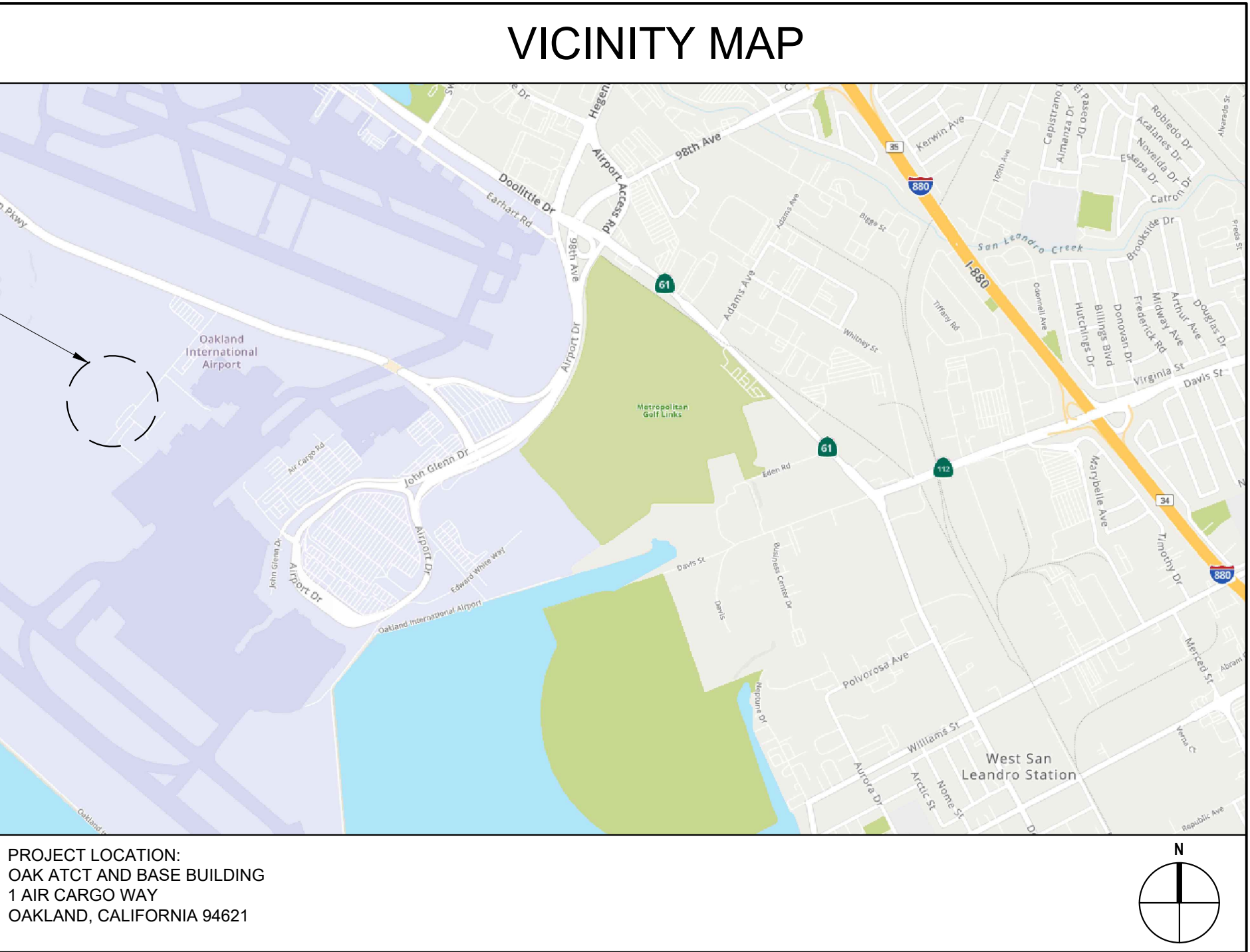


# OAKLAND (OAK) ATCT AND BASE BUILDING

## GSHP REPLACEMENT



FINAL SUBMISSION  
August 26, 2022



FOR OFFICIAL USE ONLY PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552										
JACOBS 1100 N GLEBE RD. SUITE 500 ARLINGTON, VA 22201										
		REV.	APPROVED DATE	DESCRIPTION				JCN	REDLINE DATE	APVD
		DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS      WESTERN SERVICE AREA								
		ATCT AND BASE BUILDING GSHP REPLACEMENT								
		COVER SHEET								
		OAKLAND      OAKLAND INTERNATIONAL AIRPORT (OAK)      CA								
OAKLAND ATCT OAKLAND CALIFORNIA		REVIEWED BY		SUBMITTED BY WILLIAM CASTRO				APPROVED BY VANCE WHITESEL		
				SUBMITTER'S TITLE PROJECT ENGINEER				APPROVER'S TITLE MANAGER: ENGINEERING		
				DESIGNED BY E. ROLAF				ISSUED BY ENGINEERING SERVICES TERMINAL		
				DRAWN BY E. ROLAF				DATE 8/26/2022		JCN: 18034143
				CHECKED BY W. STEVENS				DRAWING NO. OAK - 18034143 - G001		REV.



8

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INDEX OF DRAWINGS

REV	DRAWING NUMBER	DRAWING TITLE
GENERAL		
	G001	COVER SHEET
	G002	INDEX OF DRAWINGS, GENERAL NOTES, LOCATION MAP, & BUILDING CODE ANALYSIS
	G010	GENERAL ABBREVIATIONS
	G015	GENERAL, ARCHITECTURAL, AND STRUCTURAL LEGENDS
	G040	PRELIMINARY CONSTRUCTION STAGING PLAN
	G100	FIRE RESISTANCE RATED GUIDE PLAN - FIRST FLOOR
ARCHITECTURAL		
	AD100	DEMOLITION - ENLARGED FLOOR PLAN - MECHANICAL ROOM
	A100	ENLARGED FLOOR PLAN - MECHANICAL ROOM
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	S001	GENERAL NOTES
	S110	ENLARGED FOUNDATION PLAN - MECHANICAL ROOM
	S501	PIPE SUPPORT DETAILS
MECHANICAL		
	M001	MECHANICAL ABBREVIATIONS, LEGENDS, AND GENERAL NOTES
	MD100	HVAC DEMOLITION - ENLARGED FLOOR PLAN - MECHANICAL ROOM
	MD700	MECHANICAL DEMOLITION - FLOW DIAGRAM
	MD800	MECHANICAL DEMOLITION - FLOW CONTROL DIAGRAM
	M100	HVAC - ENLARGED FLOOR PLAN - MECHANICAL ROOM
	M500	MECHANICAL DETAILS
	M600	MECHANICAL SCHEDULES
	M700	MECHANICAL - FLOW DIAGRAM
	M800	MECHANICAL - FLOW CONTROL DIAGRAM
	M801	MECHANICAL - POINTS SCHEDULE
ELECTRICAL		
	E001	ELECTRICAL ABBREVIATIONS, LEGENDS, AND GENERAL NOTES
	ED120	DEMOLITION - MECHANICAL ROOM POWER PLAN
	E120	MECHANICAL ROOM POWER PLAN
	E501	PANEL SCHEDULES

6

GENERAL NOTES

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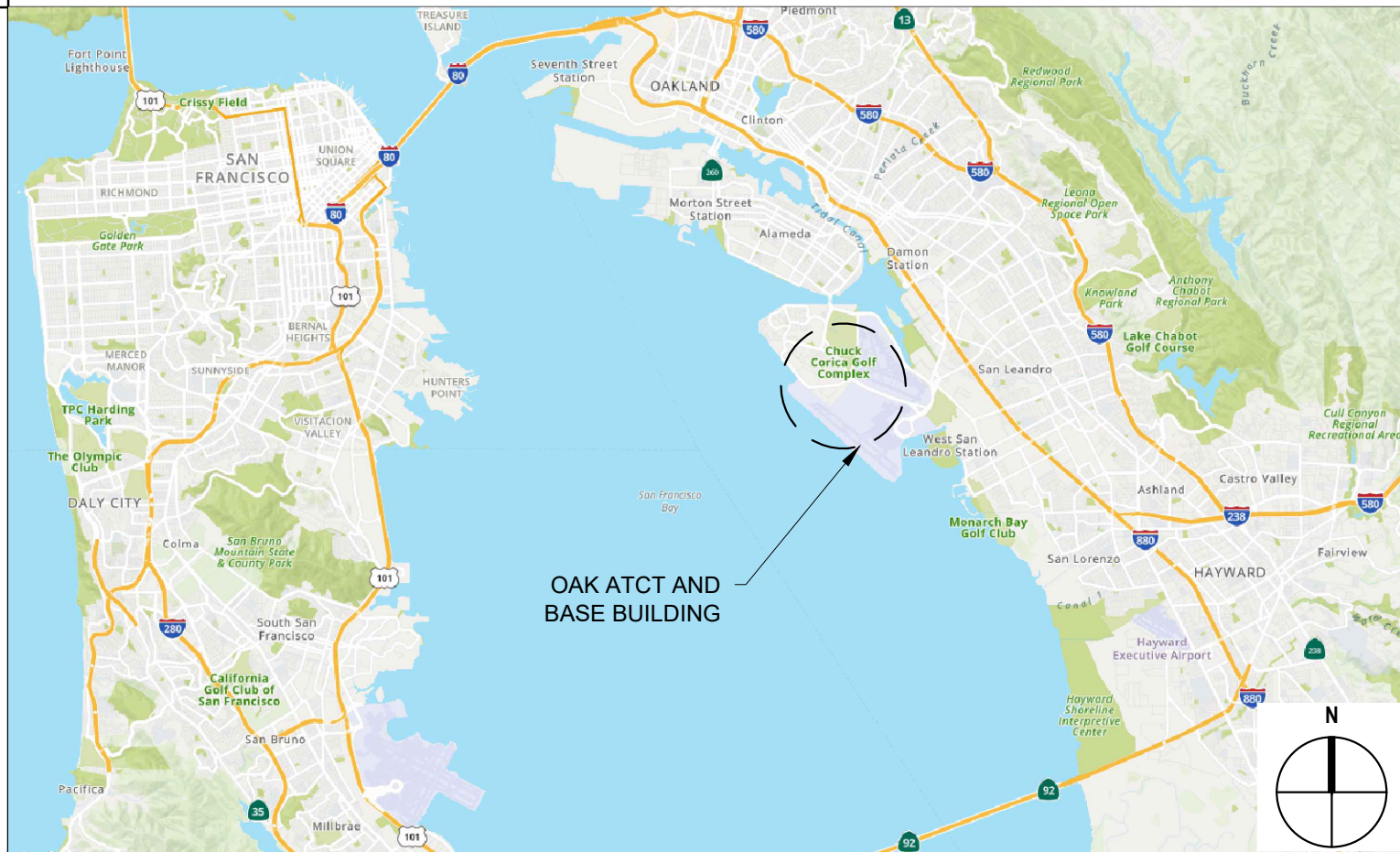
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LOCATION MAP



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REVIEWED BY

SUBMITTED BY

WILLIAM CASTRO

APPROVED BY

VANCE WHITESEL

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PROJECT ENGINEER

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E. ROLAF

ISSUED BY

ENGINEERING SERVICES TERMINAL

DRAWN BY

E. ROLAF

DATE

8/26/2022

JCN

18034143

CHECKED BY

W. STEVENS

DRAWING NO.

OAK - 18034143 - G002

REV.

JACOBS

1100 N GLEBE RD.

SUITE 500

ARLINGTON, VA 22201

COMMONWEALTH OF VIRGINIA

ERIC LANCE ROLAF JR.

Lic. No. 0401016999

ARCHITECT

08.26.2022

OAKLAND ATCT

OAKLAND

CALIFORNIA

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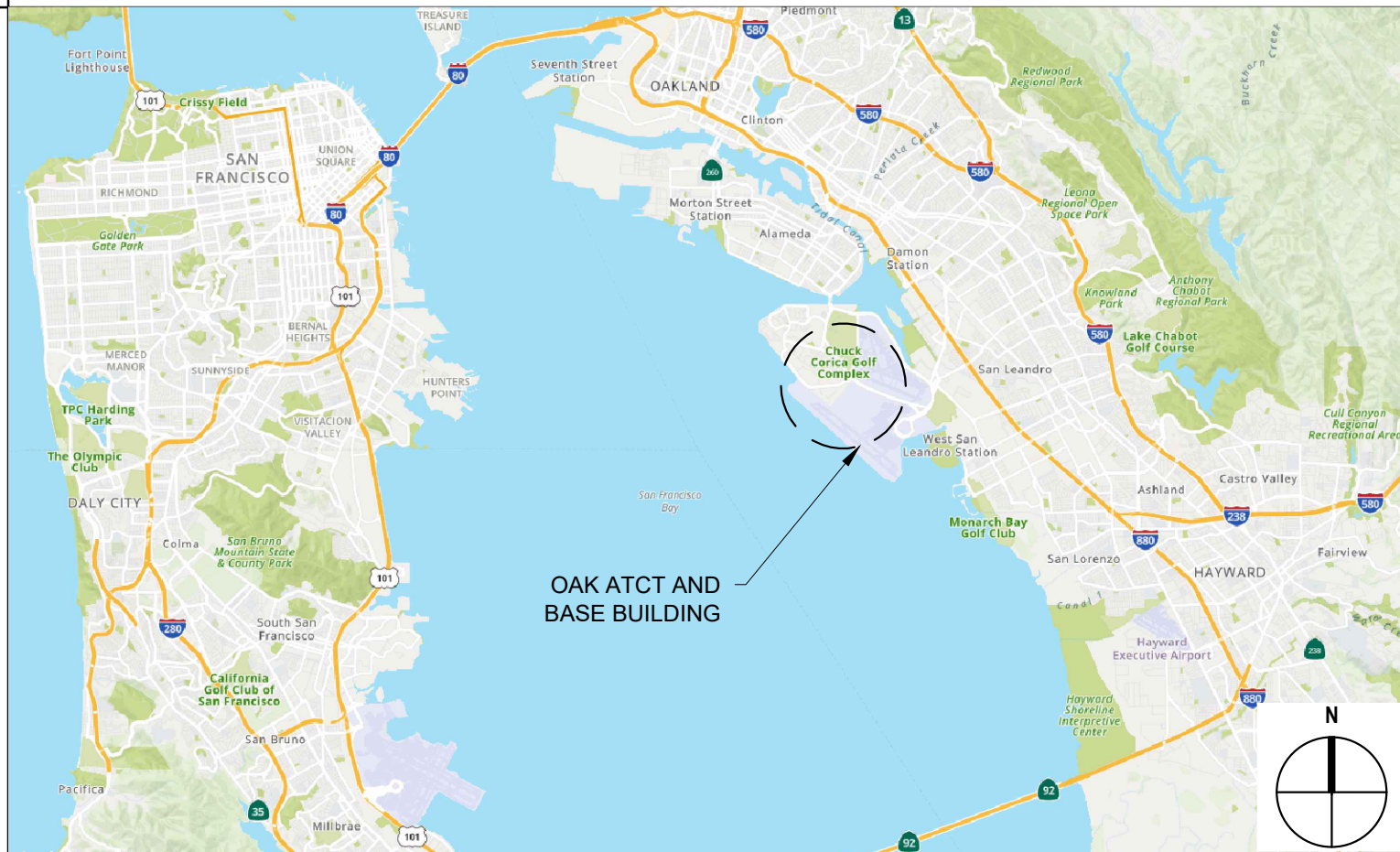
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S. WORK IN CONFINED SPACES OR AREAS MUST BE DONE IN ACCORDANCE WITH OSHA REQUIREMENTS, 29 CFR 1910.146 AND 29 CFR 1926.

T. PRIOR TO CUTTING CONCRETE, USE MAGNETIC STEEL LOCATOR TO LOCATE ELECTRICAL CONDUITS EMBEDDED IN CONCRETE. AVOID CUTTING CONDUITS AS THEY MAY BE CRITICAL TO THE OPERATION OF THE FACILITY. CONCRETE WORK MUST COMPLY WITH SILICA MANAGEMENT REQUIREMENTS.

U. REFER TO OTHER DISCIPLINES FOR ADDITIONAL DEMOLITION REQUIRED. COORDINATE REMOVING EXISTING PARTITIONS AND ENCLOSURES TO ENABLE DEMOLITION OF CONCEALED SYSTEMS TO BE DEMOLISHED. PATCH AND REPAIR DAMAGED FINISHES, AND/OR FIRE RATED ASSEMBLIES TO MATCH EXISTING ADJACENT SURFACES.

V. PROVIDE CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL PER SECTION 01 74 19.

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BUILDING CODE ANALYSIS

THIS BUILDING CODE ANALYSIS IS BASED ON THE ASSUMPTION THAT THE ATCT AND BASE BUILDING ARE FULLY SPRINKLERED AS INDICATED ON PROVIDED FAA-PROVIDED AS-BUILTS.

APPLICABLE CODES AND REGULATIONS:  
A. INTERNATIONAL BUILDING CODE (IBC), 2018 EDITION  
B. INTERNATIONAL FIRE CODE (IFC), 2018 EDITION  
C. INTERNATIONAL MECHANICAL CODE (IMC), 2018 EDITION  
D. INTERNATIONAL PLUMBING CODE (IPC) 2018 EDITION  
E. NFPA 101 - LIFE SAFETY CODE, 2018 EDITION  
F. NFPA 70 - NATIONAL ELECTRICAL CODE (NEC), 2020 EDITION  
G. NFPA 75 - STANDARD FOR THE FIRE PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT, 2020 EDITION  
H. ARCHITECTURAL BARRIERS ACT (ABA) STANDARDS - 2015  
I. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) GENERAL INDUSTRY SAFETY & HEALTH STANDARDS (29 CFR 1910 AND 1926) - CURRENT ISSUE  
J. TERMINAL FACILITIES DESIGN STANDARD (TFDS), VERSION 1.0, MARCH 31, 2021

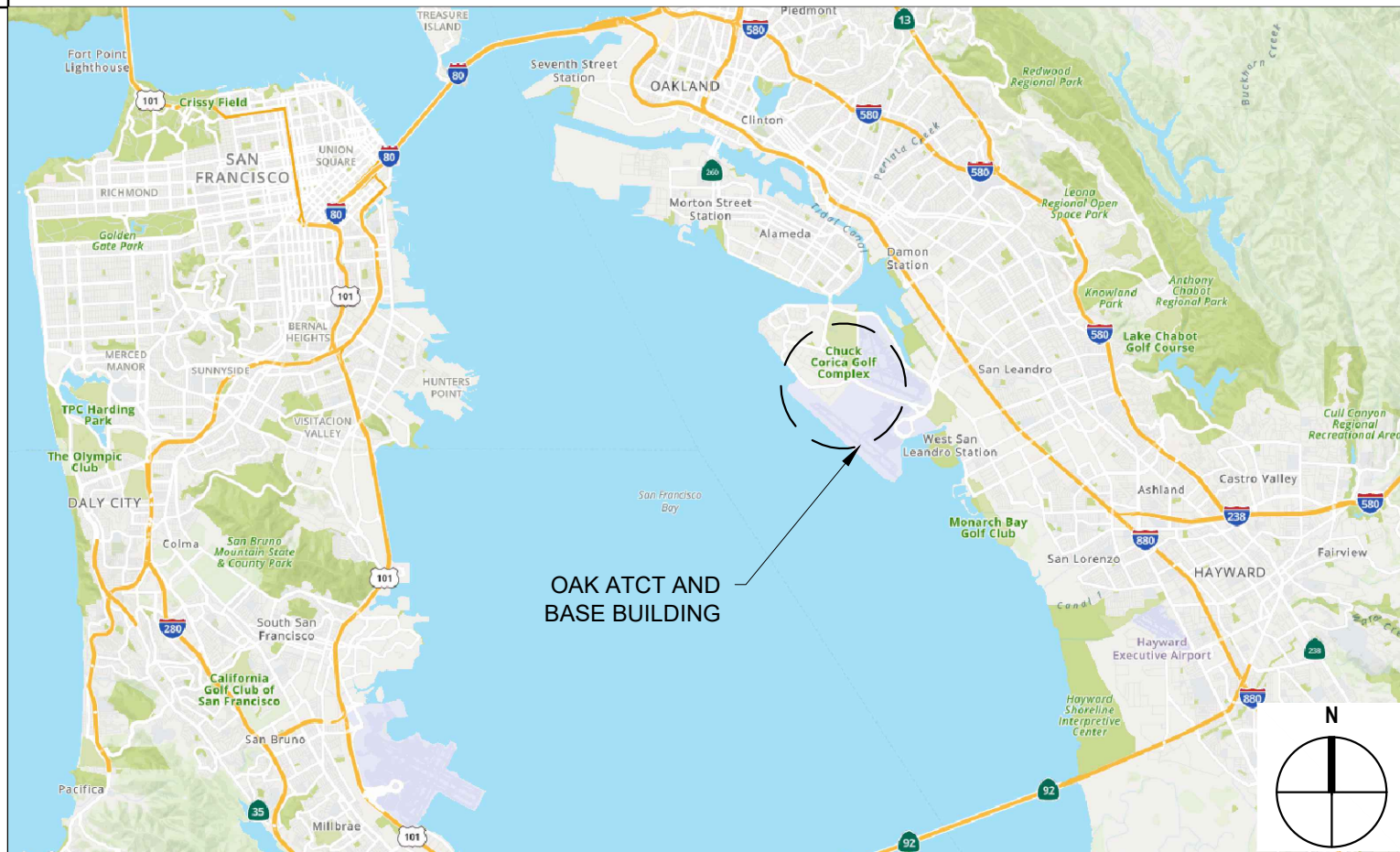
OCCUPANCY CLASSIFICATION:  
A. ATCT: BUSINESS (GROUP B) / LOW-HAZARD STORAGE (GROUP S-2)  
B. BASE BUILDING: BUSINESS (GROUP B) / LOW-HAZARD STORAGE (GROUP S-2)

CONSTRUCTION TYPE:  
A. ATCT: TYPE IB (IBC)  
B. BASE BUILDING: TYPE IIB (IBC)

SEISMIC DESIGN CATEGORY: D

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LOCATION MAP





GENERAL ABBREVIATIONS

A	A	AMPERE, AIR, COMPRESSED AIR LINE	
	AA	AIR COOLED	
	AAV	AUTOMATIC AIR VENT	
	AC	ALTERNATING CURRENT, ASPHALT CONCRETE, AIR COMPRESSOR	
	ACC	AIR COOLED LIQUID CHILLER	
	ACD	ADDRESSABLE CONTROL DEVICE	
	ACF	ACCESS FLOOR SYSTEM	
	ACM	ASBESTOS CONTAINING MATERIAL	
	ACP	ACOUSTICAL CEILING PANEL	
	ACT	ACCESS CONTROL TERMINAL, ACOUSTICAL CEILING TILE	
	ACU	AIR CONDITIONING UNIT	
	A/C	AIR CONDITIONING	
	AD	AREA DRAIN, ACCESS DOOR	
	ADJ	ADJACENT, ADJUSTABLE	
	ADR	ACCESS DOOR	
	ADTN	ADMINISTRATIVE DATA TRANSMISSION NETWORK	
	AED	AUTOMATED EXTERNAL DEFIBRILLATOR	
	AF	AMPERE FRAME, AIR FLOW SENSOR	
	AFF	ABOVE FINISH FLOOR	
	AFMS	AIR FLOW MEASURING STATION	
	AH	AIR HANDLING UNIT	
	AHU	AIR HANDLING UNIT	
	AIC	AMPERES INTERRUPTING CAPACITY	
	AID	ADDRESSABLE INTERFACE DEVICE	
	AIF	AIR INTAKE FILTER	
	AL	ALUMINUM	
	ALT	ALTERNATE	
	AM	AMP METER	
	AMM	AMMETER	
	ANN	ANNUNCIATOR	
	AO	ANALOG OUTPUT	
	AP	ANNUNCIATOR POINT	
	APC	ACOUSTICAL PANEL CEILING	
	APPROX	APPROXIMATELY	
	ARCH	ARCHITECT(URAL)	
	ARTCC	AIR ROUTE TRAFFIC CONTROL CENTER	
	ARTS	AUTOMATED RADAR TERMINAL SYSTEM	
	AS	AIR SEPARATOR	
	ASSY	ASSEMBLY	
	AT	AMPERE TRIP, AIR TRAFFIC	
ATB	AIR TERMINAL BOX		
ATCT	AIRPORT TRAFFIC CONTROL TOWER		
ATS	AUTOMATIC TRANSFER SWITCH		
AUX	AUXILIARY		
AV	ACID VENT		
AVG	AVERAGE		
AWG	AMERICAN WIRE GAUGE		
AWP	ACOUSTICAL WALL PANEL		
AWR	AUTOMATION WING REHABILITATION		
&	AND		
@	AT		
B	B	BOILER, BUILDING	
	BAT CHR	BATTERY CHARGER	
	BC	BARE COPPER	
	BD	BOARD, BACK-DRAFT DAMPER, BLOWDOWN	
	BEL	BELOW	
	BF	BLIND FLANGE	
	BFP	BACK FLOW PREVENTER	
	BFV	BUTTERFLY VALVE	
	BFW	BOILER FEED WATER	
	BHP	BRAKE HORSE POWER	
	BKR	BREAKER	
	BLDG	BUILDING	
	BLKG	BLOCKING	
	BLO	BLOWER	
	BLV	BALANCING VALVE	
	BM	BENCH MARK, BEAM	
	BO	BOTTOM OF	
	BOCA	BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL, INC	
	BOD	BOTTOM OF DUCT, BASIS OF DESIGN	
	BOP	BOTTOM OF PIPE	
	BOT, BOTT	BOTTOM	
	BPU	BREAKER PROGRAMMING UNIT	
	BRG	BEARING	
	BSMT	BASEMENT	
	BTU	BRITISH THERMAL UNIT	
	BTU/H	BRITISH THERMAL UNIT PER HOUR	
	BV	BALL VALVE	
	BWP	BACK WATER PREVENTER	
	BWV	BACK WATER VALVE	
	C	C	CONDUIT
		CA	COMBUSTION AIR
		CAB	CABINET
		CB	CIRCUIT BREAKER
		CC	COOLING COIL
		CCMS	CENTRAL CONTROL AND MONITORING SYSTEM
		CD	CONTROL DAMPER, CEILING DIFFUSER, CONDENSATE DRAIN
		CENT	CENTRIFUGAL
		CFH	CUBIC FEET PER HOUR
		CFM	CUBIC FEET PER MINUTE
		CFT	CUBIC FOOT
CG		CEILING GRILLE	
CH		CHILLER	
CI		CURB INLET, CAST IRON	
CIP		CAST IRON PIPE, CAST IN PLACE	
CIR		CIRCULATING	
CKT		CIRCUIT	
CL		CENTER LINE	
CLF		CURRENT LIMITING FUSE	
CLG		CEILING	
CLR	CLEAR		
CMP	CORRUGATED METAL PIPE		
CMU	CONCRETE MASONRY UNIT		
CO	CLEANOUT, CONDUIT ONLY		

	COL	COLUMN	
	COMB	COMBINATION, COMBINE, COMBUSTION AIR	
	COMM	COMMUNICATIONS	
	COMP	COMPRESSIBLE, COMPRESSED	
	CONC	CONCRETE	
	COND	CONDITION, CONDENSATE	
	CONN	CONNECTION	
	CONST	CONSTRUCTION	
	CONT	CONTINUOUS, CONTINUATION	
	CONTR	CONTRACTOR	
	COORD	COORDINATE	
	COR	CONTRACTING OFFICERS REPRESENTATIVE	
	CP	CONTROL PANEL, CIRCULATING PUMP	
	CPC	CRITICAL POWER CENTER	
	CPDS	CRITICAL POWER DISTRIBUTION SYSTEM	
	CPT	CARPET	
	CPU	CENTRAL PROCESSING UNIT	
	CR	CEILING REGISTER, CONTROL RELAY	
	CRAC	COMPUTER ROOM AIR CONDITIONING UNIT	
	CRAH	COMPUTER ROOM AIR HANDLING UNIT	
	CRU	COMPUTER ROOM UNIT	
	CS	CONTROL SWITCH	
	CT	CABLE TRAY, COOLING TOWER	
	CTR	CENTER, COOLING TOWER WATER RETURN	
	CTS	COOLING TOWER WATER SUPPLY	
	CU	CONDENSING UNIT	
	CW	DOMESTIC COLD WATER	
	CWR	CHILLER WATER RETURN	
	CWS	CHILLER WATER SUPPLY	
	CWV	COMBINATION WASTE AND VENT	
	CU	CONDENSING UNIT	
	CV	CONTROL VALVE, CONSTANT VOLUME TERMINAL	
	CYD	CUBIC YARD	
D	D	DRAIN, DELTA CONNECTION, DIFFUSER, DAMPER	
	DB	DIRECT BURIAL, DRY BULB	
	DBL	DOUBLE	
	DC	DIRECT CURRENT	
	DDCP	DIRECT DIGITAL CONTROL PANEL	
	DEG	DEGREE(S)	
	DET	DETAIL	
	DGP	DATA GATHERING PANEL	
	DI	DROP INLET, DAMPER POSITION INDICATOR, DIGITAL INPUT	
	DIA	DIAMETER	
	DIAG	DIAGONAL	
	DIM	DIMENSION	
	DISC	DISCONNECT	
	DISP	DISPENSER	
	DIST	DISTRIBUTION	
	DL	DEAD LOAD	
	DM	DEMAND METER	
	DN	DOWN	
	DO	DIGITAL OUTPUT	
	DOM	DOMESTIC	
	DP	DUSTPROOF PARTITION, DIFFERENTIAL PRESSURE SWITCH	
	DPDT	DOUBLE POLE DOUBLE THROW	
	DPNL	DISTRIBUTION PANEL	
	DPST	DOUBLE POLE SINGLE THROW	
	DR	DOOR	
	DWG(S)	DRAWING(S)	
	E	EA	EACH, EXHAUST AIR
		EAT	ENTERING AIR TEMPERATURE
		ECP	ENGINE CONTROL PANEL
		EDAM	ELECTRICAL DATA ACQUISITION AND MONITORING
EF		EXHAUST FAN	
EFF		EFFICIENCY	
EG		ENGINE GENERATOR, EXHAUST GRILLE	
EH		ELECTRIC HEATER	
EHC		ELECTRIC HEATING COIL	
EL, ELEV		ELEVATION, ELEVATOR	
ELEC		ELECTRIC(AL)	
EMD		ESTIMATED MAXIMUM DEMAND	
EMERG		EMERGENCY	
EMT		ELECTRICAL METAL TUBING	
ENT, ENTR		ENTRANCE	
EP		EXHAUST PIPE	
EPX		EPOXY	
EQ		EQUAL	
EQUIP		EQUIPMENT	
ER		EXHAUST REGISTER	
ERMS		ENVIRONMENTAL REMOTE MONITORING SYSTEM	
ES		EXHAUST SILENCER	
ESU		ENVIRONMENTAL SUPPORT UNIT (BUILDING)	
ET		ELECTRIC HEAT TRACE	
EW		ELECTRIC WATER COOLER	
EW		ELECTRIC WATER HEATER	
EXH		EXHAUST	
EXIST, EX		EXISTING	
EXP		EXPOSED	
EXP		EXPANSION	
EXT	EXTERIOR		
F	F	FILTER, FIRE LINE	
	FA	FAN COOLED	
	FAA	FEDERAL AVIATION ADMINISTRATION	
	FC	FAN COIL UNIT	
	FCO	FLOOR CLEANOUT	
	FCV	FLOW CONTROL VALVE	
	FD	FIRE DAMPER OR FLOOR DRAIN	
	FD/SD	COMBINATION FIRE AND SMOKE DAMPER	
	FDR	FEEDER	
	FE	FIRE EXTINGUISHER	
	FEC	FIRE EXTINGUISHER CABINET	
	FEPC	FRONT END PERSONAL COMPUTER	
	FFE	FINISHED FLOOR ELEVATION	
	FHC	FIRE HOSE CABINET	
	FI	FLANGE INSULATION, FLOW INDICATOR	

	FIN	FINISH
	FIX, FIXT	FIXTURE
	FL, FLR	FLOOR
	FLA	FULL LOAD AMPERES
	FLEX	FLEXIBLE DUCT
	FLG	FLANGE
	FLUOR	FLUORESCENT
	FM	FLOW METER, FIRE MAIN
	FO	FIBER OPTIC
	FOL	FUEL OIL LEVEL
	FOR	FUEL OIL RETURN
	FOS	FUEL OIL SUPPLY
	FOT	FIBER OPTIC TERMINAL
	FOV	FUEL OIL VENT
	FPM	FEET PER MINUTE
	FPU	FIELD PROGRAMMING UNIT
	FRP	FIBER GLASS REINFORCED PLASTIC
	FS	FLOW SWITCH
	FT, '	FEET
	FTR	FINNED TUBE RADIATION
	FV	FULL VOLTAGE
	FZ	FREEZESTAT
G	G	GAS
	GA	GAGE, GAUGE
	GALV	GALVANIZED
	GEN	GENERATOR
	GFE	GOVERNMENT FURNISHED EQUIPMENT
	GFM	GOVERNMENT FURNISHED MATERIAL
	GL	GLASS
	GND	GROUND, GROUND CONNECTOR
	GPH	GALLONS PER HOUR
	GPM	GALLONS PER MINUTE
	GR	GRILLE
	GRV	GRAVITY VENT
	GS	GAS SENSOR
	GSHP	GROUND SOURCE HEAT PUMP
	GV	GATE VALVE
	GW	GLYCOL WASTE
	GWB	GPYSUM WALLBOARD
	GWH	GAS WATER HEATER
H	H	HUMIDISTAT
	HAZMAT	HAZARDOUS MATERIALS
	HB	HOSE BIBB
	HC	HEATING COIL
	HCS	HOST COMPUTER ROOM
	HDW	HARDWARE
	HE	HEAT EXCHANGER
	HERM	HERMETIC
	HM	HOLLOW METAL
	HORIZ	HORIZONTAL
	HP	HORSE POWER, HEAT PUMP, HIGH PRESSURE
	HPL	HIGH PRESSURE LAMINATE
	HPS	HIGH PRESSURE SODIUM, HIGH PRESSURE STEAM
	HPT	HIGH POINT
	HR	HOOR
	HS	HIGH STRENGTH, HUMIDITY SENSOR
	HT	HEIGHT
	HTG	HEATING
	HTP	HOT TAP (W/ STOPPLE FITTING)
	HTR	HEATER
	HU	HUMIDIFIER
	HVAC	HEATING/VENTILATING/AIR CONDITIONING
	HW	DOMESTIC HOT WATER
	HWL	HIGH WATER LEVEL
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
	HZ	HERTZ
	HWY	HIGHWAY
I	IATA	INTERNATIONAL AIR TRANSPORT ASSOCIATION
	IBC	INTERNATIONAL BUILDING CODE
	ID	INSIDE DIAMETER
	ID	IDENTIFICATION OR IDENTIFY
	IEWH	INSTANTANEOUS ELECTRIC WATER HEATER
	IF	INSIDE FACE, INTERNAL FILTER
	IN, "	INCH
	INST	INSTRUMENTATION
	INSUL	INSULATION
	INT	INTERIOR
	INTL	INTERNATIONAL
	INV	INVERT
	ITEA	INFORMATION TECHNOLOGY EQUIPMENT AREA
	ITER	INFORMATION TECHNOLOGY EQUIPMENT ROOM
J	J	JUNCTION
	JB	JUNCTION BOX
	JC	JANITOR'S CLOSET
	JT	JOINT
K	KCMIL	THOUSAND CIRCULAR MILS
	KVA	KILOVOLT AMPERE
	KW	KILOWATTS
L	LAN	LOCAL AREA NETWORK
	LBS, #	POUNDS
	LCC	LEAD CONTAINING COATING
	LCP	LOCAL CONTROL PANEL
	LCV	LEVEL CONTROL VALVE
	LF	LINEAR FEET
	LG	LEVEL GAUGE
	LL	LIVE LOAD
	LLH	LONG LEG HORIZONTAL
	LLV	LONG LEG VERTICAL
	LONG	LONGITUDINAL
	LP	LOW POINT
	LPS	LOW PRESSURE STEAM
	LS	LEVEL SWITCH
	LT	LIGHT
	LTG	LIGHTING

M	M	MOTOR
	MAINT	MAINTENANCE
	MAS	MASONRY
	MAT	MATERIAL
	MAX	MAXIMUM
	MCC	MOTOR CONTROL CENTER
	MECH	MECHANICAL
	MET	METAL
	MFG(R)	MANUFACTURER
	MG	MOTOR GENERATOR
	MIL	MILLIMETER
	MIN	MINIMUM
	MO	MASONRY OPENING
	MOD	MODIFICATION
	MS	MOISTURE SENSOR
MTG	MOUNTING, MOUNTED	
N	N/A	NOT APPLICABLE
	NAM	NEGATIVE AIR MACHINE
	NARACS	NATIONAL RADIO COMMUNICATIONS SYSTEM
	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
	NIC	NOT IN CONTRACT
	NO, #	NUMBER
	NOM	NOMINAL
	NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE	
O	OA	OUTSIDE AIR
	OC	ON CENTER
	OD	OUTSIDE DIAMETER, OPEN DRAIN
	OF	OUTSIDE FACE
	OFD	OVERFLOW DRAIN
	OGG	THE IATA AIRPORT CODE FOR KAHULUI AIRPORT
	OH	OPPOSITE HAND
	OPNG	OPENING
	OPP	OPPOSITE
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION	
	OSW	OPERATIONS SUPPORT WING
P	P	PUMP, PHASE, POLE
	PACM	PRESSUMED ASBESTOS CONTAINING MATERIAL
	PBX	PRIVATE BRANCH EXCHANGE
	PC	PRESSURE CONTROL SWITCH
	PCB	POLYCHLORINATED BIPHENYLS
	PCF	POUNDS PER CUBIC FOOT
	PD	PRESSURE DIFFERENTIAL
	PDI	PRESSURE DIFFERENTIAL INDICATOR
	PDS	PRESSURE DIFFERENTIAL SENSOR
	PH	PHASE
	PHC	PREHEAT COIL
	PI	POINT OF INTERSECTION, PRESSURE INDICATOR
	PIV	POST INDICATOR VALVE
	PL	PROPERTY LINE, PLATE
	PLAM	PLASTIC LAMINATE
	PLF	POUNDS PER LINEAR FOOT
	PNL	PANEL
	POC	POINT OF CONNECTION
	PREP	PREPARE
	PRV	PRESSURE REDUCING VALVE
	PS	PRESSURE SENSOR
	PSF	POUNDS PER SQUARE FOOT
	PSI	POUNDS PER SQUARE INCH
	PSM	POWER SYSTEMS MODIFICATION
	PT	PAINT, POINT OF TANGENCY
	PTVC	POINT OF VERTICAL CURVATURE
	PVC	POLYVINYL CHLORIDE
	PVDS	PORTABLE VISUAL DISPLAY SYSTEM
	PVI	POINT OF VERTICAL INTERSECTION
	PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY	
R	R	RISER, RADIUS
	RA	RETURN AIR
	RAD	RADIUS
	RCAP	REFLECTED CEILING PLAN
	RCRA	RESOURCE CONSERVATION AND RECOVERY ACT
	RD	ROOF DRAIN
	RECEPT, RPTS	RECEPTACLE
	REF	REFERENCE
	REG	REGISTER
	REINF	REINFORCING
	REQ'D	REQUIRED
	REV	REVERSE, REVISION
	RF	RETURN FAN
	RGS	RIGID GALVANIZED STEEL
	RHC	REHEAT COIL
	RM	ROOM
	RO	ROUGH OPENING
	RV	REFRIGERANT VENT
	S	S
SA		SUPPLY AIR
SAN		SANITARY
SAP		SOUND ABSORBING PANEL
SC		SEALED CONCRETE
SCH, SCHED		SCHEDULE
SCWD		SOLID CORE WOOD
SD		SMOKE DAMPER
SEC		SECTION
SECM		SAFETY AND ENVIRONMENTAL COMPLIANCE MANAGER
SF		SUPPLY FAN, SQUARE FEET
SHT		SHEET
SIG		SIGNAL
SIM		SIMILAR
SM	SPRINKLER MAIN	







## GENERAL CONSTRUCTION STAGING NOTES

THE FOLLOWING NOTES AND ACCOMPANYING "CONSTRUCTION STAGING PLAN" GRAPHICALLY REPRESENT MANY OF THE MAJOR REQUIREMENTS STATED IN "DIVISION 1 GENERAL REQUIREMENTS" OF THE SPECIFICATIONS. THESE NOTES PARAPHRASE DIVISION 1 REQUIREMENTS AND ARE NOT INTENDED TO MODIFY OR REPLACE DIVISION 1 REQUIREMENTS.

CONSTRUCTION ACCESS, PARKING, OFFICES AND EXTENT/SIZE OF CONSTRUCTION STAGING AREA MUST BE COORDINATED WITH SITE PERSONNEL VIA COR, PARTICULARLY IN CONJUNCTION WITH POTENTIAL ONGOING PROJECTS. REFER TO A8/G040 FOR LOCATION OF PROPOSED CONSTRUCTION STAGING AREA AND PROPOSED CONSTRUCTION DUMPSTER. LOCATION OF FINAL CONSTRUCTION STAGING AREA, CONSTRUCTION DUMPSTER, AND CONTRACTOR'S PARKING TO BE DETERMINED AT PRECONSTRUCTION CONFERENCE.

### A. CONSTRUCTION ACCESS

- CONTRACTOR'S VEHICLES, PEDESTRIANS AND DELIVERIES TO THE SITE MUST BE THROUGH THE MAIN SECURITY GATE. COR OR BADGED PERSONNEL WILL ESCORT CONTRACTOR'S PERSONNEL, VEHICLES, AND DELIVERIES THROUGH THE MAIN SECURITY GATE. COORDINATE WITH ADVANCED NOTICE OFF-HOURS ACCESS REQUIREMENTS FOR WORK AND/OR DELIVERIES WITH COR.
- PROVIDE SIGNAGE TO INDICATE ACCESS ROUTE FOR CONSTRUCTION EMPLOYEES AND DELIVERIES ON SITE. PROVIDE NECESSARY BARRICADES, LIGHTS, SIGNAGE AND FENCING TO PROTECT, WARN AND DIRECT PERSONS NEAR CONSTRUCTION AREAS. BARRICADES, SIGNAGE, LIGHTS, FENCING ETC. MUST BE COORDINATED WITH COR PRIOR TO BEING IMPLEMENTED.
- CONTRACTOR'S ACCESS TO BUILDING FOR THE WORK MUST BE THROUGH MECHANICAL ROOM ENTRANCE DOORS AND OTHER ENTRANCES IDENTIFIED BY COR.
- KEEP BUILDING SERVICE DRIVE LANE ACCESSIBLE AT ALL TIMES FOR FAA DELIVERIES. MAINTAIN FAA ACCESS TO FAA DUMPSTERS AT ALL TIMES.
- USE OF BUILDING SERVICE DRIVE LANE MUST BE COORDINATED WITH COR IN ADVANCE.
- DELIVERIES MUST BE SCHEDULED AND APPROVED IN ADVANCE WITH COR AND AT TIMES OTHER THAN FAA EMPLOYEE SHIFT CHANGES TO AVOID CONGESTION. SHIFT CHANGES ARE STAGGERED FOR FAA PERSONNEL. COORDINATE EXACT SHIFT CHANGES WITH COR. COORDINATE DELIVERIES WITH THE COR. DELIVERY VEHICLES MUST ONLY CONTAIN ITEMS BEING DELIVERED TO FAA. IF VEHICLE CONTAINS OTHER DELIVERIES, VEHICLES WILL NOT BE ALLOWED ON SITE.

### B. CONTRACTOR PARKING

- CONTRACTOR PARKING MUST BE COORDINATED WITH COR. CONTRACTOR'S PARKING MUST BE LIMITED AS INDICATED ON PRELIMINARY CONSTRUCTION STAGING PLAN. ADDITIONAL PARKING MUST BE OFF-SITE AND PROVIDED BY CONTRACTOR. EXISTING PARKING SPACES ARE OFF-LIMITS FOR CONTRACTOR PARKING EXCEPT FOR INDICATED PARKING SPACES.

### C. FAA SECURITY REQUIREMENTS

- AN ADVANCE LIST AND WEEKLY LOG OF CONTRACTOR'S PERSONNEL MUST BE PROVIDED TO COR. FAA RESERVES THE RIGHT NOT TO ACCEPT WORKERS. AT THE START OF EACH WORK SHIFT, ALLOW ADEQUATE TIME FOR CONTRACTOR'S PERSONNEL TO SIGN-IN WITH SECURITY. TEMPORARY SECURITY BADGES MUST BE ISSUED TO CONSTRUCTION PERSONNEL. CONTRACTOR'S SUPERVISORY PERSONNEL MUST BE RESPONSIBLE FOR CONDUCT OF THEIR PERSONNEL WHILE ON SITE. CONTRACTOR'S VEHICLES MUST BE MARKED.
- SITE IS A SECURE AREA AND CONSTRUCTION VEHICLES MUST REMAIN IN CONSTRUCTION AREAS.
- THE FACILITY IS A SECURE AREA AND CONSTRUCTION PERSONNEL MUST REMAIN IN CONSTRUCTION AREAS AT ALL TIMES. CONTRACTOR MUST MINIMIZE INGRESS AND EGRESS.
- FAA BADGED ESCORTS AND DESIGNATED ESCORTS WILL BE REQUIRED FOR CONSTRUCTION PERSONNEL WORKING ON SITE. COORDINATE WORK WITHIN THE BUILDING IN ADVANCE WITH COR. ESCORTS OUTSIDE BUILDING WILL BE REQUIRED. CONTRACTOR MUST OBTAIN FAA SECURITY BADGES FOR A SUFFICIENT NUMBER OF EMPLOYEES TO PROVIDE ESCORTS FOR ALL EMPLOYEES.
- CONTRACTOR PERSONNEL MAY BE FINGERPRINTED AND PHOTOGRAPHED FOR FAA SECURITY COMPLIANCE. SOCIAL SECURITY NUMBERS WILL BE REQUIRED.

### D. CONSTRUCTION MATERIAL STORAGE

- STORAGE OF CONSTRUCTION MATERIALS ON SITE MUST BE LIMITED TO THE CONSTRUCTION STAGING AREA. MATERIALS MUST BE NEATLY STORED AND PROTECTED. LIGHTING MUST BE INSTALLED BY THE CONTRACTOR AT THE DISCRETION OF COR. DO NO DIGGING WITHOUT PRIOR PERMISSION FROM COR. BURIED CABLES (UNDERGROUND UTILITIES) MAY RUN THROUGH STAGING AREA AND ELSEWHERE.
- THE CONSTRUCTION STAGING AREA MUST BE SURROUNDED BY A LOCKABLE FENCE. CONSTRUCTION OF THE FENCE MUST BE TO THE SATISFACTION OF THE COR. PROVIDE COR WITH KEYS TO FENCE IN CASE OF EMERGENCY. COORDINATE NUMBER OF KEYS WITH COR.

### E. CONSTRUCTION DEBRIS

- ENCLOSED DUMPSTERS FOR DISPOSAL OF CONSTRUCTION DEBRIS MUST BE PROVIDED BY CONTRACTOR IN THE LOCATION INDICATED. AREAS AROUND DUMPSTERS MUST BE KEPT CLEAN AND FREE OF EXCESS DEBRIS AND DUST DURING CONSTRUCTION. DEBRIS MUST BE REMOVED BY CONTRACTOR DAILY. PROVIDE SEPARATE DUMPSTER, IF REQUIRED, FOR ABATEMENT MATERIAL. QUANTITY AND POSITION OF DUMPSTERS MUST BE COORDINATED WITH THE COR PRIOR TO THEIR DELIVERY AND PLACEMENT. CONSTRUCTION DUMPSTER MUST NOT INTERFERE WITH ACCESS TO FAA DUMPSTERS.

### F. CONSTRUCTION OFFICE

- ROOM 133, ESU STORAGE, MAY BE USED AS PROVISIONAL OFFICE SPACE FOR THE CONTRACTOR. CONTRACTOR MUST PROVIDE BOTTLED WATER. TEMPORARY POWER FOR SMALL OFFICE EQUIPMENT IS AVAILABLE. IF REQUIRED FOR CONSTRUCTION PURPOSES OF THE WORK, COORDINATE SPACE REQUIREMENTS WITHIN ROOM WITH COR. COORDINATE TEMPORARY RELOCATION OF FAA EQUIPMENT AND MATERIALS AS REQUIRED. PRIOR TO PROJECT COMPLETION, RETURN SPACE TO ORIGINAL CONDITION, COORDINATE WITH COR.

### G. CONSTRUCTION TOILET FACILITIES

- PORTABLE CHEMICAL TOILETS MUST BE PROVIDED WITHIN THE CONSTRUCTION STAGING AREA. PORTABLE CHEMICAL TOILETS MUST NOT BE ALLOWED WITHIN THE BUILDING. COORDINATE WITH THE COR FOR SCHEDULING OF SERVICE.
- PROVIDE WASH STATIONS IN ADDITION TO PORTABLE TOILETS IN CONSTRUCTION STAGING AREA.
- TOILET ROOMS INSIDE BUILDING ARE NOT FOR THE CONTRACTOR'S USE.

### H. DEMOLITION AND CONSTRUCTION HOURS

- OAK ATCT IS A 24 HOUR 7 DAY PER WEEK OPERATING FACILITY. THE BASE BUILDING OPERATES UNDER NORMAL BUSINESS HOURS (MONDAY - FRIDAY, 7:00 AM - 4:00 PM). NORMAL CONSTRUCTION HOURS MUST BE MONDAY - FRIDAY, 7:30 AM - 4:00 PM.
- CONTRACTOR MUST NOT INTERFERE WITH THE FUNCTION OF THIS FACILITY. DEMOLITION AND CONSTRUCTION NOISE MUST BE MINIMIZED BETWEEN 6:00 AM TO 7:00PM. WORK DETERMINED BY THE COR TO BE DISRUPTIVE TO THE OPERATIONS MUST BE STOPPED AND RESCHEDULED TO BE PERFORMED DURING OFF-HOURS.
- OFF HOURS WORK MUST BE ACCOMPLISHED 7:00PM TO 6:00 AM, MONDAY - FRIDAY. OFF HOURS WORK MUST OCCUR DURING HOURS MOST BENEFICIAL TO THE FACILITY, INCLUDING BUT NOT LIMITED TO NIGHTS AND WEEKENDS. COORDINATE WITH COR WORK REQUIRED TO BE PERFORMED DURING OFF HOURS, NIGHTS, AND WEEKENDS TO MINIMIZE RISK AND DISRUPTION TO THE OPERATIONAL FACILITY.
- FAA HAS AND MAINTAINS EQUIPMENT THAT IS CRITICAL TO ITS OPERATION THROUGHOUT THIS FACILITY. COORDINATE WITH COR LOCATION OF CRITICAL EQUIPMENT THAT MAY BE AFFECTED BY THE WORK DIRECTLY OR THROUGH CLOSE PROXIMITY. COORDINATE WITH COR PROCEDURES TO PROTECT FAA/GOVERNMENT EQUIPMENT. WORK IN AREAS WITH CRITICAL EQUIPMENT MUST BE ACCOMPLISHED DURING OFF-HOURS OR AS APPROVED BY COR.
- NOISY DEMOLITION (INSIDE OR OUTSIDE), OFF-HOURS CONSTRUCTION ACTIVITIES, AND WORK AFFECTING THE EQUIPMENT ROOM MUST BE SCHEDULED, COORDINATED AND APPROVED IN WRITING BY COR WITH A MINIMUM OF 10 WORKING DAYS NOTICE IN ADVANCE OF PERFORMANCE OF THE WORK.
- CONCRETE SAWING, CORE DRILLING, CONCRETE DEMOLITION AND ANCHOR DRILLING MUST BE ALLOWED ONLY AT PREARRANGED TIMES APPROVED BY COR. SCHEDULE, COORDINATE AND HAVE APPROVAL BY COR IN WRITING, A MINIMUM OF 10 WORKING DAYS BEFORE THE PERFORMANCE OF THE WORK.

### I. HAZMAT REMOVAL AND DISPOSAL

- PER FAA INFORMATION, THERE IS NO HAZMAT IN THE AREA OF WORK. IF HAZMAT IS ENCOUNTERED OR IF ANY MATERIAL IS SUSPECTED TO CONTAIN HAZMAT, CEASE WORK IN THE AREA AND NOTIFY COR TO PLAN HOW TO PROCEED WITH THE WORK.

### J. PARKING LOT, DRIVEWAY REPAIR, AND LANDSCAPED AREAS

- UPON COMPLETION OF WORK, CONTRACTOR MUST REPAIR PAVED SURFACES AT AFFECTED WORK AREAS TO ORIGINAL CONDITION, INCLUDING STRIPING OF REPAIRED PAVED SURFACES.
- DISTURBED LAWNS AND LANDSCAPING MUST BE RESTORED TO ORIGINAL CONDITION BY CONTRACTOR TO THE SATISFACTION OF COR. LAWN DAMAGED BY THE WORK MUST BE REPLACED TO MATCH EXISTING AND TO SATISFACTION OF COR.

### K. EQUIPMENT PROTECTION

- PROTECT FAA EQUIPMENT, BOTH INSIDE AND OUTSIDE BUILDING, FROM DAMAGE, INCLUDING BUT NOT LIMITED TO: DAMAGE CAUSED BY IMPACT, VIBRATIONS, WATER, HAZMAT, DEBRIS AND DUST, INCLUDING CORE DRILLING.
- SHUTDOWNS AND SWITCHOVERS OF MECHANICAL AND ELECTRICAL SYSTEMS MUST BE ACCOMPLISHED DURING OFF-HOURS AS INDICATED UNDER DEMOLITION AND CONSTRUCTION HOURS ON THIS SHEET. ONLY FAA MAY SHUT OFF MECHANICAL VALVES. COORDINATE SHUTTING OFF VALVES WITH COR. PREPARATORY WORK MUST BE COMPLETED PRIOR TO SHUTDOWN AND SWITCHOVER. SCHEDULE, COORDINATE AND HAVE APPROVAL IN WRITING BY COR WITH A MINIMUM OF 10 WORKING DAYS NOTICE IN ADVANCE OF PERFORMANCE OF WORK. ONLY FAA PERSONNEL MAY OPERATE CIRCUIT BREAKERS. CONTRACTOR MUST REQUEST PERMISSION, COORDINATE, AND HAVE APPROVAL IN WRITING BY COR WITH A MINIMUM OF 10 WORKING DAYS NOTICE IN ADVANCE FOR EACH CASE OF BREAKER OPERATION. CONTRACTOR MUST NOT OPEN (DE-ENERGIZE) OR CLOSE (ENERGIZE) ANY CIRCUIT BREAKER AT ANY TIME.
- ATCT IS A 24 HOUR 7 DAY PER WEEK OPERATING FACILITY. COORDINATE CONSTRUCTION ACTIVITY SO AS NOT TO INTERFERE WITH FUNCTIONS OF THE FACILITY.
- NO WELDING EQUIPMENT MUST BE POWERED BY THE FACILITY ELECTRICAL SYSTEM. WELDING MUST NOT BE PERMITTED IN FAA OCCUPIED AREAS UNLESS APPROVED IN WRITING BY COR. OSHA WORK PRACTICES MUST BE EXERCISED FOR ALL PHASES OF CONSTRUCTION INCLUDING WELDING OPERATIONS.
- USE GREAT CARE AND CAUTION WHILE WORKING IN ALL AREAS OF THIS FACILITY. WORK MUST BE COORDINATED WITH COR. DISRUPTION OF THIS FACILITY SHALL NOT BE PERMITTED.
- EXISTING FAA AIR TRAFFIC EQUIPMENT MUST REMAIN OPERATIONAL THROUGHOUT DURATION OF THIS CONTRACT. PROVIDE CONTINUOUS PROTECTION OF THIS EQUIPMENT FROM PHYSICAL OR ELECTRICAL DAMAGE AS A RESULT OF INCIDENTAL OR ACCIDENTAL NEGLIGENCE SUCH AS, BUT NOT LIMITED TO, DISRUPTION OF POWER TO EQUIPMENT. NOTIFY COR IMMEDIATELY OF DAMAGE OR DISRUPTION OF ELECTRICAL AND/OR MECHANICAL SERVICES.
- VENT TO THE EXTERIOR FUMES AND ODORS RESULTING FROM THE WORK. VENTS MUST NOT DISCHARGE NEAR AIR INTAKES, WINDOWS OR SIMILAR OPENINGS TO THE BUILDING. TAKE CARE NOT TO EXPOSE FAA EMPLOYEES TO FUMES, ODORS, OR OFF GASSING.

### L. COVID-19 PROTOCOL AND SAFETY PLAN

- COORDINATE WITH COR LOCAL, FEDERAL AND FAA-SPECIFIC PROTOCOL FOR COVID-19 AT THE TIME OF THE WORK. COMPLY WITH LOCAL, FEDERAL, AND FAA-SPECIFIC PROTOCOL AS REQUIRED.
- REFER TO SPECIFICATIONS FOR COVID-19 SAFETY PLAN REQUIREMENTS AND OTHER SPECIAL CONTRACT REQUIREMENTS.

# PRELIMINARY CONSTRUCTION STAGING PLAN

NOTE:  
FINAL CONSTRUCTION STAGING AREA WILL BE DETERMINED AT THE PRECONSTRUCTION MEETING.

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PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

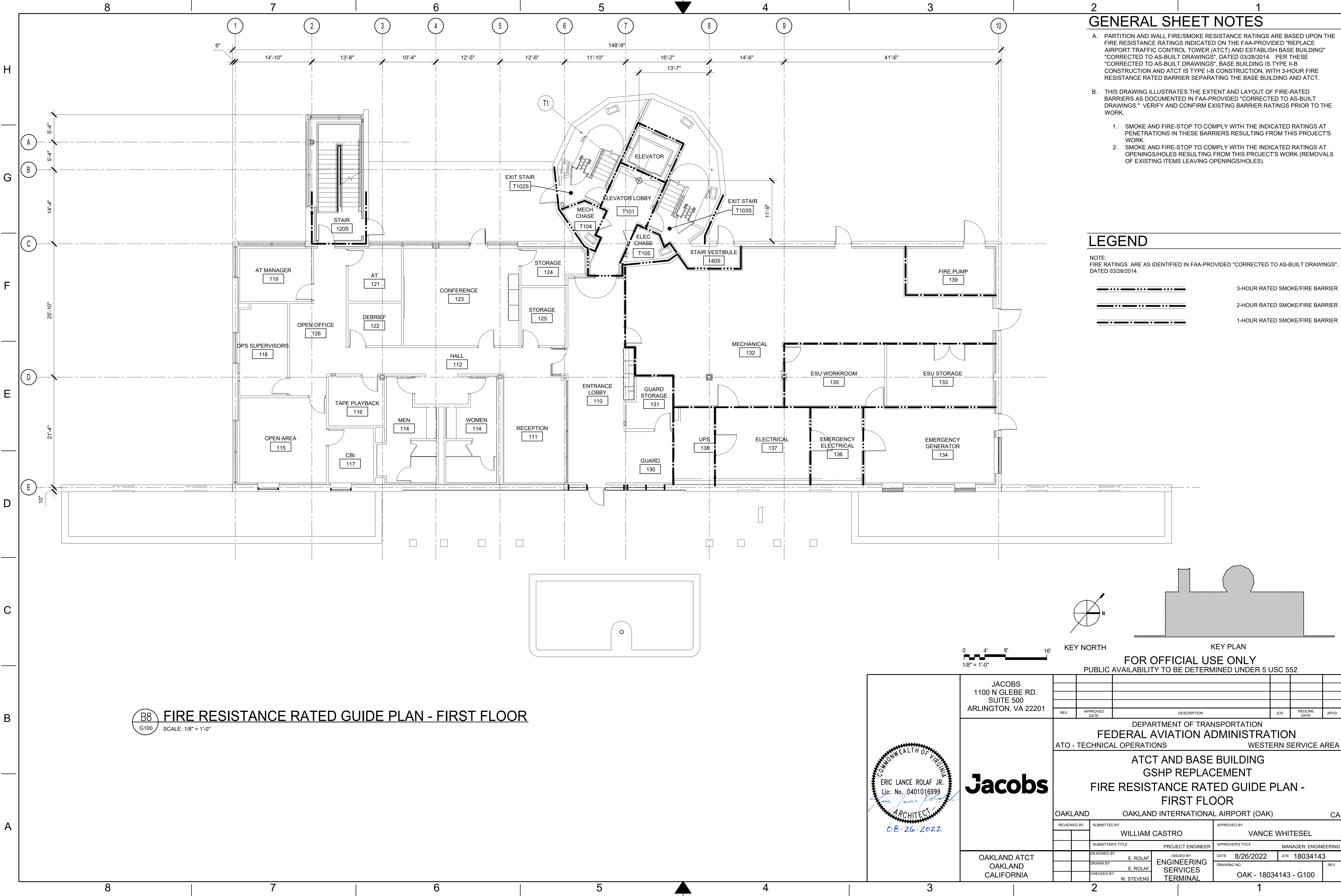
REV.	APPROVED DATE	DESCRIPTION						JCN	REDLINE DATE	APVD
<p align="center"><b>DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION</b></p> <p><b>AUTO - TECHNICAL OPERATIONS</b>                      <b>WESTERN SERVICE AREA</b></p> <p align="center"><b>ATCT AND BASE BUILDING GSHP REPLACEMENT</b></p> <p align="center"><b>PRELIMINARY CONSTRUCTION STAGING PLAN</b></p>										
OAKLAND	OAKLAND INTERNATIONAL AIRPORT (OAK)								CA	
REVIEWED BY	SUBMITTED BY					APPROVED BY				
	WILLIAM CASTRO					VANCE WHITESEL				
	SUBMITTER'S TITLE					MANAGER: ENGINEERING				
	PROJECT ENGINEER									
DESIGNED BY	E. ROLAF	ISSUED BY				DATE	8/26/2022	JCN:	18034143	
DRAWN BY	E. ROLAF	ENGINEERING SERVICES TERMINAL								
CHECKED BY	W. STEVENS					DRAWING NO.		OAK - 18034143 - G040		
								REV.		

**Jacobs**

OAKLAND ATCT  
OAKLAND  
CALIFORNIA

ISSUED BY <b>ENGINEERING          SERVICES          TERMINAL</b>	DATE	8/26/2022	JCN:	18034
	DRAWING NO. OAK - 18034143 - G040			





GENERAL SHEET NOTES

- A. PARTITION AND WALL FIRE/SMOKE RESISTANCE RATINGS ARE BASED UPON THE FIRE RESISTANCE RATINGS INDICATED ON THE FAA-PROVIDED "REPLACE AIRPORT TRAFFIC CONTROL TOWER (ATCT) AND ESTABLISH BASE BUILDING" "CORRECTED TO AS-BUILT DRAWINGS", DATED 03/28/2014. PER THESE "CORRECTED TO AS-BUILT DRAWINGS", BASE BUILDING IS TYPE II-B CONSTRUCTION AND ATCT IS TYPE I-B CONSTRUCTION, WITH 3-HOUR FIRE RESISTANCE RATED BARRIER SEPARATING THE BASE BUILDING AND ATCT.
- B. THIS DRAWING ILLUSTRATES THE EXTENT AND LAYOUT OF FIRE-RATED BARRIERS AS DOCUMENTED IN FAA-PROVIDED "CORRECTED TO AS-BUILT DRAWINGS." VERIFY AND CONFIRM EXISTING BARRIER RATINGS PRIOR TO THE WORK.
1. SMOKE AND FIRE-STOP TO COMPLY WITH THE INDICATED RATINGS AT PENETRATIONS IN THESE BARRIERS RESULTING FROM THIS PROJECT'S WORK.
  2. SMOKE AND FIRE-STOP TO COMPLY WITH THE INDICATED RATINGS AT OPENINGS/HOLES RESULTING FROM THIS PROJECT'S WORK (REMOVALS OF EXISTING ITEMS LEAVING OPENINGS/HOLES).

LEGEND

NOTE:  
FIRE RATINGS ARE AS IDENTIFIED IN FAA-PROVIDED "CORRECTED TO AS-BUILT DRAWINGS", DATED 03/28/2014.

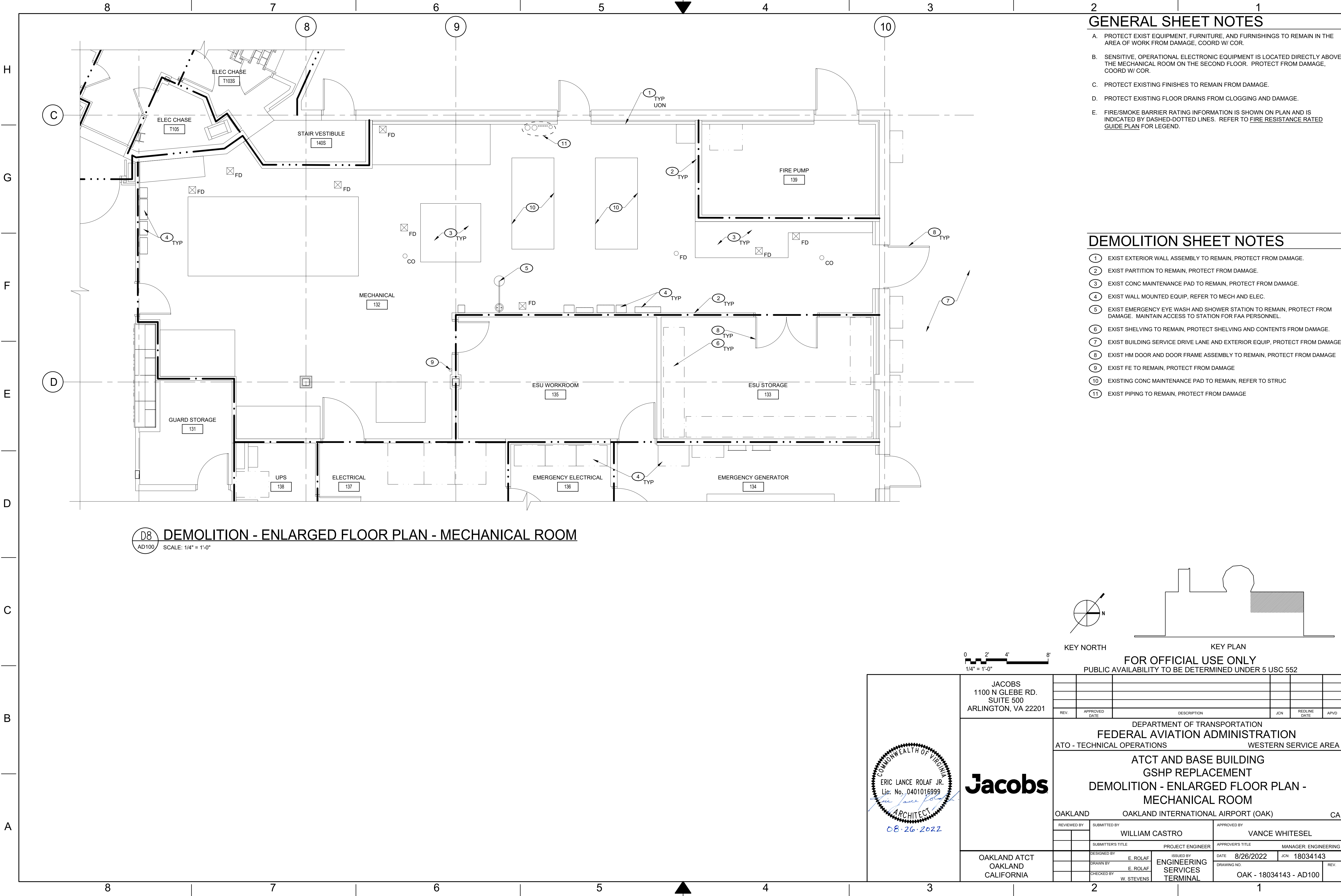
- 3-HOUR RATED SMOKE/FIRE BARRIER
- 2-HOUR RATED SMOKE/FIRE BARRIER
- 1-HOUR RATED SMOKE/FIRE BARRIER

B8 FIRE RESISTANCE RATED GUIDE PLAN - FIRST FLOOR

G100 SCALE: 1/8" = 1'-0"

	JACOBS 1100 N GLEBE RD. SUITE 500 ARLINGTON, VA 22201				
		DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS WESTERN SERVICE AREA			
		ATCT AND BASE BUILDING GSHP REPLACEMENT FIRE RESISTANCE RATED GUIDE PLAN - FIRST FLOOR			
		OAKLAND	OAKLAND INTERNATIONAL AIRPORT (OAK)		
REVIEWED BY		SUBMITTED BY WILLIAM CASTRO	APPROVED BY VANCE WHITESEL		
DESIGNED BY E. ROLAF		PROJECT ENGINEER	MANAGER: ENGINEERING		
DRAWN BY E. ROLAF		ISSUED BY ENGINEERING SERVICES TERMINAL	DATE: 8/26/2022 JCN: 18034143		
CHECKED BY W. STEVENS		DRAWING NO. OAK - 18034143 - G100		REV.	
OAKLAND ATCT OAKLAND CALIFORNIA					





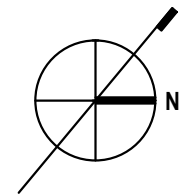
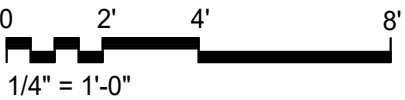
GENERAL SHEET NOTES

- A. PROTECT EXIST EQUIPMENT, FURNITURE, AND FURNISHINGS TO REMAIN IN THE AREA OF WORK FROM DAMAGE, COORD W/ COR.
- B. SENSITIVE, OPERATIONAL ELECTRONIC EQUIPMENT IS LOCATED DIRECTLY ABOVE THE MECHANICAL ROOM ON THE SECOND FLOOR. PROTECT FROM DAMAGE, COORD W/ COR.
- C. PROTECT EXISTING FINISHES TO REMAIN FROM DAMAGE.
- D. PROTECT EXISTING FLOOR DRAINS FROM CLOGGING AND DAMAGE.
- E. FIRE/SMOKE BARRIER RATING INFORMATION IS SHOWN ON PLAN AND IS INDICATED BY DASHED-DOTTED LINES. REFER TO FIRE RESISTANCE RATED GUIDE PLAN FOR LEGEND.

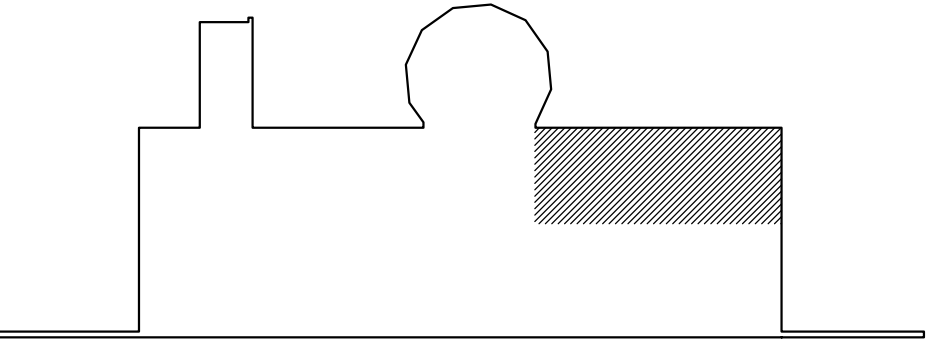
DEMOLITION SHEET NOTES

- 1 EXIST EXTERIOR WALL ASSEMBLY TO REMAIN, PROTECT FROM DAMAGE.
- 2 EXIST PARTITION TO REMAIN, PROTECT FROM DAMAGE.
- 3 EXIST CONC MAINTENANCE PAD TO REMAIN, PROTECT FROM DAMAGE.
- 4 EXIST WALL MOUNTED EQUIP, REFER TO MECH AND ELEC.
- 5 EXIST EMERGENCY EYE WASH AND SHOWER STATION TO REMAIN, PROTECT FROM DAMAGE. MAINTAIN ACCESS TO STATION FOR FAA PERSONNEL.
- 6 EXIST SHELVING TO REMAIN, PROTECT SHELVING AND CONTENTS FROM DAMAGE.
- 7 EXIST BUILDING SERVICE DRIVE LANE AND EXTERIOR EQUIP, PROTECT FROM DAMAGE
- 8 EXIST HM DOOR AND DOOR FRAME ASSEMBLY TO REMAIN, PROTECT FROM DAMAGE
- 9 EXIST FE TO REMAIN, PROTECT FROM DAMAGE
- 10 EXISTING CONC MAINTENANCE PAD TO REMAIN, REFER TO STRUC
- 11 EXIST PIPING TO REMAIN, PROTECT FROM DAMAGE

D8 DEMOLITION - ENLARGED FLOOR PLAN - MECHANICAL ROOM  
AD100 SCALE: 1/4" = 1'-0"




KEY NORTH



KEY PLAN

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PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

<div>JACOBS 1100 N GLEBE RD. SUITE 500 ARLINGTON, VA 22201</div> <div></div>	<div>JACOBS</div>	DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS WESTERN SERVICE AREA					
		ATCT AND BASE BUILDING GSHP REPLACEMENT DEMOLITION - ENLARGED FLOOR PLAN - MECHANICAL ROOM					
		OAKLAND OAKLAND INTERNATIONAL AIRPORT (OAK) CA					
		REVIEWED BY		SUBMITTED BY		APPROVED BY	
		WILLIAM CASTRO		VANCE WHITESEL			
DESIGNED BY		PROJECT ENGINEER		MANAGER: ENGINEERING			
E. ROLAF							
DRAWN BY		ISSUED BY		DATE			
E. ROLAF		E. ROLAF		8/26/2022			
CHECKED BY		DRAWING NO.		JCN: 18034143			
W. STEVENS		OAK - 18034143 - AD100		REV.			







## GENERAL

3. VERIFY AND BE RESPONSIBLE FOR DIMENSIONS AND CONDITIONS AT THE SITE AND IS TO NOTIFY THE ENGINEER OF RECORD OF DISCREPANCIES BETWEEN THE ACTUAL CONDITIONS AND INFORMATION SHOWN ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK. REFER TO ARCHITECTURAL, MECHANICAL, AND ELECTRICAL.
2. BRING OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE CONTRACT DRAWINGS AND THE SPECIFICATIONS TO THE ATTENTION OF THE ENGINEER OF RECORD BEFORE PROCEEDING WITH ANY WORK SO INVOLVED. REPORT DISCREPANCIES TO THE ENGINEER OF RECORD FOR RESOLUTION BEFORE PROCEEDING.
3. DIMENSIONS TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS AND DETAILS. NOTES AND DETAILS ON DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
4. DO NOT STORE CONSTRUCTION MATERIALS ON POURED OR ERECTED FLOORS OR ROOF IN EXCESS OF 80% OF THE DESIGN LIVE LOAD. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE SUB-CONTRACTORS ARE INFORMED AND DO NOT VIOLATE THIS IMPORTANT REQUIREMENT. AVOID PLACING MATERIALS ON ALREADY POURED OR ERECTED FLOORS OR ROOFS.
5. DO NOT PLACE OPENINGS, POCKETS, ETC., IN SLABS, BEAMS, COLUMNS, WALLS, ETC. UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL OR APPROVED IN WRITING BY THE ENGINEER OF RECORD.
6. ASTM SPECIFICATIONS NOTED ON THESE DRAWINGS MUST BE THE LATEST REVISIONS.
7. IN THE EVENT CERTAIN FEATURES OF THE CONSTRUCTION ARE NOT FULLY SHOWN ON THE DRAWINGS OR CALLED FOR IN THE NOTES OR SPECIFICATIONS THEIR CONSTRUCTION ARE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE SHOWN OR CALLED FOR AND BE REVIEWED BY THE ENGINEER OF RECORD.
8. SEE ARCHITECTURAL FOR THE FOLLOWING:
  - SIZE AND LOCATION OF DOOR AND WINDOW OPENINGS, EXCEPT AS NOTED.
  - SIZE AND LOCATION OF INTERIOR AND EXTERIOR NON-BEARING PARTITIONS.
  - SIZE AND LOCATION OF CONCRETE CURBS, FLOOR DRAINS, SLOPES, DEPRESSED AREAS, CHANGES IN LEVEL, CHAMFERS, GROOVES, INSERTS, ETC.
  - SIZE AND LOCATION OF FLOOR AND ROOF OPENINGS EXCEPT AS SHOWN.
  - DIMENSIONS NOT SHOWN ON STRUCTURAL
9. SEE MECHANICAL, AND ELECTRICAL FOR THE FOLLOWING:
  - PIPE AND DUCT RUNS, SLEEVES, HANGERS, TRENCHES, PITS, WALL AND SLAB OPENINGS, ETC. EXCEPT AS SHOWN OR NOTED.
  - ELECTRICAL CONDUIT RUNS, BOXES, OUTLETS IN WALL AND SLABS.
  - CONCRETE INSERTS FOR ELECTRICAL OR PLUMBING FIXTURES.
10. ITEMS IN THE PROJECT SPECIFICATIONS, BUT NOT SHOWN ON THE DRAWINGS ARE CONSIDERED AS PART OF THE DRAWINGS.
11. ALTERATION, REHABILITATION OR RECONSTRUCTION: ARE IN ACCORDANCE WITH THE GOVERNING CODE. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK ARE NOT COMPLYING WITH THE GOVERNING CODE, A CHANGE ORDER, OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED WORK TO BE SUBMITTED TO AND APPROVED BY THE ENGINEER OF RECORD BEFORE PROCEEDING WITH THE WORK.
12. SUBSTITUTIONS: PROVIDE MANUFACTURER'S ICC REPORTS AND A LIST OF PROPOSED SUBSTITUTIONS TO THE ENGINEER OF RECORD FOR REVIEW BEFORE FABRICATION.
13. CONSTRUCTION LOADS: MATERIALS TO BE EVENLY DISTRIBUTED IF PLACED ON FRAMED FLOORS OR ROOFS. LOADS ARE TO NOT EXCEED THE ALLOWABLE LOADING FOR THE SUPPORTING MEMBERS AND THEIR CONNECTIONS.
14. STRUCTURAL PLANS INDICATE ONLY THE APPROXIMATE LOCATION OF MECHANICAL, ELECTRICAL AND OTHER EQUIPMENT, AS WELL AS THE RELATED AUXILIARY FRAMING NECESSARY TO SUPPORT SUCH EQUIPMENT. THE FINAL POSITIONING OF THESE ITEMS IS DEPENDENT UPON THE EQUIPMENT PROVIDED. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WORK BETWEEN SUBCONTRACTORS AND CRAFTS IN THIS REGARD, AND PROVIDING NECESSARY DIMENSIONS IN A TIMELY MANNER TO PARTIES INVOLVED. GENERAL
15. PIPES, DUCTS, SLEEVES, CHASES, ETC. NOT TO BE PLACED IN SLABS, BEAMS, OR WALLS UNLESS SPECIFICALLY SHOWN OR NOTED NOR ANY STRUCTURAL MEMBER BE CUT FOR PIPES, DUCTS, ETC., UNLESS SPECIFICALLY SHOWN. OBTAIN PRIOR WRITTEN APPROVAL FOR INSTALLATION OF ANY ADDITIONAL PIPES, DUCTS, ETC.
16. CONSTRUCTION METHODS AND PROJECT SAFETY: THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE AND DO NOT INDICATE METHODS, PROCEDURES OR SEQUENCE OF CONSTRUCTION. TAKE NECESSARY PRECAUTIONS TO MAINTAIN AND INSURE THE INTEGRITY OF THE STRUCTURE DURING CONSTRUCTION. NEITHER THE GOVERNMENT, ARCHITECT, NOR ENGINEER IS TO ENFORCE SAFETY MEASURES OR REGULATIONS. THE CONTRACTOR TO CONSTRUCT AND MAINTAIN SAFETY DEVICES, INCLUDING SHORING AND BRACING, AND BE SOLELY RESPONSIBLE FOR CONFORMING TO LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS.

## DESIGN CRITERIA

THE PROJECT IS TO BE DESIGNED UNDER INDUSTRY STANDARDS LISTED BELOW. THE FOLLOWING LATEST PUBLICATIONS UON TO BE USED FOR THE DESIGN, FABRICATION, AND CONSTRUCTION OF STRUCTURAL ITEMS FOR THE PROJECT:

INTERNATIONAL BUILDING STANDARDS CODE, 2018 EDITION.

ASCE 7-16 MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES.

ACI 318-14, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY.

ACI 301-16, SPECIFICATIONS FOR STRUCTURAL CONCRETE

ACI SP-66-04, ACI DETAILING MANUAL

## DESIGN LOADS

- |    |  |                                       |
|----|--|---------------------------------------|
| 1. | DEAD LOADS: AS CALCULATED ACTUAL WEIGHT OF PERMANENT BUILDING MATERIALS AND EQUIPMENT. |                                       |
| 2. | LIVE LOADS:<br>A. MECHANICAL AND ELECTRICAL ROOMS                                      | 150 PSF                               |
| 3. | SEISMIC LOAD:<br>SITE CLASS:   | E (BASED ON RECORD DRAWINGS)          |
|    | RISK CATEGORY  | IV                                    |
|    | SPECTRAL ACCELERATION:   | $S_S = 1.50g$<br>$S_1 = 0.60g$        |
|    | DESIGN SPECTRAL ACCELERATION:  | $S_{DS} = 1.219g$<br>$S_{D1} = 0.80g$ |
|    | SEISMIC DESIGN CATEGORY:   | D                                     |
|    | SEISMIC IMPORTANCE FACTOR  | $I_e = 1.50$                          |
|    | HEAT PUMP, BUFFER TANK, EXPANSION TANK   | $a_p = 1.0$<br>$R_p = 2.5$            |

## CONCRETE

- PHASES OF WORK PERTAINING TO THE CONCRETE CONSTRUCTION IS TO CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-14) WITH MODIFICATIONS AS NOTED IN THE DRAWINGS OR SPECIFICATIONS.
2. CONCRETE MIXES MUST BE DESIGNED BY A QUALIFIED TESTING LABORATORY, STAMPED AND SIGNED BY A LICENSED CIVIL ENGINEER AND APPROVED BY THE STRUCTURAL ENGINEER. DO NOT USE CALCIUM CHLORIDE IN ADMIXTURES.
3. SCHEDULE OF STRUCTURAL CONCRETE, 28 DAY STRENGTHS AND TYPES
- | LOCATIONS OF STURCTURE | STRENGTHS PSI | TYPE          |
|------------------------|---------------|---------------|
| A. HOUSEKEEPING PAD    | 4,000         | NORMAL WEIGHT |
4. PORTLAND CEMENT IS TO CONFORM TO ASTM C-150 TYPE II/V WHERE IN CONTACT WITH EARTH. TYPE III/II LOW ALKALI ELSEWHERE.
5. AGGREGATE FOR CRUSHED-ROCK CONCRETE IS TO CONFORM TO REQUIREMENTS AND TESTS AT ASTM C-33 AND PROJECT SPECIFICATIONS. EXCEPTIONS MAY BE USED ONLY WITH PERMISSION OF THE ENGINEER OF RECORD.
6. PLACEMENT OF CONCRETE IS TO CONFORM TO ACI STANDARD 301 AND PROJECT SPECIFICATIONS. SLAB/BLAST CONCRETE SURFACES AGAINST WHICH CONCRETE IS TO BE PLACED.
7. MINIMUM CLEAR COVERAGE OF CONCRETE OVER OUTER REINFORCING BARS IS AS FOLLOWS (UNLESS NOTED OTHERWISE):
- |  | MIN. COVER, INCHES    |
|--|-----------------------|
| 1. CAST-IN PLACE   |                       |
| 1. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH  | 3                     |
| 2. CONCRETE EXPOSED TO EARTH OR WEATHER:<br>No. 6 THRU No. 18 BAR<br>No. 5 BAR, W31 OR D31 WIRE, & SMALLER   | 2<br>1 1/2            |
| 3. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:<br>SLABS, WALLS:<br>No. 14 AND NO. 18 BAR<br>No. 11 AND SMALLER<br>BEAMS, COLUMNS, PEDESTALS<br>AND TENSION TIES | 1 1/2<br>3/4<br>1 1/2 |
8. REINFORCING BARS, ANCHOR BOLTS AND OTHER CONCRETE INSERTS ARE TO BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.
9. THE MAXIMUM SLUMP NOT TO EXCEED THE SLUMP OF 5" PER THE MIX DESIGN THAT HAS BEEN REVIEWED AND APPROVED BY THE ENGINEER OF RECORD OF RECORD. WATER CEMENT RATIOS ARE NOT TO EXCEED 0.45.
10. ROUGHEN SURFACE OF HORIZONTAL OR NEARLY HORIZONTAL CONSTRUCTION JOINTS SO THAT THE AGGREGATE IS TO BE EXPOSED UNIFORMLY, LEAVING NO LAITANCE, LOOSENED PARTICLES OR DAMAGED CONCRETE.
11. CHAMFER 3/4 INCH ON EXPOSED CORNERS UNO.

## REINFORCING STEEL

1. REINFORCING STEEL ARE DETAILED AND PLACED IN CONFORMANCE WITH THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-14), AND THE "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION" (LATESTED.) BY THE C.R.S.I., AS MODIFIED BY THE PROJECT DRAWINGS AND SPECIFICATIONS.
2. REINFORCING BARS ARE TO CONFORM TO THE REQUIREMENTS OF ASTM A-615 GRADE 60.
3. WELDED REINFORCEMENT ARE TO CONFORM TO THE REQUIREMENTS OF ASTM A-706 GRADE 60. WELDING OF REINFORCEMENT ARE TO BE WITH LOW HYDROGEN ELECTRODES IN CONFORMANCE WITH "RECOMMENDED PRACTICES FOR WELDING REINFORCING STEEL", ETC., AMERICAN WELDING SOCIETY, AWS D1.4 (SEE SPECIFICATIONS).
4. REINFORCING BAR BENDS ARE MADE COLD.
5. PROVIDE CHAIRS, SPACERS, AND SAND PLATES AS REQUIRED TO MAINTAIN CONCRETE COVER.
6. SPLICES (STANDARD LAPS):  
REFER TO SCHEDULE IN TYPICAL DETAILS FOR SPLICE LENGTHS. STAGGER BOTTOM SPLICES AT LEAST 5'-0" FROM SPLICES IN OTHER BOTTOM REINFORCEMENT. STAGGER SPLICES FOR TOP REINFORCEMENT SIMILAR.
7. BARS ARE MARKED SO THEIR IDENTIFICATION CAN BE MADE WHEN THE FINAL IN-PLACE INSPECTIO

## POST INSTALLED ANCHORS

1. ANCHOR RODS FOR POST-INSTALLED ANCHORS ARE F1554 THREADED RODS. SEE DRAWINGS FOR ANCHOR DIAMETER. PROVIDE STANDARD EMBEDMENT DEPTH UNLESS OTHERWISE NOTED AND INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
2. CONCRETE ANCHORAGE: USE ADHESIVE OR MECHANICAL ANCHORS OR AS INDICATED ON DRAWINGS.
3. DRILLING OF BOLT HOLES ARE NOT TO DAMAGE REBAR IN CONCRETE. DETECT REBARS AND OFFSET BOLTS AS NECESSARY BEFORE DRILLING. DRILL HOLES IN ITEMS TO BE FASTENED AFTER BOLTS ARE INSTALLED.
4. PROVIDE A STANDARD WASHER AND HEX NUT WITH EACH BOLT.
5. PROVIDE STAINLESS STEEL FASTENERS FOR EXTERIOR USE OR WHEN EXPOSED TO WEATHER. PROVIDE GALVANIZED CARBON STEEL ANCHORS AT OTHER LOCATIONS. UNLESS OTHERWISE NOTED.
6. IF REINFORCEMENT IS ENCOUNTERED DURING DRILLING, ABANDON AND SHIFT THE HOLE LOCATION TO SOUND CONCRETE BETWEEN THE DOWEL AND THE ABANDONED HOLE. FILL THE ABANDONED HOLE WITH NON-SHRINK GROUT. IF THE ANCHOR OR DOWEL CAN NOT BE SHIFTED AS NOTED ABOVE, THE ENGINEER MUST DETERMINE THE NEW LOCATION.
7. LOCATE REINFORCEMENT AND CONFIRM FINAL ANCHOR LOCATIONS PRIOR TO FABRICATING PLATES, MEMBERS, OR OTHER STEEL ASSEMBLIES ATTACHED WITH MECHANICAL ANCHORS.

## ADHESIVE ANCHORS

1. ADHESIVE ANCHORS: HILTI HIT-RE500-V3 (ICC ESR-3814) OR APPROVED EQUAL.
2. INSTALL ANCHORS IN ACCORDANCE WITH THE LATEST ICC-ESR.

## STRUCTURAL TEST & INSPECTIONS

1. SPECIAL INSPECTIONS PROVIDED BY AN APPROVED INDEPENDENT AGENCY HIRED BY THE CONTRACTOR. SPECIAL INSPECTION PROVIDED FOR THE FOLLOWING TYPES OF WORK PER CHAPTER 17 OF IBC 2018 SEE PROJECT SPECIFICATIONS FOR SPECIFIC REQUIREMENTS.
- A. BOLTS AND DOWELS INSTALLED IN CONCRETE.
- B. CONCRETE REINFORCEMENT
- C. POST-INSTALLED ANCHORS IN CONCRETE PER ACI 318-14 SECTION 17.8.2

## DEFERRED SUBMITTALS

1. THE FOLLOWING ITEMS NOT SPECIFICALLY DETAILED HEREIN, ARE DEFERRED SUBMITTALS PENDING APPROVAL OF THE AUTHORITY HAVING JURISDICTION:
  - A. SEISMIC SUPPORT AND ANCHORAGE OF MEP EQUIPMENT AND FIXTURES.
2. DEFERRED SUBMITTALS MUST BE ACCOMPANIED BY CALCULATIONS SIGNED AND SEALED BY A LICENSED CIVIL/STRUCTURAL ENGINEER.
3. DEFERRED SUBMITTALS MUST BE SUBMITTED TO AND APPROVED BY THE AUTHORITY HAVING JURISDICTION PRIOR TO INSTALLATION

### TABLE 1705.3

## REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION


VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	IBC REFERENCE
1. INSPECT REINFORCEMENT AND VERIFYING PLACEMENT.	-	X	ACI 318: CH. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.	X	-	ACI 318: 17.8.2.4	-
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	-	X	ACI 318: 17.8.2	-
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 2.a.				
3. VERIFY USE OF REQUIRED DESIGN MIX	-	X	ACI 318: CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
4. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12	1908.10
5. INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
6. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	-	X	ACI 318: 26.5.3-26.5.5	1908.9
7. INSPECT FORM/WORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X	ACI 318: 26.11.1,2(b)	-

## STRUCTURAL ABBREVIATIONS

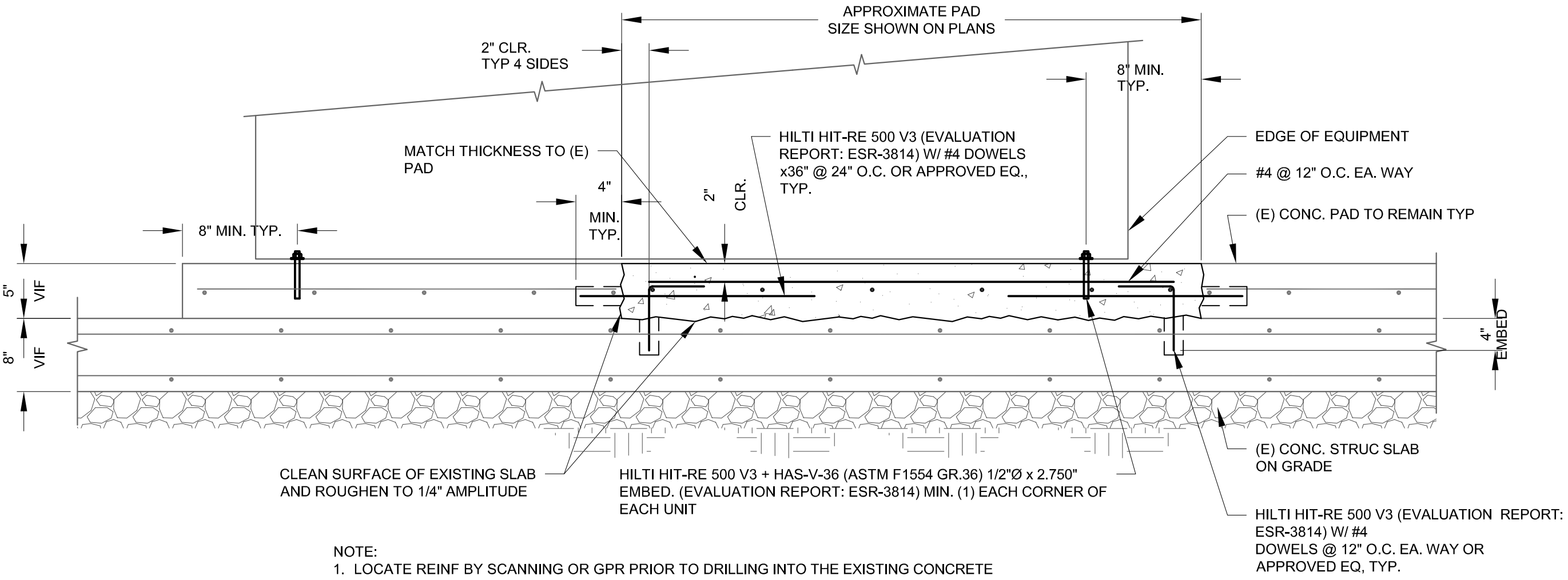
ARCH.	ARCHITECTURAL
ALT.	ALTERNATIVE
BM	BEAM
(E)	EXISTING
EA.	EACH
EQ.	EQUAL
CLR.	CLARENCE
CONC.	CONCRETE
CONN.	CONNECTION
LBS	POUNDS
LONG.	LONGITUDINAL
MECH.	MECHANICAL
MIN.	MINIMUM
MAX.	MAXIMUM
GRP	GROUP
PC.	PENETRATING RADAR
TYP.	ON CENTER
TRANS.	TYPICAL
V.I.F.	TRANSVERSE
W/	VERIFY IN FIELD
WT	WITH
WF	WIDE FLANGE
WT	WEIGHT

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PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

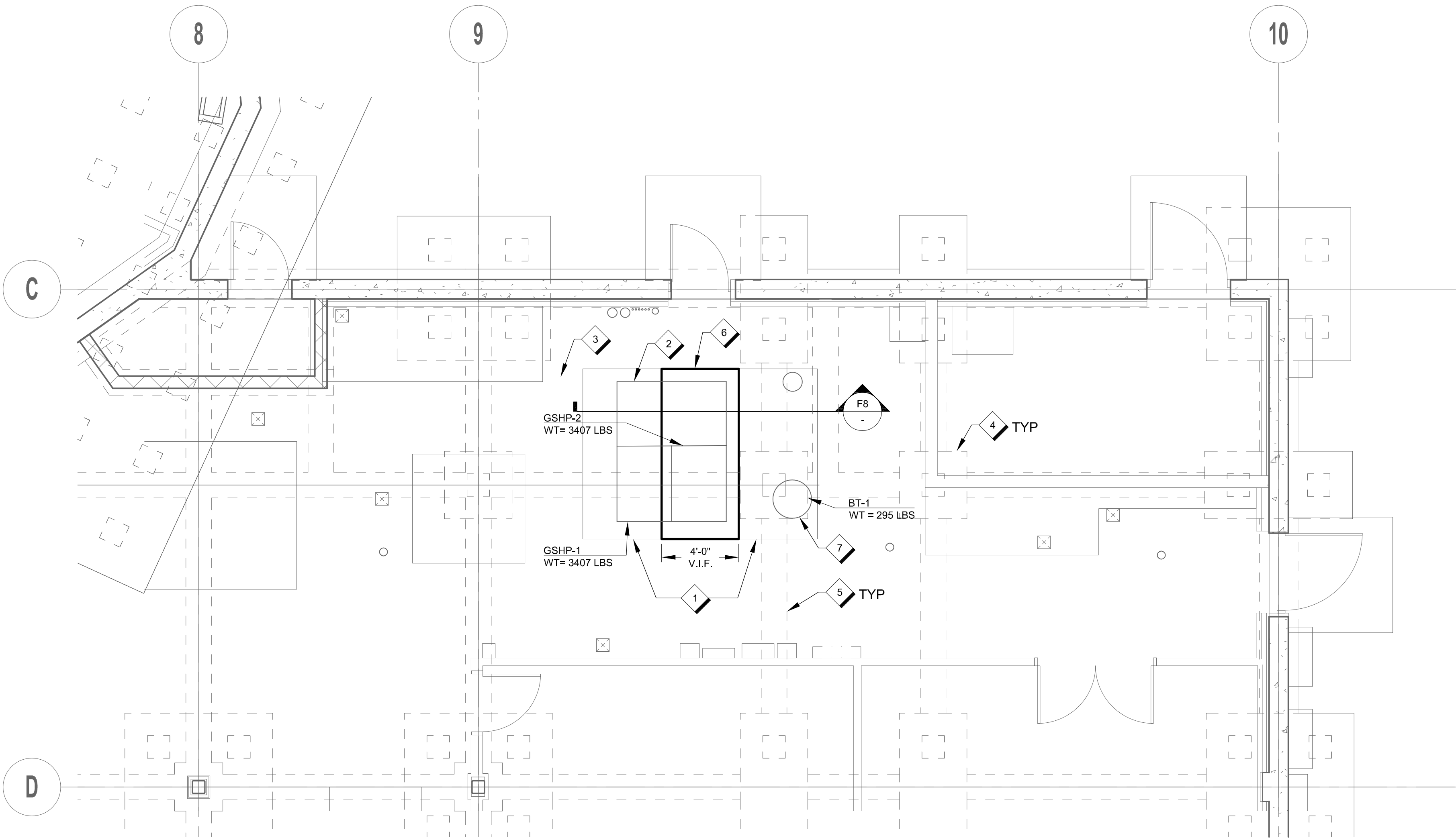
  08.26.2022	JACOBS 1100 N GLEBE RD. SUITE 500 ARLINGTON, VA 22201	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																																																						
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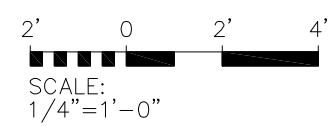


NOTE:  
1. LOCATE REINF BY SCANNING OR GPR PRIOR TO DRILLING INTO THE EXISTING CONCRETE SLAB. DO NOT DAMAGE THE EXISTING REINFORCEMENT.

**F8** **SECTION**  
SCALE: NTS



**A8 ENLARGED FOUNDATION PLAN - MECHANICAL ROOM**  
SCALE: 1/4" = 1'-0"

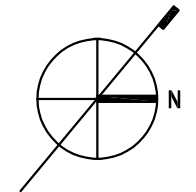


GENERAL SHEET NOTES:

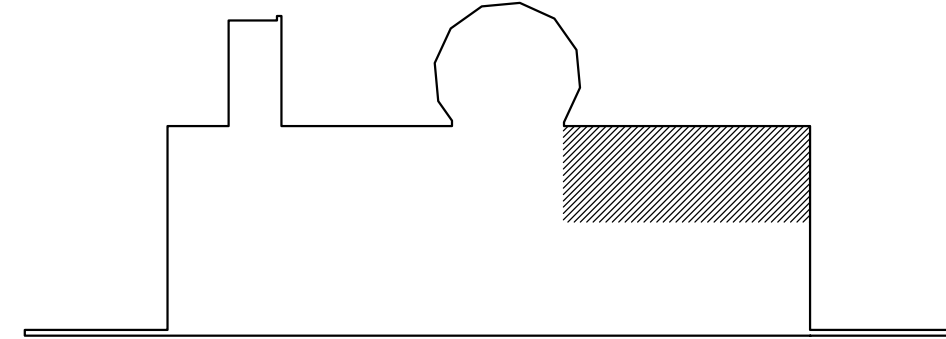
- A. LOCATE REINFORCEMENT BY SCANNING OR GPR PRIOR TO DRILLING THE EXISTING CONCRETE SLAB. DO NOT DAMAGE THE EXISTING REINFORCEMENT.
- B. FIELD VERIFY ALL DIMENSIONS AND LOCATIONS.
- C. (E) STRUCTURAL SLAB ON GRADE IS 8" THICK W/ #4 @ 6" O.C. SPANNING BETWEEN GRIDS C - D, & #4 @ 12" O.C. SPANNING BETWEEN GRIDS 9 - 10, V.I.F.
- D. (E) FOUNDATION SYSTEM, GRADE BEAM, PILE, PILE CAP SHOWN FOR REFERENCE ONLY, V.I.F.
- E. FOR PIPE SUPPORT DETAILS SEE SHEET S501

**SHEET NOTES:**

- |   |   |
|---|---|
| 1 | (E) HOUSEKEEPING PAD TO REMAIN, 5" THICK W/ #4 @ 12" O.C. BOTH WAY, CENTERED IN PAD, V.I.F.                           |
| 2 | GSHP, REFER TO MECH.  |
| 3 | (E) STRUCTURAL SLAB, DO NOT DAMAGE THE CONCRETE NOR REBAR.  |
| 4 | (E) PILE CAP AND PILE   |
| 5 | (E) CONCRETE GRADE BEAM   |
| 6 | INFILL CONCRETE PAD PER DETAIL F8/S110  |
| 7 | BUFFER TANK, REFER TO MECHANICAL, SEE DETAIL F8/S110 FOR ANCHORAGE INFORMATION SIMILAR TO HEAT PUMP, (4) ANCHOR TOTAL |



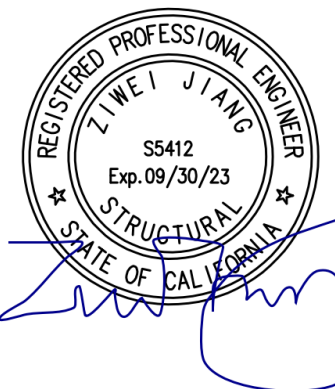

KEY NORTH



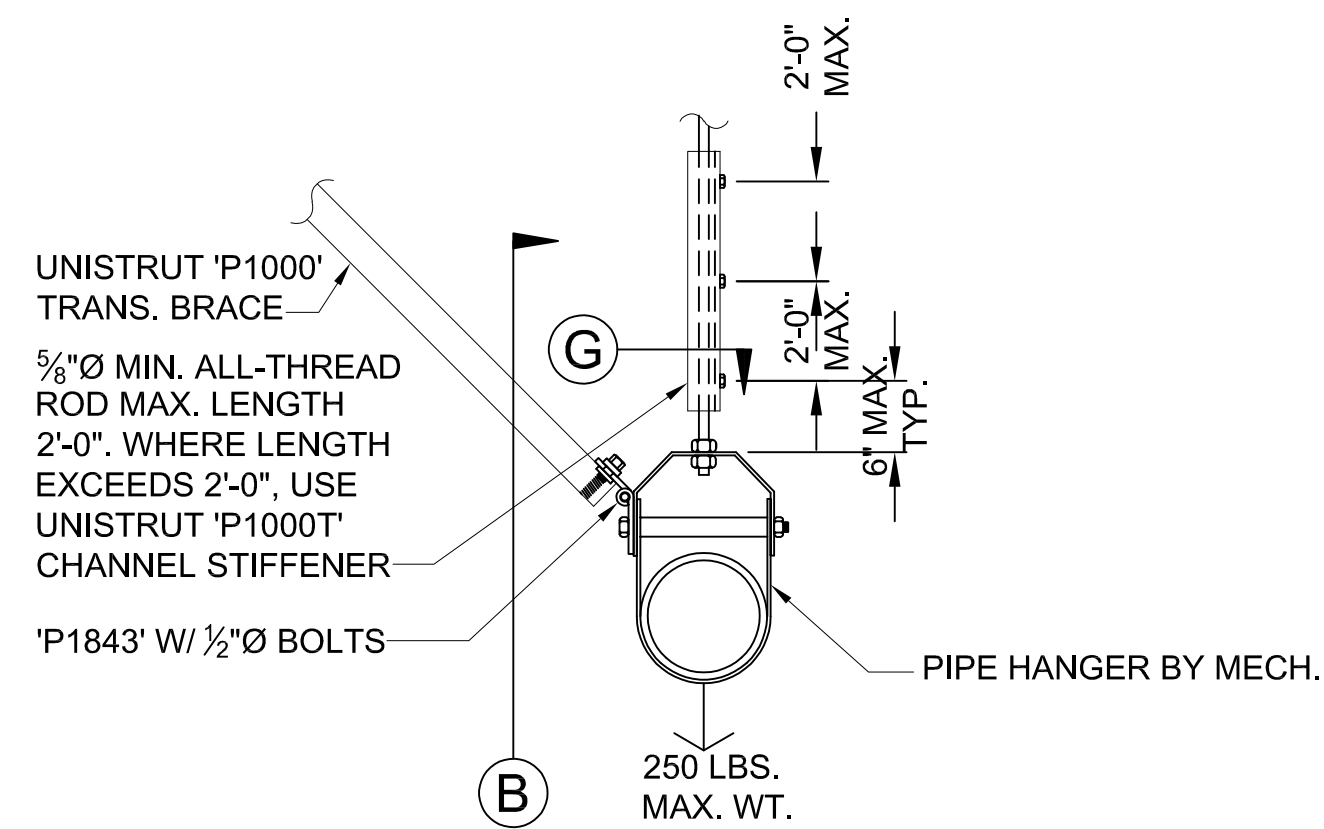
## KEY PLAN

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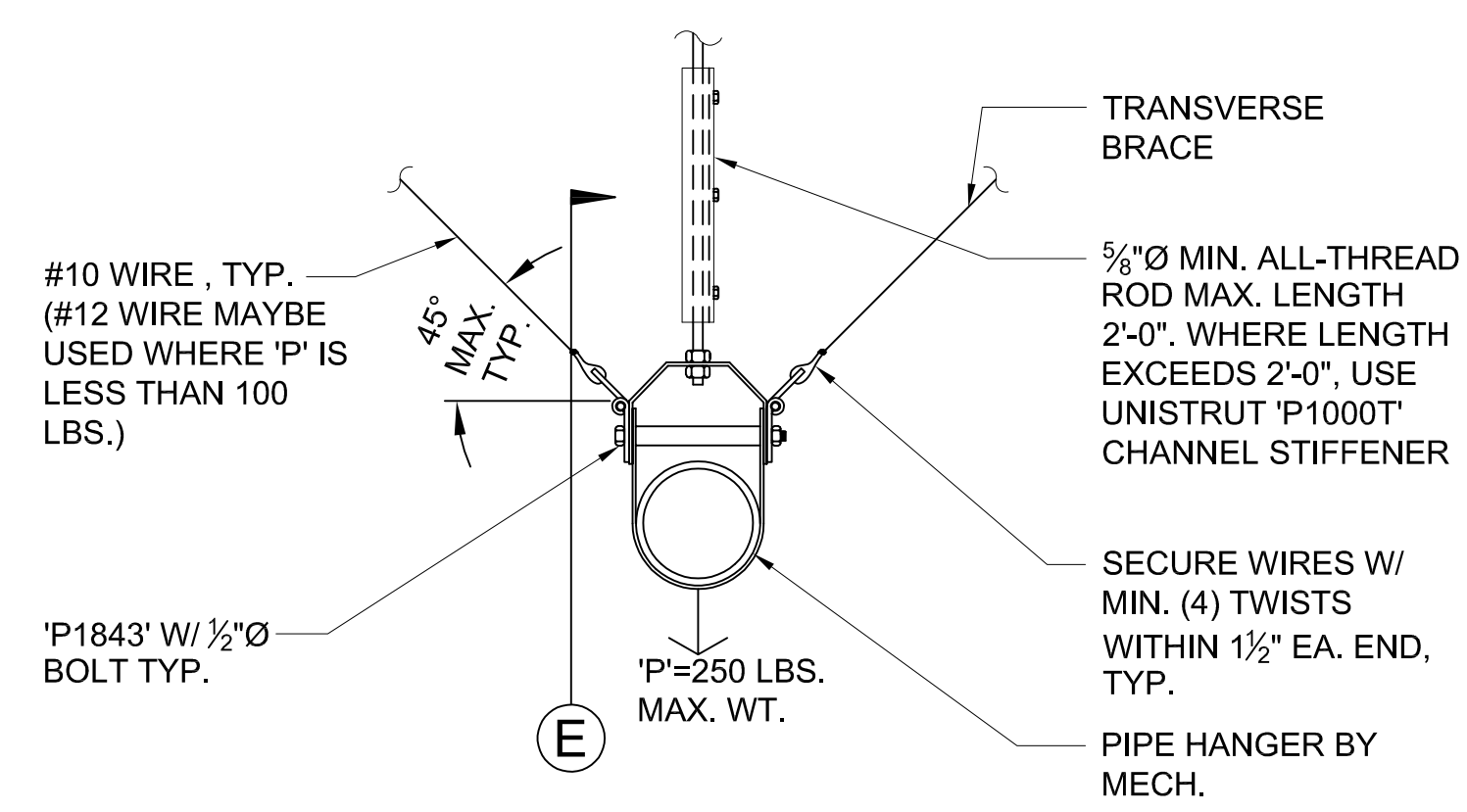
PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

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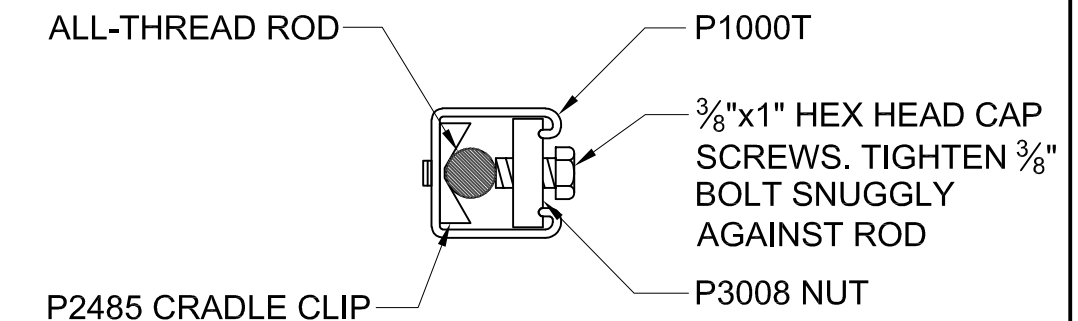




## A SINGLE PIPE SUPPORT

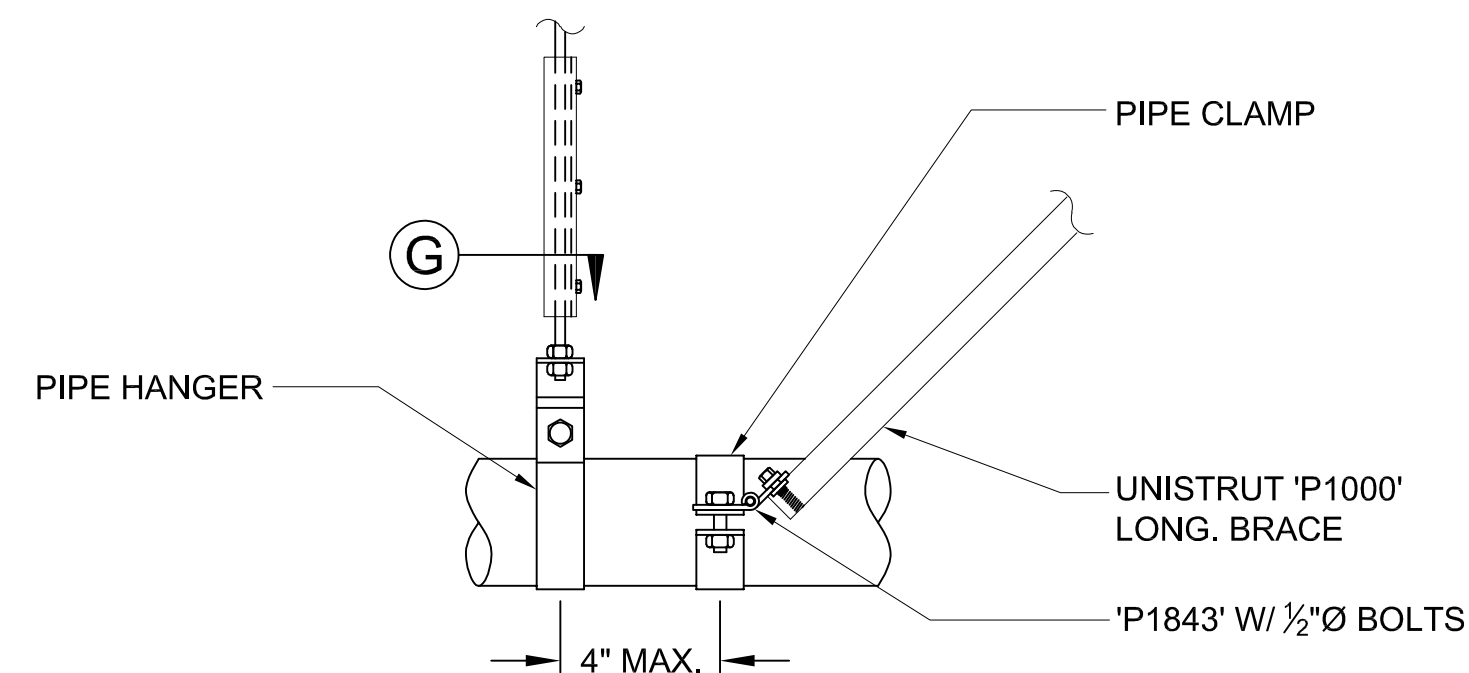


**(D) SINGLE PIPE SUPPORT (ALT.)**  
TRANSVERSE BRACE

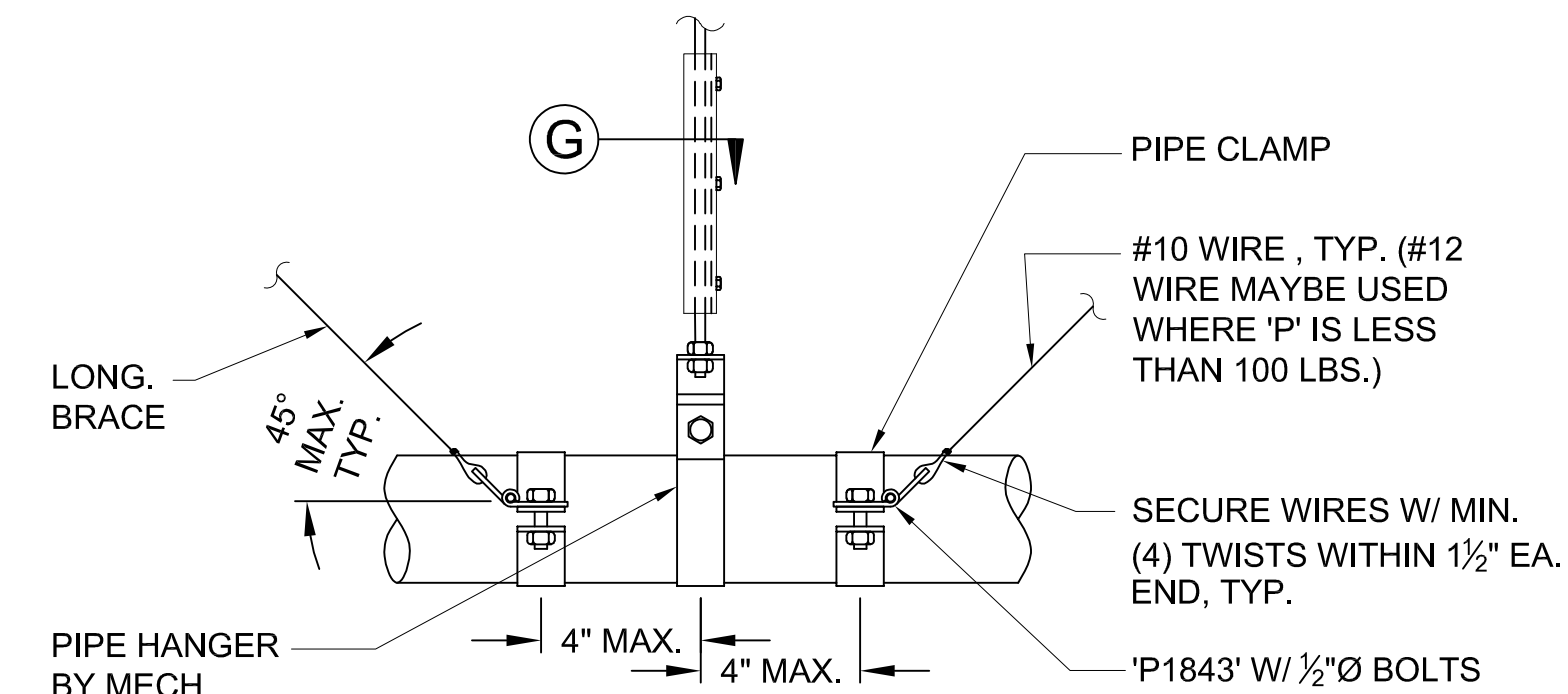


NOTE:  
FOR TOP CONN. OF ROD SEE A6

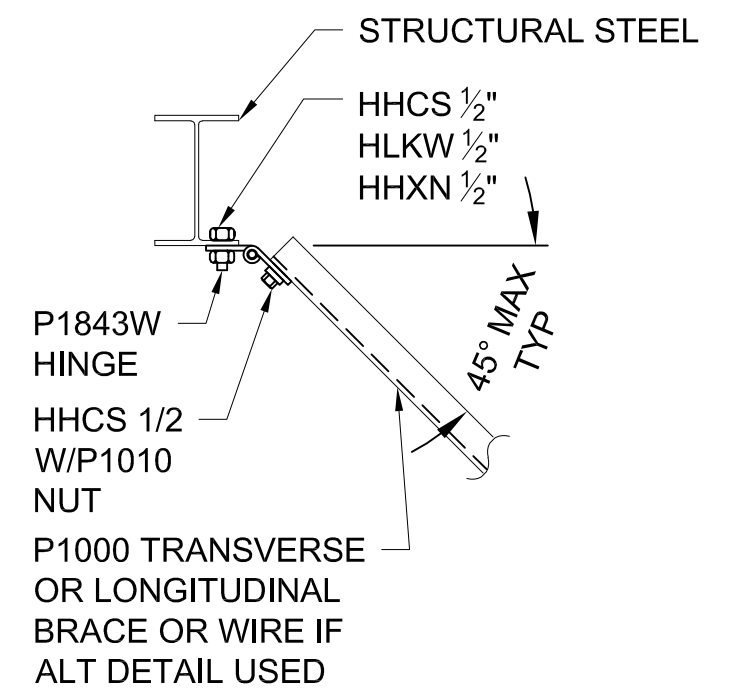
## PLAN SECTION G



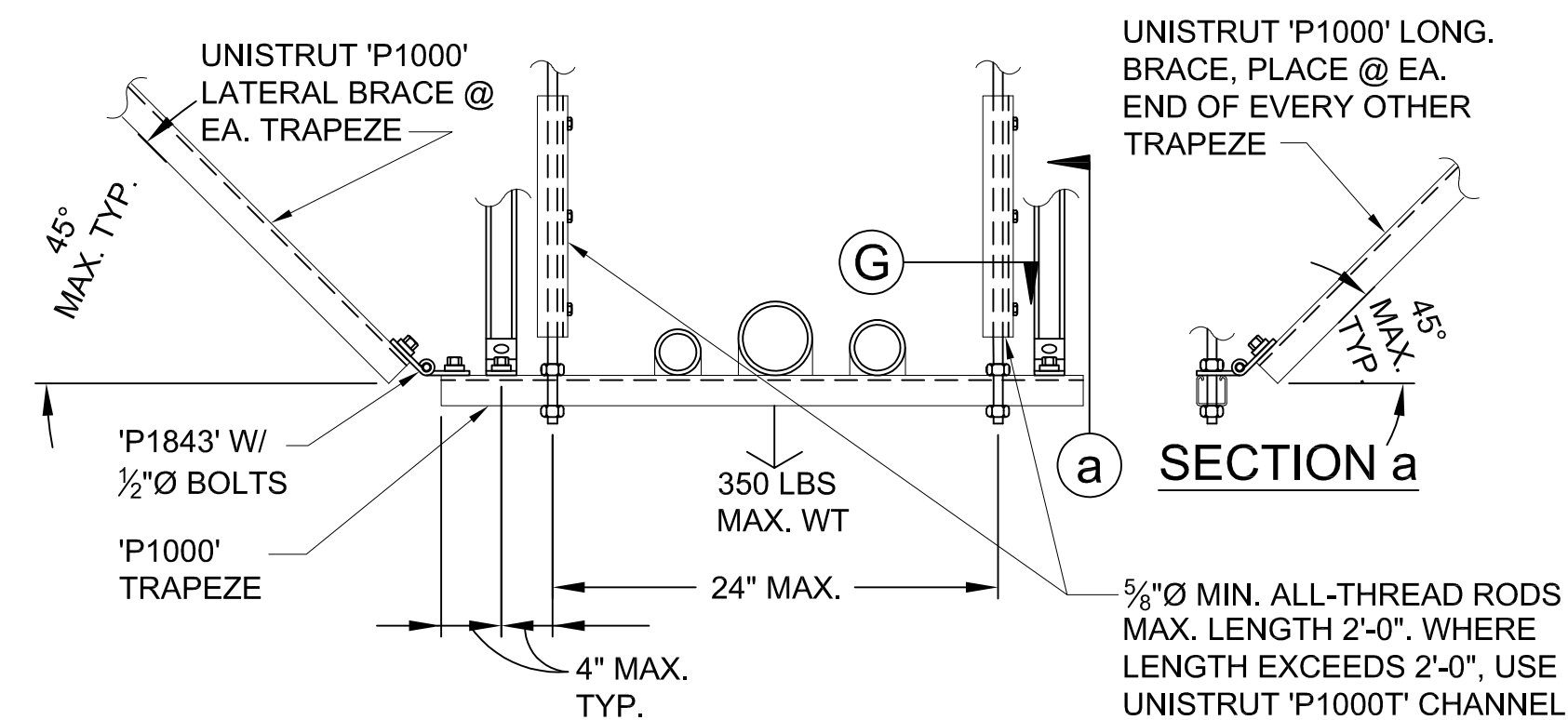
**(B) SINGLE PIPE SUPPORT**  
LONGITUDINAL BRACE



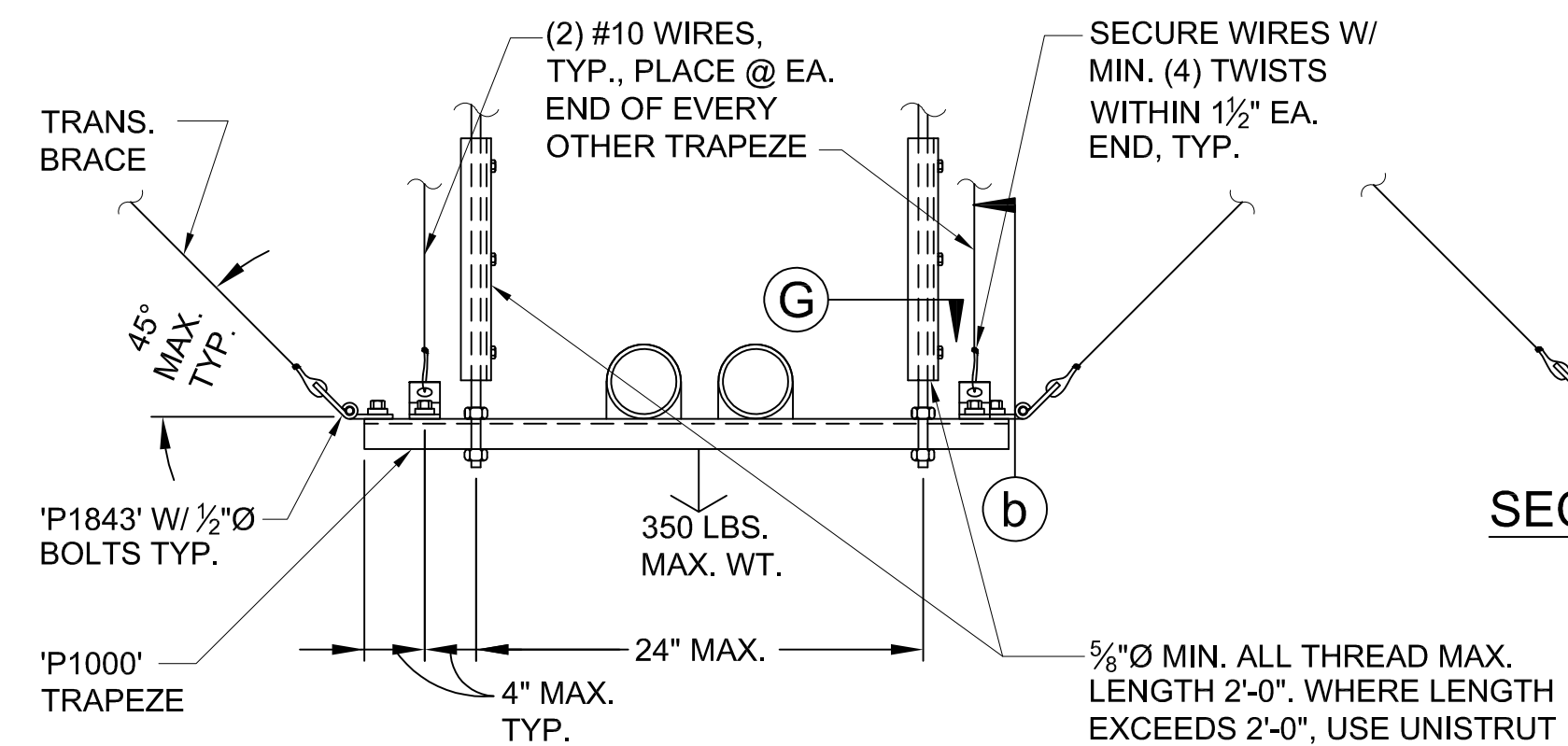
**(E) SINGLE PIPE SUPPORT (ALT.)**  
LONGITUDINAL BRACE



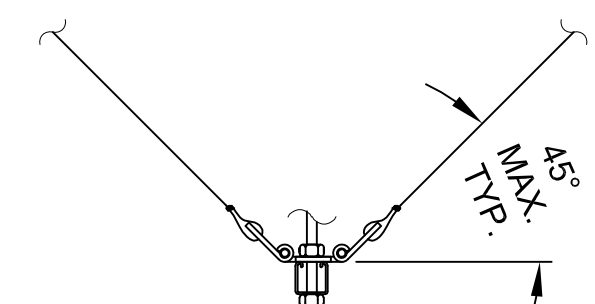
**TOP CONNECTION DETAIL**



© TRAPEZE SUPPORT



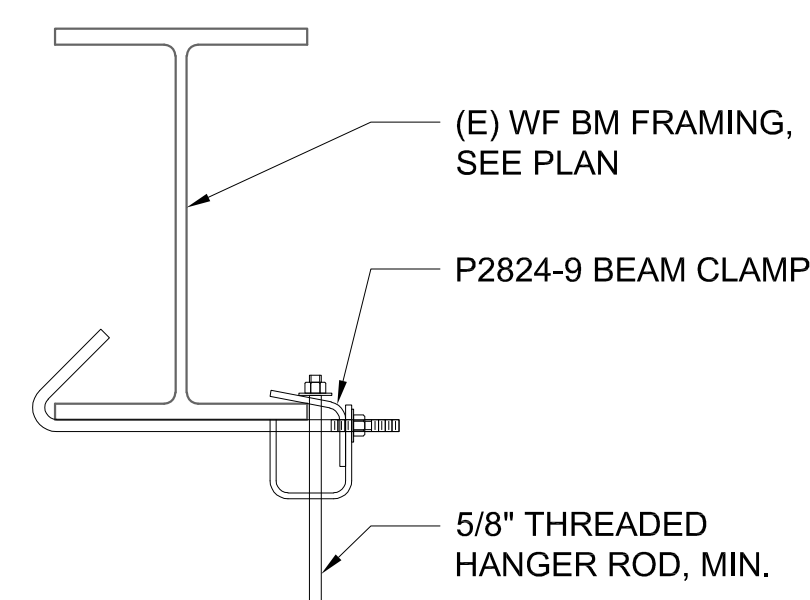
**F** TRAPEZE SUPPORT (ALT.)



SECTION b



**C6** **PIPE SUPPORT DETAILS**  
SCALE: NTS

SCALE: NTS



**A6 TYP BEAM CLAMP**  
SCALE: NTS

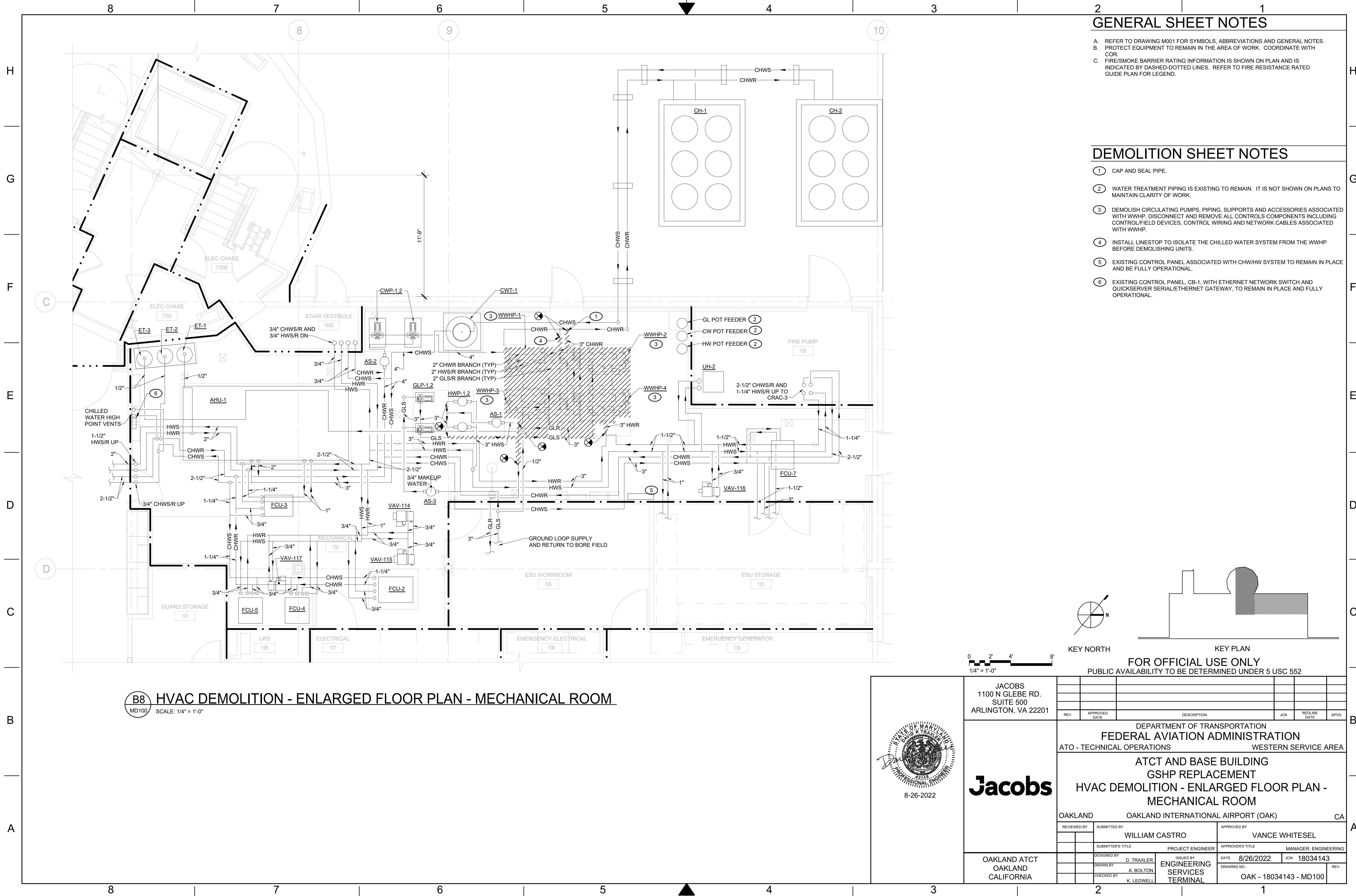
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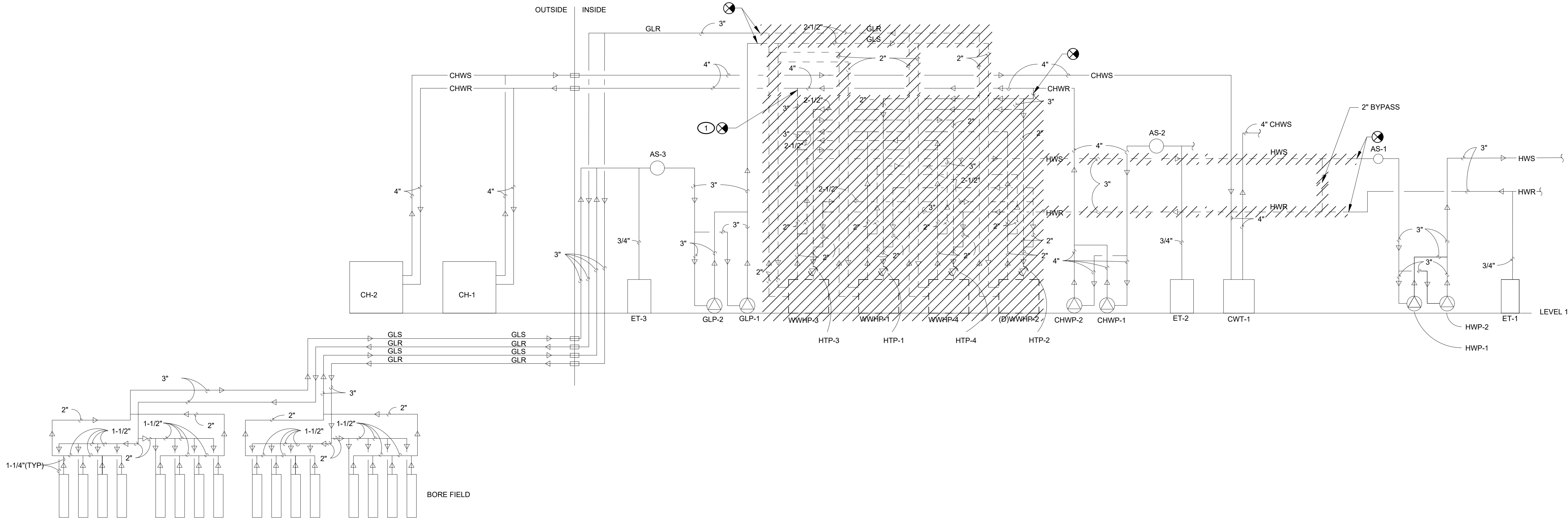


GENERAL SHEET NOTES

- A. REFER TO DRAWING M001 FOR SYMBOLS, ABBREVIATIONS AND GENERAL NOTES.  
B. PROTECT EQUIPMENT TO REMAIN IN THE AREA OF WORK. COORDINATE WITH COR.

DEMOLITION SHEET NOTES

- 1 CAP AND SEAL PIPE.



D6 BASE BUILDING CHILLED AND HOT WATER DEMOLITION SCHEMATIC DIAGRAM  
MD700 NOT TO SCALE

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	JACOBS 1100 N GLEBE RD. SUITE 500 ARLINGTON, VA 22201				
		DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS WESTERN SERVICE AREA ATCT AND BASE BUILDING GSHP REPLACEMENT MECHANICAL DEMOLITION - FLOW DIAGRAM			
		OAKLAND OAKLAND INTERNATIONAL AIRPORT (OAK) CA			
		REVIEWED BY	SUBMITTED BY WILLIAM CASTRO	APPROVED BY VANCE WHITESEL	
		DESIGNED BY D. TRAXLER	PROJECT ENGINEER	APPROVER'S TITLE MANAGER: ENGINEERING	
	DRAWN BY A. BOLTON	ISSUED BY ENGINEERING SERVICES TERMINAL	DATE 8/26/2022	JCN 18034143	REV.
	CHECKED BY K. LEDWELL		DRAWING NO. OAK - 18034143 - MD700		

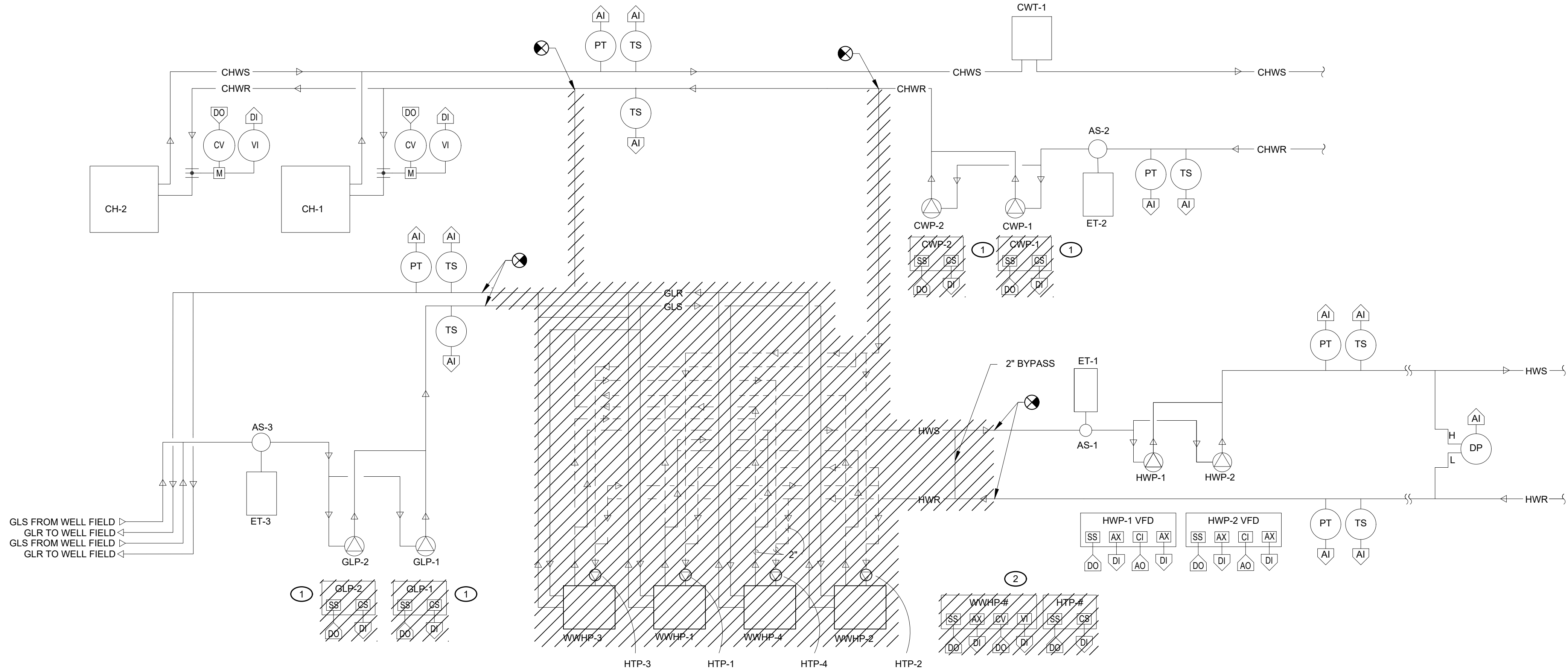


GENERAL SHEET NOTES

A. REFER TO SHEETS M001 AND M002 FOR MECHANICAL ABBREVIATIONS, SYMBOLS AND GENERAL NOTES.

DEMOLITION SHEET NOTES

- 1 DISCONNECT AND REMOVE PUMP START/STOP AND PUMP STATUS POINTS FROM RESPECTIVE CONTROLLER(S), REMOVE POINTS AND ASSOCIATED PROGRAMMING FROM DATABASE.
- 2 TYPICAL TRANE CONTROL BOARD MOUNTED IN EACH WATER TO WATER HEAT PUMP (WWHP) UNIT. DISCONNECT AND REMOVE ALL CONTROL AND MONITORING POINTS ASSOCIATED WITH EACH WWHP. MODIFY AND RECONNECT EXISTING NETWORK AS REQUIRED. ALL OTHER CONTROLLERS AND BAS MUST REMAIN FULLY OPERATIONAL.

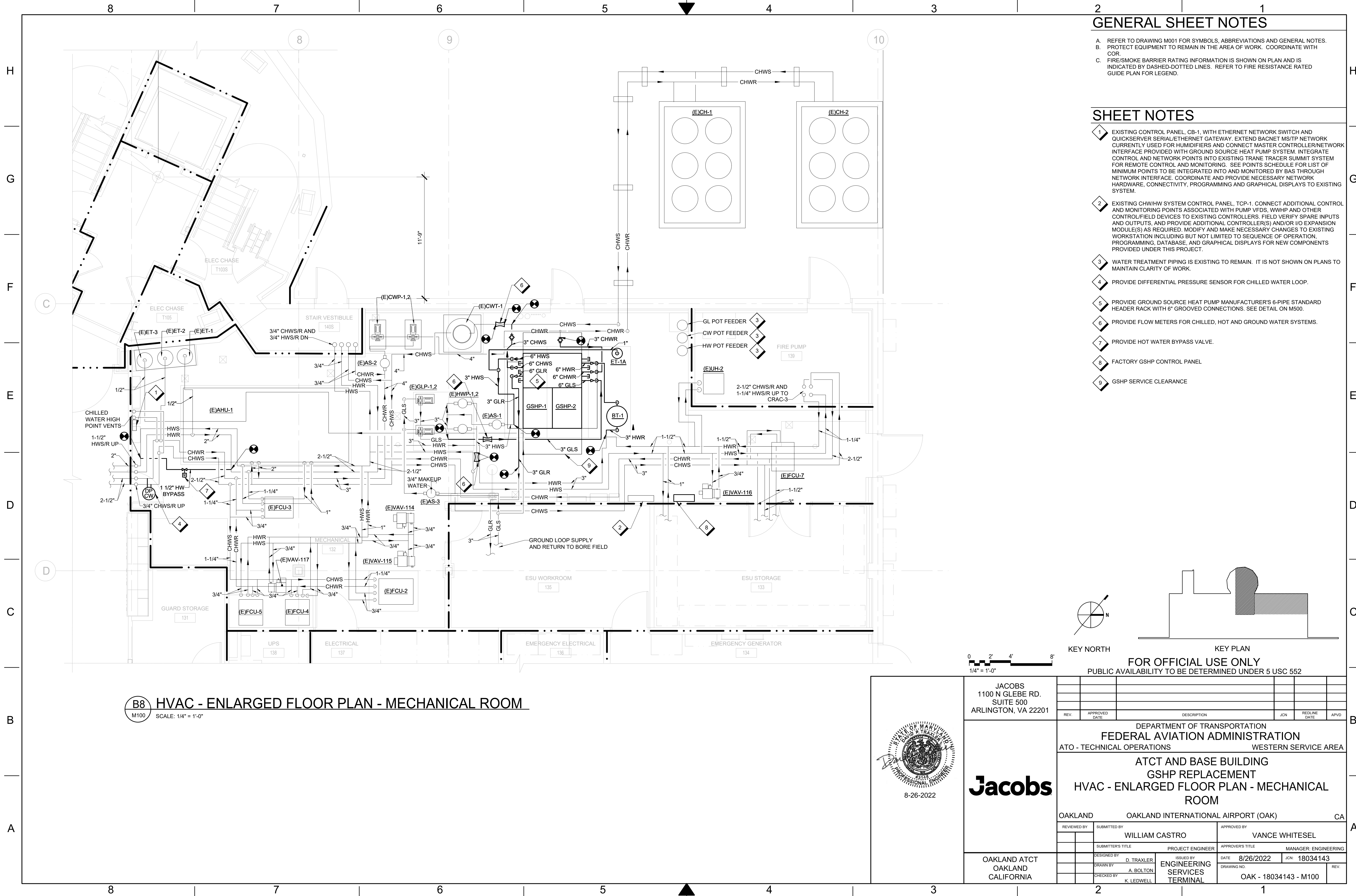


E8 DEMOLITION FLOW CONTROL DIAGRAM - BASE BUILDING CHILLED AND HOT WATER SYSTEMS  
MD800 NOT TO SCALE

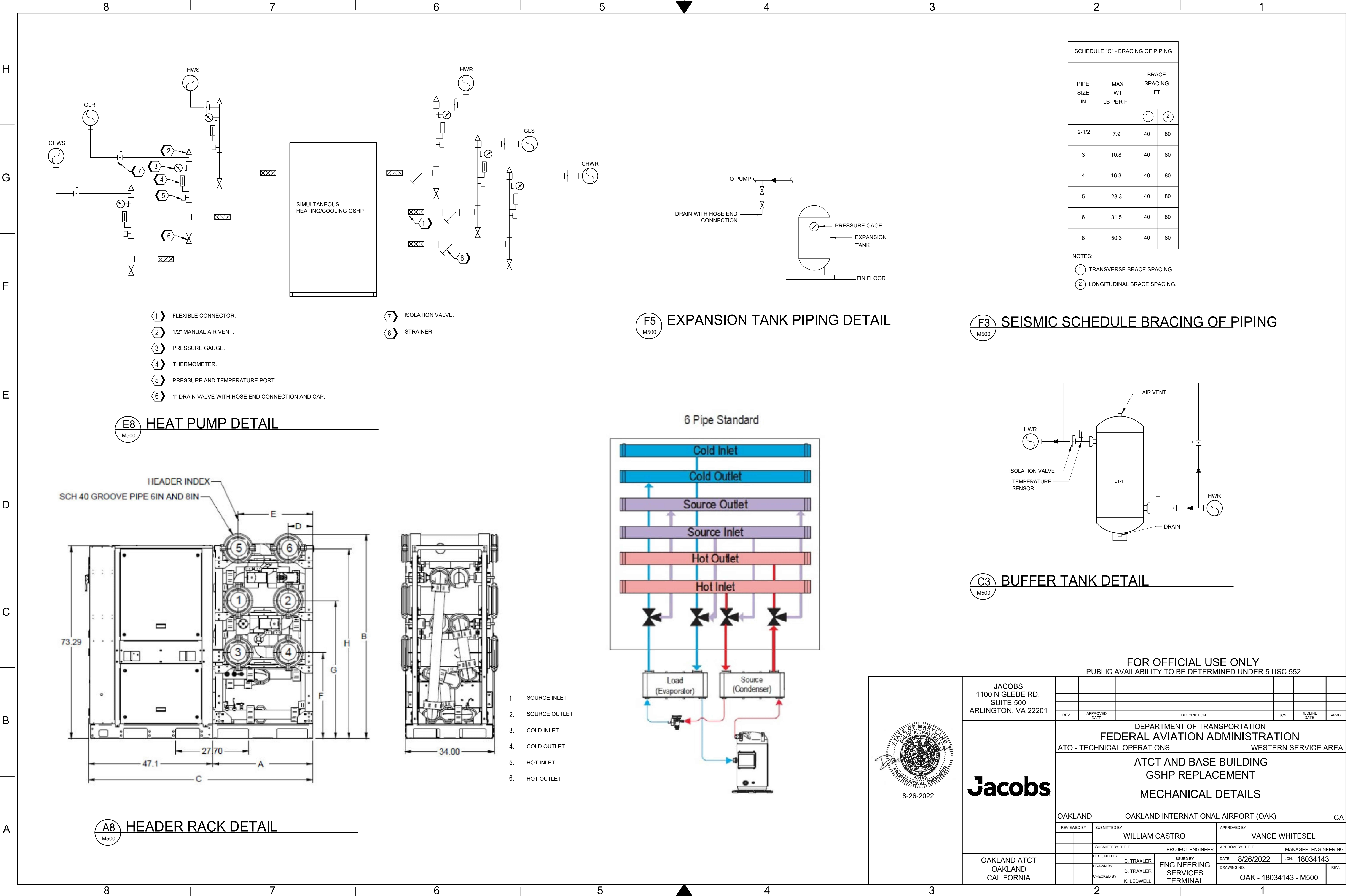
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	OAKLAND ATCT OAKLAND CALIFORNIA	DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ATO - TECHNICAL OPERATIONS WESTERN SERVICE AREA					
		ATCT AND BASE BUILDING GSHP REPLACEMENT MECHANICAL DEMOLITION FLOW CONTROL DIAGRAM					
		OAKLAND OAKLAND INTERNATIONAL AIRPORT (OAK) CA					
REVIEWED BY		SUBMITTED BY		APPROVED BY			
		WILLIAM CASTRO		VANCE WHITESEL			
SUBMITTER'S TITLE		PROJECT ENGINEER		APPROVER'S TITLE		MANAGER: ENGINEERING	
DESIGNED BY		R. JEON		ISSUED BY		DATE	
DRAWN BY		R. JEON		ENGINEERING SERVICES		DRAWING NO.	
CHECKED BY				TERMINAL		OAK - 18034143 - MD800	





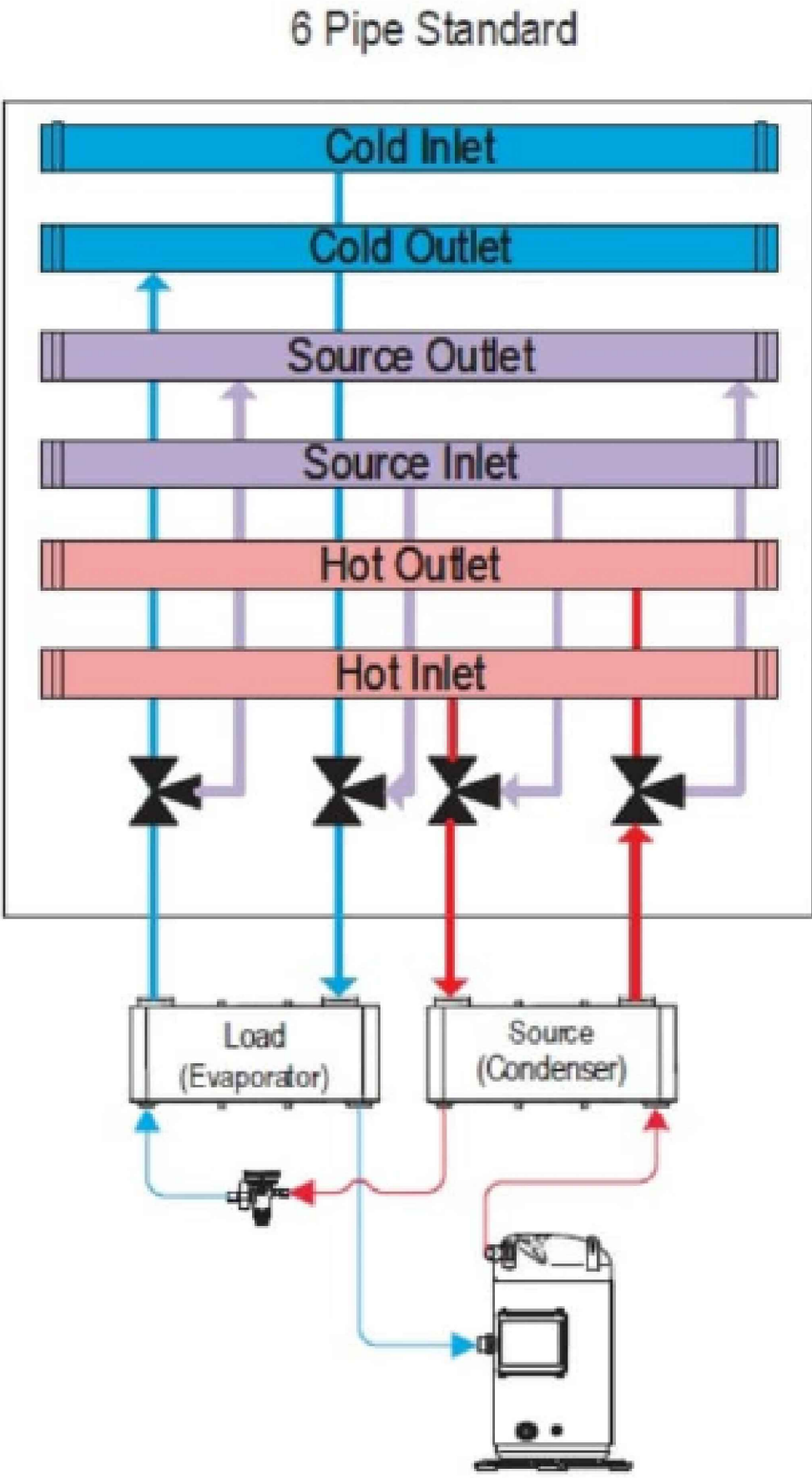
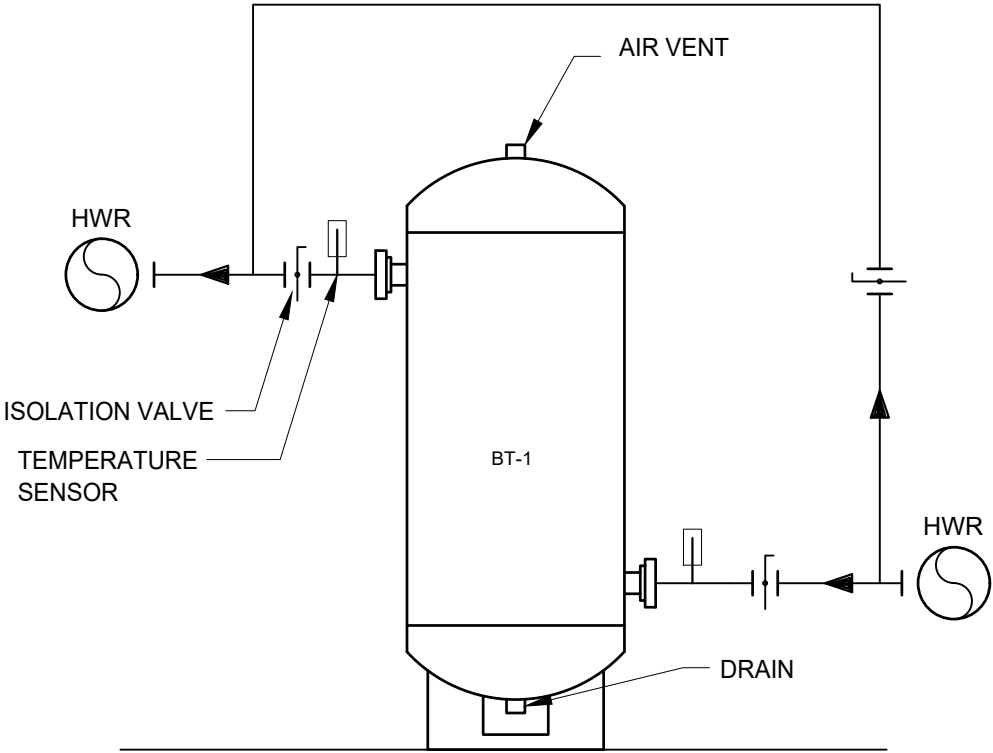
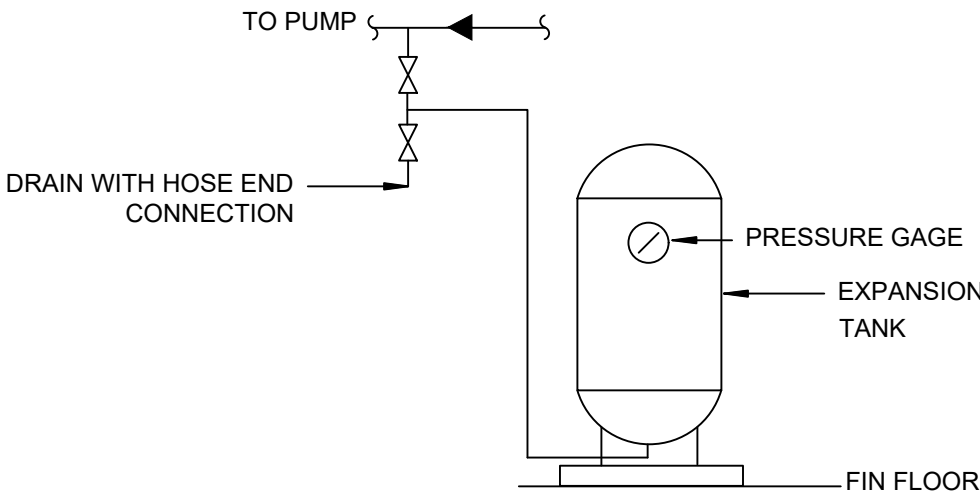




SCHEDULE "C" - BRACING OF PIPING			
PIPE SIZE IN	MAX WT LB PER FT	BRACE SPACING FT	
		(1)	(2)
2-1/2	7.9	40	80
3	10.8	40	80
4	16.3	40	80
5	23.3	40	80
6	31.5	40	80
8	50.3	40	80

NOTES:

- (1) TRANSVERSE BRACE SPACING.  
(2) LONGITUDINAL BRACE SPACING.



1. SOURCE INLET  
2. SOURCE OUTLET  
3. COLD INLET  
4. COLD OUTLET  
5. HOT INLET  
6. HOT OUTLET

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		REV.	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
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		ATCT AND BASE BUILDING GSHP REPLACEMENT MECHANICAL DETAILS					
		OAKLAND OAKLAND INTERNATIONAL AIRPORT (OAK) CA					
		SUBMITTED BY WILLIAM CASTRO		APPROVED BY VANCE WHITESEL			
		SUBMITTER'S TITLE PROJECT ENGINEER		APPROVER'S TITLE MANAGER: ENGINEERING			
		DESIGNED BY D. TRAXLER		ISSUED BY ENGINEERING SERVICES TERMINAL		DATE 8/26/2022	
		DRAWN BY D. TRAXLER				JCN: 18034143	
		CHECKED BY K. LEDWELL				REV.	
						OAK - 18034143 - M500	

Jacobs

OAKLAND ATCT  
OAKLAND  
CALIFORNIA

## GROUND SOURCE HEAT PUMP SCHEDULE

GROUND SOURCE HEAT PUMP SCHEDULE																																											
EQUIP. TAG	LOCATION	TONS	HEATING PERFORMANCE DATA										COOLING PERFORMANCE DATA										SIMULTANEOUS HEATING AND COOLING PERFORMANCE DATA										ELECTRICAL DATA				REFRIG. TYPE	WEIGHT (LBS)	KNOWN ACCEPTABLE MANUFACTURER AND MODEL	NOTES			
			CONDENSER HOT WATER					EVAPORATOR SOURCE WATER					COP	EVAPORATOR CHILLED WATER					CONDENSOR SOURCE WATER					EER	CHILLED WATER SIDE					HOT WATER SIDE											EER		
			CAPACITY (MBH)	EWT(°F)	LWT(°F)	DESIGN (GPM)	MAX PD (PSI)	CAPACITY (MBH)	EWT (°F)	LWT (°F)	DESIGN (GPM)	MAX PD (PSI)		CAPACITY (MBH)	EWT (°F)	LWT (°F)	DESIGN (GPM)	MAX PD (PSI)	CAPACITY (MBH)	EWT (°F)	LWT (°F)	DESIGN (GPM)	MAX PD (PSI)		CAPACITY (MBH)	EWT (°F)	LWT (°F)	DESIGN (GPM)	MAX PD (PSI)	CAPACITY (MBH)	EWT (°F)	LWT (°F)	DESIGN (GPM)	MAX PD (PSI)	VOLT/ PH/Hz	MCA						FLA	MOCP
GSHP-1.2	MECH ROOM 132	20	281	110	121.7	48	1.46	210	50	41.6	50	1.38	3.959	258	55	44.68	50	1.38	316	90	102.6	50	1.55	15.24	229	55	45.85	50	1.38	300	110	122.5	48	1.46	25.31	208/3/60	88	78.2	125	R-410A	3407	WATER FURNACE WCHDM-020	ALL

## NOTES:

1. PROVIDE 20 TON MODULES WITH TWO 10 TON COMPRESSORS.
2. PROVIDE FACTORY INSTALLED 6 PIPE STANDARD HEADER KIT WITH MODULATING 3-WAY VALVES.
3. PROVIDE FACTORY ATTENUATION KIT, DIFFERENTIAL PRESSURE TRANSDUCERS, EEV, 316 SS BRAZED PLATE HX, END CAPS, Y-STRAINERS, AND BYPASS HEADER KIT.
4. PROVIDE SEPARATE DISCONNECTS FOR EACH MODULE
5. PROVIDE GROUND SOURCE HEAT PUMP SYSTEM SUPERVISORY CONTROL PANEL WITH BACNET MS/TP INTERFACE TO INTERLOCK WITH BUILDING BAS. SEE CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION
6. PROVIDE UNIT THAT CAN ACCOMMODATE VARIABLE WATER FLOW OPERATION FOR HOT WATER, CHILLED WATER, AND BOREFIELD WATER.
7. PROVIDE FUSED DISCONNECT.

## EXPANSION TANK SCHEDULE

EXPANSION TANK SCHEDULE						
EQUIP. TAG	SYSTEM SERVED	TANK TYPE	TANK VOLUME (GAL)	MINIMUM TANK CHARGE (PSI)	DIMENSION DIA X HT (IN)	NOTES
ET-1A	HOT WATER	BLADDER - FULL ACCEPTANCE	10	15	12 X 23.5	ALL

NOTES:

1. PROVIDE PRESSURE GAUGE
2. PROVIDE SEISMIC RESTRAINTS

## BUFFER TANK SCHEDULE

BUFFER TANK SCHEDULE				
EQUIP. TAG	SYSTEM SERVED	TANK VOLUME (GAL)	MODEL	NOTES
BT-1	HOT WATER	120	HWBT-120-3-150	1

NOTES:

1. PROVIDE 2" TANK INSULATION WITH VAPOR BARRIER.

## EXISTING PUMP SCHEDULE

EXISTING PUMP SCHEDULE													
EQUIP. TAG	LOCATION	SERVES	TYPE	GPM	TOTAL HEAD FT WG	MOTOR DATA					IMPELLER DIAMETER (IN)	MANUFACTURER AND MODEL NO	NOTES
						HP	RPM	VOL	PH	HZ			
(E)CWP-1.2	BASE BUILDING	CHILLED WATER	CLOSE-COUPLED	170	78	7.5	1760	208	3	60	9	BELL AND GOSSETT 1531 2BC	2.3
(E)HWP-1.2	BASE BUILDING	HEATING WATER	IN-LINE	48	55	2	1760	208	3	60	7	BELL AND GOSSETT 80 2X7	1.3
(E)GLP-1.2	BASE BUILDING	GROUND LOOP	CLOSE-COUPLED	105	40	2	1760	208	3	60	6.625	BELL AND GOSSETT 1531 2AC	2.3

NOTES:

1. PUMP HAS AN EXISTING VFD
2. PROVIDE A VFD. COORDINATE WITH ELECTRICAL
3. SCHEDULE IS PROVIDED FOR REFERENCE ONLY.

## EXISTING AIR COOLED CHILLER SCHEDULE

EXISTING AIR COOLED CHILLER SCHEDULE																					
EQUIP. TAG	LOCATION	TYPE	AMB TEMP °F DB	MIN CAP TONS	MIN CAP MBH	EVAPORATOR WATER				CONDENSER FAN DATA		ELECTRICAL DATA				COMPRESSOR		MANUFACTURER	NOTES		
						GPM	EW T °F	LWT °F	MAX PD FT WG	NO.	TYPE	HP EA	MCA	VOL	PH	HZ	NO.			TOTAL STEPS	
(E)CH-1.2	SEE DWGS	AIR-COOLED SCROLL	95	76	912	170	57	45	10	6	PROP.	2	397	208	3	60	4	4	TRANE	1	

NOTES:

1. SCHEDULE IS PROVIDED FOR REFERENCE ONLY.



## EXISTING MECHANICAL EQUIPMENT SCHEDULE

EXISTING MECHANICAL EQUIPMENT SCHEDULE		
EQUIP. TAG	FUNCTION	SPECIFICATION
(E)AS-1	AIR SEPARATOR (HOT WATER)	
(E)AS-2	AIR SEPARATOR (CHILLED WATER)	
(E)AS-3	AIR SEPARATOR (GROUND LOOP)	

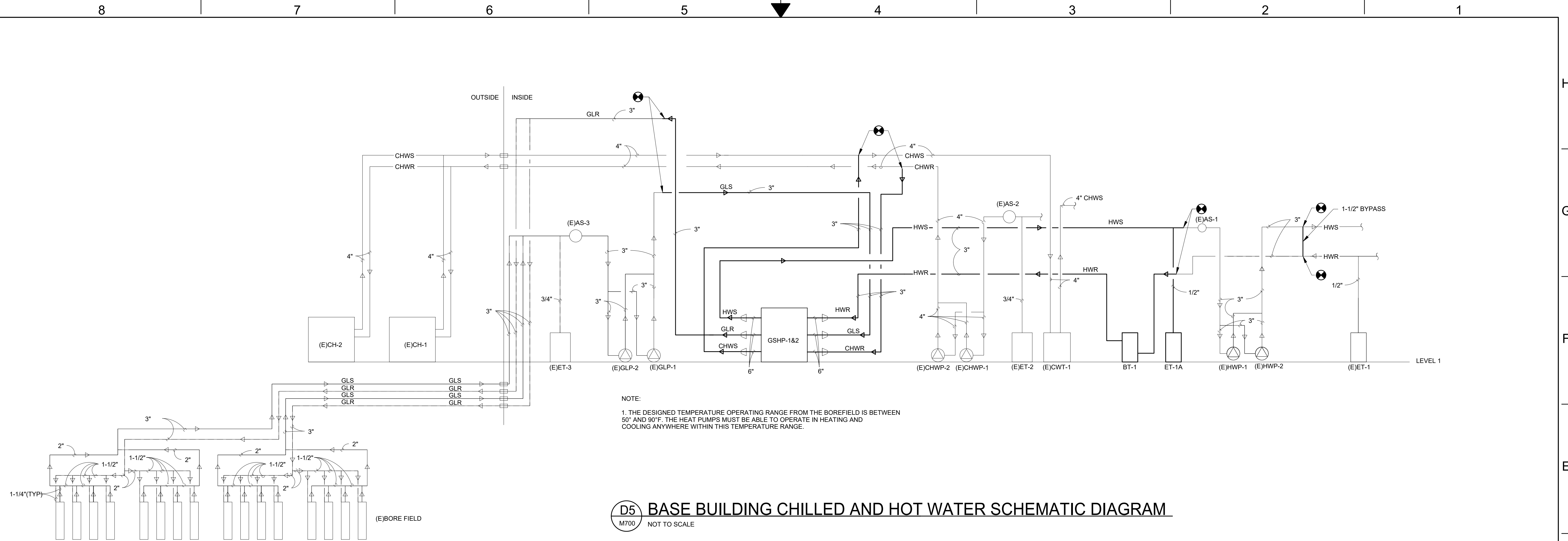
NOTES:



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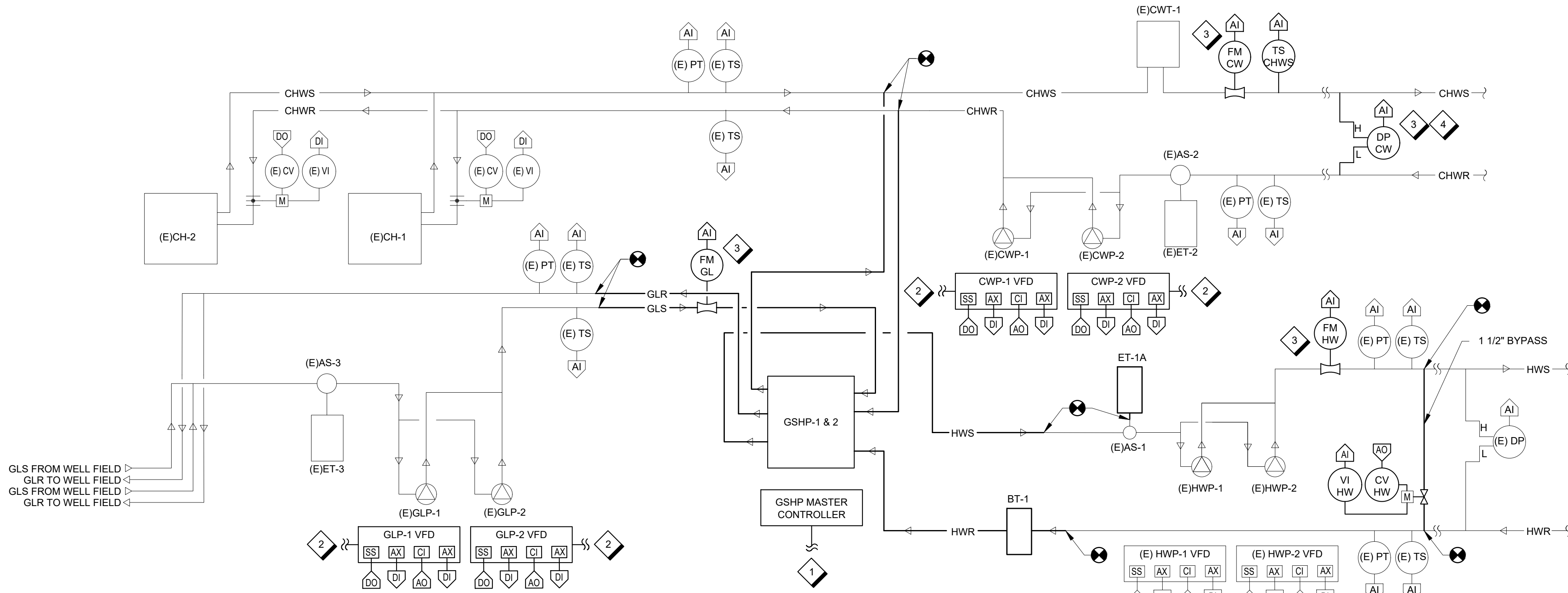
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		D. TRAXLER		K. LEDWELL		OAK - 18034143 - M700						



**GROUND SOURCE HEAT PUMP SYSTEM:**

1. THE EXISTING WATER TO WATER HEAT PUMPS (WWHP-1 THRU WWHP-4) ARE TO BE REPLACED WITH A NEW GROUND SOURCE HEAT PUMP (GSPH) SYSTEM CONSISTING OF TWO GROUND SOURCE HEAT PUMP MODULES (GSPH-1 AND GSPH-2) AS PART OF THIS PROJECT. ALSO, VFDS WILL BE ADDED TO THE EXISTING CHILLED WATER PUMPS (CWP-1 AND CWP-2) AND GROUND LOOP PUMPS (GLP-1 AND GLP-2). THE FOLLOWING SEQUENCES DESCRIBE THE OPERATION OF THE PLANT AS A WHOLE AND MAKE NO DISTINCTION BETWEEN EXISTING AND NEW EQUIPMENT. THE CONTRACTOR MUST PROVIDE NEW CONTROL LOGIC AND DDC PROGRAMMING TO MEET THE REQUIRED OPERATION OF NEW AND EXISTING EQUIPMENT AS DESCRIBED HERE. PROVIDE ADDITIONAL CONTROLLER(S) AND/OR I/O EXPANSION MODULE(S), FIELD/CONTROL DEVICES AND OTHER COMPONENTS AS REQUIRED.
2. ALL THE PUMPS ARE CONFIGURED FOR LEAD-STANDBY OPERATION WHERE ONE PUMP OPERATES AS A LEAD AND THE OTHER IS A STANDBY. GSPH-1 AND GSPH-2 ARE LEAD-LAG UNITS AND THE PACKAGED CONTROLS WILL AUTOMATICALLY STAGE ON AND OFF THE GSPH MODULES AS NECESSARY. THE "LEAD" PUMP MODULE IS ALLOWED TO OPERATE IN SIMULTANEOUS HEATING AND COOLING AND THE "LAG" GSPH WILL OPERATE IN COOLING ONLY MODE TO MEET THE HEATING AND COOLING LOADS IN THE FACILITY. PROVIDE AN AUTOMATIC PROGRAM THAT IS GOVERNMENT REPROGRAMMABLE, TO ALTERNATE THE EQUIPMENT WEEKLY (ADJUSTABLE) TO MAINTAIN EVEN USE. IT MUST BE POSSIBLE FOR MAINTENANCE PERSONNEL TO SELECT THE "LEAD" AND "LAG" (GSPH MODULES), AND THE "LEAD" AND "STANDBY" (CHILLERS AND PUMPS) EQUIPMENT THROUGH THE ASSOCIATED GRAPHICAL DISPLAYS ON THE EXISTING OPERATOR'S WORKSTATION (OWS).
3. THE "LEAD" GSPH MODULE IS INTENDED TO OPERATE IN SIMULTANEOUS HEATING AND COOLING MODE AT ALL TIMES AND THE "LAG" MODULE IS INTENDED TO OPERATE IN COOLING ONLY MODE. WHEN THE GROUND LOOP WATER SUPPLY TEMPERATURE RISES ABOVE 90° (ADJUSTABLE) AND TWO MODULES ARE OPERATING, TURN OFF THE "LAG" COOLING ONLY MODULE AND TURN ON THE "LEAD" AIR COOLED CHILLER. WHEN THE GROUND LOOP WATER SUPPLY TEMPERATURE DROPS BELOW 90° F FOR 24 HOURS (ADJUSTABLE), RETURN THE GSPH MODULES TO NORMAL OPERATION.
4. ADDITIONAL MONITORING: IN ADDITION TO THE POINTS MENTIONED IN THESE SEQUENCES PROVIDE THE ADDITIONAL MONITORING POINTS LISTED IN THE POINTS SCHEDULE.

### CHILLED WATER SYSTEM

1. COOLING OPERATION - LOADING:
- A. "FIRST STAGE" COOLING (ASSUMES CHILLED WATER SYSTEM IS OFF AT STARTUP CONDITIONS):
- 1) WHEN THERE IS A CALL FOR COOLING IN THE FACILITY, THE BAS MUST SEND A SIGNAL TO THE PACKAGED CONTROLS ASSOCIATED WITH GSPH SYSTEM, WHICH WILL OPEN THE ISOLATION VALVES ASSOCIATED WITH CHILLED WATER AND GROUND LOOP WATER CONNECTIONS ON "LEAD" GSPH MODULE.
  - 2) WHEN BOTH ISOLATION VALVES HAVE BEEN PROVEN OPEN, THE "LEAD" CHILLED WATER PUMP AND "LEAD" GROUND LOOP WATER PUMP MUST START. ONCE THE PUMP IS STARTED, THE BAS MUST INCREASE THE SPEED OF CHILLED WATER PUMP TO MEET THE REQUIRED CHILLED WATER FLOW FOR THE "LEAD" GSPH MODULE, INITIALLY SET AT 50 GPM (ADJUSTABLE), AND THE SPEED OF GROUND LOOP WATER PUMP TO MEET THE REQUIRED GROUND LOOP WATER FLOW, INITIALLY SET AT 50 GPM (ADJUSTABLE). THIS PUMP SPEED MUST BE DETERMINED IN CONSULTING WITH THE BALANCING CONTRACTOR DURING THE TAB PROCESS.
  - 3) WHEN BOTH THE "LEAD" CHILLED WATER PUMP AND THE "LEAD" GROUND LOOP WATER PUMP HAVE BEEN PROVEN TO BE RUNNING THROUGH THE OUTPUTS FROM THE PUMP VFDS, AND BOTH PUMPS ARE RUNNING AT THE SPEED FOR THE REQUIRED FLOW RATES, THE COOLING MODE IN THE GSPH SYSTEM MUST BE ENABLED BY THE BAS. ONCE ENABLED, THE GSPH'S SELF-CONTAINED, PACKAGED CONTROLS WILL OPERATE THE GSPH MODULE AS REQUIRED TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT THE SET POINT.
  - 4) IF THE "LEAD" GSPH MODULE IS OPERATING IN COOLING MODE BUT THE CHILLED WATER SUPPLY TEMPERATURE RISES ABOVE THE SET POINT FOR MORE THAN 5 MINUTES (ADJUSTABLE), THE "LAG" GSPH MODULE MUST BE STARTED BY THE BAS, WHICH WILL OPEN THE ISOLATION VALVES ASSOCIATED WITH CHILLED WATER AND GROUND LOOP WATER CONNECTIONS ON "LAG" GSPH MODULE.
  - 5) WHEN BOTH ISOLATION VALVES HAVE BEEN PROVEN OPEN, THE BAS MUST INCREASE THE SPEED OF THE "LEAD" CHILLED WATER PUMP TO MEET THE REQUIRED CHILLED WATER FLOW FOR BOTH GSPH MODULES, INITIALLY SET AT 100 GPM (ADJUSTABLE), AND THE SPEED OF GROUND LOOP WATER PUMP TO MEET THE REQUIRED GROUND LOOP WATER FLOW, INITIALLY SET AT 100 GPM (ADJUSTABLE). THIS PUMP SPEED MUST BE DETERMINED IN CONSULTING WITH THE BALANCING CONTRACTOR DURING THE TAB PROCESS.
  - 6) WHEN BOTH THE "LEAD" CHILLED WATER PUMP AND THE "LEAD" GROUND LOOP WATER PUMP ARE RUNNING AT THE SPEED FOR THE REQUIRED FLOW RATES, THE GSPH'S SELF-CONTAINED, PACKAGED CONTROLS WILL OPERATE THE GSPH MODULES AS REQUIRED TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT THE SET POINT.
  - 7) IF THE CHILLED WATER SUPPLY TEMPERATURE DROPS BELOW THE SET POINT FOR MORE THAN 5 MINUTES (ADJUSTABLE) WHILE BOTH GSPH MODULES ARE IN OPERATION, THE BAS MUST SEND A SIGNAL TO DISABLE THE "LAG" GSPH MODULE, WHICH WILL CLOSE THE ASSOCIATED ISOLATION VALVES AND REDUCE THE SPEED OF CHILLED WATER PUMP AND GROUND LOOP WATER PUMP FOR THE "LEAD" GSPH MODULE AS DESCRIBED ABOVE.
- B. "SECOND STAGE" COOLING: IF BOTH GSPH MODULES ARE OPERATING IN COOLING MODE BUT THE CHILLED WATER SUPPLY TEMPERATURE RISES ABOVE THE SET POINT FOR MORE THAN 5 MINUTES (ADJUSTABLE), THE SECOND STAGE COOLING MUST BE STARTED BY THE BAS.
- 1) WHEN THERE IS A CALL FOR THE "SECOND STAGE" COOLING, THE BAS MUST DISABLE THE GSPH SYSTEM, WHICH WILL ALSO CLOSE THE ASSOCIATED ISOLATION VALVES, AND THE ISOLATION VALVE ASSOCIATED WITH THE "LEAD" AIR COOLED CHILLER MUST OPEN BY THE BAS AT THE SAME TIME.
  - 2) ONCE THE ISOLATION VALVE ASSOCIATED WITH CHILLER IS FULLY OPEN, THE BAS MUST INCREASE THE SPEED OF THE "LEAD" CHILLED WATER PUMP TO MEET THE REQUIRED CHILLED WATER FLOW FOR THE SECOND STAGE COOLING, INITIALLY SET AT 170 GPM (ADJUSTABLE). THIS PUMP SPEED MUST BE DETERMINED IN CONSULTING WITH THE BALANCING CONTRACTOR DURING THE TAB PROCESS.
  - 3) WHEN THE "LEAD" CHILLED WATER PUMP HAS BEEN PROVEN TO BE RUNNING AT THE SPEED FOR THE REQUIRED FLOW RATE, THE "LEAD" AIR COOLED CHILLER MUST BE ENABLED BY THE BAS.
  - 4) THE "LEAD" CHILLER'S SELF-CONTAINED, PACKAGED CONTROLS MUST START AND OPERATE THE CHILLER TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT THE SET POINT
- C. ACTIVATE A CRITICAL ALARM IF THE BAS DETERMINES THAT A CHILLER IS REQUIRED TO OPERATE TO MEET THE FACILITY COOLING LOAD AND NO CHILLER IS AVAILABLE FOR OPERATION.
2. COOLING OPERATION - UNLOADING:
- A. "SECOND STAGE" COOLING: IF THE "LEAD" AIR COOLED CHILLER IS OPERATING AT OR LESS THAN 25% OF TOTAL CAPACITY (ADJUSTABLE) FOR MORE THAN 30 MINUTES (ADJUSTABLE), AND THE GEOTHERMAL WATER TEMPERATURE IS BELOW 90F, THE "SECOND STAGE" COOLING MUST BE DISABLED.
- 1) THE BAS MUST DISABLE THE "LEAD" AIR COOLED CHILLER.
  - 2) AFTER A DELAY OF TWO MINUTES (ADJUSTABLE), THE ISOLATION VALVE ASSOCIATED WITH THE "LEAD" CHILLER MUST CLOSE AND THE BAS MUST SEND A SIGNAL TO THE PACKAGED CONTROLS ASSOCIATED WITH GSPH SYSTEM, WHICH WILL OPEN THE ISOLATION VALVES ASSOCIATED WITH CHILLED WATER CONNECTION AT THE SAME TIME.
  - 3) ONCE THE ISOLATION VALVE ASSOCIATED WITH THE "LEAD" AIR COOLED CHILLER HAS BEEN PROVEN TO BE CLOSED THROUGH THE VALVE POSITION SWITCH, THE BAS MUST DECREASE THE SPEED OF THE "LEAD" CHILLED WATER PUMP TO MEET THE REQUIRED CHILLED WATER FLOW FOR THE FIRST STAGE COOLING INDICATED ABOVE.
  - 4) WHEN THE "LEAD" CHILLED WATER PUMP HAS BEEN PROVEN TO BE RUNNING THROUGH THE OUTPUTS FROM THE PUMP VFD, AND THE PUMP IS RUNNING AT THE SPEED FOR THE REQUIRED GSPH SYSTEM FLOW RATE, THE COOLING MODE IN THE "LAG" GSPH MODULE MUST BE ENABLED BY THE BAS.

**E8 FLOW**  
M800 NOT TO SCALE

## FLOW CONTROL DIAGRAM - BASE BUILDING CHILLED AND HOT WATER SYSTEMS

**CHILLED WATER SYSTEM - CONTINUED:**

- 3) ONCE ENABLED, THE GSHPS' SELF-CONTAINED, PACKAGED CONTROLS WILL OPERATE THE GSHSP MODULES AS REQUIRED TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE AT THE SETPOINT.
- B. "FIRST STAGE" COOLING: WHEN THE CHILLED WATER SYSTEM IS MANUALLY DISABLED, THE "FIRST STAGE" COOLING MUST BE DISABLED.
  - 1) THE BAS MUST DISABLE THE COOLING MODE IN THE GSHSP SYSTEM.
  - 2) AFTER A DELAY OF TWO MINUTES (ADJUSTABLE), THE "LEAD" CHILLED WATER PUMP MUST BE STOPPED.
  - 3) ONCE THE "LEAD" CHILLED WATER PUMP HAS BEEN PROVEN TO BE OFF THROUGH THE OUTPUTS FROM THE PUMP VFD, THE BAS MUST INITIATE A TIME DELAY, SET AT 1 MINUTE (ADJUSTABLE).
  - 4) AFTER THE TIME DELAY HAS EXPIRED, THE BAS MUST SEND A SIGNAL TO THE GSHSP SYSTEM, WHICH WILL CLOSE THE ASSOCIATED ISOLATION VALVE.
- C. EQUIPMENT ROTATION: WHEN SWITCHING THE "LEAD," "LAG" AND "STANDBY" UNITS, THE EQUIPMENT IN THE NEXT SEQUENCE MUST BE ENABLED OR STARTED BEFORE THE PREVIOUSLY ENABLED OR STARTED UNIT IS DISABLED OR STOPPED. DURING THE GSHSP MODULES ROTATION, THE "LEAD" GSHSP MODULE MUST BECOME THE "LAG" EQUIPMENT AND THE "LAG" GSHSP MODULE MUST BECOME THE "LEAD" GSHSP MODULE. DURING THE CHILLERS AND PUMPS ROTATION, THE "LEAD" EQUIPMENT MUST BECOME THE "STANDBY" EQUIPMENT AND THE "STANDBY" EQUIPMENT MUST BECOME THE "LEAD" EQUIPMENT.
- D. GSHSP SYSTEM FAILURE: IF THE "LEAD" GSHSP MODULE SHOULD FAIL, AN ALARM MUST BE GENERATED, ASSUMING THE "LAG" GSHSP MODULE IS IDLE AND AVAILABLE FOR OPERATION, THE GSHSP'S PACKAGE CONTROLS MUST AUTOMATICALLY ENABLE THE "LAG" GSHSP MODULE TO REPLACE THE FAILED MODULE. IF THE ENTIRE GSHSP SHOULD FAIL, AN ALARM MUST BE GENERATED, THE BAS MUST AUTOMATICALLY ENABLE THE SECOND STAGE COOLING/AIR COOLED CHILLER. AFTER THE SECOND STAGE COOLING IS ENABLED AND FULLY OPERATIONAL, THE FIRST STAGE COOLING/GSHSP SYSTEM MUST BE DISABLED.
- 3. CHILLER FAILURE: IF AN ENABLED AIR COOLED CHILLER SHOULD FAIL DURING THE OPERATION OF THE SECOND STAGE COOLING, AN ALARM MUST BE GENERATED, ASSUMING THE "STANDBY" CHILLER IS IDLE AND AVAILABLE FOR OPERATION, THE BAS MUST AUTOMATICALLY ENABLE THAT CHILLER TO REPLACE THE FAILED CHILLER. AFTER THE NEWLY STARTED CHILLER IS IN OPERATION, THE FAILED CHILLER MUST BE DISABLED.
- 4. CHILLER SUPPLY WATER TEMPERATURE CONTROL: THE GSHSP SYSTEM AND CHILLER MUST BE CONTROLLED BY ITS PACKAGED CONTROLS TO MAINTAIN THE CHILLED WATER SUPPLY WATER TEMPERATURE AT 45°F. THE SET POINT MUST BE ADJUSTABLE THROUGH THE BAS.
- 5. CHILLED WATER PUMP CONTROL (CWP-1 AND CWP-2):
  - A. CHILLED WATER PUMP HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE OFF MODE, THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS.
  - B. CHILLED WATER PUMP LOCAL-REMOTE SPEED CONTROL: LOCAL-REMOTE SETTINGS MUST BE PROVIDED AS PART OF EACH VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE LOCAL MODE, THE PUMP'S SPEED MUST BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE RESPECTIVE DRIVE CONTROL PANEL. IN THE REMOTE MODE, THE PUMP'S SPEED MUST BE CONTROLLED BY THE BAS.
  - C. CHILLED WATER PUMPS MUST BE STARTED AND STOPPED ACCORDING TO THE COOLING LOADING AND UNLOADING SEQUENCES DESCRIBED ABOVE.
  - D. CHILLED WATER PUMP FAILURE:
    - 1) IF A CHILLED WATER PUMP SHOULD FAIL, AN ALARM MUST BE GENERATED, ASSUMING THE "STANDBY" CHILLED WATER PUMP IS IDLE AND AVAILABLE FOR OPERATION, THE BAS MUST AUTOMATICALLY ENABLE THAT PUMP TO REPLACE THE FAILED PUMP. AFTER THE NEWLY STARTED PUMP IS IN OPERATION, THE FAILED PUMP MUST BE DISABLED.
    - 2) CHILLED WATER PUMPS THAT FAIL DURING OPERATION MUST AUTOMATICALLY BE ASSIGNED A DESIGNATION OF "FAILED." CHILLED WATER PUMP FAILURE MUST INCLUDE: LOSS OF STATUS AND FAULT/TROUBLE.
    - 3) ANY PUMP THAT IS TAKEN OUT OF OPERATION FOR MAINTENANCE MUST BE ASSIGNED A DESIGNATION OF "FAILED" BY THE OPERATOR. THE BAS MUST NOT ATTEMPT TO START PUMPS WITH AN ASSIGNED DESIGNATION OF "FAILED."
- F. CHILLER STANDBY OPERATION:
  - 1) IF THE AIR COOLED CHILLERS HAVE NOT OPERATED FOR 1 WEEK (ADJ.), ONE AIR COOLED CHILLER SHALL BE STARTED AND RUN FOR 15 MIN. (ADJ.) AND THEN TURN OFF AND THEN THE OTHER AIR COOLED CHILLER SHALL BE STARTED AND RUN FOR 15 MIN. (ADJ.) AND THEN TURN OFF. THE AIR COOLED CHILLERS SHALL THEN RETURN TO LAG/STANDBY OPERATION.

### HOT WATER SYSTEM:

1. HEATING OPERATION - LOADING
- A. ASSUMES HOT WATER SYSTEM IS OFF AT STARTUP CONDITIONS:
- 1) WHEN THERE IS A CALL FOR HEATING IN THE FACILITY, THE BAS MUST SEND A SIGNAL TO THE PACKAGED CONTROLS ASSOCIATED WITH GSPH SYSTEM, WHICH WILL OPEN THE ISOLATION VALVES ASSOCIATED WITH HOT WATER AND GROUND LOOP WATER CONNECTIONS.
  - 2) WHEN BOTH ISOLATION VALVES HAVE BEEN PROVEN OPEN, THE "LEAD" HOT WATER PUMP AND "LEAD" GROUND LOOP WATER PUMP MUST START, ONCE THE PUMP IS STARTED, THE BAS MUST INCREASE THE SPEED OF HOT WATER PUMP TO MEET THE REQUIRED HOT WATER FLOW, INITIALLY SET AT 48 GPM (ADJUSTABLE), AND THE SPEED OF GROUND LOOP WATER PUMP TO MEET THE REQUIRED GROUND LOOP WATER FLOW, INITIALLY SET AT 50 GPM (ADJUSTABLE), THIS PUMP SPEED MUST BE DETERMINED IN CONSULTING WITH THE BALANCING CONTRACTOR DURING THE TAB PROCESS.
  - 3) WHEN BOTH THE "LEAD" HOT WATER PUMP AND THE "LEAD" GROUND LOOP WATER PUMP HAVE BEEN PROVEN TO BE RUNNING THROUGH THE OUTPUTS FROM THE PUMP VFDS, AND BOTH PUMPS ARE RUNNING AT THE SPEED FOR THE REQUIRED FLOW RATE, THE HEATING MODE IN THE GSPH SYSTEM MUST BE ENABLED BY THE BAS. THE GSPH'S SELF-CONTAINED, PACKAGED CONTROLS WILL OPERATE THE GSPH MODULES AS REQUIRED TO MAINTAIN THE HOT WATER SUPPLY TEMPERATURE AT THE SET POINT. ONLY ONE MODULE IS ALLOWED TO RUN IN HEATING MODE AT ANY TIME. THE SECOND MODULE IS A STANDBY HEATING MODULE.
- B. EQUIPMENT ROTATION: DURING THE GSPH MODULES ROTATION, THE HEATING "LEAD" GSPH MODULE MUST BECOME THE "STANDBY" EQUIPMENT AND THE "STANDBY" HEATING GSPH MODULE MUST BECOME THE "LEAD" GSPH MODULE.
- C. ACTIVATE A CRITICAL ALARM IF THE BAS DETERMINES THAT THE GSPH SYSTEM IS REQUIRED TO OPERATE TO MEET THE FACILITY HEATING LOAD AND THE GSPH SYSTEM IS NOT AVAILABLE FOR OPERATION.
2. HEATING OPERATION - UNLOADING:
- D. WHEN THERE IS NO CALL OF HEATING IN THE FACILITY OR THE HOT WATER SYSTEM IS MANUALLY DISABLED, THE HEATING MODE MUST BE DISABLED.
- 1) THE BAS MUST DISABLE THE HEATING MODE IN THE GSPH SYSTEM.
  - 2) AFTER A DELAY OF TWO MINUTES (ADJUSTABLE), THE "LEAD" HOT WATER PUMP MUST BE STOPPED.

## GENERAL SHEET NOTES

- A. REFER TO SHEETS M001 AND M002 FOR MECHANICAL ABBREVIATIONS, SYMBOLS AND GENERAL NOTES.

## SHEET NOTES

- 1 GSHP-1 AND GSHP-2 MUST BE PROVIDED WITH MANUFACTURER'S PACKAGED CONTROLS INCLUDING BACNET MASTER CONTROLLER/NETWORK GATEWAY, SENSORS AND OTHER FIELD/CONTROL DEVICES FOR REMOTE CONTROL AND MONITORING. EXTEND BACNET MSTP NETWORK FROM BACNET/ETHERNET GATEWAY IN HUMIDIFIER CONTROL PANEL (CB-1), AND CONNECT GSHP MASTER CONTROLLER/NETWORK GATEWAY. MAP OVER AND INTEGRATE CONTROL AND MONITORING POINTS LISTED IN POINTS SCHEDULE INTO BAS.
- 2 PROVIDE VFD WITH BACNET NETWORK INTERFACE THAT IS COMPATIBLE WITH THE BAS. EACH VFD MUST BE CONNECTED TO THE BAS NETWORK SO IT CAN BE MONITORED BY THE BAS. SEE BAS POINT FUNCTION SCHEDULE FOR A LIST OF NETWORK POINTS.
- 3 SEE M100 FOR LOCATIONS OF DIFFERENTIAL PRESSURE SENSOR AND FLOW METERS.
- 4 PROVIDE DIFFERENTIAL PRESSURE SENSOR FOR CHILLED WATER LOOP AND CONNECT TO BAS. IF DIFFERENTIAL PRESSURE DROPS BELOW OR RISES ABOVE LOW/HIGH DIFFERENTIAL PRESSURE SET POINTS, LOW/HIGH DP ALARM MUST BE GENERATED AT BAS.


**HOT WATER SYSTEM - CONTINUED:**

- 3) ONCE THE "LEAD" HOT WATER PUMP HAS BEEN PROVEN TO BE OFF THROUGH THE OUTPUTS FROM THE PUMP VFD, THE BAS MUST INITIATE A TIME DELAY, SET AT 1 MINUTE (ADJUSTABLE).
- 4) AFTER THE TIME DELAY HAS EXPIRED, THE BAS MUST SEND A SIGNAL TO THE GSPH SYSTEM, WHICH WILL CLOSE THE ASSOCIATED ISOLATION VALVE.
3. GSPH SYSTEM FAILURE: IF THE "LEAD" GSPH MODULE SHOULD FAIL, AN ALARM MUST BE GENERATED. ASSUMING THE "LAG" GSPH MODULE IS IDLE AND AVAILABLE FOR OPERATION, THE GSPH'S PACKAGE CONTROLS MUST AUTOMATICALLY ENABLE THE "LAG" GSPH MODULE TO REPLACE THE FAILED MODULE. IF THE ENTIRE GSPH SHOULD FAIL, A CRITICAL ALARM MUST BE GENERATED AT THE BAS.
4. HOT WATER SUPPLY WATER TEMPERATURE CONTROL: THE GSPH SYSTEM MUST BE CONTROLLED BY ITS PACKAGED CONTROLS TO MAINTAIN THE HOT WATER SUPPLY WATER TEMPERATURE AT 120°F. THE SET POINT MUST BE ADJUSTABLE THROUGH THE BAS.
5. HOT WATER PUMP CONTROL (HWP-1 AND HWP-2):
  - A. HOT WATER PUMP HAND-OFF AUTO OPERATION: HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE OFF MODE, THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS.
  - B. HOT WATER PUMP LOCAL-REMOTE SPEED CONTROL: LOCAL-REMOTE SETTINGS MUST BE PROVIDED AS PART OF EACH VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE LOCAL MODE, THE PUMPS SPEED MUST BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE RESPECTIVE DRIVE CONTROL PANEL. IN THE REMOTE MODE, THE PUMPS SPEED MUST BE CONTROLLED BY THE BAS.
  - C. HOT WATER PUMPS MUST BE STARTED AND STOPPED ACCORDING TO THE HEATING LOADING AND UNLOADING SEQUENCES DESCRIBED ABOVE.
  - D. HOT WATER PUMP FAILURE:
    - 1) IF A HOT WATER PUMP SHOULD FAIL, AN ALARM MUST BE GENERATED. ASSUMING THE "STANDBY" HOT WATER PUMP IS IDLE AND AVAILABLE FOR OPERATION, THE BAS MUST AUTOMATICALLY ENABLE THAT PUMP TO REPLACE THE FAILED PUMP. AFTER THE NEWLY STARTED PUMP IS IN OPERATION, THE FAILED PUMP MUST BE DISABLED.
    - 2) HOT WATER PUMPS THAT FAIL DURING OPERATION MUST AUTOMATICALLY BE ASSIGNED A DESIGNATION OF "FAILED." HOT WATER PUMP FAILURE MUST INCLUDE: LOSS OF STATUS AND FAULT/TROUBLE.
    - 3) ANY PUMP THAT IS TAKEN OUT OF OPERATION FOR MAINTENANCE MUST BE ASSIGNED A DESIGNATION OF "FAILED" BY THE OPERATOR. THE BAS MUST NOT ATTEMPT TO START PUMPS WITH AN ASSIGNED DESIGNATION OF "FAILED."
  - E. HOT WATER PUMP SPEED CONTROL:
    - 1) THE BAS MUST MONITOR THE DIFFERENTIAL PRESSURE BETWEEN THE HOT WATER SUPPLY AND HOT WATER RETURN PIPING THROUGH EXISTING DIFFERENTIAL PRESSURE SENSOR IN THE BUILDING.
    - 2) IF THE DIFFERENTIAL PRESSURE DROPS BELOW THE DIFFERENTIAL PRESSURE SET POINT, WHICH MUST BE INITIALLY SET AT 15 PSI (ADJUSTABLE), THE VFD SPEED MUST BE INCREASED. IF THE DIFFERENTIAL PRESSURE RISES ABOVE THE DIFFERENTIAL PRESSURE SET POINT, THE VFD SPEED MUST BE DECREASED.
    - 3) IF THE DIFFERENTIAL PRESSURE SENSOR SHOULD FAIL, THE BAS MUST RUN THE PUMP AT THE DEFAULT SPEED OF 80% (ADJUSTABLE). THIS PUMP SPEED MUST BE DETERMINED IN CONSULTING WITH THE BALANCING CONTRACTOR DURING THE TAB PROCESS.
6. HOT WATER BYPASS VALVE CONTROL: THE BAS MUST MONITOR THE HOT WATER SUPPLY FLOW RATE. IF THE FLOW RATE DROPS BELOW THE MINIMUM HOT WATER FLOW SET POINT, WHICH MUST BE INITIALLY SET AT 40 GPM (ADJUSTABLE), WHILE THE HOT WATER PUMP VFD IS RUNNING AT THE MINIMUM SPEED, THE BAS MUST MODULATE THE HOT WATER BYPASS VALVE TOWARDS OPEN POSITION TO MAINTAIN THE FLOW RATE AT THE SET POINT. IF THE FLOW RATE RISES ABOVE THE SET POINT, THE BAS MUST MODULATE THE HOT WATER BYPASS VALVE TOWARDS TO CLOSED POSITION TO MAINTAIN THE FLOW RATE AT OR ABOVE THE SET POINT.

**GROUND LOOP WATER PUMPS:**

1. GROUND LOOP WATER PUMP CONTROL (GLP-1 AND GLP-2):
- A. GROUND LOOP WATER PUMP HAND-OFF-AUTO OPERATION: HAND-OFF-AUTO SETTINGS MUST BE PROVIDED AS PART OF THE VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE OFF MODE, THE PUMP MUST BE STOPPED. IN THE HAND MODE, THE PUMP MUST RUN CONTINUOUSLY. IN THE AUTO MODE, THE PUMP MUST BE STARTED AND STOPPED BY THE BAS.
  - B. GROUND LOOP WATER PUMP LOCAL-REMOTE SPEED CONTROL: LOCAL-REMOTE SETTINGS MUST BE PROVIDED AS PART OF EACH VARIABLE FREQUENCY DRIVE THROUGH THE DRIVE'S KEYPAD. IN THE LOCAL MODE, THE PUMP'S SPEED MUST BE CONTROLLED THROUGH A MANUAL SPEED CONTROL LOCATED AT THE RESPECTIVE DRIVE CONTROL PANEL. IN THE REMOTE MODE, THE PUMP'S SPEED MUST BE CONTROLLED BY THE BAS.
  - C. GROUND LOOP WATER PUMPS MUST BE STARTED AND STOPPED ACCORDING TO THE LOADING AND UNLOADING SEQUENCES DESCRIBED ABOVE.
  - D. GROUND LOOP WATER PUMP FAILURE:
    - 1) IF A GROUND LOOP WATER PUMP SHOULD FAIL, AN ALARM MUST BE GENERATED. ASSUMING THE "STANDBY" GROUND LOOP WATER PUMP IS IDLE AND AVAILABLE FOR OPERATION, THE BAS MUST AUTOMATICALLY ENABLE THAT PUMP TO REPLACE THE FAILED PUMP. AFTER THE NEWLY STARTED PUMP IS IN OPERATION, THE FAILED PUMP MUST BE DISABLED.
    - 2) GROUND LOOP WATER PUMPS THAT FAIL DURING OPERATION MUST AUTOMATICALLY BE ASSIGNED A DESIGNATION OF "FAILED." GROUND LOOP WATER PUMP FAILURE MUST INCLUDE: LOSS OF STATUS AND FAULT/TROUBLE.
    - 3) ANY PUMP THAT IS TAKEN OUT OF OPERATION FOR MAINTENANCE MUST BE ASSIGNED A DESIGNATION OF "FAILED" BY THE OPERATOR. THE BAS MUST NOT ATTEMPT TO START PUMPS WITH AN ASSIGNED DESIGNATION OF "FAILED."
  - E. GROUND LOOP WATER PUMP SPEED CONTROL:
    - 1) THE BAS MUST MONITOR THE GROUND LOOP WATER FLOW IN THE GSPH SYSTEM.
    - 2) IF THE FLOW METER SHOULD FAIL, THE BAS MUST RUN THE PUMP AT THE DEFAULT SPEED OF 80% (ADJUSTABLE). THIS PUMP SPEED MUST BE DETERMINED IN CONSULTING WITH THE BALANCING CONTRACTOR DURING THE TAB PROCESS.



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		OAKLAND		OAKLAND INTERNATIONAL AIRPORT (OAK)				CA
		REVIEWED BY	SUBMITTED BY <b>WILLIAM CASTRO</b>			APPROVED BY <b>VANCE WHITESEL</b>		
			SUBMITTER'S TITLE			PROJECT ENGINEER		
<b>OAKLAND ATCT</b> <b>OAKLAND</b> <b>CALIFORNIA</b>			DESIGNED BY W. LYNN		<b>ENGINEERING SERVICES</b> <b>TERMINAL</b>		DATE <b>8/26/2022</b>	JCN: <b>18034143</b>
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