8"	3/8"	1/4"x1"	1/4"x1"
1"	3/8"	3/8"	1/4"x1"	1/4"x1"
1 1/4"	3/8"	3/8"	1/4"x1"	1/4"x1"
1 1/2"	3/8"	3/8"	1/4"x1"	1/4"x1"
2"	3/8"	3/8"	1/4"x1"	1/4"x1"
2 1/2"	1/2"	5/8"	3/8"x1-1/4"	3/8"x1-1/4"
3"	1/2"	5/8"	3/8"x1-1/4"	3/8"x1-1/4"

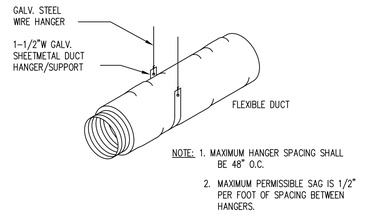
PIPE HANGER



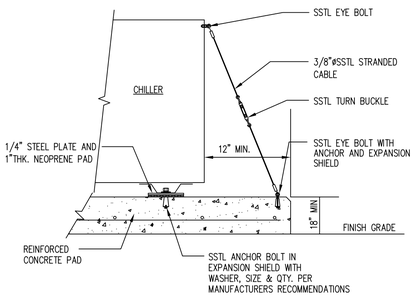
DUCT THRU WALL



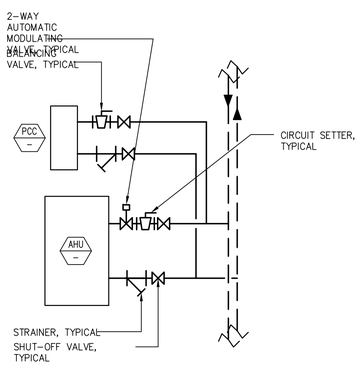
AHU COIL PIPING DIAGRAM



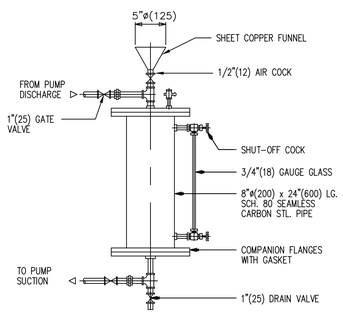
FLEXIBLE DUCT HANGER



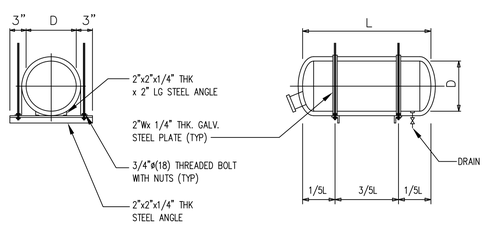
CH/ACCU MOUNTING DETAIL



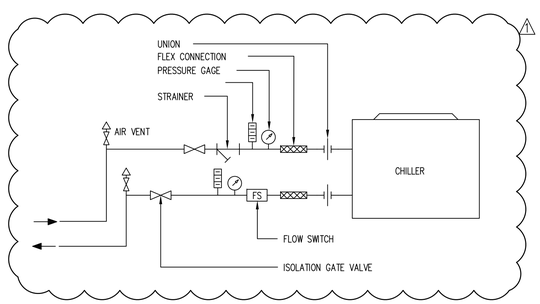
PRECOOLING PIPING DIAGRAM



CHEMICAL FEEDER



EXPANSION TANK MOUNTING



CHILLER PIPING DIAGRAM

1 / M-18 MISCELLANEOUS DETAILS

SCALE: NOT-TO-SCALE

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Guam Department of Education GUAM STA. RITA

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