

Helix







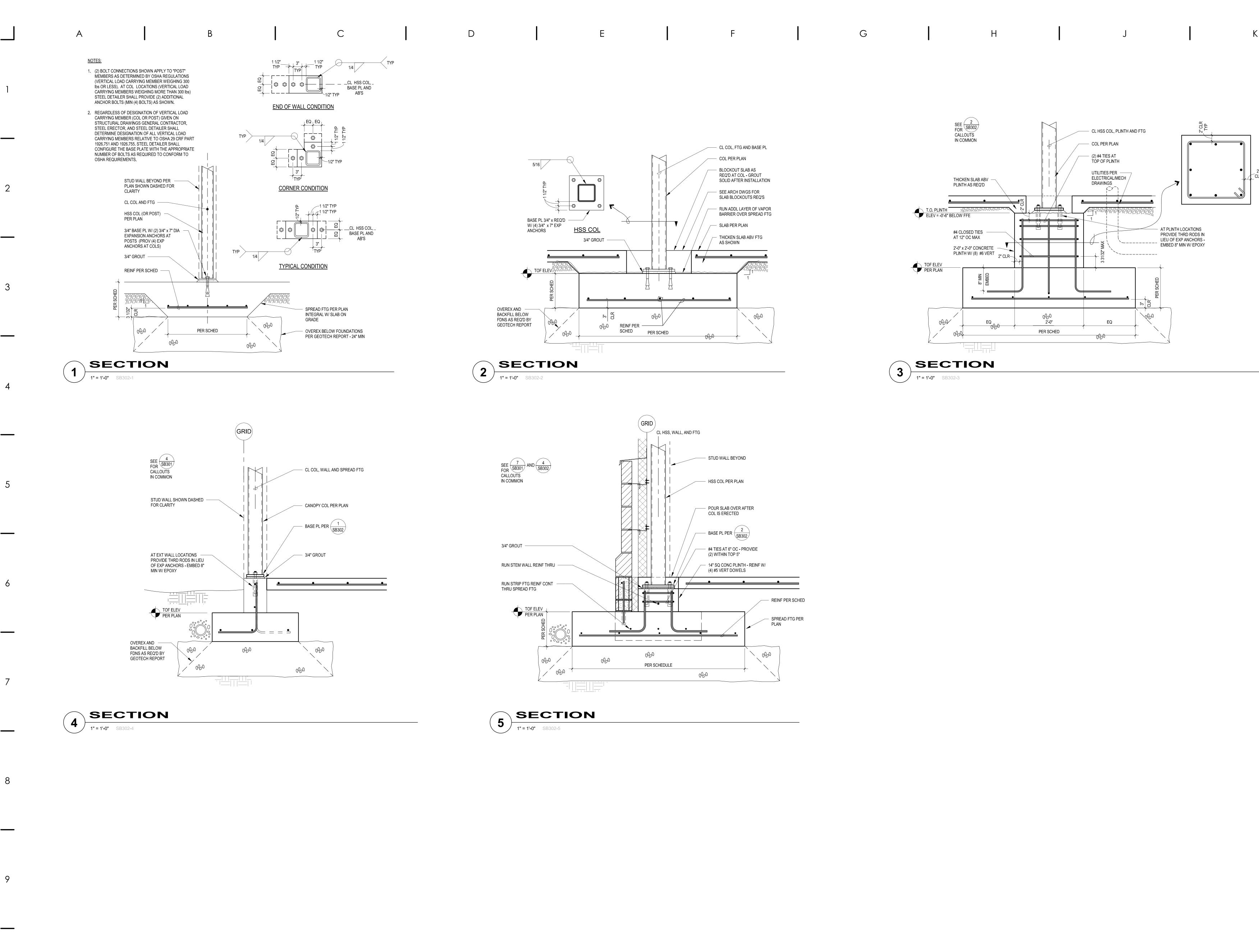
FOUNDATION DETAILS

CITY OF FEDERAL WAY FLEET & SHOP BUILDING

	FEDER	AL WAY, WASH	INGTON
	REVISION		DAT
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	DATE		JOB NC
	05.06.24		a23-08
		BID SET	

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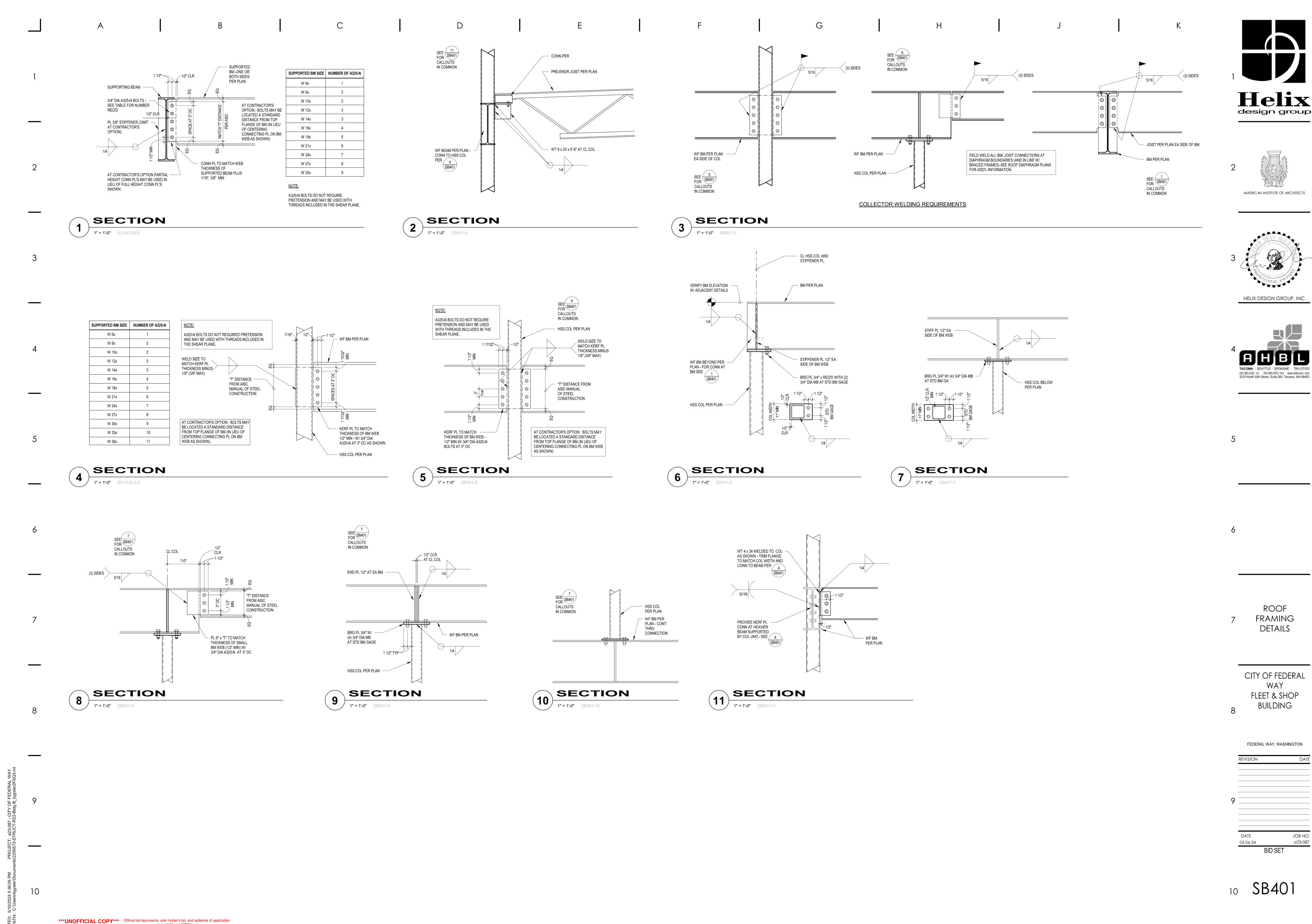
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Helix design group AMERICAN INSTITUTE OF ARCHITECTS HELIX DESIGN GROUP, INC 253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB 2215 North 30th Street, Suite 300 Tacoma, WA 98403 FOUNDATION DETAILS CITY OF FEDERAL WAY FLEET & SHOP BUILDING FEDERAL WAY, WASHINGTON

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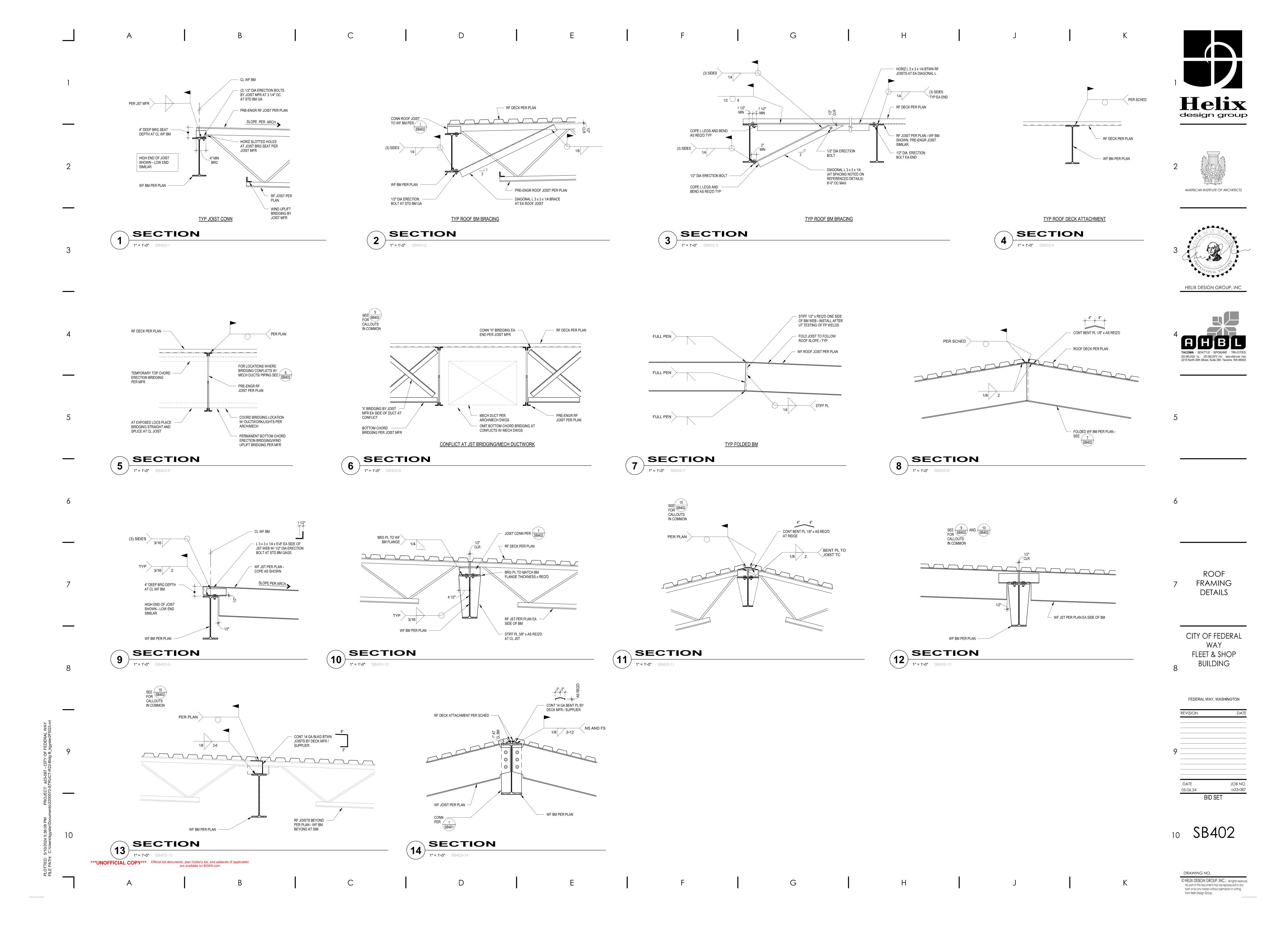


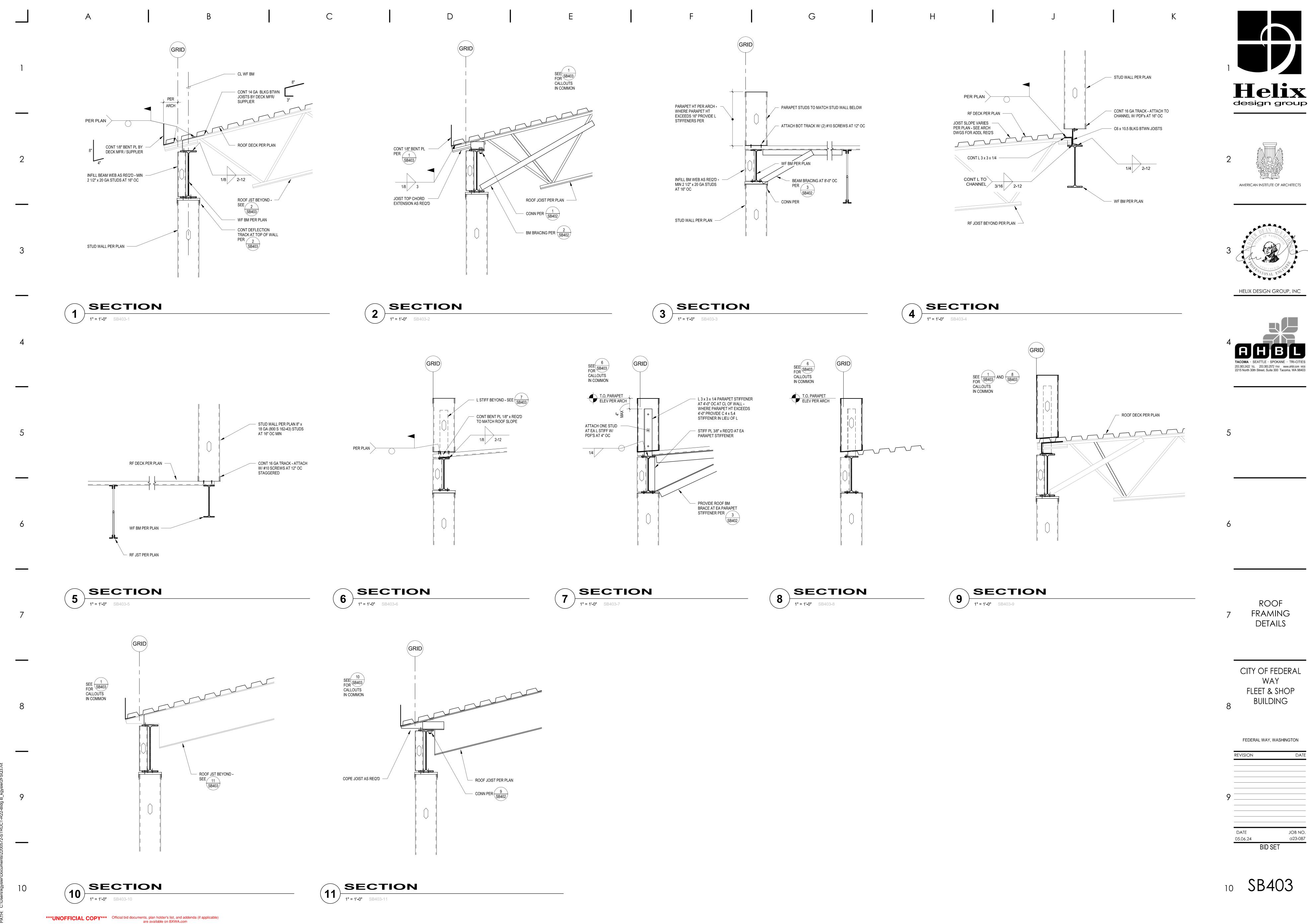
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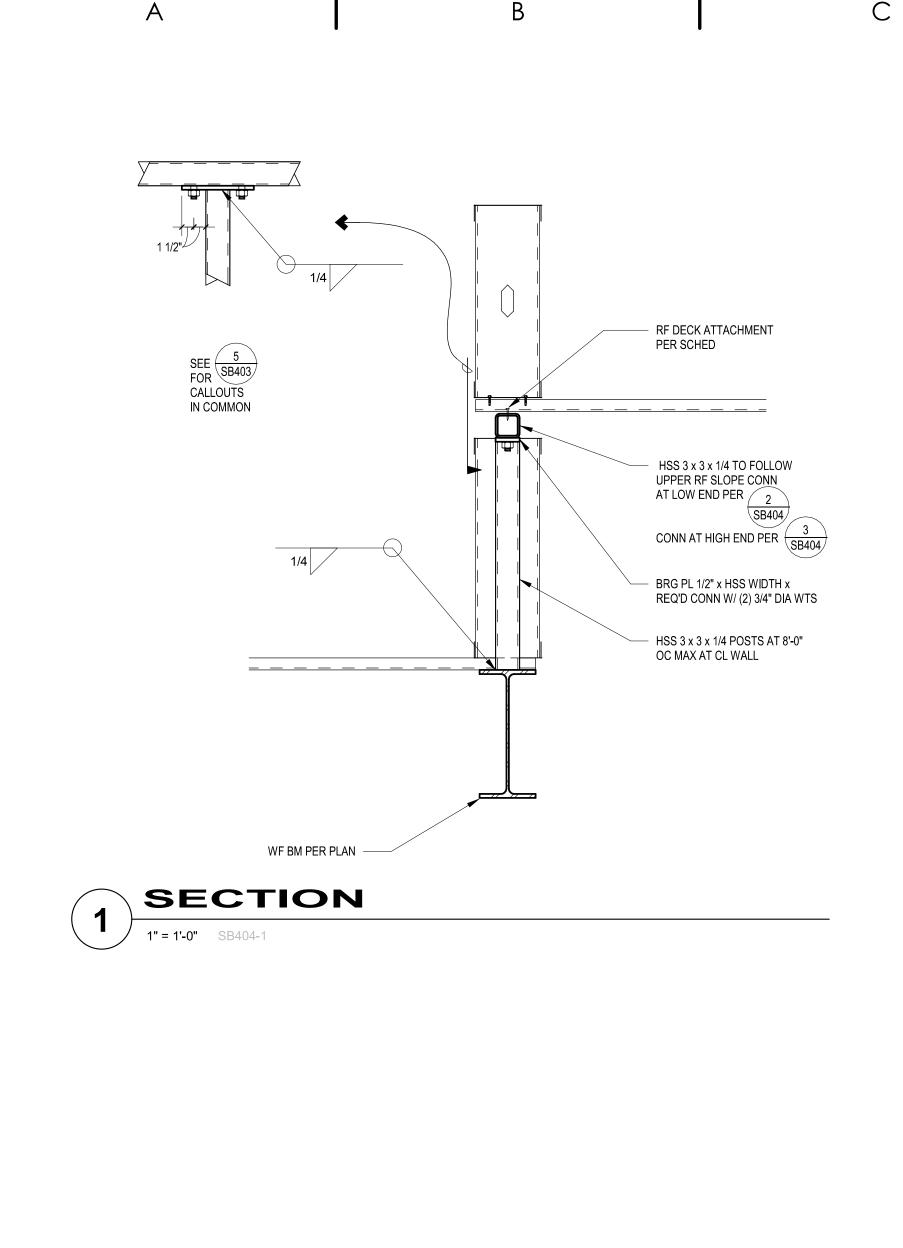


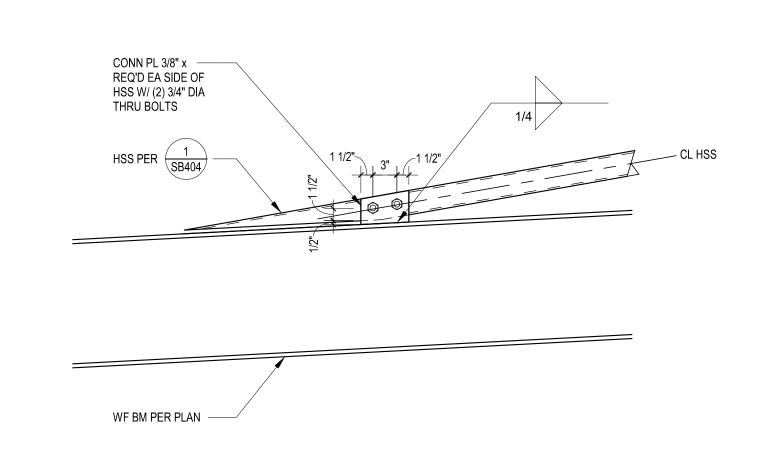
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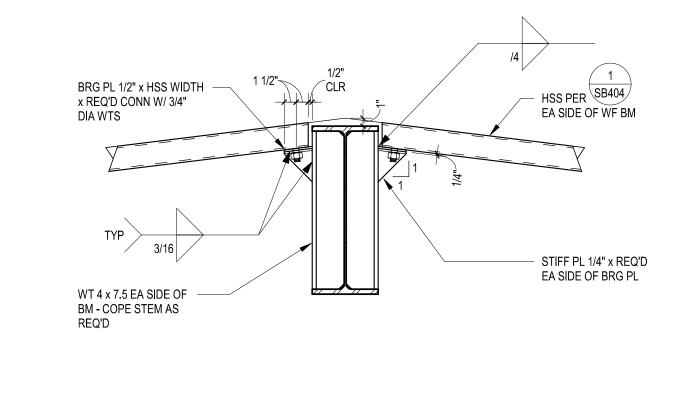
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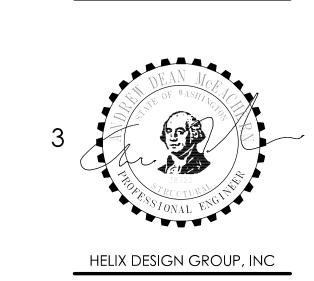
2 SECTION













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	DETAILS

	CITY OF FEDERAL
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	FEDERAL WAY,	WASHINGTON
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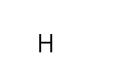
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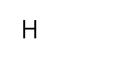
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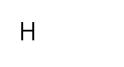
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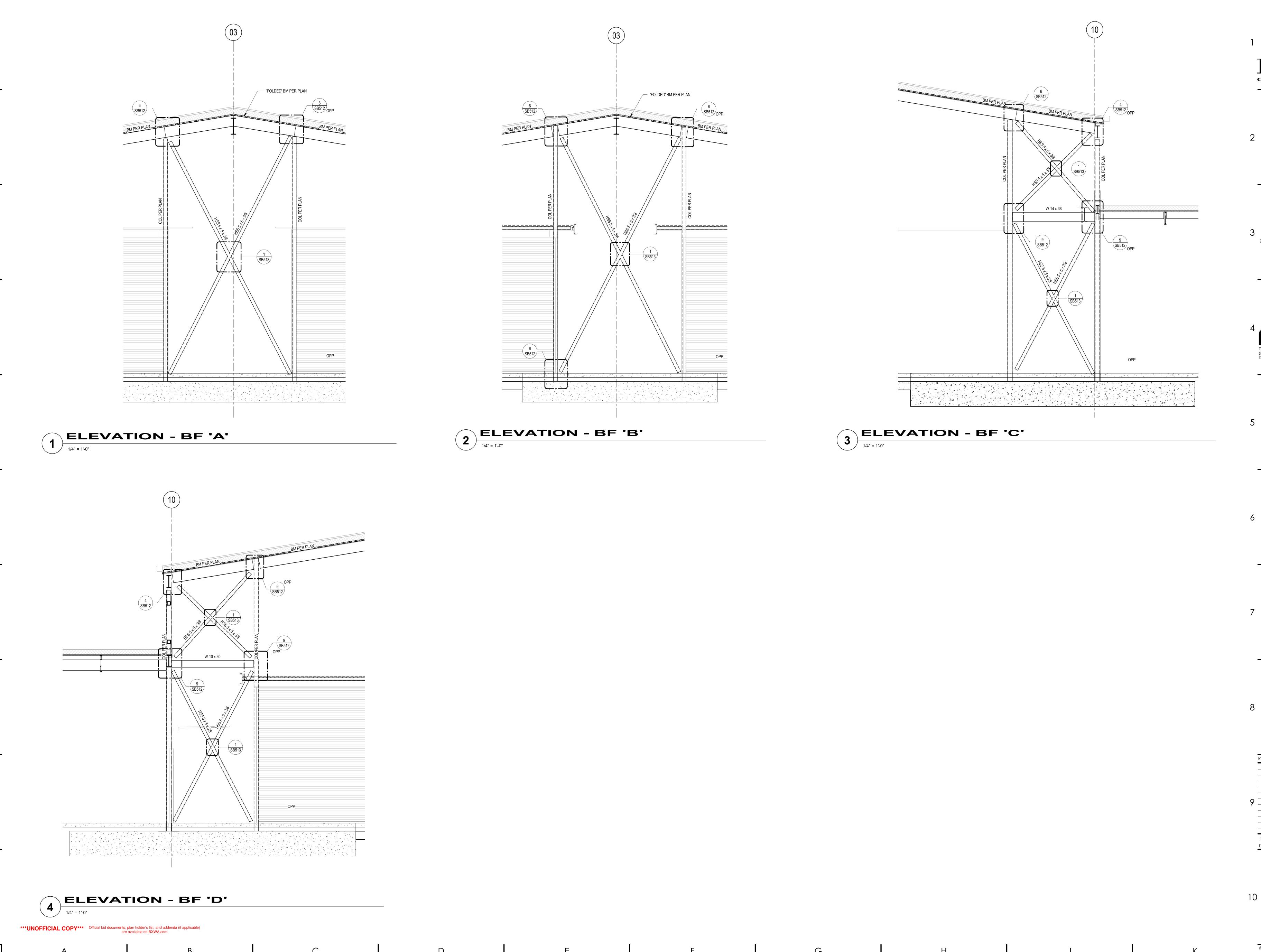






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BRACED FRAME ELEVATIONS

CITY OF FEDERAL WAY FLEET & SHOP BUILDING

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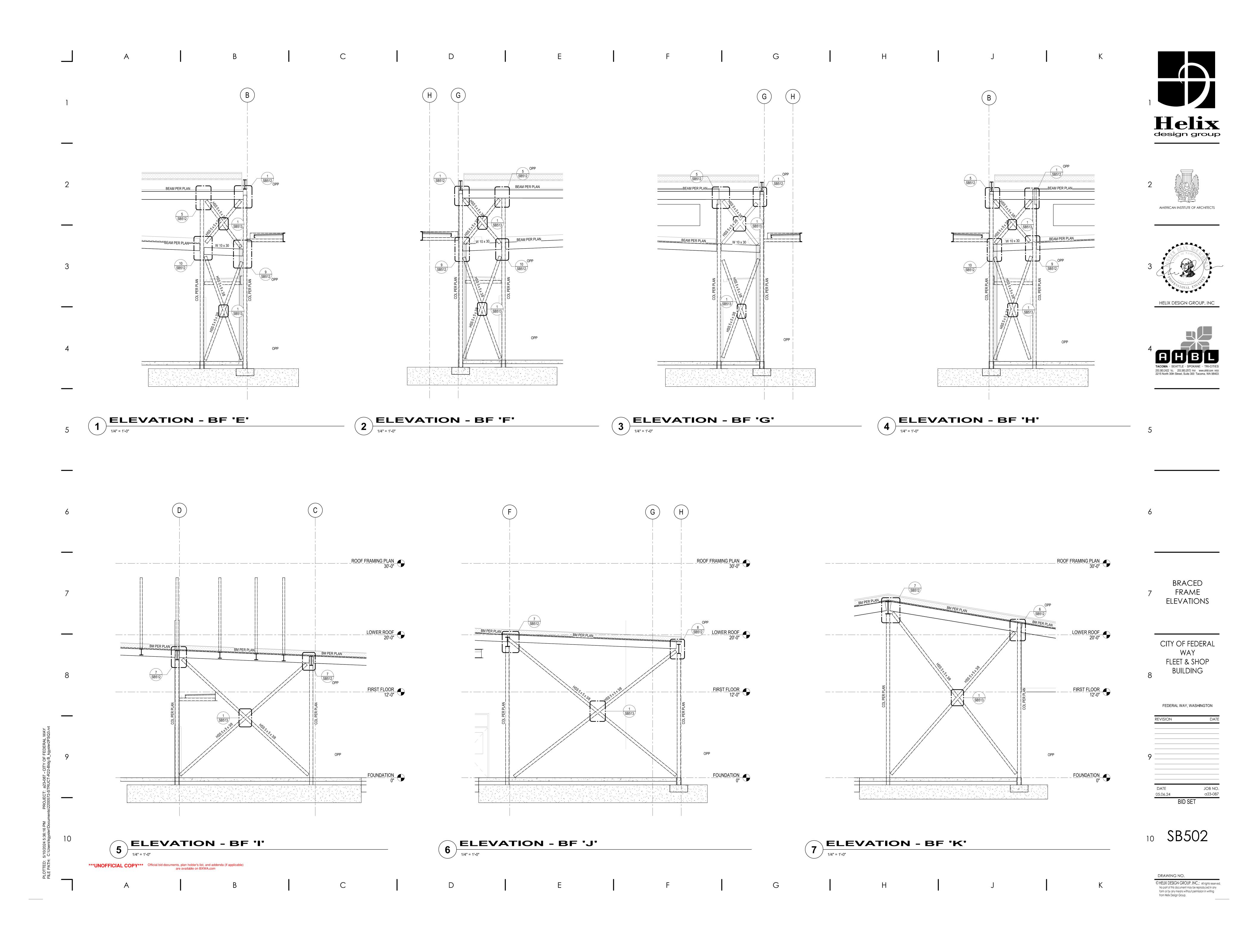
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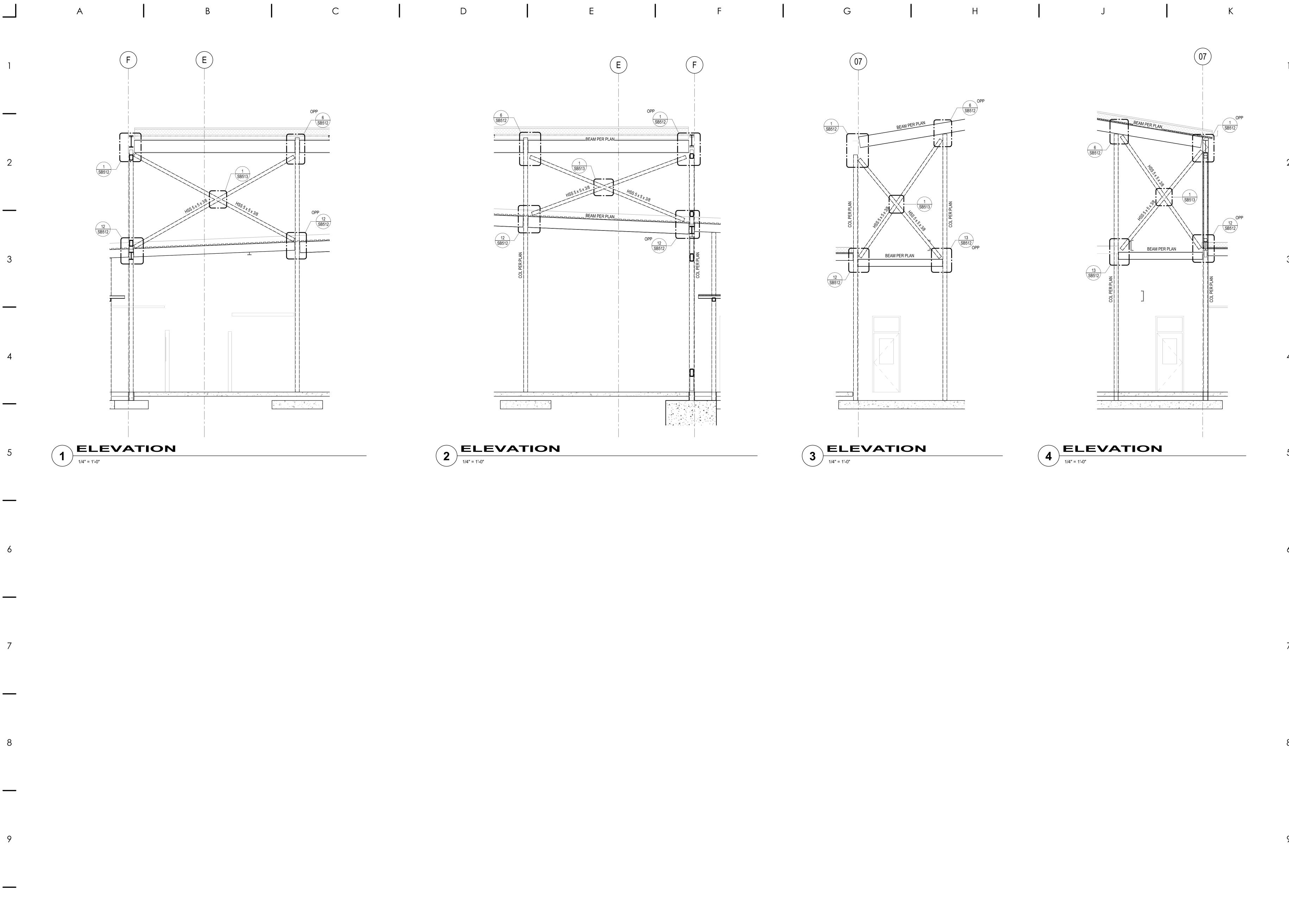
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CITY OF FEDERAL WAY FLEET & SHOP BUILDING

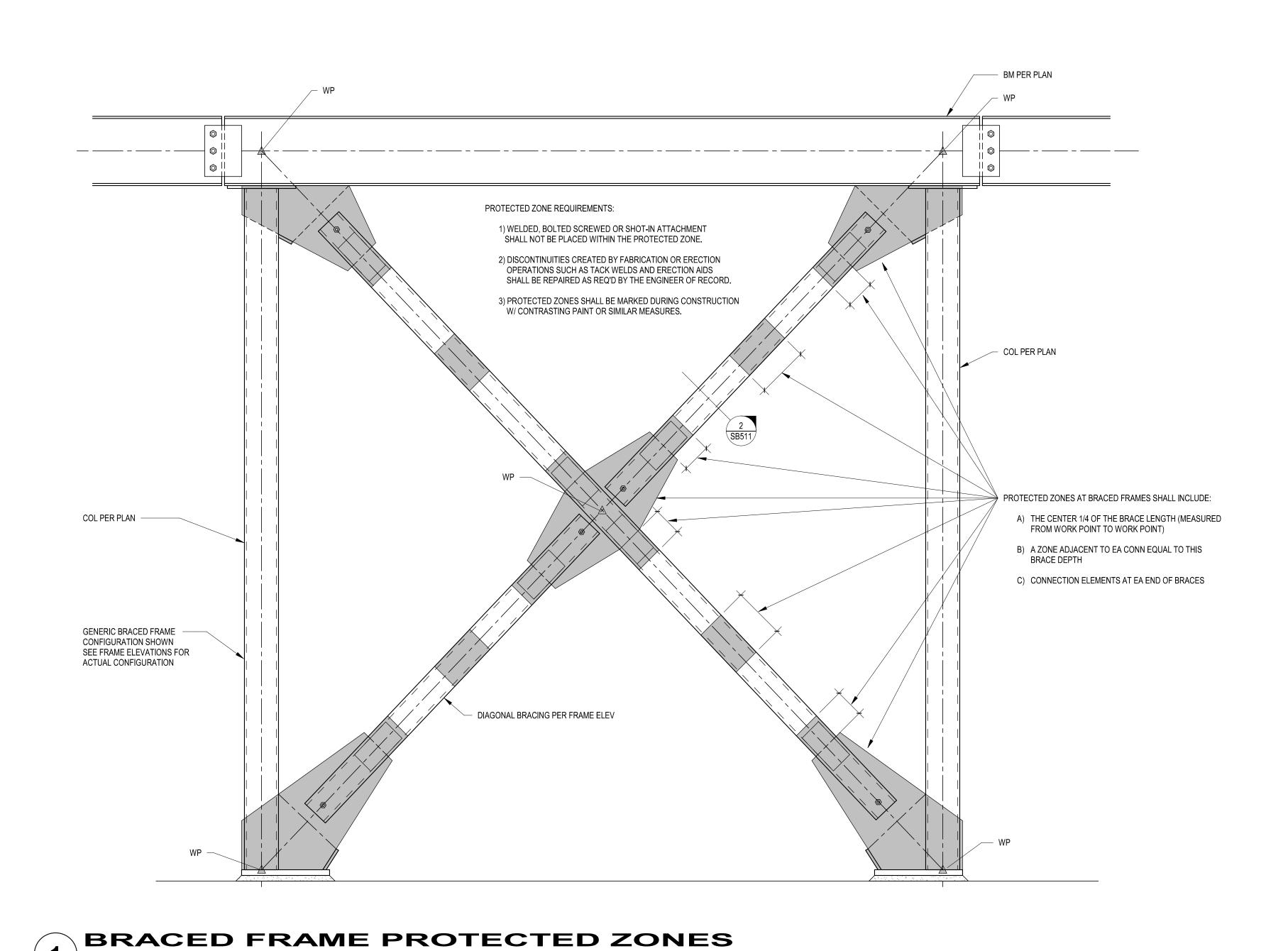
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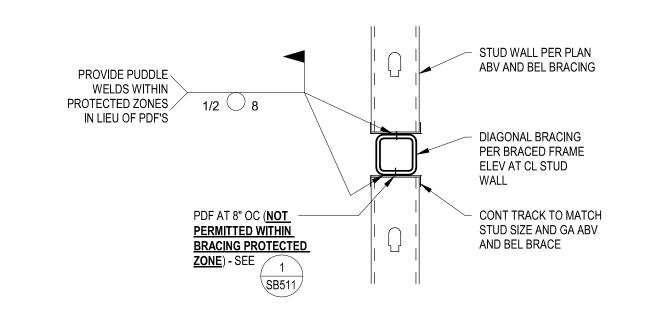
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BRACED FRAME DETAILS

CITY OF FEDERAL WAY FLEET & SHOP

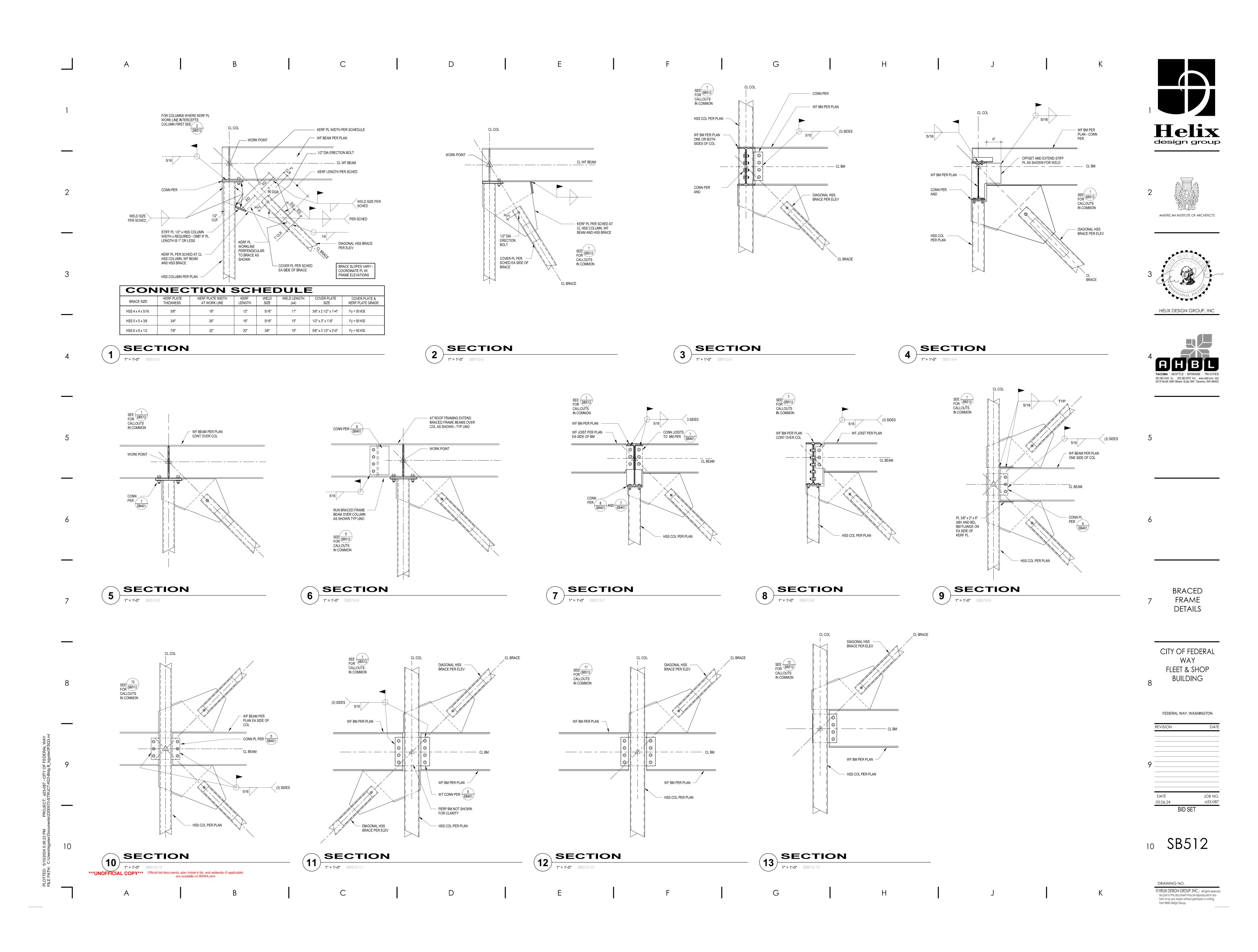
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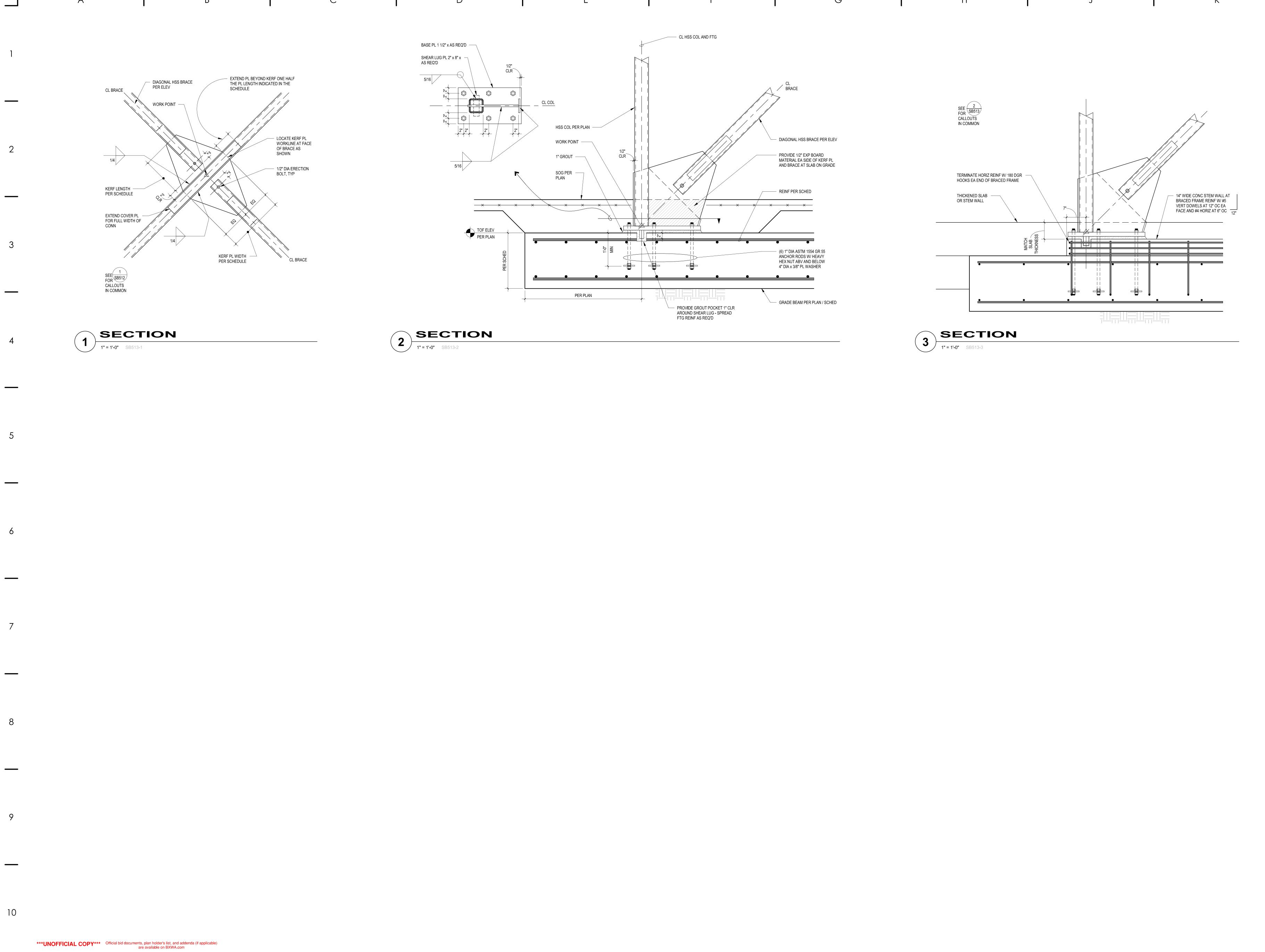
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DETAILS

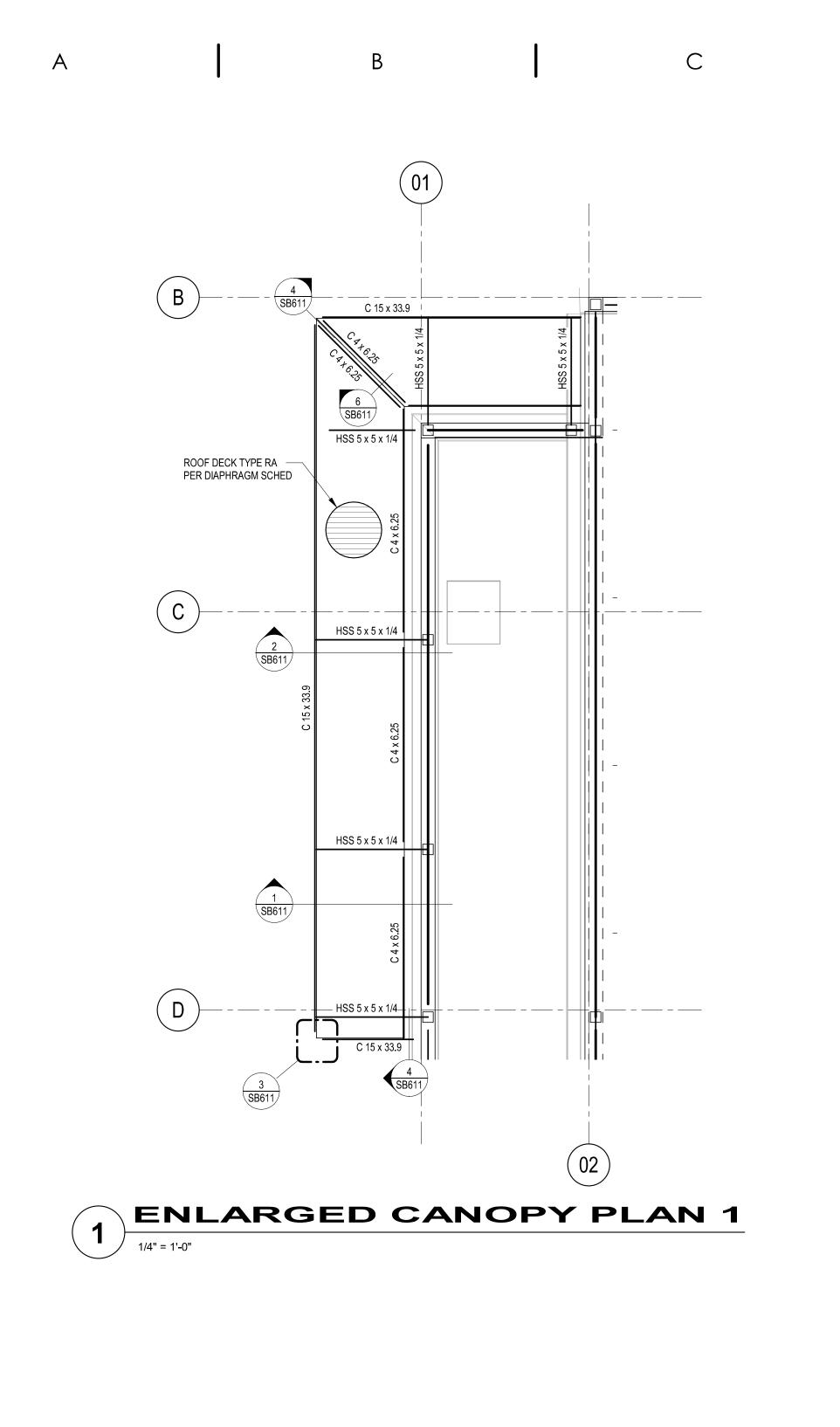
CITY OF FEDERAL WAY FLEET & SHOP BUILDING

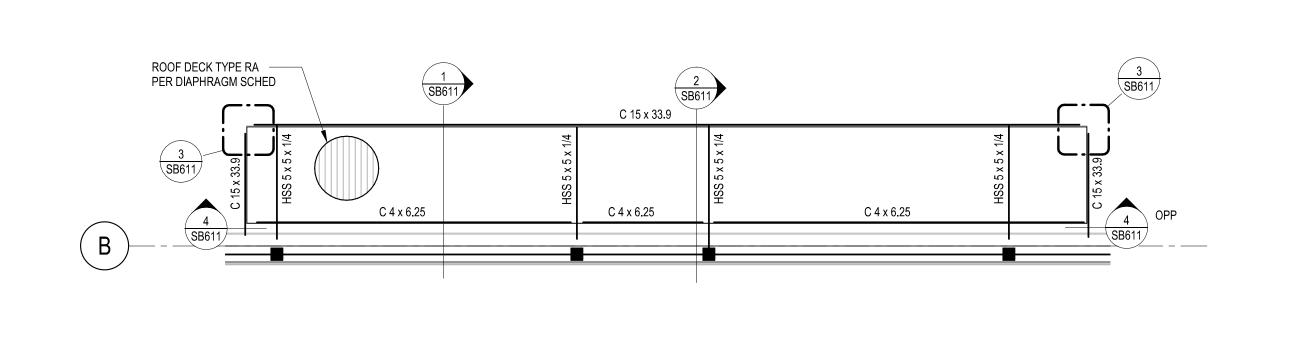
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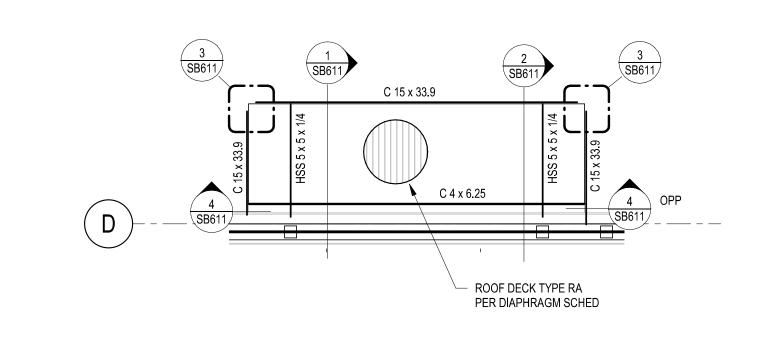
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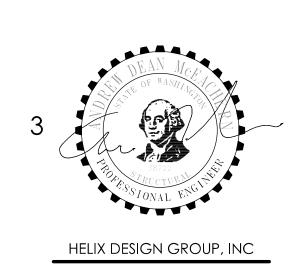








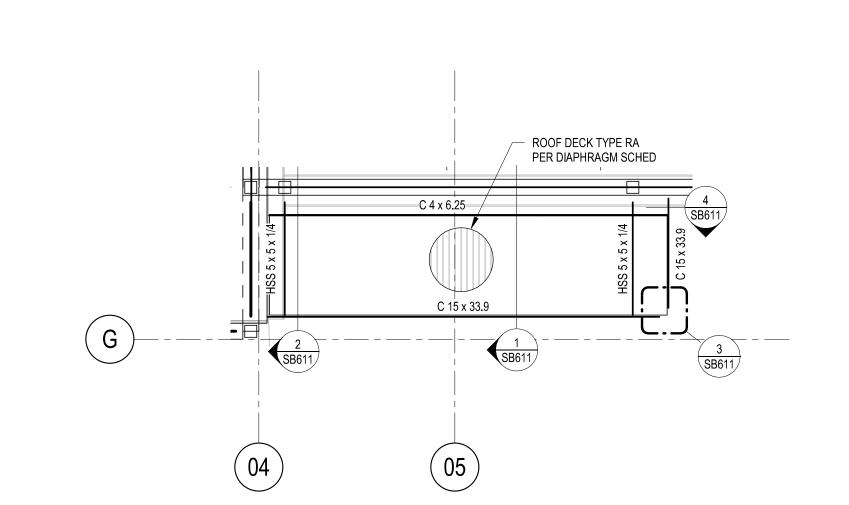


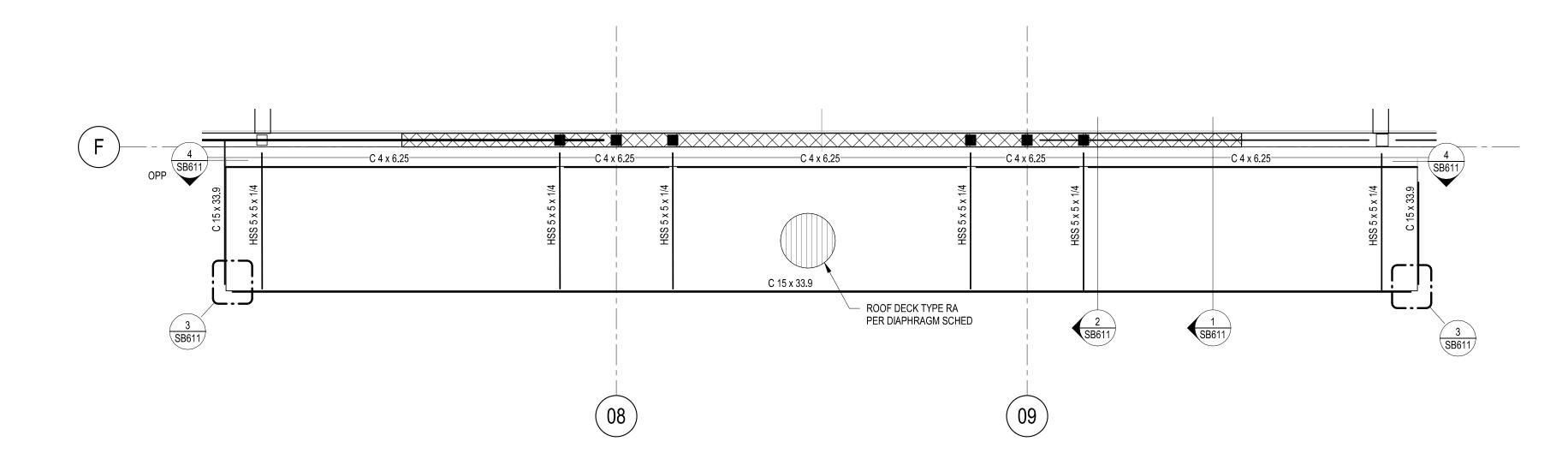


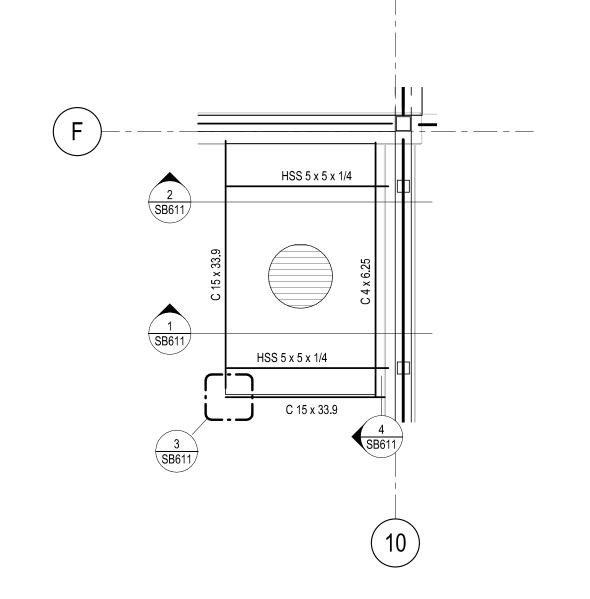












	CITY OF FEDERA WAY
8	FLEET & SHOP BUILDING

CANOPY

PLANS

WAY, WASHINGTON
DATE
JOB NO. a23-087

ENLARGED CANOPY PLAN 4

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5 ENLARGED CANOPY PLAN 5

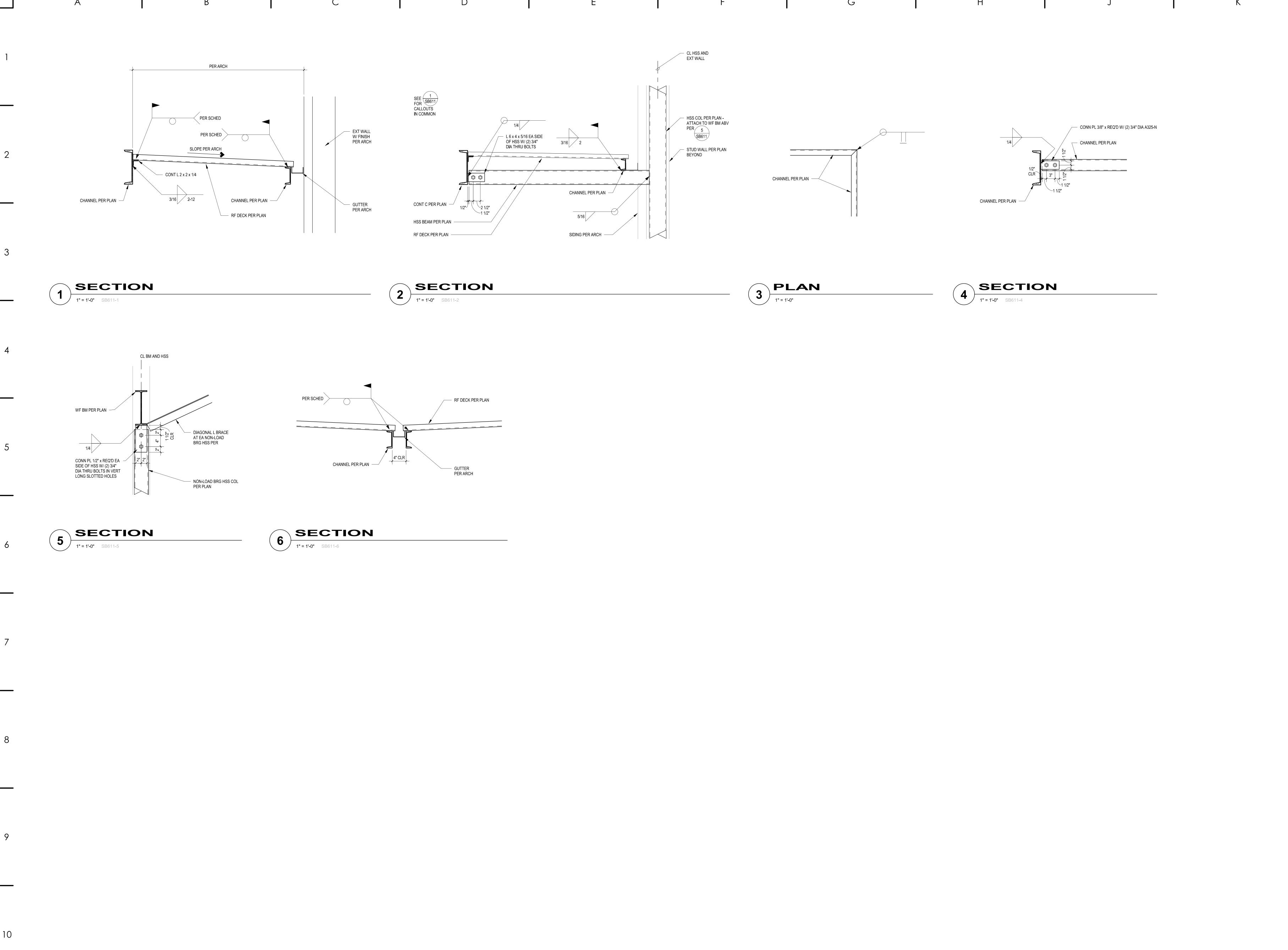
6 ENLARGED CANOPY PLAN 6

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CANOPY DETAILS

CITY OF FEDERAL WAY FLEET & SHOP BUILDING

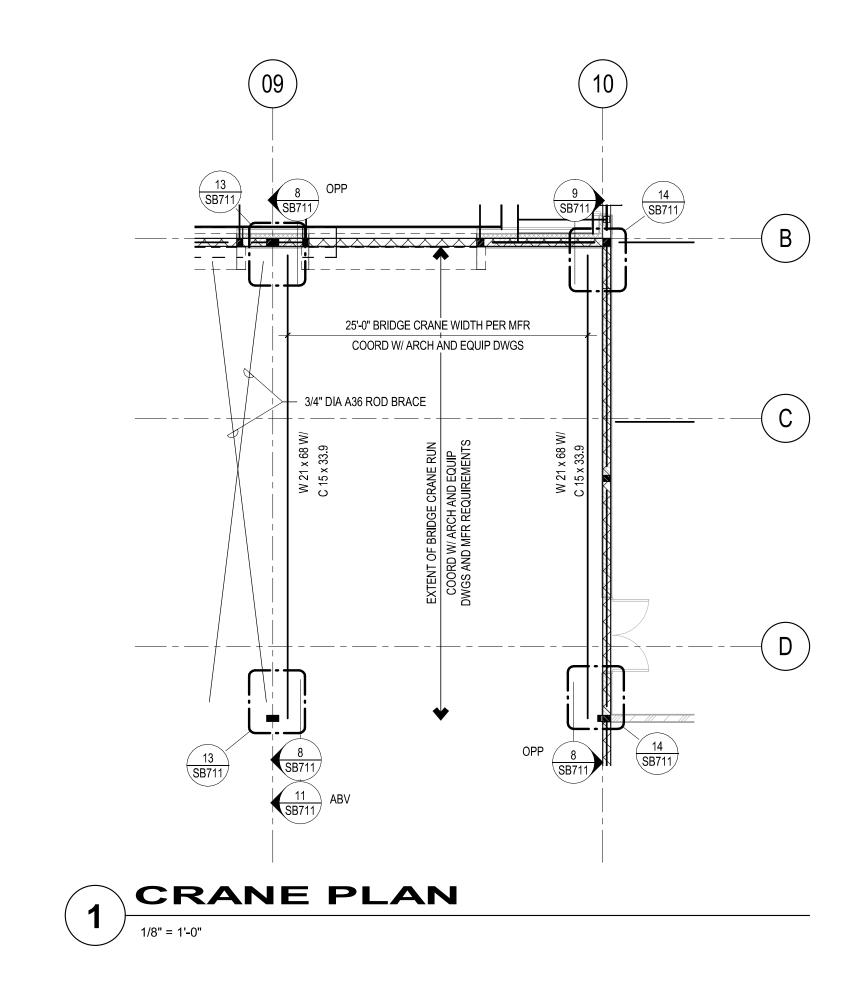
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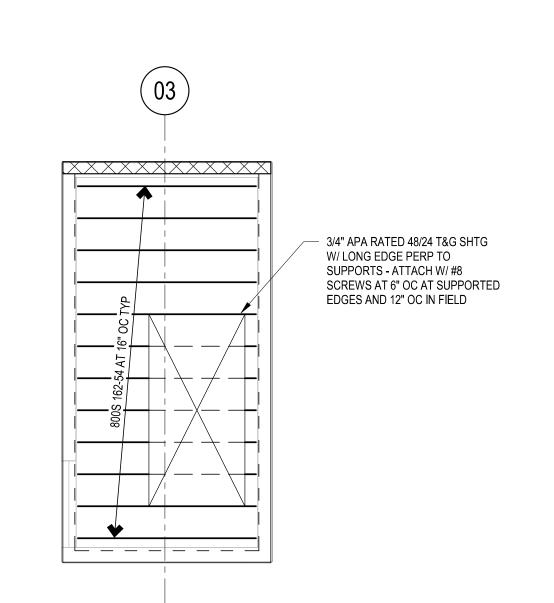
FEDERAL WAY, WASHINGTON

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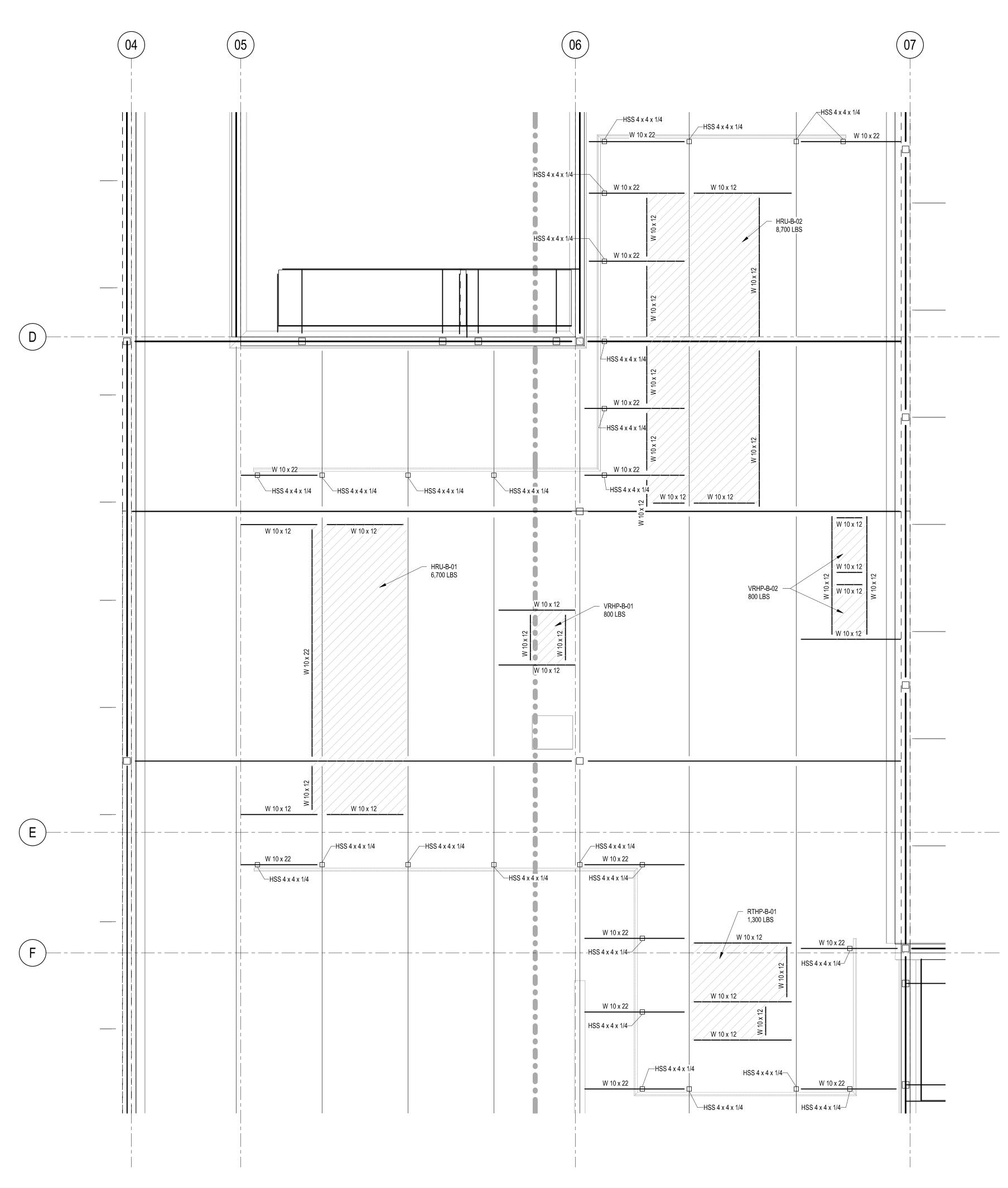
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2 ENLARGED MEZZANINE FRAMING PLAN
1/4" = 1'-0"

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3 ENLARGED FRAMING PLAN

1/4" = 1'-0"

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EQUIPMENT SUPPORT PLANS

CITY OF FEDERAL
WAY
FLEET & SHOP
BUILDING

FEDERAL WAY, WASHINGTON

REVISION

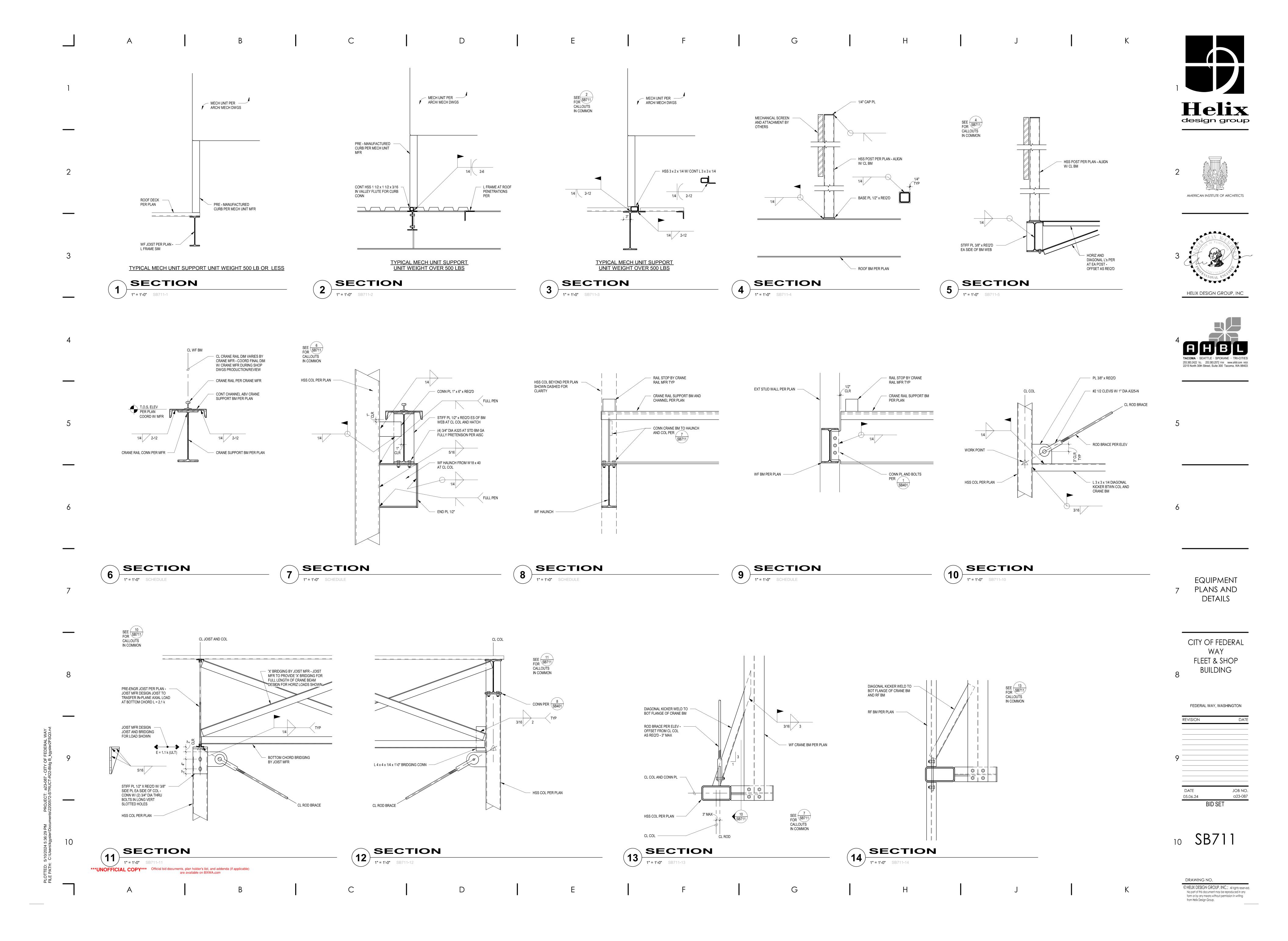
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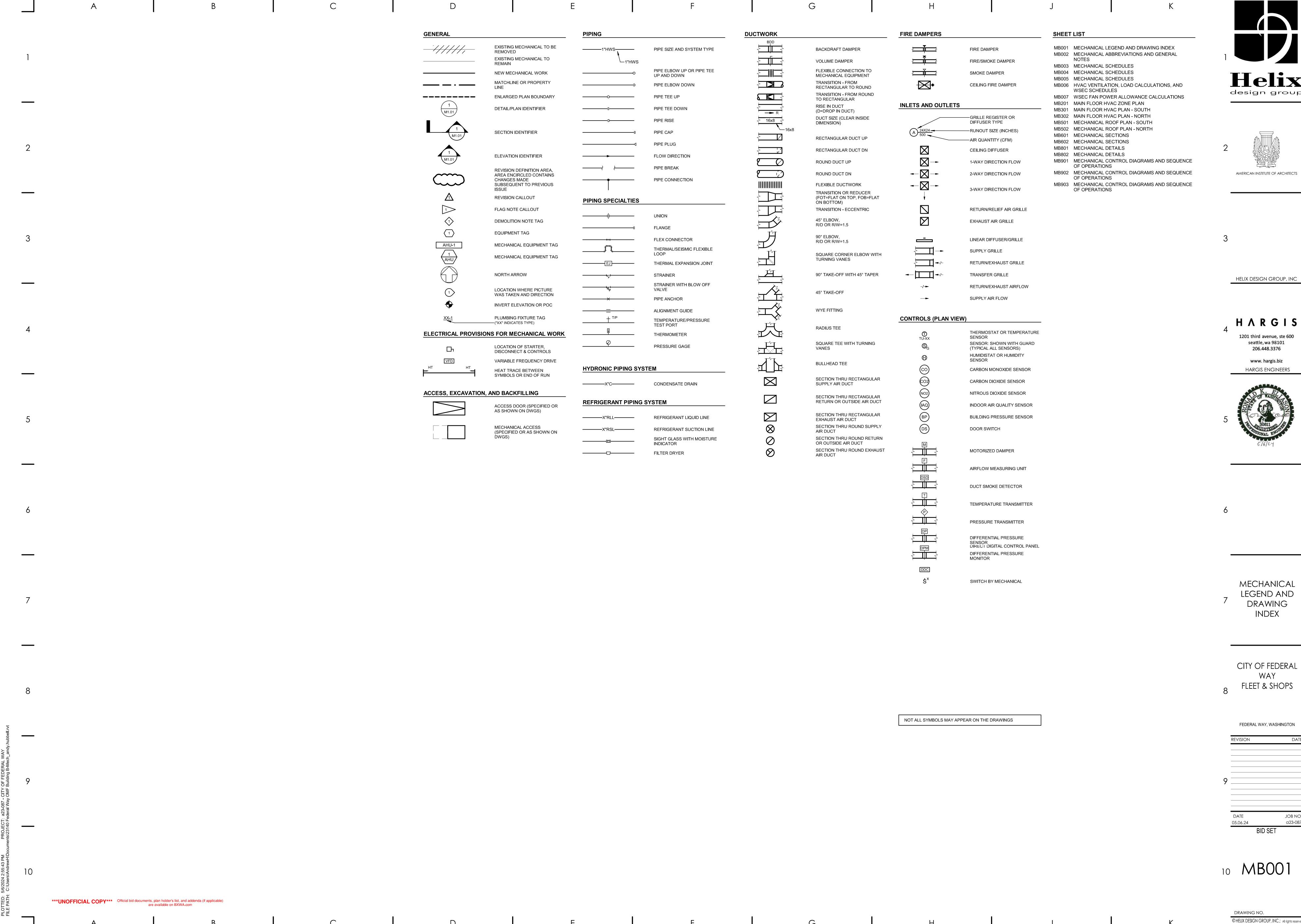
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ABBREVIATIONS GENERAL NOTES - MECHANICAL SHEET METAL NOTES EWT ENTERING WATER TEMP DIAMETER, PHASE MPG MEDIUM PRESSURE GAS 1. COORDINATE MECHANICAL WORK WITH THAT OF OTHER 1. VOLUME DAMPERS: PROVIDE A MANUAL VOLUME 1. THE COMPONENT IMPORTANCE FACTOR (Ip) FOR ALL NON-DAMPER FOR EACH SUPPLY, RETURN, AND EXHAUST TRADES (ELECTRICAL, ARCHITECTURAL, STRUCTURAL, EXH EXHAUST MEDIUM PRESSURE STEAM CIVIL, AND LANDSCAPE). REFER TO ELECTRICAL, OPENING, LOCATED AS FAR UPSTREAM AS POSSIBLE AIR, AMPS EXT EXTERIOR, EXTERNAL MEDICAL VACUUM FROM THE OPENING. PROVIDE A MANUAL VOLUME ARCHITECTURAL, STRUCTURAL, CIVIL, AND LANDSCAPE AUTOMATIC AIR VENT AAV DRAWINGS AND SPECIFICATIONS. COORDINATION DAMPER FOR BRANCH MAINS SERVING MORE THAN ONE ABV ABOVE FAHRENHEIT, FIRE MAIN PIPING NOT APPLICABLE SHALL OCCUR PRIOR TO FABRICATION, PURCHASE, OPENING. AIR CONDITIONER F/S FIRE/SMOKE DAMPER NORMALLY CLOSED, NOISE CRITERIA AND/OR INSTALLATION OF ALL WORK. 2. BACKDRAFT DAMPERS: PROVIDE ADJACENT TO FC ACU AIR CONDITIONING UNIT FLUID COOLER NOT IN CONTRACT 2. COORDINATE PLUMBING, HVAC, AND FIRE PROTECTION LOUVERS UNLESS MOTOR OPERATED DAMPERS ACCESS DOOR FCO FLOOR CLEANOUT NORMALLY OPEN, NITROUS OXIDE SYSTEMS ROUTING PRIOR TO INSTALLATION. DURING PROVIDED. FCU ADA AMERICANS WITH DISABILITIES ACT FAN COIL UNIT NUMBER LAYOUT COORDINATION, DUCTWORK TAKES FIRE DAMPER, FLOOR DRAIN, DRY SPRINKLER NON POTABLE 3. ACCESS DOORS: PROVIDE AT DUCT SMOKE PRECEDENCE OVER PLUMBING, INCLUDING FIRE ROUTING ABOVE FINISHED FLOOR NON POTABLE COLD WATER PIPING PROTECTION SYSTEMS. DETECTORS, BACKDRAFT DAMPERS, MOTOR OPERATED FIRE DEPARTMENT CONNECTION DAMPERS, [FIRE DAMPERS,] [SMOKE DAMPERS], SECTION 230550. AIRFLOW MEASURING STATION NPH NON POTABLE HOT WATER PIPING FF FOULING FACTOR, FLAT FILTER, FINISHED FLOOR 3. UNLESS OTHERWISE SPECIFIED, THE GENERAL COMBINATION FIRE/SMOKE DAMPERS, BOTH SIDES OF AFUE ANNUAL FUEL UTILIZATION EFFICIENCY NTS NOT TO SCALE CONTRACTOR (GC) SHALL BE RESPONSIBLE FOR DUCT MOUNTED COILS, [AIRSTREAM MEASURING UNITS,] FFD FUNNEL FLOOR DRAIN ABOVE GROUND PAINTING, CUTTING, AND PATCHING OF EXISTING AND PLENUMS. FLA FULL LOAD AMPS AUTHORITY HAVING JURISDICTION O2 OXYGEN AHJ FLOORS, WALLS, AND PARTITIONS IN THE EXISTING FLEX FLEXIBLE AIR HANDLING UNIT OUTDOOR AIR 4. UNLESS NOTED TO USE LARGER SIZE DUCT, PROVIDE BUILDING. FLR FLOOR THE FOLLOWING MINIMUM SIZE BRANCH DUCTS TO ACOUSTIC LINED (DUCT) OBD OPPOSED BLADE DAMPER 4. REFER TO STRUCTURAL DRAWINGS FOR ALLOWABLE CEILING DIFFUSERS. FLTR FILTER AMBIENT ON CENTER AMB METHODS/LOADS FOR HANGING PIPING/DUCTS FROM FLOW MEASUREMENT STATION (HVAC, PLUMBING) ACCESS PANEL OUTSIDE DIMENSION OR DIAMETER 6" DIA. FOR UP TO 120 CFM STRUCTURAL MEMBERS. FUEL OIL RETURN PIPING APD AIR PRESSURE DROP ORD OVERFLOW ROOF DRAIN 8" DIA. FOR 121-210 CFM FOS FUEL OIL SUPPLY PIPING ARCH ARCHITECT ORL OVERFLOW RAIN LEADER 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE 10" DIA. FOR 211-300 CFM FUEL OIL TANK FOT SAFE KEEPING OF HIS OWN PROPERTY ON THE JOB ASHRA AMERICAN SOCIETY OF HEATING, REFRIGERATION OSA OUTDOOR SUPPLY AIR 12" DIA. FOR 301-450 CFM AND AIR-CONDITIONING ENGINEERS, INC. FIRE PUMP, FLOATING POINT CONTROL SITE. OWNER ASSUMES NO RESPONSIBILITY FOR 14" DIA. FOR 451-600 CFM OVERFLOW STORM DRAIN PROTECTION OF PROPERTIES AGAINST FIRE, THEFT, 16" DIA. FOR 601-820 CFM FPM FEET PER MINUTE ASSY ASSEMBLY OV OUTLET VELOCITY AND ENVIRONMENTAL CONDITIONS. ATM ATMOSPHERE FEET PER SECOND 5. PROVIDE 12" LONG, ½" WIDE FLUORESCENT ORANGE FPVC APPROVED PVC FIRE SPRINKLER ROUTING ΑV ACID RESISTANT VENT PUMP, PRESSURE, PLUMBING FIXTURE TAPE AT CONCEALED VOLUME DAMPER LOCATIONS. ACID RESISTANT WASTE FS FLOOR SINK PD PRESSURE DROP, PUMPED DRAIN FT FEET, FIN TUBE PHASE MECHANICAL EQUIPMENT INSTALLATION NOTES FOLLOWING: BOILER FTD FOOTING DRAIN POST INDICATOR VALVE **BLOWER COIL** FTG FOOTING DRAIN PLANTER DRAIN 1. ACCESS CLEARANCES FOR MAINTENANCE AND FTU BACK DRAFT DAMPER FIN TUBE UNIT POINT OF CONNECTION REPLACEMENT: VERIFY PHYSICAL DIMENSIONS OF BELOW FLOOR FV FACE VELOCITY EQUIPMENT TO ENSURE THAT ACCESS CLEARANCES CONDENSATE PUMP RETURN CAN BE MET. COORDINATE LOCATIONS OF MECHANICAL BHP BRAKE HORSE POWER FW FILTERED WATER PIPING PRESSURE REDUCING VALVE WORK AND WORK OF OTHER TRADES TO PROVIDE EXERCISED TO OBTAIN CONFORMANCE WITH THE BLW BELOW PSIG POUNDS PER SQUARE INCH GAGE ACCESS CLEARANCES FOR SERVICE AND MAINTENANCE. CONSTRUCTION DOCUMENTS APPROVED BY THE BOD BOTTOM OF DUCT GAS BUILDING OFFICIAL; BOP BOTTOM OF PIPE GAGE GA QTY QUANTITY вот воттом GAHU GAS AIR HANDLING UNIT **PIPING NOTES** GAL BTUH BRITISH THERMAL UNIT PER HOUR GALLONS RETURN AIR. RELIEF AIR GALVANIZED BALL VALVE ROOF DRAIN 1. DISASSEMBLY PROVISIONS: PROVIDE UNIONS OR GC GAS COCK, GENERAL CONTRACTOR REFERENCE, RETURN/EXHAUST FAN FLANGES AT PIPING CONNECTIONS TO EQUIPMENT, CONDENSATE PIPING GFU GAS FIRED UNIT REGISTER REG COILS, TRAPS, CONTROL VALVES, AND OTHER C. TK COMPRESSION TANK GALLONS PER FLUSH RELIEF FAN COMPONENTS TO ALLOW DISASSEMBLY FOR AIR COMPRESSOR GPH GALLONS PER HOUR RETURN GRILLE MAINTENANCE. GPM GALLONS PER MINUTE CAP CAPACITY ROOF HOOD 2. REFRIGERANT PIPING: PROVIDE SIZING AND CIRCUIT SETTING BALANCING VALVE GAS PRESSURE REGULATING VALVE ROUGH IN AND CONNECT INSTALLATION IN STRICT ACCORDANCE WITH COOLING COIL GRILLES, REGISTERS, AND DIFFUSERS RAIN LEADER MANUFACTURER'S INSTRUCTIONS AND IN SUCH A WAY CD CEILING DIFFUSER, CONDENSATE DRAIN GV GATE VALVE, GLOBVE VALVE RATED LOAD AMPS AS TO BE INCONSPICUOUS AND FREE FROM ANY CFG CEILING FIRE DAMPER GW GREASE WASTE PIPING ROUGH IN AND CONNECT POSSIBLE CONDENSATION. PIPE SIZES NOTED ARE FOR CFM CUBIC FEET PER MINUTE GWB GYPSUM WALLBOARD RPBA REDUCED PRESSURE BACKFLOW ASSEMBLY REFERENCE AND SHALL BE INSTALLED PER CG CEILING GRILLE MANUFACTURERS RECOMMENDATIONS. CONTRACTOR RPBP REDUCED PRESSURE BACKFLOW PREVENTER SHALL PROVIDE CONTROL WIRING BETWEEN CABINET HEATER, CHILLER HUMIDISTAT, HEIGHT REVOLUTIONS PER MINUTE EQUIPMENT FOR AN OPERATIONAL SYSTEM. CHILLED WATER PUMP HB HOSE BIBB RTU ROOFTOP UNIT CHR CHILLED WATER RETURN, CHILLER **HEATING COIL** SAFETY RELIEF VALVE 3. PRESSURE/TEMPERATURE TEST PORTS: PROVIDE AT CHS CHILLED WATER SUPPLY HEAD, HUB DRAIN HD SUPPLY AND RETURN PIPING CONNECTIONS TO EQUIPMENT. CKV CHECK VALVE HGL REFRIGERANT HOT GAS LINE SENSOR CLG CEILING, COOLING HORIZ HORIZONTAL S. TK STORAGE TANK 4. PROVIDE 12" LONG, ½" WIDE FLUORESCENT ORANGE CO CLEANOUT, CO SENSOR HP HORSEPOWER, HEAT PUMP SUPPLY AIR TAPE AT CONCEALED VALVE LOCATIONS. CO2 CO2 SENSOR HIGH PRESSURE CONDENSATE RETURN SAT SUPPLY AIR TEMPERATURE COMB COMBUSTION, COMBINATION HPS HIGH PRESSURE STEAM SCFM STANDARD CUBIC FEET PER MINUTE COND CONDENSER, CONDENSATE HRU HEAT RECOVERY UNIT SD STORM DRAIN PIPING PLUMBING NOTES HST STORAGE TANK CONN CONNECTOR SENS SENSIBLE CONT CONTINUE, CONTROL HTG HEATING SUPPLY FAN, SQUARE FOOT 1. ACCESS PANELS: PROVIDE IN NON ACCESSIBLE COP COEFFICIENT OF PERFORMANCE HVAC HEATING, VENTILATING, AND AIR CONDITIONING SUPPLY GRILLE, SIGHT GLASS WITH MOISTURE CEILINGS AND WALLS FOR VALVES, WATER HAMMER COTG CLEANOUT TO GRADE HOT WATER PIPING INDICATOR ARRESTERS, CLEANOUTS, AND OTHER ITEMS THAT CONDENSATE RECEIVER, CONDENSER WATER SHC STEAM HEATING COIL HWC HOT WATER CIRCULATING PIPING REQUIRE ACCESS TO PROPERLY MAINTAIN OR SERVICE RETURN HWR HOT WATER RETURN SIM SIMILAR THE BUILDING. REFER TO SPECIFICATIONS. CS CONDENSER WATER SUPPLY HWS HOT WATER SUPPLY REFRIGERANT SUCTION LINE CT COOLING TOWER HX HEAT EXCHANGER SCREENED OPENING CTF COOLING TOWER FILTER HZ HERTZ SOV SHUTOFF VALVE CU CONDENSING UNIT, CUBIC STATIC PRESSURE CV CONSTANT VOLUME IAQ INDOOR AIR QUALITY SPKR SPRINKLER FLOW COEFFICIENT INDIRECT DRAIN STATIC PRESSURE STATION COLD WATER PIPING INVERT ELEVATION STAINLESS STEEL, SANITARY SEWER CWR CONDENSING WATER RETURN IN. INCH SOUND TRAP CWS CONDENSING WATER SUPPLY IN. WG INCHES WATER COLUMN STM STEAM IRR IRRIGATION PIPING SOFT WATER PIPING DRAIN INDIRECT WASTE PIPING DB DRY BULB (TEMPERATURE) TEMPERED WATER PIPING DECIBEL kW KILOWATT TOWER BYPASS VALVE DCVA DOUBLE CHECK VALVE ASSEMBLY TEMPERATURE CONTROL VALVE DDCV DOUBLE DETECTOR CHECK VALVE TRENCH DRAIN, TEMPERATURE DIFFERENCE LENGTH DEG DEGREE LAT LEAVING AIR TEMPERATURE TDH TOTAL DYNAMIC HEAD DFU DRAINAGE FIXTURE UNIT LB LINEAR BAR TEMP TEMPERATURE DH DUCT HEATER LBS POUND TRANSFER GRILLE DI DUCTILE IRON LINEAR DIFFUSER TOP OF DUCT DIA DIAMETER TOP OF PIPE REFRIGERANT LIQUID LINE TOF DIMENSION LOW PRESSURE CONDENSATE RETURN TOP TOP OF STEEL LOCATION OF STARTER, DISCONNECT AND LIQUID PETROLEUM GAS PIPING TOP OF FOOTING TOS CONTROLS LOW PRESSURE STEAM TRAP STEAM TRAP LPS DISCH DISCHARGE LINEAR RETURN TSP TOTAL STATIC PRESSURE LR DN DOWN LOCKED ROTOR AMPS TSTAT THERMOSTAT DPV DIFFERENTIAL PRESSURE VALVE LVR LOUVER TERMINAL UNIT DV DRAIN VALVE TYP TYPICAL LWCD LOW WATER CUT-OFF DWB DOMESTIC WATER BOOSTER LWR LOW WALL RETURN DWGS DRAWINGS LOW WALL SUPPLY UNDERGROUND LEAVING WATER TEMPERATURE UH UNIT HEATER EXISTING UNO UNLESS NOTED OTHERWISE EA EXHAUST AIR MEDICAL AIR EAT ENTERING AIR TEMPERATURE MEDICAL AIR COMPRESSOR VENT PIPING, VOLT EER ENERGY EFFICIENCY RATIO MIXED AIR TEMPERATURE VALVE EXHAUST FAN MAV MANUAL AIR VENT VARIABLE AIR VOLUME **EFFICIENCY** MAX MAXIMUM VCD VOLUME CONTROL DEVICE EXHAUST GRILLE, ENGINE GENERATOR THOUSAND BTU PER HOUR VOLUME DAMPER EXPANSION JOINT MECHANICAL CONTRACTOR VELOCITY ELEVATION EL VENT VENTILATION, VENTILATOR MCA MINIMUM CIRCUIT AMPACITY ELEC ELECTRIC MECH MECHANICAL VFD VARIABLE FREQUENCY DRIVE EMCS EMERGENCY MANAGEMENT AND CONTROL SYSTEM MERV MINIMUM EFFICIENCY REPORTING VALVE VOLT VOLTAGE EQUIV EQUIVALENT VTR VENT THRU ROOF MIN MINIMUM ESP EXTERNAL STATIC PRESSURE MOCP MAXIMUM OVERCURRENT PROTECTION ET EXPANSION TANK MOD MOTOR OPERATED DAMPER W WASTE, WATT, WIDE, WATER EVAP EVAPORATOR, EVAPORATIVE MPC MEDIUM PRESSURE CONDENSATE RETURN WITH EWC ELECTRIC WATER COOLER WB WET BULB (TEMPERATURE) WC WATER CLOSET, WATER COLUMN WCO WALL CLEANOUT WG WATER GAGE WH WATER HEATER, WALL HYDRANT WHA WATER HAMMER ARRESTOR WM WATER METER WSEC WASHINGTON STATE ENERGY CODE WSFU WATER SUPPLY FIXTURE UNIT WT WEIGHT

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NON-STRUCTURAL MECHANICAL COMPONENT NOTES

- STRUCTURAL COMPONENTS SHALL BE: Ip = 1.5
- 2. THE FOLLOWING ITEMS ARE TAKEN DIRECTLY FROM THE 2018 INTERNATIONAL BUILDING CODE AND FROM THE AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD 7. THE CONTRACTOR SHALL REFER TO THE ABOVE FOR ADDITIONAL INFORMATION, EXCEPTIONS, AND FURTHER DESCRIPTIONS. THE CONTRACTOR SHALL ADHERE TO REQUIREMENTS AND AS SUCH, SHALL BE INCLUDED WITHIN BID. ALSO REFER TO SPECIFICATION

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- 2018 IBC, 1613.1, SCOPE: ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND NON-STRUCTURAL COMPONENTS THAT ARE PERMANENTLY ATTACHED TO STRUCTURES AND THEIR SUPPORTS AND ATTACHMENTS SHALL BE DESIGNED AND CONSTRUCTED TO RESIST THE EFFECTS OF EARTHQUAKE MOTIONS IN ACCORDANCE WITH ASCE 7, EXCLUDING CHAPTER 14 AND APPENDIX 11A.
- 4. 2018 IBC, 1704.4, CONTRACTOR RESPONSIBILITY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF A SEISMIC-FORCE-RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM, OR SEISMIC-RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS AND SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL INCLUDE THE
- ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS; ACKNOWLEDGEMENT THAT CONTROL WILL BE
- PROCEDURES FOR EXERCISING CONTROL WITHIN THE CONTRACTOR'S ORGANIZATION, THE METHOD AND FREQUENCY OF REPORTING AND THE DISTRIBUTION OF THE REPORTS;
- IDENTIFICATION AND QUALIFICATIONS OF THE PERSON(S) EXERCISING SUCH CONTROL AND THEIR POSITION(S) IN THE ORGANIZATION.

5. DIVISION 21, 22, 23 RESPONSIBILITIES:

- A. HANGERS AND SEISMIC BRACING FOR MECHANICAL SYSTEMS SHALL BE DESIGNED AND SPECIFIED BY DIVISION 21, 22, 23. DIVISION 21, 22, 23 SHALL REFER TO THE MECHANICAL DRAWINGS FOR LOCATIONS OF EQUIPMENT AND HUNG MECHANICAL SYSTEMS AS STRUCTURAL DRAWINGS DO NOT SHOW THE LOCATIONS OF MECHANICAL EQUIPMENT, DUCTWORK, PIPING, AND OTHER COMPONENTS.
- DIVISION 21, 22, 23 SHALL COORDINATE THE SUPPORT SYSTEMS AND DESIGN LOADS FOR HUNG PIPING AND OTHER MECHANICAL SYSTEMS (INCLUDING COMBINED MULTIPLE PIPE RUNS) WITH THE GENERAL CONTRACTOR AND THE STEEL AND WOOD JOIST MANUFACTURERS IN ADDITION TO OTHER TRADES THAT MAY BE IMPACTED.





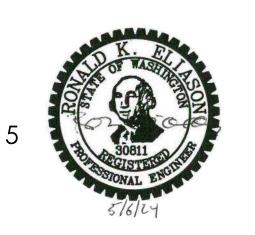
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HARGIS 1201 third avenue, ste 600 seattle, wa 98101

> www. hargis.biz HARGIS ENGINEERS

206.448.3376



MECHANICAL **ABBREVIATIONS** AND GENERAL

CITY OF FEDERAL WAY FLEET & SHOPS

FEDERAL WAY, WASHINGTON

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HEAT RECOVERY UNIT SCHEDULE SUPPLY FAN MOTOR LOCATION AREA SERVED MANUFACTURER / MODEL NO. SUPPLY FAN EXHAUST FAN EXHAUST FAN MOTOR NOTES MARK MIN TSP ESP SPEED RPM BKW KW TYPE TYPE AIRFLOW MIN TSP ESP SPEED RPM BKW KW TYPE TYPE MAX TOTAL | FLOW | (IN WC) | (IN WC) | CONTROL | FLOW | FLOW | (IN WC) | (IN WC) | CONTROL | (TOT) (CFM) (CFM) (CFM) (CFM) OXYGEN 8 / V60OU-HRV-BP 5900 PLENUM 5900 (NOTE 6) 3.1 1.0 ECM 2128 3.29 2 (3.3) ECM PLENUM 5400 2200 1.85 0.5 ECM 1795 1.95 2 (3.3) ECM 1, 2, 4, 5, 6, 7, 8, 9 HRU-B-01 ROOF NORTH SHOP | OXYGEN 8 / V1000U-HRV-BP | 9500 | PLENUM | 9500 | (NOTE 6) | 3.1 | 1.0 | ECM | 2204 | 5.45 | 3 (3.3) | ECM | PLENUM | 9000 | 2.05 | 0.5 | ECM | 1914 | 3.44 | 3 (3.3) | ECM | 1, 3, 4, 5, 6, 7, 8, 9 | HRU-B-02 ROOF NOTES: design group 1. EQUIPMENT SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR MINIMUM RATINGS. 2. PROVIDE WITH ONE DAIKIN AHU INTEGRATION VALVE KIT MODEL EKEXV400 AND ONE DAIKIN W-CONTROLLER. 3. PROVIDE WITH TWO DAIKIN AHU INTEGRATION VALVE KITS MODEL EKEXV400 AND TWO DAIKIN W-CONTROLLERS. 4. PROVIDE SINGLE POINT POWER CONNECTION FOR UNIT AND DAIKIN CONTROLLERS. 5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS. 6. REFER TO TERMINAL UNIT SCHEDULES FOR MINIMUM AIRFLOWS IN VARIOUS MODES OF OPERATION. PROVIDE WITH FACTORY MOUNTED SENSORS AS INDICATED ON SHEET MB901. 8. PROVIDE WITH BACNET IP CARD FOR INTEGRATION WITH DDC CONTROL SYSTEM. 9. PROVIDE WITH PRE-FABRICATED ROOF CURB IN ACCORDANCE WITH SPECIFICATION SECTION 233400. AMERICAN INSTITUTE OF ARCHITECTS HEAT RECOVERY UNIT SCHEDULE NOTES 24 56.2 62 36.8 92.7 86 77.5 75 84.2 84.1 1, 2, 4, 5, 6, 7, 8, 9 HRU-B-01 HRU-B-02 PLATE 9500 9000 1.0 - 24 56.4 62 37.3 90.1 86 77.4 75 84.1 82.6 1, 3, 4, 5, 6, 7, 8, 9 HRU-B-02 1. EQUIPMENT SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR MINIMUM RATINGS. HELIX DESIGN GROUP, INC 2. PROVIDE WITH ONE DAIKIN AHU INTEGRATION VALVE KIT MODEL EKEXV400 AND ONE DAIKIN W-CONTROLLER. 3. PROVIDE WITH TWO DAIKIN AHU INTEGRATION VALVE KITS MODEL EKEXV400 AND TWO DAIKIN W-CONTROLLERS. 4. PROVIDE SINGLE POINT POWER CONNECTION FOR UNIT AND DAIKIN CONTROLLERS. 5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS. HARGIS 6. REFER TO TERMINAL UNIT SCHEDULES FOR MINIMUM AIRFLOWS IN VARIOUS MODES OF OPERATION. 7. PROVIDE WITH FACTORY MOUNTED SENSORS AS INDICATED ON SHEET MB901. 1201 third avenue, ste 600 8. PROVIDE WITH BACNET IP CARD FOR INTEGRATION WITH DDC CONTROL SYSTEM seattle, wa 98101 9. PROVIDE WITH PRE-FABRICATED ROOF CURB IN ACCORDANCE WITH SPECIFICATION SECTION 233400. 206.448.3376 www. hargis.biz HARGIS ENGINEERS HEAT RECOVERY UNIT SCHEDULE ELECTRICAL MOUNTING / DETAIL / MARK DIAGRAM | DIAGRAM / ROWS FACE APD LAT LAT CAP CAP EAT LAT CAP / FPI / VEL (IN. WG.) DB/WB DB/WB TOT SENS (DEG F) (MBH) SUPPORT V/Ø MCA MOCP FACE | INITIAL | FINAL FACE | INITIAL | FINAL LxWxH WEIGHT REFERENCE | SEQUENCE RATING VEL RATING (INxINxIN) (LBS) PD PD VEL PD (DEG F) (DEG F) (MBH) (MBH)) (FPM) (IN WC) (IN WC) (FPM) (IN WC) (IN WC) HRU-B-01 | R-410A | 4 / 14 / 13 | 454 | 0.3 | 54.9 | 52.3 | 165.8 | 146.1 | 1, 2, 4, 5, 6, 7, 8, 9 HRU-B-01 85 | 183.3 | CARTRIDGE | 13 | 500 1.00 | CARTRIDGE | 500 460 / 3 | 23.09 1, 2 / MB801 | 2 / MB901 85 293.1 CARTRIDGE 13 500 1, 3, 4, 5, 6, 7, 8, 9 HRU-B-02 HRU-B-02 R-410A 5 / 11 / 21 462 0.33 54.5 51.9 276.0 238.7 56.4 1.00 CARTRIDGE 500 0.25 1, 2 / MB801 2 / MB901 0.4 460 / 3 | 33.89 35 | 279x103x102 | 8700 | 1. EQUIPMENT SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR MINIMUM RATINGS. 2. PROVIDE WITH ONE DAIKIN AHU INTEGRATION VALVE KIT MODEL EKEXV400 AND ONE DAIKIN W-CONTROLLER. 3. PROVIDE WITH TWO DAIKIN AHU INTEGRATION VALVE KITS MODEL EKEXV400 AND TWO DAIKIN W-CONTROLLERS. 4. PROVIDE SINGLE POINT POWER CONNECTION FOR UNIT AND DAIKIN CONTROLLERS. 5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS. 6. REFER TO TERMINAL UNIT SCHEDULES FOR MINIMUM AIRFLOWS IN VARIOUS MODES OF OPERATION. 7. PROVIDE WITH FACTORY MOUNTED SENSORS AS INDICATED ON SHEET MB901. 8. PROVIDE WITH BACNET IP CARD FOR INTEGRATION WITH DDC CONTROL SYSTEM. 9. PROVIDE WITH PRE-FABRICATED ROOF CURB IN ACCORDANCE WITH SPECIFICATION SECTION 233400. ROOFTOP HEAT PUMP SCHEDULE MANUFACTURER / MODEL NO. NOTES MARK LOCATION AREA SERVED SUPPLY FAN MOTOR POWER EXHAUST FAN POWER EXHAUST FAN MOTOR VENT. COIL MIN OA | MAX OA | MIN FLOW TSP ESP TSP ESP CONTROL (CFM) (IN WC) (IN WC) (IN WC) (IN WC) ECM ROOF OFFICE-COMMON 106 DAIKIN / REBEL DPS003A 80 870 CENTRIFUGAL 870 1.3 0.5 1774 0.32 4 ECM 460/3 CENTRIFUGAL 0.26 0.25 1028 ECM 0.12 4 ECM 460/3 1, 2, 3, 4, 5, 6, 7, 8 RTHP-B-01 **MECHANICAL** 1. EQUIPMENT SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR MINIMUM RATINGS **SCHEDULES** 2. PROVIDE WITH LOW AMBIENT CONTROL AND HIGH STATIC MOTOR KIT. 3. PROVIDE SINGLE POINT POWER CONNECTION. 4. AMBIENT TEMPERATURES LISTED ARE FOR HEATING/COOLING EFFICIENCIES PER AHRI 360 AND THE 2018 WSEC. 5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS. 6. PROVIDE WITH FACTORY AND FIELD MOUNTED SENSORS AS INDICATED ON SHEET MB902. 7. PROVIDE WITH BACNET IP CARD FOR INTEGRATION WITH DDC CONTROL SYSTEM. 8. PROVIDE WITH PRE-FABRICATED ROOF CURB IN ACCORDANCE WITH SPECIFICATION SECTION 238100. CITY OF FEDERAL WAY ROOFTOP HEAT PUMP SCHEDULE AUX. ELEC. HEAT MARK CONDENSING SECTION PREFILTER / FINAL FILTER ELECTRICAL MOUNTING / DETAIL / CONTROL NOTES SUPPORT DIAGRAM DIAGRAM / EAT, DB | EAT, WB | LAT, DB | LAT, WB | EER V/Ø MCA MOCP CONTROL LxWxH WEIGHT CAPACITY OA EAT LAT CAP/COP CAP/COP REFERENCE | SEQUENCE RATING TEMP. | (DEG F) | (DEG F) | (17 DEG F) | (47 DEG F) (DEG F) (DEG F) (DEB F) VEL PD PD (#)-(INxINxIN) (INxINxIN) (LBS) (MBH) (MBH) (DEG F) (KW) (FPM) | (IN WC) | (IN WC) FEDERAL WAY, WASHINGTON RTHP-B-01 22.6 24 65.8 89.6 - 30 / 4.06 33.1 25.7 86 76 62.6 49 49 12.2 1 INVERTER SCROLL 1 6 SCR CARTRIDGE 8 / 14 122 0.06 0.5 460/3 21.5 25 67x87x41 1300 CURB 1, 2 / MB801 1 / MB902 1, 2, 3, 4, 5, 6, 7, 8 RTHP-B-01 1. EQUIPMENT SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. 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FAN S	CHEDULE																													
MARK	LOCATION	AREA SERVED	MANUFACTURER / MODEL NO.	FAN TYPE	AIRFLOW	ESP	FAN		FAN W	HEEL			МО	TOR		SPEED	BACKDRAFT	Е	LECTRIC	AL	PHYSICAL		SOUND	MOUNTING /	INTERLOCK	INTERLOCK	DETAIL /	CONTROL	NOTES	MARK
					(CFM)	(IN WG)	RPM	TYPE	SIZE (IN)	DRIVE	CLASS	RPM	BHP	HP	V/Ø	CONTROL	DAMPTER AT FAN	MCA	MOCP	SCCR (kA)	DIAxH / WxHxL (INxIN) / (INxINxIN)	WEIGHT (LBS)	INLET (SONES)	SUPPORT	DIV 23	DIV 26	DIAGRAM REFERENCE	DIAGRAM / SEQUENCE		
EF-B-01	ROOF	MECHANICAL 116	GREENHECK / G-070-VG	DOWNBLAST	150	.25	1257	ВІ	8.125	DIRECT	I	1725	0.01	1/15	115/1	ECM	N	2	15	5	20x15	50	2.5	ROOF	Y	N	7 / M801	3 / MB902	1, 2, 3, 4	EF-B-01
EF-B-02	ROOF	WASH BAY EQUIPMENT 122	GREENHECK / G-100-VG	DOWNBLAST	900	.5	1392	ВІ	11.125	DIRECT	I	1725	0.15	1/4	115/1	ECM	N	4	15	5	25x26	65	7.7	ROOF	Y	N	7 / M801	3 / MB902	1, 2, 3, 4	EF-B-02
EF-B-03	ROOF	WASHBAY 121	GREENHECK / CUE-140-VG	UPBLAST	2220	.5	1412	ВІ	14.625	DIRECT	I	1725	0.53	3/4	115/1	ECM	N	11	20	5	29x32	70	13.0	ROOF	Y	N	8 / M801	4 / MB902	1, 2, 3, 4	EF-B-03
SF-B-01	TIRE REPAIR 120	WASHBAY 121	GREENHECK / SQ-95-VG	INLINE	600	.5	1683	ВІ	10.875	DIRECT	I	1725	0.13	1/6	115/1	ECM	N	3	15	5	15x15x16	60	9.2	SUSPENDED	Y	N	12 / M801	6 / MB902	1, 3, 4	SF-B-01

2. PROVIDE WITH MOTORIZED DAMPER, BIRDSCREEN, NEMA 3R DISCONNECT, CURB SEAL, HINGED BASE, ROOF CURB IN ACCORDANCE WITH SPECIFICATION SECTION 233400, AND ECM MOTOR WITH 0-10 VDC INPUT.

TITUS DESV | HRU-B-02

3.PROVIDE WITH VARI-GREEN HOA.

4. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS.

MARK	LOCATION	AREA SERVED	MANUFACTURER	ASSOCIATED	UNIT	MAXIMUM	HEATING	MINIMUM	UNOCCUPIED	INLET	OUTLET	INLET	OUTLET			ELECTR	RIC COIL			ELEC	PHYSICA	AL	MOUNTING	DETAIL /	CONTROLS	NOTES	MARK
		(NOTE 4)	/ MODEL NO.	UNIT	TYPE	AIRFLOW	AIRFLOW	AIRFLOW	MINIMUM AIRFLOW	DUCT	DUCT	SP	SP	KW	MAX APD	EAT	LAT	V/Ø	CONTROL	V/Ø	LxWxH	WEIGHT	SUPPORT	DIAGRAM	DIAGRAM /	1	
						(CFM)	(CFM)	(CFM)	(CFM)	(IN DIA)	(INxIN)	(IN WC)	(IN WC)		(IN WG)	(DEG F)	(DEG F)		STEPS		(INxINxIN)	(LBS)		REFERENCE	SEQUENCE	<u> </u>	
TU-B-01	DEPARTMENTAL SHOP 101	DEPARTMENTAL SHOP 101	TITUS DESV	HRU-B-01	16	2500	1250	1000	0 (NOTE 6)	16	24x18	0.80	0.50	7.0	0.1	60	77.7	480 / 3	SCR	24/1	39.5x24x18	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-01
TU-B-02	DEPARTMENTAL SHOP 101	DEPARTMENTAL SHOP 101	TITUS DESV	HRU-B-01	16	2500	1250	1000	0 (NOTE 6)	16	24x18	0.80	0.50	7.0	0.1	60	77.7	480 / 3	SCR	24/1	39.5x24x18	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-02
TU-B-03	SNOW AND ICE STORAGE 104	SNOW AND ICE STORAGE 104	TITUS DESV	HRU-B-01	6	350	350	140	0 (NOTE 6)	6	12x8	0.80	0.50	2.5	0.1	60	82.6	480 / 3	SCR	24/1	39.5x12x8	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-03
TU-B-04	CARPENTRY SHOP 105	CARPENTRY SHOP 105	TITUS DESV	HRU-B-01	8	550	550	550	0 (NOTE 6)	8	12x10	0.80	0.50	2.5	0.1	60	74.4	480 / 3	SCR	24/1	39.5x12x10	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-04
TU-B-05	PARTS STORAGE 114	FLEET MAINTENANCE BAYS 107	TITUS DESV	HRU-B-02	16	2750	1375	2750	600 (NOTE 7)	16	24x18	0.80	0.50	9.0	0.1	60	80.7	480 / 3	SCR	24/1	39.5x24x18	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-05
TU-B-06	TOOL ROOM 115	FLEET MAINTENANCE BAYS 107	TITUS DESV	HRU-B-02	16	2750	1375	2750	600 (NOTE 7)	16	24x18	0.80	0.50	9.0	0.1	60	80.7	480 / 3	SCR	24/1	39.5x24x18	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-06
TU-B-07	PARTS STORAGE 114	PARTS STORAGE 114	TITUS DESV	HRU-B-02	6	390	390	390	0 (NOTE 8)	6	12x8	0.80	0.50	2.5	0.1	60	80.3	480 / 3	SCR	24/1	39.5x12x8	50	SUSPENDED	10, 11 / MB801	1 / MB901	1, 2, 3, 5	TU-B-07
												1						+				-					

12 16x15

0.80

0 (NOTE 8)

300 (NOTE 7)

NOTES:

TU-B-08

1. SEE DETAIL 10/MB801 AND 11/MB801 FOR VAV UNIT INSTALLATION AND SUPPORT DETAILS.

2. PROVIDE WITH HANGER BRACKETS, FIBER FREE LINER, LOW LEAKAGE ACCESS DOOR, AND REMOVABLE FLOW SENSOR.

3. DIV 230900 CONTRACTOR SHALL PROVIDE ELECTRICAL 24V/1Ø CONNECTION TO VAV BOX.

4. AREA SERVED INDICATES ROOM WHERE TEMPERATURE SENSOR IS LOCATED FOR EACH TERMINAL UNIT. SEE HVAC ZONE PLANS FOR ALL ROOMS SERVED BY EACH TERMINAL UNIT.

5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS.

TOOL ROOM 115

COMPRESSOR AND LUBE OIL 118

FABRICATION AND WELDING 119

6. HRU-B-01 IS OFF UNLESS UNOCCUPIED HEATING OR COOLING IS REQUIRED. IF REQUIRED, MINIMUM AIRFLOW AND MINIMUM HEATING AIRFLOW ARE AS SCHEDULED.

TOOL ROOM 115

COMPRESSOR AND LUBE OIL 118

FABRICATION AND WELDING 119

TU-B-11 TIRE REPAIR AND TIRE STORAGE BAY 120 TIRE REPAIR AND TIRE STORAGE BAY 120 TITUS DESV HRU-B-02 12 1250

7. TERMINAL UNITS SHALL OPERATE AT MINIMUM AIRFLOW 24/7 UNLESS UNOCCUPIED HEATING OR COOLING SETPOINTS ARE EXCEEDED. IF SO, AIRFLOWS SHALL BE AS SCHEDULED FOR OCCUPIED. IF GAS CONCENTRATIONS RISE ABOVE SETPOINTS, AIRFLOWS ARE SET TO MAXIMUM PER SEQUENCE OF OPERATION.

1. PROVIDE WITH WALL BRACKET.

2. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS.

625 625

8. TERMINAL UNITS ARE SET TO ZERO FLOW UNLESS REQUIRED FOR UNOCCUPIED HEATING AND COOLING. IF REQUIRED, MINIMUM AIRFLOW AND MINIMUM HEATING AIRFLOW ARE AS SCHEDULED.

ELECT	RIC DUCT HEA	ATER SCHEDUL	E																
MARK	LOCATION	AREA SERVED	MANUFACTURER / MODEL NO.	ASSOCIATED	AIRFLOW			ELEC	CTRIC HEA	TING COIL			PHY:	SICAL	MOUNTING /	DETAIL /	CONTROL	NOTES	MARK
				UNIT	(CFM)	CAPACITY (KW)	V/Ø	EAT (DEG F)	LAT (DEG F)	MAX FV (FPM)	MAX APD (IN WC)	CONTROL TYPE	LxW (INxIN)	WEIGHT (LBS)	SUPPORT	DIAGRAM REFERENCE	DIAGRAM / SEQUENCE		
EDH-B-01	TIRE REPAIR 120	WASH BAY 121	GREENHECK / IDHE	EF-B-05	600	6	480 / 3	55	86.0	700	0.1	SCR	12x12	50	SUSPENDED	11 / MB802	6 / MB902	1, 2	EDH-B-0
NOTES:			1	-1	- I		1	-	1		I		1	1	l	-I	I	1	-

12 | 16x15 | 0.80 | 0.50 | 5.0 | 0.1 | 60 | 71.0 | 480 / 3 | SCR | 24/1 | 39.5x16x15

0.50 4.0 0.1 60 80.2 480 / 3 SCR 24/1 39.5x16x15

1. CONTROL PANEL SHALL BE PROVIDED WITH A VISIBLE NAMPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH THE UL REQUIREMENTS. REFER TO THE ELECTRICAL DRAWINGS FOR MINIMUM RATINGS. 2. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS.

MARK	LOCATION	SPACE SERVED	MANUFACTURER / MODEL NO.	TYPE	AIRFLOW	FAN	ELECTRI	C HEATING CO	IL	ELECT	RICAL	PHYSIC	CAL	MOUNTING /	CONTROL	NOTES	MARK
					(CFM)	MOTOR HP	TOTAL CAP (KW)	TEMP RISE (DEG F)	STAGES (#)	V/Ø	AMPS (A)	WxHxD (INxINxIN)	WEIGHT (LBS)	SUPPORT	DIAGRAM / SEQUENCE		
EUH-B-01	MECHANICAL 116	MECHANICAL 116	MODINE / HER 30	HORIZONTAL	380	1/40	3	25	1	480/3	-	14x18x18	40	WALL	2 / MB902	1, 2	EUH-B-01
EUH-B-02	WASH BAY EQUIPMENT 122	WASH BAY EQUIPMENT 122	MODINE / HER 30	HORIZONTAL	380	1/40	3	25	1	480/3	-	14x18x18	40	WALL	2 / MB902	1, 2	EUH-B-02
EUH-B-03	FIRE SPRINKLER 123	FIRE SPRINKLER 123	MODINE / HER 30	HORIZONTAL	380	1/40	3	25	1	480/3	-	14x18x18	40	WALL	2 / MB902	1, 2	EUH-B-03

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50 | SUSPENDED | 10, 11 / MB801 | 1 / MB901 | 1, 2, 3, 5 | TU-B-10

50 | SUSPENDED | 10, 11 / MB801 | 1 / MB901 | 1, 2, 3, 5 | TU-B-11

CITY OF FEDERAL

FEDERAL WAY, WASHINGTON

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MARK	LOCATION	AREA SERVED	MANUFACTURER / MODEL NO.	ASSOCIATED		HEAT	ΓING			COOLIN	G		E	LECTRICA	L	PHYSI	CAL	MOUNTING /	DETAIL /	CONTROL	NOTES	MARK
				UNIT	CAPACITY (MBH)	OA TEMP. (DEG F)	COP (47 DEG F)	COP (17 DEG F)	TOTAL CAP (MBH)	OA TEMP. (DEG F)	EER	IEER	V/Ø	MCA	MOCP	WxHxD (INxINxIN)	WEIGHT (LBS)	SUPPORT	DIAGRAM REFERENCE	DIAGRAM / SEQUENCE		
VRHP-B-01	ROOF - MAINTENANCE	SOUTH SHOP	DAIKIN / RXYQ144AAYDA	HRU-B-01	154	47	3.4	2.1	138	95	11.7	22.90	460/3	21.3	25	49x66x31	800	CURB	6 / MB801	2 / MB901	1, 3, 4, 5, 6	VRHP-B-01
VRHP-B-02	DOOF MAINTENANCE	NORTH SHOP		LIDII D 02	204	47	2.2	2.2	274	05	40.2	40.0	460/3	21.3	25	49x66x31	800	CURB	C / NADOO4	2 / MD004	4.0.0.4.5.0	VOLID D 00
VRHP-B-UZ	ROOF - MAINTENANCE	NORTH SHOP	DAIKIN / RXYQ288AAYDA	HRU-B-02	294	47	3.3	2.2	274	95	10.3	19.2	460/3	21.3	25	49x66x31	800	CURB	6 / MB801	2 / MB901	1, 2, 3 ,4, 5, 6	VRHP-B-02

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1. EQUIPMENT SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR MINIMUM RATINGS.

2. UNIT COMPRISED OF MULTIPLE HEAT PUMPS. PROVIDE SEPARATE POWER CONNECTION AND DISCONNECT FOR EACH.

3. REFRIGERANT PIPING TO BE SIZED PER MANUFACTURER'S RECOMMENDATIONS, GENERAL ROUTING PER PLANS.

4. AMBIENT TEMPERATURES LISTED ARE FOR HEATING/COOLING EFFICIENCIES PER AHRI 1230 AND THE 2018 WSEC.5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS.

6. REFERENCE SHEET MB901 FOR VRF HEAT PUMP INTEGRATION WITH THE HEAT RECOVERY UNIT INTEGRATION PANEL AND W-CONTROLLER.

MARK	LOCATION	AREA SERVED	MANUFACTURER / MODEL NO.	FAN	COOLING	HEATING CAP	REFRIG	WSEC	SEER2	COP	I	ELECTRICA	NL	PHYS	SICAL	SOUND	MOUNTING /	NOTES	MARK
				FLOW (CFM)	TOTAL CAP (MBH)	(MBH)		REQUIRED SEER			MCA	MOCP	V/Ø	HxWxD (INxINxIN)	WEIGHT (LBS)	LEVEL (dBA)	SUPPORT		
ACU-B-01	COMM. 109	COMM. 109	DAIKIN / FTXM09WVJU9	515	a	11	R-32	14.95	27.4	4.6	12.3	15	208 / 1	12x37x11	30	45	WALL	1, 2, 3, 4, 5	ACU-B-01
HP-B-01	ROOF	COMM. 109	DAIKIN / RXM09WVJU9	1296	9	''	11-52	14.93	27.4	4.0	12.5	13	208 / 1	24x34x12	100	49	PAD	1, 2, 3, 4, 3	HP-B-01
ACU-B-02	ELEC 117	ELEC 117	DAIKIN / FTXM24WVJU9	845	21.6	24	D 22	14.05	22	2.54	10.9	20	208 / 1	44x11x12	35	51	WALL	10245	ACU-B-02
HP-B-02	ROOF	ELEC 117	DAIKIN / RXM24WVJU9	2179	∠1.0	24	R-32	14.95	22	3.54	19.8	20	208 / 1	35x13x29	135	56	PAD	1, 2, 3, 4, 5	HP-B-02

NOTES:

- 1. PROVIDE REFRIGERANT LINE KIT SIZED TO MANUFACTURER'S RECOMMENDATION.
- 2. PROVIDE HARD WIRED TEMPERATURE SENSOR.
- 3. SEER/EER BASED ON 95 DEG DB OA, 80 DEG F DB/67 DEG F WB EAT IN ACCORDANCE WITH ARI STD 210/240.
- 4. SYSTEM COMPLIES WITH 2018 WSEC SECTION C403.5 ECONOMIZER EXCEPTION 11.
- 5. VERIFY ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PLANS.

AIR DEVICE SCHEDULE

MARK	MANUFACTURER / MODEL NO.	SUPPLY / RETURN / EXH	DESCRIPTION	TYPE (BORDER TYPE)	NECK SIZE (LxW) (IN)	FACE SIZE (LxW) (IN)	AIRFLOW RANGE < 25 NC	FRAME TYPE	FINISH	MATERIAL	ACC.	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
C1	TITUS MCD	SUPPLY	SQUARE CEILING DIFFUSER	HARD OR LAY-IN	6" DIA	24x24	0 - 150	3	WHITE	STEEL	4 WAY	1, 2 / MB802	1	C1
					8" DIA	24x24	170 - 220							
					10" DIA	24x24	250 - 350							
S1	TITUS 300RLHD	SUPPLY	HEAVY DUTY DOUBLE DEFLECTION SUPPLY GRILLE	SIDEWALL OR DUCT	PER PLANS	-	-	1	WHITE	STEEL	-	4, 5 / MB802	2	S1
S2	TITUS DL	SUPPLY	DRUM LOUVER	DUCT	PER PLANS	-	-	1	WHITE	STEEL	-	4, 5 / MB802		S2
R1 / E1	TITUS 50F	RET/EXH	EGGCRATE RETURN GRILLE	HARD OR LAY-IN	10x10	12x12	UP TO 450	1	WHITE	ALUMINUM	-	3 / MB802		R1 / E
					22x10	24x12	UP TO 700							
					22x22	24x24	UP TO 1600							
R2 / E2	TITUS 33RL	RET/EXH	HEAVY DUTY RETURN GRILLE	SIDEWALL	SIDEWALL	-	-	1	WHITE	STEEL		4 / MB802	2	R2 / E
R3 / E3	TITUS 50F	RET/EXH	HEAVY DUTY RETURN GRILLE	SIDEWALL OR DUCT	PER PLANS	_	-	1	WHITE	ALUMINUM		4 / MB802		R3 / E

NOTES
NOTES:

1. ADJUST DIFFUSERS FOR 4-WAY THROW UNLESS INDICATED OTHERWISE ON DRAWINGS.

2. PROVIDE ALUMINUM CONSTRUCTION FOR WASH BAY GRILLES.

7 MECHANICA SCHEDULES

CITY OF FEDERAL WAY FLEET & SHOPS

FEDERAL WAY, WASHINGTON

DATE JOB NO 05.06.24 a23-08

 $_{10}$ MROOF

DRAWING NO.

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					IMC 201	18							IMC 20	018				Design	Occ	cupants	Lig	hting	Equipm	ent	IES Loads	3	Ro	oom Cooling L	oads	Room Loads Heat	ting			Design Airfl	lows				Desig	Airflow (Act	tual)
Unit Tag	Room	Area (sf)	Clg Type	Water closets/ cfm/w Showers	Hood of Dryer Exhaus	EA CFM/S	F EA (cfm)	Occ/ 1000 sf	Occ (Pz) cfr	n/ Occ Rpi Rp)	Pz cfm/	/ft^2 RaA	Az Vbz (cf	fm) Ez	Voz	Actual Occ.	Vou	OA (cfm)		esens otuh)	t (btuh)	IES btu	h w/sf	btuh	Clg (MBH)	Htg (MBH)	Qsens (btuh)	Qlat (btuh)	Qtot (btuh)	Q (btuh)	T1 (SA Temp Clg	T2 (Space	Clg CFM	T1 (SA Temp Ht	T2 (Space tg) Temp Htg	e Htg CFM g) Calc	Actual CF	M SA or TA	. cfm/sf	Press	RA
RU-B-01	SHOPS	9850	NONE			0.0	0	2	20	0.0	0.1	12 121	0 1210	0 1.0	1210	24	1210	1210	24 7	7560 12	2600	IES 432	42 IES	6864	33.7	85.1	91366	7560	98926	85100	55	78	3610	85	65	3870	5000	5000	0.51	500	0
RHP-B-01	TOILET	55	HARD	1 70		2.0	110	0	0	0.0	0.0	00 0	0	1.0	0	0	0	0	0	0	0	IES 15	5 0	0	0.1	0.22	255	0	255	220	55	78	10	85	65	10		0	0.00	-100	0
	TOILET	55	HARD	1 70		2.0	110	0	0	0.0	0.0	00 0	0	1.0	0	0	0	0	0	0	0	IES 15	5 0	0	0.1	0.18	255	0	255	180	55	78	10	85	65	10		0	0.00	-100	0
	CARPENTRY SHOP	842	NONE			0.0	0	2	2	0.0	0.1	12 100	0 100	1.0	100	2	100	100	2	630 1	050	IES 361	8 IES	4823	4.8	4.2	13871	630	14501	4200	55	78	550	85	65	190	550	550	0.65	100	0
	SNOW AND ICE STORAGE	705	NONE			0.0	0	0	0	0.0	0.1	12 80	80	1.0	80	0	80	80	0	0	0	IES 89	3 0	0	0.9	4	1793	0	1793	4000	55	78	70	85	65	180	350	350	0.50	100	0
HRU-B-01		11507					220		22						1390	26		1390	26 8	3190 1	3650				40	94	107540	8190	115730	93700			4250			4260	5900	5900	0.51	500	0
				·											,			·			•										·							'			
RU-B-02	FLEET SHOP	6156	NONE			0.75	4620	2	12	0.0	0.1	12 740	0 740	1.0	740	12	740	740	12 3	3780 6	300	IES 126	03 IES	21005	35.5	67.6	72888	3780	76668	67600	55	78	2880	85	65	3070		5500	0.89	900	0
RHP-B-02	TIRE REPAIR	1664	NONE			0.75	1250	2	3	0.0	0.1	12 200	0 200	1.0	200	3	200	200			575	IES 340		_	8.4	14.3	18430	945	19375	14300	55	78	730	85	65	650	1250	1250	0.75	0	0
	TOOL ROOM	1045	NONE			0.75	780	2	2	0.0	0.1	12 130	0 130	1.0	130	2	130	130	2	630 1	050	IES 213	9 IES	3566	3.4	4.9	9735	630	10365	4900	55	78	380	85	65	220	780	780	0.75	-20	0
	TOILET	60	HARD	1 70		2.0	120	0	0	0.0	0.0	00 0	0	1.0	0	0	0	0	0	0	0	IES 15	5 0	0	0.1	0.22	255	0	255	220	55	78	10	85	65	10		0	0.00	-120	0
	TOILET	60	HARD	1 70		2.0	120	0	0	0.0	0.0	00 0	0	1.0	0	0	0	0	0	0	0	IES 15	5 0	0	0.1	0.18	255	0	255	180	55	78	10	85	65	10		0	0.00	-120	0
	LAUNDRY	70	HARD		150	1.0	150	0	0	0.0	0.0	00 0	0	1.0	0	0	0	0	0	0	0	IES 16	3 3	717	0.26	0.26	1140	0	1140	260	55	78	50	85	65	10		0	0.00	-150	0
	LUBE OIL COMPRESSOR	528	NONE			1.0	530	0	0	0.0	0.1	12 60	60	1.0	60	0	60	60	0	0	0	IES 77	5 5	9010	1.1	4.3	10885	0	10885	4300	55	78	430	85	65	200	530	530	1.00	0	0
	FABRICATION/WELDING BAY	1326	NONE			1.0	1330	2	3	0.0	0.1	12 160	0 160	1.0	160	3	160	160	3	945 1	575	IES 570	01 5	22628	7.6	9.2	36874	945	37819	9200	55	78	1460	85	65	420	1440	1440	1.09	10	0
RU-B-02		10909					8900		20						1290	20		1290	20	6300 10	0500				56	101	150462	6300	156762	100960			5950			4590	9500	9500	0.87	500	0
		·		·	·					·			·																		·	·									
F-B-01/EDH-B-01/EF-B-04		1482	NONE			1.5	2220	0	0	0.0	0.1	12 180	0 180	1.0	180	0	180	180	0	0	0	IES 303	34 2	10116	9.2	17.3	22350	0	22350	17300	85	95	2030	85	55	520	600	600	1.50	-1620	0
F-B-03/EUH-B-03	WASH BAY EQUIPMENT	450	NONE			2.0	900	0	0	0.0	0.1	12 50	50	1.0	50	0	50	50	0	0	0	IES 58	3 5	7679	0.58	2.3	8842	0	8842	2300	85	95	800		55		0	0	2.00	-900	0
UH-B-04	SPRINKLER	105	NONE			1.0	110	0	0	0.0	0.1	12 10) 10	1.0	10	0	10	10	0	0	0	IES 15	4 0	0	0.22	1.4	374	0	374	1400					55		0				
F-B-02/EUH-B-02	MECHANICAL	154	NONE			1.0	150	0		0.0	0.1) 20	1.0	20	0	20	20	0	0	0	IES 15		0	0.33	1	484	0	484	1000	85	95	40		55		0	0	0.97	-150	0
F-B-01/EUH-B-01	ELECTRICAL	198	NONE			1.0	200	0	0	0.0 0	0.1	12 20) 20	1.0	20	0	20	20	0	0	0	IES 42	5 0	0	0.42	1	845	0	845	1000	85	95	80		55		0	0	1.01	-200	0
SF/EF/EUH/EDH		2389					3580		0						280	0		280	0	0	0				11	23	32895	0	32895	23000			2950			520	600	600	0.25	-2870	0
				1							1					1		1		1			1							1	1								1		
THP-B-01	OFFICE-COMMON	772	NONE			0.0	0	5	4	5.0 30	0.0	06 50	0 80	1.0	80	6	80	80	6	1500 1	200	IES 80	3 1.5	3952	5.9	7.6	12155	1500	13655	7600	55	75	550	85	70	460	870	870	1.13	80	790
THP-B - 01		772					0		4						80	6		80	6	1500 1	200				6	8	12155	1500	13655	7600			550			460	870	870	1.13	80	790

AMERICAN INSTITUTE OF ARCHITECTS

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IMPELLER DIAMETER (IN)	MINIMUM PEAK TOTAL EFFICIENCY (%) (NOTE 1)	MINIMUM PEAK TOTAL EFFICIENCY (%) (NOTE 2)
8	49	52
10	52	57
12	56	60

FAN EFFICIENCY GRADE (FEG)

10	52	57
12	56	60
14	58	62
16	60	63
18	61	64
20	62	65
22	62	65
24+	63	66

1. MINIMUM PEAK TOTAL EFFICIENCY FOR FANS OPERATING WITH MOTORS OVER 5 HP CORRESPOND TO FEG 67 PER AMCA 205 AS REQUIRED BY SECTION C403.8.3 OF THE ENERGY CODE. DESIGN FAN OPERATION MUST BE WITHIN 15% OF MAXIMUM TOTAL FAN EFFICIENCY. SEE AVAILABLE EXCEPTIONS WITHIN SECTION NOTED ABOVE.

2. MINIMUM PEAK TOTAL EFFICIENCY FOR FANS OPERATING WITH MOTORS OVER 1 HP CORRESPOND TO FEG 71 PER AMCA 205 AS REQUIRED BY SECTION C406.2.3 OF THE ENERGY CODE. DESIGN FAN OPERATION MUST BE WITHIN 10% OF MAXIMUM TOTAL FAN EFFICIENCY. SEE AVAILABLE EXCEPTIONS WITHIN SECTION FROM NOTE #1.

UCT SYSTEMS INSULATION SCHEDULE

DUCT SYSTEM TYPE	LOCATION OF DUCT	DUCT CONFIGURATION	INSULATION TYPE	MINIMUM R-VALUE, INSULATION THICKNESS	NOTES
SUPPLY AIR	WITHIN UNCONDITIONED	RECTANGULAR (EXPOSED)	RIGID BOARD OR ELASTOMERIC	R-6	
OR RETURN AIR	SPACE	RECTANGULAR (CONCEALED), ROUND, AND OVAL	DUCT WRAP OR ELASTOMERIC	K-0	<u>-</u>
SUPPLY AIR	WITHIN CONDITIONED SPACE	RECTANGULAR (EXPOSED)			1.2
SUPPLY AIR	WITHIN CONDITIONED SPACE	RECTANGULAR (CONCEALED), ROUND, AND OVAL	DUCT WRAP OR ELASTOMERIC	— R-3.3	1,2

GENERAL NOTE: (APPLICABLE TO ALL DUCT SYSTEM TYPES IN SCHEDULE) CONDITIONED SPACE IS DEFINED AS AN AREA, ROOM, OR SPACE THAT IS ENCLOSED WITHIN THE BUILDING THERMAL ENVELOPE THAT IS DIRECTLY HEATED OR COOLED OR THAT IS INDIRECTLY HEATED OR COOLED. SPACES ARE INDIRECTLY HEATED OR COOLED WHERE THEY COMMUNICATE THROUGH OPENINGS WITH CONDITIONED SPACES, WHERE THEY ARE SEPARATED FROM CONDITIONED SPACES BY UNINSULATED WALLS, FLOORS OR CEILINGS, OR WHERE THEY CONTAIN UNINSULATED DUCTS, PIPING OR OTHER SOURCES OF HEATING OR COOLING.

SCHEDULE NOTES:

1. INCLUDE FACTORY APPLIED WEATHERABLE JACKET OR MANUFACTURER RECOMMENDED COATING.

1. WHEN THE SUPPLY DUCT IS LOCATED WITHIN THE CONDITIONED SPACE THAT THE DUCT DIRECTLY SERVES, DUCT INSULATION IS NOT REQUIRED. 2. WHEN THE SUPPLY DUCT CONVEYS AIR THAT IS BETWEEN 65F AND 105F, DUCT INSULATION IS NOT REQUIRED. THIS REQUIREMENT IS MORE STRINGENT THAN ENERGY CODE.

TYPE OF PIPE	INSTALLATION LOCATION	INSULATION TYPE	PIPE SIZE (INCHES)	INSULATION THICKNESS (INCHES)	NOTE
COLD HVAC PIPING	INSIDE BUILDING ENVELOPE	FIBERGLASS	1-1/4 INCH AND SMALLER	1" THICK	-
COLD HVAC PIPING	INSIDE BUILDING ENVELOPE	FIBERGLASS	1-1/2 INCH AND LARGER	1-1/2" THICK	-
EFRIGERANT SUCTION AND	ALLLOCATIONS	FLASTOMEDIO	3/4 INCH AND SMALLER	1" THICK	1
LIQUID LINES	ALL LOCATIONS	ELASTOMERIC	1 INCH AND LARGER	1-1/2" THICK OR MULTIPLE LAYERS FOR 2" TOTAL THICKNESS	1

ENERGY CODE NOTES:

	PIPING AND DUCT INSULATION: COMPLY WITH THICKNESS AND TYPES LISTED IN THE ENERGY CODE ENFORCED BY AHJ UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED.
-	DUCT SEALING: SEAL DUCT TRANSVERSE JOINTS AND LONGITUDINAL SEAMS PER THE ENERGY CODE ENFORCED BY AHJ UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED.

MOTORS: COMPLY WITH MINIMUM FULL LOAD EFFICIENCIES LISTED IN THE ENERGY CODE ENFORCED BY AHJ.

RECORD DRAWINGS: SUBMIT TO THE BUILDING OWNER PER THE ENERGY CODE ENFORCED BY AHJ. OPERATION AND MAINTENANCE MANUALS: SUBMIT TO THE BUILDING OWNER PER THE ENERGY CODE ENFORCED BY

SYSTEM BALANCING: BALANCE HVAC SYSTEMS PER THE ENERGY CODE ENFORCED BY AHJ AND SUBMIT WRITTEN REPORT TO THE BUILDING OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL TESTING, ADJUSTING, AND BALANCING (TAB) REQUIREMENTS.

MECHANICAL SYSTEMS COMMISSIONING AND COMPLETION REQUIREMENTS: TEST SYSTEMS TO ENSURE THAT BUILDING SYSTEMS HAVE BEEN DESIGNED, INSTALLED, AND FUNCTION PROPERLY, EFFICIENTLY, AND CAN BE MAINTAINED IN ACCORDANCE WITH CONTRACT DOCUMENTS IN ORDER TO SATISFY THE BUILDING OWNER'S DESIGN INTENT AND OPERATIONAL REQUIREMENTS PER THE ENERGY CODE ENFORCED BY AHJ. REFER TO SPECIFICATIONS

FOR ADDITIONAL COMMISSIONING REQUIREMENTS. ENERGY METERING: COMPLY WITH ENERGY SOURCE AND END-USE METERING REQUIREMENTS LISTED IN THE

ENERGY CODE ENFORCED BY AHJ. THIS BUILDING AND ITS ENERGY SYSTEMS HAVE BEEN DESIGNED TO COMPLY WITH THE ENERGY CODE ENFORCED BY AHJ. CONTRACTOR IS RESPONSIBLE FOR CORRECT INSTALLATION OF ENERGY CONSERVATION MEASURES.

FANS: COMPLY WITH THE MINIMUM PEAK TOTAL EFFICIENCY REQUIREMENTS AS INDICATED ON THE FAN EFFICIENCY

GRADE (FEG) SCHEDULE. DUCT CONSTRUCTION REQUIREMENTS: DUCT CONSTRUCTION SHALL COMPLY WITH SMACNA STANDARDS PER PROJECT SPECIFICATIONS, UNO. DUCTWORK SHALL MEET AIR LEAKAGE REQUIREMENTS PER PROJECT

SPECIFICATIONS, UNO (EQUAL OR MORE STRINGENT THAN 2018 WSEC C402.5). DUCT PRESSURE CLASSIFICATION REQUIREMENTS: CONSTRUCT DUCT TO PRESSURE CLASSIFICATION AS INDICATED IN PROJECT SPECIFICATIONS. CONDUCT DUCT LEAKAGE TESTING AS INDICATED IN PROJECT

SPECIFICATIONS.
PIPE PROTECTION: WHERE INDICATED PROVIDE FACTORY APPLIED WEATHERABLE JACKET PER PROJECT SPECIFICATIONS, UNO.

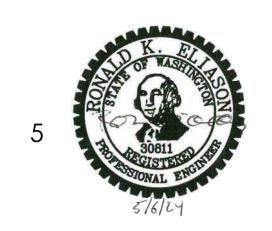
SPECIFICATIONS. SUBMIT COMPLETE DUCT LEAKAGE TESTING REPORT TO A/E AS INDICATED IN PROJECT

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FEDERAL WAY, WASHINGTON

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Mechanical Fan Sys					FANSYS			
2018 WSEC - Washington State Energy C Project Title:	City of Federal Way Fleet & Shops	ercial Buildings		Date:	ce for 2018 WSEC 			
A separate MECH-FANSYS form must be	<u> </u>	that exceeds the 5 hn threshold		Date.	2/21/2024			
Fan System ID	HRU-B-02	That exceeds the 5 mp threshold.						
System Supply Fan Speed Control	cv	Constant Volume (CV), Variable oper C403.8.1, Exception 1	Air Volume (VAV), or Hospita	/Lab CV system that quali	ifies for VAV budget			
Compliance Option	Brake HP	Compliance is based upon either the fan motor nameplate horse power (Option 1), the fan brake horsepower (Option 2), C403.6.10 high efficieny multi-zone VAV fan brake horsepower (10% less than Option 2), or C403.12 high efficiency single-zone VAV fan brake horsepower (10% less than Option 2). The bhp calculation provides adjustments for special equipment per Table C403.8.1(1).						
Fan System Supply CFM Total	9,500	In Fan Equipment Schedule below, provide maximum design supply airflow rate (CFM) of all supply fans serving the conditioned space in Fan Equipment Schedule below. Fan System CFM Total is the supply airflow of the central air handler at peak design conditions. Additional volumetric air flow provided at zone fan terminals, booster fans, or through induction is not included in the supply CFM total. However, the fan power of this equipment is included in the HP and BHP calculations. Fan System Supply CFM Total is automatically calculated by the form.						
Fan Equipment Schedule								
Fan ID and Location	Fan Type	Quantity of Fan Type	Total CFM (Note 1)	Total Nameplate HP (Note 2)	Total BHP (Note 3)			
HRU SUPPLY	ERV - Supply	3	3,167	13.46	7.41			
HRU EXHAUST	ERV - Exhaust	3	3,000	13.46	4.68			
Note 1 - Total CFM is the maximum CFM operating at peak design operating			Total Proposed:	26.9	12.1			
Note 2 - Total namplate hp of the listed far Note 3 - Total brake horsepower (bhp) of t design operating conditions. Not	n(s). the listed fan(s) at peak		Total Allowance:	10.5	18.7			
if Nameplate HP compliance option		Con	npliance Message:	СОМР	LIES			
Brake Horsepower Allowa	nce Adjustments							
Device Type	Description and Location	CFM thorough this device (CFMD)	Assigned Pressure Drop, PD in w.c.	Calculated Pressure Drop, PD in w.c.	Adjustment, A in bhp			

Device Type	Description and Location	CFM thorough this device (CFMD)	Assigned Pressure Drop, PD in w.c. (Note 6)	Calculated Pressure Drop, PD in w.c. (Note 7)	Adjustment, A in bhp (Note 8)
Fully ducted return and/or exhaust	HVAC DWGS	9,000	0.5		1.089
Particulate filtration: MERV 13 - 15	MERV 13 PER EQUIPMENT SCHEDULES	9,500	0.9		2.070
Energy recovery device, other than coil (Notes 4 & 5)	ENERGY RECOVERY CORE - OUTSIDE AIR AIRSTREAM	9,500		1.48	3.404
Energy recovery device, other than coil (Notes 4 & 5)	ENERGY RECOVERY CORE - EXHAUST AIR AIRSTREAM	9,000		1.48	3.224
Note 4 - Bhp allowance for energy recov	very devices and run around coil loops		Tota	al Adjustment (bhp):	9.79

- Note 4 Bhp allowance for energy recovery devices and run around coil loops includes both air streams, so the CFMD is the sum of the supply CFM and exhaust CFM if
- both go through the device. Note 5 - Energy recovery effectiveness is defined as change in the enthalpy of the outdoor air supply divided by the enthaply difference between the outdoor air
- and return air at design conditions. Note 6 - Assigned pressure drop (PD) adjustment per Table C403.8.1(2). Note 7 - Pressure drop (PD) adjustment shall be calculated per the applicable method
- defined in Table C403.8.1(2). based on specific system conditions. Note 8 - A = PD * CFMD/4131 where A is the allowed system brake horse power adjustment, PD is pressure drop allowance, and CFMD is the cfm through the

Mechanical Fan Systo 2018 WSEC - Washington State Energy Code					FANSYS
0,	'				
•	of Federal Way Fleet & Shop			Date:	2/27/2024
A separate MECH-FANSYS form must be cor	· · · · · · · · · · · · · · · · · · ·	em that exceeds the 5 np threshold.			
Fan System ID	HRU-B-01				
System Supply Fan Speed Control	VAV	Constant Volume (CV), Variable of per C403.8.1, Exception 1	Air Volume (VAV), or Hospit	al/Lab CV system that quali	fies for VAV budget
Compliance Option	Brake HP	Compliance is based upon either (Option 2), C403.6.10 high efficie C403.12 high efficiency single-zc calculation provides adjustments	eny multi-zone VAV fan brak one VAV fan brake horsepov	ke horsepower (10% less th wer (10% less than Option :	an Option 2), or
Fan System Supply CFM Total	5,900	In Fan Equipment Schedule belo serving the conditioned space in airflow of the central air handler a terminals, booster fans, or throug of this equipment is included in the calculated by the form.	Fan Equipment Schedule b at peak design conditions. A gh induction is not included i	elow. Fan System CFM To additional volumetric air flow in the supply CFM total. Ho	tal is the supply provided at zone fa wever, the fan powe
Fan Equipment Schedule					
Fan ID and Location	Fan Type	Quantity of Fan Type	Total CFM (Note 1)	Total Nameplate HP (Note 2)	Total BHP (Note 3)
HRU SUPPLY	ERV - Supply	2	2,950	8.97	4.47
HRU EXHAUST	ERV - Exhaust	2	2,700	8.87	2.65
Note 1 - Total CFM is the maximum CFM of the	ne listed fan(s) when		Total Proposed:	17.8	7.1

Device Type	Description and Location	CFM thorough this device (CFMD)	Assigned Pressure Drop, PD in w.c. (Note 6)	Calculated Pressure Drop, PD in w.c. (Note 7)	Adjustment, A in bhp (Note 8)
Fully ducted return and/or exhaust	HVAC DWGS	5,400	0.5		0.654
Particulate filtration: MERV 13 - 15	MERV 13 PER EQUIPMENT SCHEDULES	5,900	0.9		1.285
Energy recovery device, other than coil (Notes 4 & 5)	ENERGY RECOVERY CORE - OUTSIDE AIR AIRSTREAM	5,900		1.54	2.199
Energy recovery device, other than coil (Notes 4 & 5)	ENERGY RECOVERY CORE - EXHAUST AIR AIRSTREAM	5,400		1.54	2.013

- Note 4 Bhp allowance for energy recovery devices and run around coil loops includes both air streams, so the CFMD is the sum of the supply CFM and exhaust CFM if
- both go through the device. Note 5 - Energy recovery effectiveness is defined as change in the enthalpy of the
- outdoor air supply divided by the enthaply difference between the outdoor air and return air at design conditions. Note 6 - Assigned pressure drop (PD) adjustment per Table C403.8.1(2).
- Note 7 Pressure drop (PD) adjustment shall be calculated per the applicable method defined in Table C403.8.1(2). based on specific system conditions. Note 8 - A = PD * CFMD/4131 where A is the allowed system brake horse power
- adjustment, PD is pressure drop allowance, and CFMD is the cfm through the

Mechanical Fan Sy	stem Power Allo	wance		MECH-	FANSYS
2018 WSEC - Washington State Energy	Code Compliance Forms for Comr	mercial Buildings		Compliand	ce for 2018 WSEC
Project Title:	City of Federal Way Fleet & Shop	s		Date:	2/27/2024
A separate MECH-FANSYS form must b	pe completed for every HVAC syste	m that exceeds the 5 hp threshold.			
Fan System ID	HRU-B-01				
System Supply Fan Speed Control	VAV	Constant Volume (CV), Variable per C403.8.1, Exception 1	Air Volume (VAV), or Hosp	oital/Lab CV system that qual	ifies for VAV budget
Compliance Option	Brake HP	Compliance is based upon either (Option 2), C403.6.10 high efficiency single-zo	eny multi-zone VAV fan br one VAV fan brake horsep	ake horsepower (10% less th ower (10% less than Option	nan Option 2), or
		calculation provides adjustments	for special equipment per	Table C403.8.1(1).	
Fan System Supply CFM	5,900	In Fan Equipment Schedule belo serving the conditioned space in airflow of the central air handler a	Fan Equipment Schedule at peak design conditions.	below. Fan System CFM To Additional volumetric air flow	tal is the supply v provided at zone fan
Total	3,555	terminals, booster fans, or throug of this equipment is included in the calculated by the form.	gh induction is not included ne HP and BHP calculation	l in the supply CFM total. Ho ns. Fan System Supply CFM	wever, the fan power Total is automatically
Fan Equipment Schedule					
Fan ID and Location	Fan Type	Quantity of Fan Type	Total CFM (Note 1)	Total Nameplate HP (Note 2)	Total BHP (Note 3)
HRU SUPPLY	ERV - Supply	2	2,950	8.97	4.47
HRU EXHAUST	ERV - Exhaust	2	2,700	8.87	2.65

Equipment Schedule Fan ID and Location Fan Type Quantity of Fan Type (Note 1) Total Nameplate HP (Note 2) (Note 3) (Note 4 & 5) (Note 4 & 5) (Note 4 & 5) (Note 4) (Note 6) (al		of this equipment is included in the calculated by the form.	ie ne and bne calculations.		
Fan ID and Location Fan Type Quantity of Fan Type (Note 1) HP (Note 2) (Note 3) SUPPLY ERV - Supply 2 2,950 8.97 4.47 EXHAUST ERV - Exhaust 2 2,700 8.87 2.65 1 - Total CFM is the maximum CFM of the listed fan(s) when operating at peak design operating conditions. 2 - Total namplate hp of the listed fan(s) at peak design operating conditions. Not required if Nameplate HP compliance option chosen. Compliance Message: Compliance Message: COMPLIES Ke Horsepower Allowance Adjustments Device Type Description and Location CFM thorough this device (CFMD) CFM thorough this device (CFMD) CFM thorough this device (CFMD) Description and Location CFM thorough this device (CFMD)	Equipment Schedule					
EXHAUST ERV - Exhaust 2 2,700 8.87 2.65 1 - Total CFM is the maximum CFM of the listed fan(s) when operating at peak design operating conditions. 2 - Total namplate hp of the listed fan(s) at peak design operating conditions. 3 - Total Proposed: Total Proposed: 17.8 7.1 Total Allowance: 8.9 13.8 Compliance Message: COMPLIES Re Horsepower Allowance Adjustments Device Type Description and Location Description and Location CFM thorough this device (CFMD) CFM thorough this device (CFMD) CFM thorough this device (Note 6) CFM thorough this device (Note 6) CFM thorough this device (Note 6) CFM thorough this device (Note 7) Adjustment, A in bhp (Note 8) Assigned Pressure Drop, PD in w.c. (Note 6) CFM thorough this device (Note 7) Adjustment, A in bhp (Note 8) Compliance Message: Compliance Messag	Fan ID and Location	Fan Type	Quantity of Fan Type			
1 - Total CFM is the maximum CFM of the listed fan(s) when operating at peak design operating conditions. 2 - Total namplate hp of the listed fan(s). 3 - Total proposed: 4 - Total Proposed: 5 - Total Allowance: 6 - Superating conditions. Not required if Nameplate HP compliance option chosen. Compliance Message: Complianc	SUPPLY	ERV - Supply	2	2,950	8.97	4.47
operating at peak design operating conditions. 2- Total namplate hp of the listed fan(s). 3- Total parable horsepower (bhp) of the listed fan(s) at peak design operating conditions. Not required if Nameplate HP compliance option chosen. Compliance Message: COMPLIES Compliance Message: Calculated Pressure Drop, PD in w.c. (Note 6) in w.c. (Note 7) A justment, A in bhp (Note 8) Compliance Message: Calculated Pressure Drop, PD in w.c. (Note 6) In w.c. (Note 7) Calculated Pressure Drop, PD in w.c. (Note 7) A justment, A in bhp (Note 8) Compliance Message: Compliance Message: Compliance Message: Calculated Pressure Drop, PD in w.c. (Note 6) In w.c. (Note 7) Calculated Pressure Drop, PD in w.c. (Note 7) In w.c. (Note 7) Calculated Pressure Drop, PD in w.c. (Note 8) Compliance Message: Compliance Messag	EXHAUST	ERV - Exhaust	2	2,700	8.87	2.65
operating at peak design operating conditions. 2- Total namplate hp of the listed fan(s). 3- Total parable horsepower (bhp) of the listed fan(s) at peak design operating conditions. Not required if Nameplate HP compliance option chosen. Compliance Message: COMPLIES Compliance Message: Calculated Pressure Drop, PD in w.c. (Note 6) in w.c. (Note 7) A justment, A in bhp (Note 8) Compliance Message: Calculated Pressure Drop, PD in w.c. (Note 6) In w.c. (Note 7) Calculated Pressure Drop, PD in w.c. (Note 7) A justment, A in bhp (Note 8) Compliance Message: Compliance Message: Compliance Message: Calculated Pressure Drop, PD in w.c. (Note 6) In w.c. (Note 7) Calculated Pressure Drop, PD in w.c. (Note 7) In w.c. (Note 7) Calculated Pressure Drop, PD in w.c. (Note 8) Compliance Message: Compliance Messag						
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design operating conditions. Not required if Nameplate HP compliance option chosen. Compliance Message: COMPLIES Re Horsepower Allowance Adjustments Device Type Description and Location Description and Location CFM thorough this device (CFMD) Collulated Pressure Drop, PD in w.c. (Note 6) CNOte 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Compliance Message: COMPLIES				rotai i ropossu.	17.0	7.1
Compliance Message: COMPLIES	operating at peak design operat 2 - Total namplate hp of the listed f	ting conditions. an(s).		•		
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Device Type Description and Location Description and Location CFM thorough this device (CFMD) CFM thorough this device (CFMD) Assigned Pressure Drop, PD in w.c. (Note 6) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8) Calculated Pressure Drop, PD in w.c. (Note 7) Adjustment, A in bhp (Note 8)	operating at peak design operat 2 - Total namplate hp of the listed f 3 - Total brake horsepower (bhp) o design operating conditions. No	ting conditions. an(s). f the listed fan(s) at peak ot required	Com	Total Allowance:	8.9	13.8
Device Type Description and Location Description and Location CFM thorough this device (CFMD) Drop, PD in w.c. (Note 6) CFM thorough this device (CFMD) Ressure Drop, PD in w.c. (Note 7) A in bhp (Note 8) Description and Location A signed Pressure Drop, PD in w.c. (Note 7) A in bhp (Note 8) Description and Location A in bhp (Note 8) Description and Location Drop, PD in w.c. (Note 7) Description and Location A in bhp (Note 8) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 8) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 8) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 8) Description and Location Drop, PD in w.c. (Note 7) Description and Location Drop, PD in w.c. (Note 8) Description and Location Description and Location Drop, PD in w.c. (Note 8) Description and Location Description and Location	operating at peak design operat 2 - Total namplate hp of the listed f 3 - Total brake horsepower (bhp) o design operating conditions. No	ting conditions. an(s). f the listed fan(s) at peak ot required	Con	Total Allowance:	8.9	13.8
culate filtration: MERV 13 - 15 MERV 13 PER EQUIPMENT 5,900 0.9 1.285 gy recovery device, other than ENERGY RECOVERY CORE - 5,900 1.54 2.199	operating at peak design operat 2 - Total namplate hp of the listed f 3 - Total brake horsepower (bhp) o design operating conditions. No if Nameplate HP compliance op	ting conditions. an(s). f the listed fan(s) at peak ot required tion chosen.	Com	Total Allowance:	8.9	13.8
SCHEDULES SCHEDULES SCHEDULES SUITAGE TILITRATION: MERV 13 - 15 SCHEDULES SCHEDULES SUITAGE TILITRATION: MERV 13 - 15 SUITAGE TILITRATION	operating at peak design operating 2 - Total namplate hp of the listed f3 - Total brake horsepower (bhp) of design operating conditions. Notif Nameplate HP compliance op	ting conditions. an(s). f the listed fan(s) at peak of required tion chosen. cance Adjustments	CFM thorough this device	Total Allowance: Assigned Pressure Drop, PD in w.c.	Calculated Pressure Drop, PD in w.c.	13.8 LIES Adjustment, A in bhp
5,900 1.54 2.199	operating at peak design operating 2 - Total namplate hp of the listed f 3 - Total brake horsepower (bhp) of design operating conditions. Notif Nameplate HP compliance operating the design operating conditions. Notif Nameplate HP compliance operating the design operating conditions. Notif Nameplate HP compliance operations are considered to the design operation of the design operation operat	ting conditions. an(s). f the listed fan(s) at peak of required tion chosen. Tance Adjustments Description and Location	CFM thorough this device (CFMD)	Total Allowance: Inpliance Message: Assigned Pressure Drop, PD in w.c. (Note 6)	Calculated Pressure Drop, PD in w.c.	Adjustment, A in bhp (Note 8)
	operating at peak design operating 2 - Total namplate hp of the listed f 3 - Total brake horsepower (bhp) of design operating conditions. Notif Nameplate HP compliance operating conditions.	ting conditions. an(s). f the listed fan(s) at peak of required tion chosen. Tance Adjustments Description and Location HVAC DWGS MERV 13 PER EQUIPMENT	CFM thorough this device (CFMD) 5,400	Assigned Pressure Drop, PD in w.c. (Note 6)	Calculated Pressure Drop, PD in w.c.	Adjustment, A in bhp (Note 8)

Total Adjustment (bhp): 6.15

Mechanical Fan System Power Allowance MECH-FANSYS-SUM 018 WSEC - Washington State Energy Code Compliance Forms for Commercial Buildings Compliance for 2018 WSEC roject Title: City of Federal Way Fleet & Shops 2/27/2024 IVAC Air Distribution System Schedule List all HVAC systems that have the capability to provide heating and/or cooling to the spaces they serve. System Total ystem or Primary Speed Control Nameplate HP Calculation Required

Supply Fan ID (Note 3) (Note 4) 17.95 5.24 HRU-B-01 Heat Recovery Unit with Split System DX Heating and Cooling HRU-B-02 Heat Recovery Unit with Split System DX Heating and Cooling 26.92 12.09 VAV 0.48 RTHP-B-01 Single Zone VAV unit, with HR

- Note 1 Constant Volume (CV), Variable Air Volume (VAV), or Hospital/Lab CV system that qualifies for VAV budget per C403.8.1 Exception 1. Single zone VAV systems shall comply as CV.
- lote 2 Describe system type and list all fans (or groups of fans) associated with the delivery and removal of conditioned air by the system. Include all supply, return/relief, exhaust and exhaust hoods (>1 hp), make-up air, dedicated outside air (DOAS), booster fans, and series fan powered terminals. VAV parallel fan-powered terminals and economizer relief fans do not need to be included if the fans do not operate at peak
- lote 3 Enter the total nameplate hp of all fans associated with the delivery and removal of conditioned air by the system. lote 4 - This form automatically identifies whether a MECH-FANSYS form is required to demonstrate compliance with the fan power allowance (Yes), or this information is not required because the system has a combined total nameplate motor hp that is 5 hp or less (No)

A MECH-FANSYS form shall be provided for each system with total nameplate hp greater than 5 hp. Select (Add Fan System Form) to generate an additional form. Added forms can be deleted with button in cell E32 of the added form.

Mechanical Fan Sy	stem Power Allo	wance		MECH-	FANSYS
2018 WSEC - Washington State Energy	Code Compliance Forms for Comr	nercial Buildings		Complian	ce for 2018 WSEC
Project Title:	City of Federal Way Fleet & Shop	s		Date:	2/27/2024
A separate MECH-FANSYS form must b	pe completed for every HVAC syste	m that exceeds the 5 hp threshold.			
Fan System ID	RTHP-B-01				
System Supply Fan Speed Control	CV	Constant Volume (CV), Variable per C403.8.1, Exception 1	Air Volume (VAV), or Hospita	al/Lab CV system that qua	lifies for VAV budget
Compliance Option	Brake HP	Compliance is based upon either (Option 2), C403.6.10 high efficiency single-zonal calculation provides adjustments	eny multi-zone VAV fan brak one VAV fan brake horsepov	e horsepower (10% less t ver (10% less than Option	han Option 2), or
Fan System Supply CFM Total	870	In Fan Equipment Schedule belc serving the conditioned space in airflow of the central air handler terminals, booster fans, or throug of this equipment is included in the calculated by the form.	Fan Equipment Schedule be at peak design conditions. A gh induction is not included in	elow. Fan System CFM To dditional volumetric air flov n the supply CFM total. Ho	otal is the supply w provided at zone fan owever, the fan power
Fan Equipment Schedule					
Fan ID and Location	Fan Type	Quantity of Fan Type	Total CFM (Note 1)	Total Nameplate HP (Note 2)	Total BHP (Note 3)
RTHP SUPPLY	Supply	1	870	4	0.32
RTHP RETURN	Exhaust	1	790	4	0.12

if Nameplate HP compliance op	uon onoson.	Com	npliance Message:	СОМР	LIES
Brake Horsepower Allow	ance Adjustments				
Device Type	Description and Location	CFM thorough this device (CFMD)	Assigned Pressure Drop, PD in w.c. (Note 6)	Calculated Pressure Drop, PD in w.c. (Note 7)	Adjustment, A in bhp (Note 8)
Fully ducted return and/or exhaust	HVAC DWGS	790	0.5		0.096
Particulate filtration: MERV 13 - 15	MERV 14 PER EQUIPMENT SCHEDULES	870	0.9		0.190
Central resistance heat	EQUIPMENT SCHEDULES	870	-0.2	1.48	0.312

Note 4 - Bhp allowance for energy recovery devices and run around coil loops includes both air streams, so the CFMD is the sum of the supply CFM and exhaust CFM if

both go through the device. Note 5 - Energy recovery effectiveness is defined as change in the enthalpy of the outdoor air supply divided by the enthaply difference between the outdoor air and return air at design conditions

Note 1 - Total CFM is the maximum CFM of the listed fan(s) when

Note 3 - Total brake horsepower (bhp) of the listed fan(s) at peak design operating conditions. Not required if Nameplate HP compliance option chosen.

operating at peak design operating conditions.

Note 2 - Total namplate hp of the listed fan(s).

Note 6 - Assigned pressure drop (PD) adjustment per Table C403.8.1(2).

Note 7 - Pressure drop (PD) adjustment shall be calculated per the applicable method defined in Table C403.8.1(2). based on specific system conditions.

Note 8 - A = PD * CFMD/4131 where A is the allowed system brake horse power adjustment, PD is pressure drop allowance, and CFMD is the cfm through the

device.

Total Adjustment (bhp): 0.60

8.0

1.0

0.4

1.4

CALCULATIONS

AMERICAN INSTITUTE OF ARCHITECTS

HELIX DESIGN GROUP, INC

HARGIS

1201 third avenue, ste 600

seattle, wa 98101

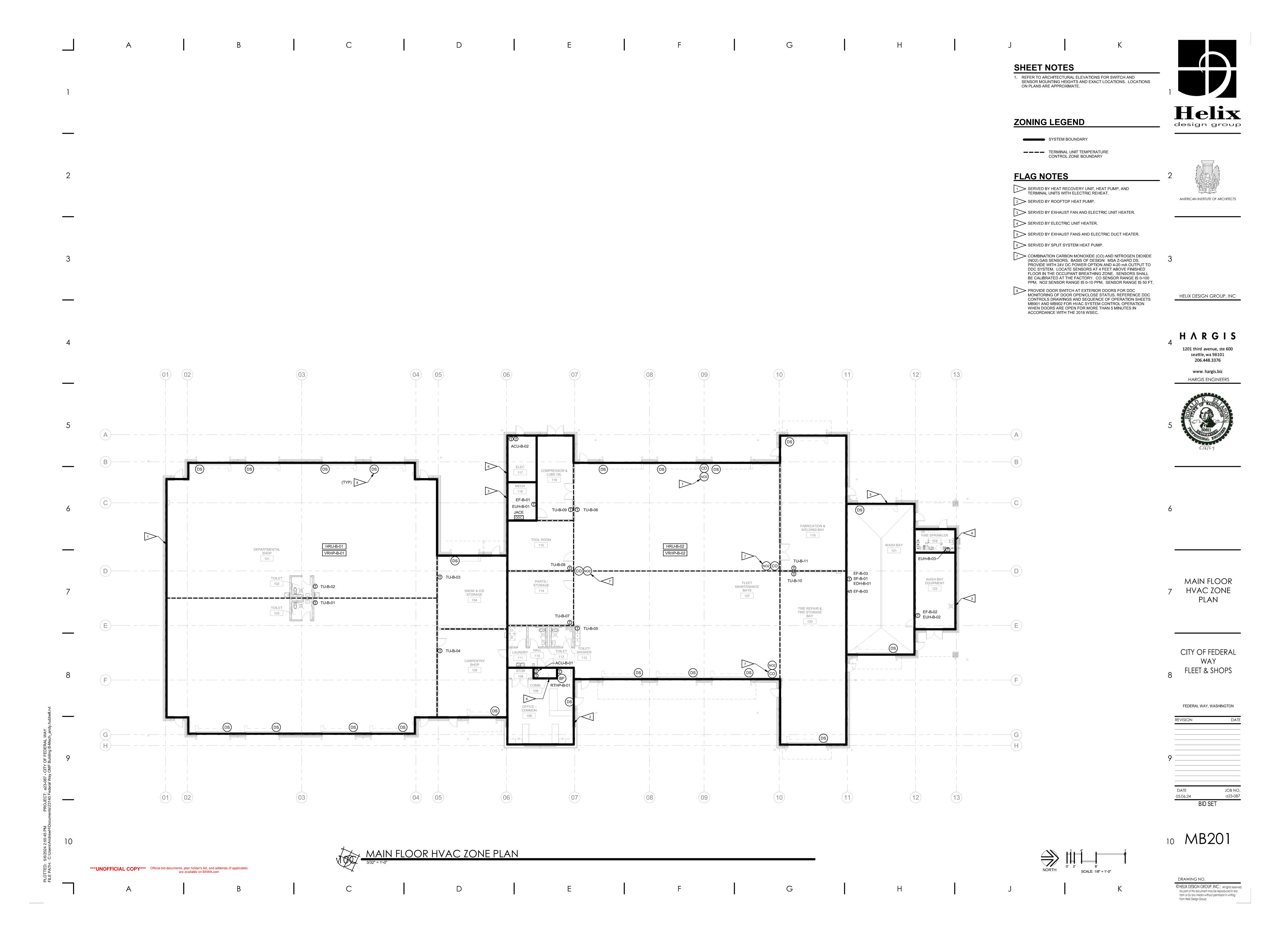
206.448.3376

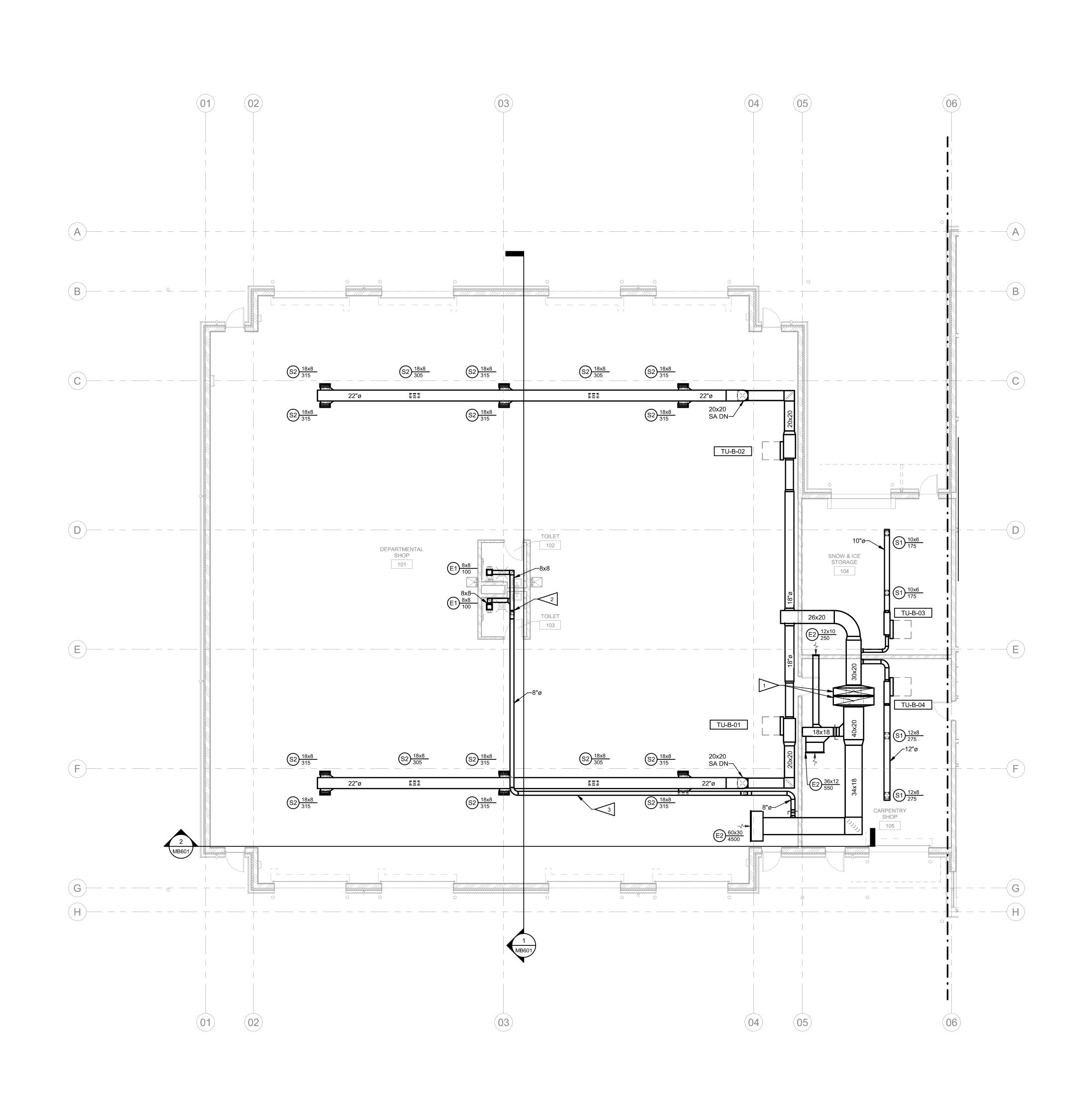
www. hargis.biz

HARGIS ENGINEERS

FEDERAL WAY, WASHINGTON

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MAIN FLOOR HVAC PLAN - SOUTH

UNOFFICIAL COPY Official bid documents, plan holder's list, and addenda (if applicable) are available on BXWA.com

SHEET NOTES

- 4 DEFED TO MEDICA CEDIES CHIEFTS I
- REFER TO MB800 SERIES SHEETS FOR STANDARD DETAILS NOT REFERENCED ON PLANS. COMPLY WITH ALL REQUIREMENTS IN DETAILS.
- 2. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND INTERIOR ELEVATIONS FOR FINAL LOCATION OF ALL GRILLES, DIFFUSERS, AND EXPOSED DUCTWORK. PROVIDE ADDITIONAL DUCTWORK AND FITTINGS TO MAKE FINAL CONNECTION. REPORT DISCREPANCIES IN QUANTITY OF AIR TERMINALS BETWEEN ARCHITECTURAL AND MECHANICAL DRAWINGS TO A/E.
- 3. PROVIDE A MANUAL VOLUME DAMPER FOR EACH SUPPLY, RETURN, AND EXHAUST OPENING. LOCATE AS FAR UPSTREAM AS POSSIBLE FROM THE OPENING UNLESS OTHERWISE NOTED. NOT ALL VOLUME DAMPERS ARE SHOWN ON PLANS. PROVIDE A MANUAL VOLUME DAMPER FOR BRANCH MAINS SERVING MORE THAN ONE OPENING AS INDICATED ON THE DRAWINGS.
- 4. DIVISION 23 SHALL REVIEW TU BOX LOCATIONS AND COORDINATE WITH OTHER DISCIPLINES TO ENSURE TU BOX ACCESS IS MAINTAINED. TYPICAL ALL TU BOX LOCATIONS. CONTRACTOR SHALL PROVIDE MOCK-UP OF ONE FTU/VAV FOR REVIEW PRIOR TO INSTALLATION OF ALL EQUIPMENT TO ENSURE DESIGN INTENT IS
- REFER TO MB201 FOR TEMPERATURE SENSOR AND SWITCH LOCATIONS.
- 6. PROVIDE ACCESS DOOR IN ALL OUTSIDE AIR, EXHAUST AIR, AND RETURN AIR PLENUMS, OR DUCTS LOCATED BEHIND LOUVERS FOR BACKDRAFT AND/OR MOTORIZED DAMPER ACCESS. PROVIDE 24"x24" UNLESS OTHERWISE NOTED. REFER TO DETAILS.
- 7. ALL PLENUMS BEHIND LOUVERS SHALL BE A MINIMUM OF 36 INCHES DEEP UNLESS OTHERWISE NOTED. ALL PLENUMS BEHIND SUPPLY, RETURN, AND EXHAUST AIR GRILLES SHALL BE A MINIMUM OF 24 INCHES DEEP OR THE SIZE OF THE DUCT, WHICHEVER IS LARGER UNLESS OTHERWISE NOTED.

FLAG NOTES

- 30x20 SUPPLY DUCT AND 40x20 EXHAUST DUCT UP TO HRU-B-01. PROVIDE TRANSITION AND CONNECT TO UNIT.
- 2 8x8 EXHAUST DUCT UP. TRANSITION TO 8"Ø IN THE VERTICAL.
- ROUTE 8"Ø EXHAUST IN BEAM POCKET, AND FOLLOW THE SLOPE OF THE ROOF.

HELIX DESIGN GROUP, INC

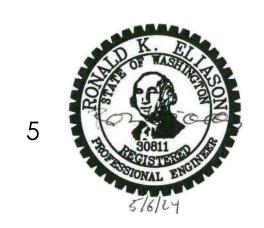
design group

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1201 third avenue, ste 600 seattle, wa 98101 206.448.3376

> www. hargis.biz HARGIS ENGINEERS



MAIN FLOOR 7 HVAC PLAN -SOUTH

CITY OF FEDERAL WAY FLEET & SHOPS

FEDERAL WAY, WASHINGTON

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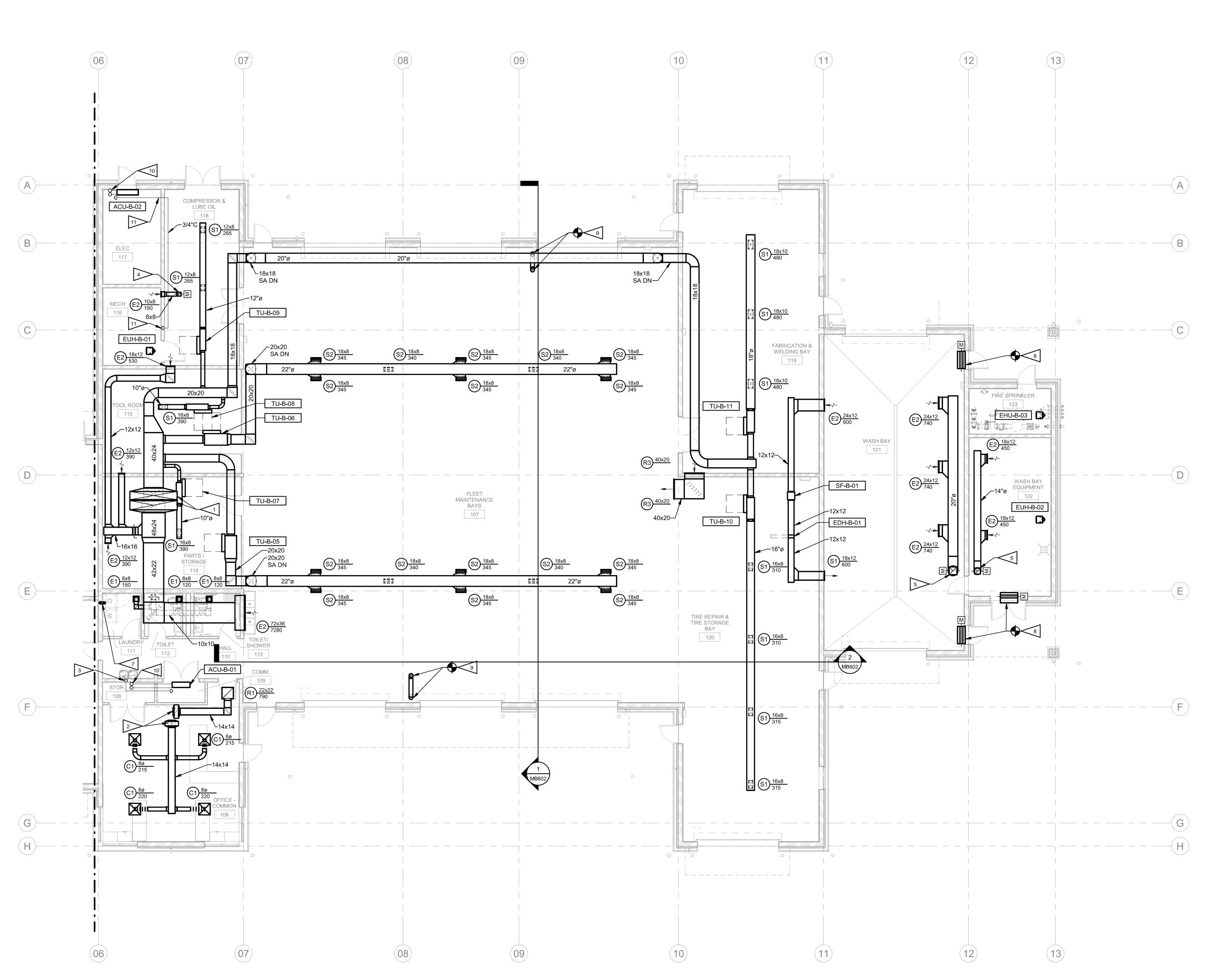
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10 MB301

DRAWING NO.

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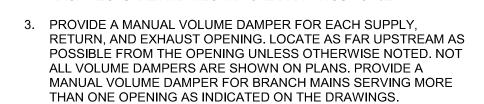
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SHEET NOTES

1. REFER TO MB800 SERIES SHEETS FOR STANDARD DETAILS NOT REFERENCED ON PLANS. COMPLY WITH ALL REQUIREMENTS IN

2. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND INTERIOR ELEVATIONS FOR FINAL LOCATION OF ALL GRILLES, DIFFUSERS, AND EXPOSED DUCTWORK. PROVIDE ADDITIONAL DUCTWORK AND FITTINGS TO MAKE FINAL CONNECTION. REPORT DISCREPANCIES IN QUANTITY OF AIR TERMINALS BETWEEN ARCHITECTURAL AND MECHANICAL DRAWINGS TO A/E.



- 4. DIVISION 23 SHALL REVIEW TU BOX LOCATIONS AND COORDINATE WITH OTHER DISCIPLINES TO ENSURE TU BOX ACCESS IS MAINTAINED. TYPICAL ALL TU BOX LOCATIONS. CONTRACTOR SHALL PROVIDE MOCK-UP OF ONE FTU/VAV FOR REVIEW PRIOR TO INSTALLATION OF ALL EQUIPMENT TO ENSURE DESIGN INTENT IS
- 5. REFER TO M201 FOR TEMPERATURE SENSOR AND SWITCH LOCATIONS.
- 6. PROVIDE ACCESS DOOR IN ALL OUTSIDE AIR, EXHAUST AIR, AND RETURN AIR PLENUMS, OR DUCTS LOCATED BEHIND LOUVERS FOR BACKDRAFT AND/OR MOTORIZED DAMPER ACCESS. PROVIDE 24"x24" UNLESS OTHERWISE NOTED. REFER TO DETAILS.
- 7. ALL PLENUMS BEHIND LOUVERS SHALL BE A MINIMUM OF 36 INCHES DEEP UNLESS OTHERWISE NOTED. ALL PLENUMS BEHIND SUPPLY, RETURN, AND EXHAUST AIR GRILLES SHALL BE A MINIMUM OF 24 INCHES DEEP OR THE SIZE OF THE DUCT, WHICHEVER IS LARGER UNLESS OTHERWISE NOTED.

FLAG NOTES

1 40x24 SUPPLY DUCT AND 48x24 EXHAUST DUCT UP TO HRU-B-02. PROVIDE TRANSITION AND CONNECT TO UNIT.

2 14x14 SUPPLY AND RETURN DUCTS UP TO RTHP-B-01. PROVIDE TRANSITION AND CONNECT TO UNIT.

3 ROUTE 3/4" CONDENSATE DRAIN DOWN WITHIN WALL AND TERMINATE IN TAIL PIECE OF DRINKING FOUNTAIN. 4 8x8 EXHAUST DUCT UP TO EF-B-01.

5 14"Ø EXHAUST DUCT UP TO EF-B-02. TRANSITION TO 12x12 IN THE VERTICAL. PROVIDE RECTANGULAR MOTORIZED DAMPER AND CONNECT TO FAN.

6 20"Ø EXHAUST DUCT UP TO EF-B-03. TRANSITION TO 16x16 IN THE VERTICAL. PROVIDE RECTANGULAR MOTORIZED DAMPER AND CONNECT TO FAN.

ROUTE 4"Ø DRYER EXHAUST DUCT DOWN WALL AND CONNECT TO DRYER, AND ROUTE UP THROUGH ROOF.
OFFSET DUCT AROUND STRUCTURE, PROVIDE BACKDRAFT DAMPER, AND CONNECT TO DRYER ROOF CAP. 8 CONNECT DUCT TO LOUVER PROVIDED BY ARCHITECT.

COORDINATE DUCT AND MOTORIZED DAMPER DIMENSION TO MATCH LOUVER, APPROXIMATELY 36x24. 9 CONNECT EXHAUST DUCT TO VEHICLE EXHAUST EXTRACTION FAN AND ROUTE UP THROUGH ROOF.

RSL/RLL PIPING ROUTED UP THROUGH ROOF TO HEAT PUMP FROM AIR CONDITIONING UNIT. SIZE PER MANUFACTURER'S RECOMMENDATIONS.

ROUTE 3/4" C FROM ACU-B-02 INTO COMPRESSOR AND LUBE OIL 118 AND OVER TO MECHANICAL 116. ROUTE PIPING DOWN WITHIN WALL AND TERMINATE ABOVE FLOOR DRAIN WITH AIR GAP. COORDINATE PIPING IN ELECTRICAL ROOM TO AVOID ELECTRICAL PANELS AND THE SUSPENDED TRANSORMER. COORDINATE PIPING IN MECHANICAL ROOM WITH THE FLOOR DRAIN SO AS NOT TO BE A TRIPPING HAZARD.





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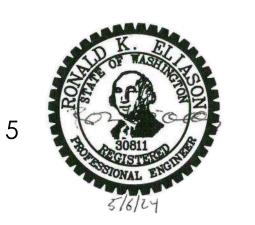
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MAIN FLOOR HVAC PLAN -NORTH

CITY OF FEDERAL WAY FLEET & SHOPS

FEDERAL WAY, WASHINGTON

10 MB302

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MAIN FLOOR HVAC PLAN - NORTH

from Helix Design Group.

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1. REFER TO MB800 SERIES SHEETS FOR STANDARD DETAILS NOT REFERENCED ON PLANS. COMPLY WITH ALL REQUIREMENTS IN 2. REFER TO ARCHITECTURAL DRAWINGS FOR ROOFING DETAILS. PROVIDE PRE-MANUFACTURED ROOF CURB FOR ALL ROOFTOP EXHAUST FANS AND HOODS. PROVIDE TOP OF CURB MINIMUM 10 INCHES ABOVE FINISHED ROOF SURFACE. REFER TO DIVISION 23 SPECIFICATIONS. design group 4. MAINTAIN A MINIMUM 10 FEET BETWEEN SANITARY VENTS AND ALL OUTSIDE AIR INTAKES. NOT ALL MECHANICAL VENTS ARE SHOWN ON ROOF PLAN. REFER TO PLUMBING FLOOR PLANS FOR ADDITIONAL LOCATIONS. 5. LOCATE ALL EXTERIOR OUTSIDE AIR, CO2, PHOTOCELL, ETC. ON NORTH FACE OF EXTERIOR BUILDING WALL OR ROOFTOP EQUIPMENT. COORDINATE EXACT LOCATIONS WITH A/E. **FLAG NOTES** 1 EQUIPMENT ACCESS SPACE (TYP). 2 RSS/RSL PIPING. SIZE PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE OUTDOOR JACKETING PER SPEC. 3 3/4" CONDENSATE DRAIN. 4 HRU INTEGRATION VALVE KIT. 5 HRU INTEGRATION KIT - CONTROL BOX. HELIX DESIGN GROUP, INC 206.448.3376 HRU-B-01 8 FLEET & SHOPS ***UNOFFICIAL COPY*** Official bid documents, plan holder's list, and addenda (if applicable) are available on BXWA.com

SHEET NOTES

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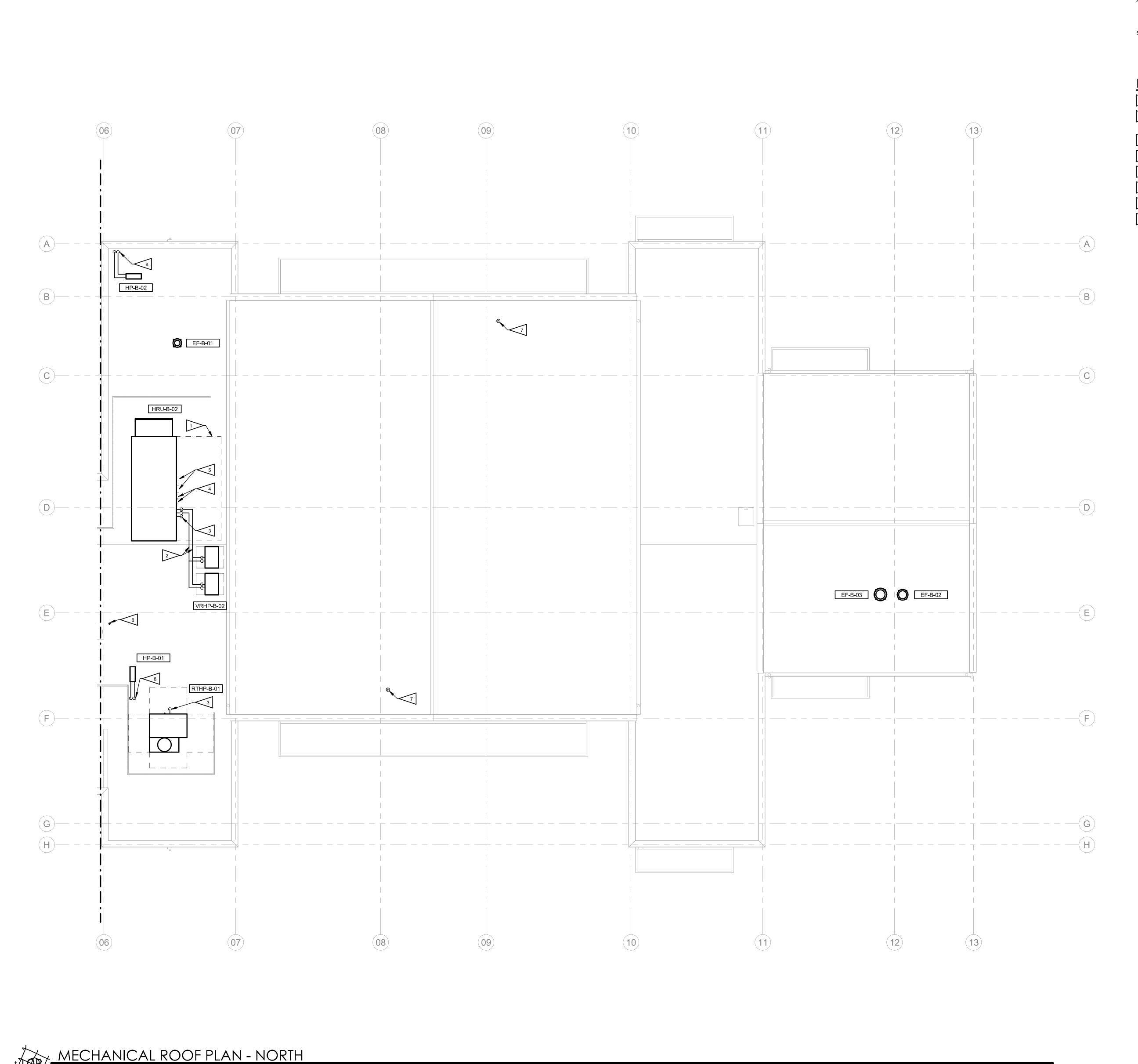
MECHANICAL 7 ROOF PLAN -SOUTH

CITY OF FEDERAL

FEDERAL WAY, WASHINGTON

10 MB501

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SPECIFICATIONS.

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REFERENCED ON PLANS. COMPLY WITH ALL REQUIREMENTS IN

2. REFER TO ARCHITECTURAL DRAWINGS FOR ROOFING DETAILS. 3. PROVIDE PRE-MANUFACTURED ROOF CURB FOR ALL ROOFTOP EXHAUST FANS AND HOODS. PROVIDE TOP OF CURB MINIMUM 10 INCHES ABOVE FINISHED ROOF SURFACE. REFER TO DIVISION 23

4. MAINTAIN A MINIMUM 10 FEET BETWEEN SANITARY VENTS AND ALL OUTSIDE AIR INTAKES. NOT ALL MECHANICAL VENTS ARE SHOWN ON ROOF PLAN. REFER TO PLUMBING FLOOR PLANS FOR ADDITIONAL LOCATIONS.

5. LOCATE ALL EXTERIOR OUTSIDE AIR, CO2, PHOTOCELL, ETC. ON NORTH FACE OF EXTERIOR BUILDING WALL OR ROOFTOP EQUIPMENT. COORDINATE EXACT LOCATIONS WITH A/E.

FLAG NOTES

1 EQUIPMENT ACCESS SPACE (TYP).

2 RSS/RSL PIPING. SIZE PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE OUTDOOR JACKETING PER

3 3/4" CONDENSATE DRAIN.

4 HRU INTEGRATION VALVE KIT.

5 HRU INTEGRATION KIT - CONTROL BOX.

6 DRYER ROOF CAP. 7 VEHICLE EXHAUST DUCT.

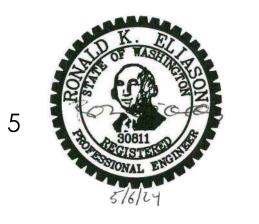
8 RSS/RSL PIPING FROM SPLIT SYSTEM HEAT PUMP DOWN THROUGH ROOF. SIZE PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE OUTDOOR JACKETING PER design group



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MECHANICAL

ROOF PLAN -NORTH

CITY OF FEDERAL 8 FLEET & SHOPS

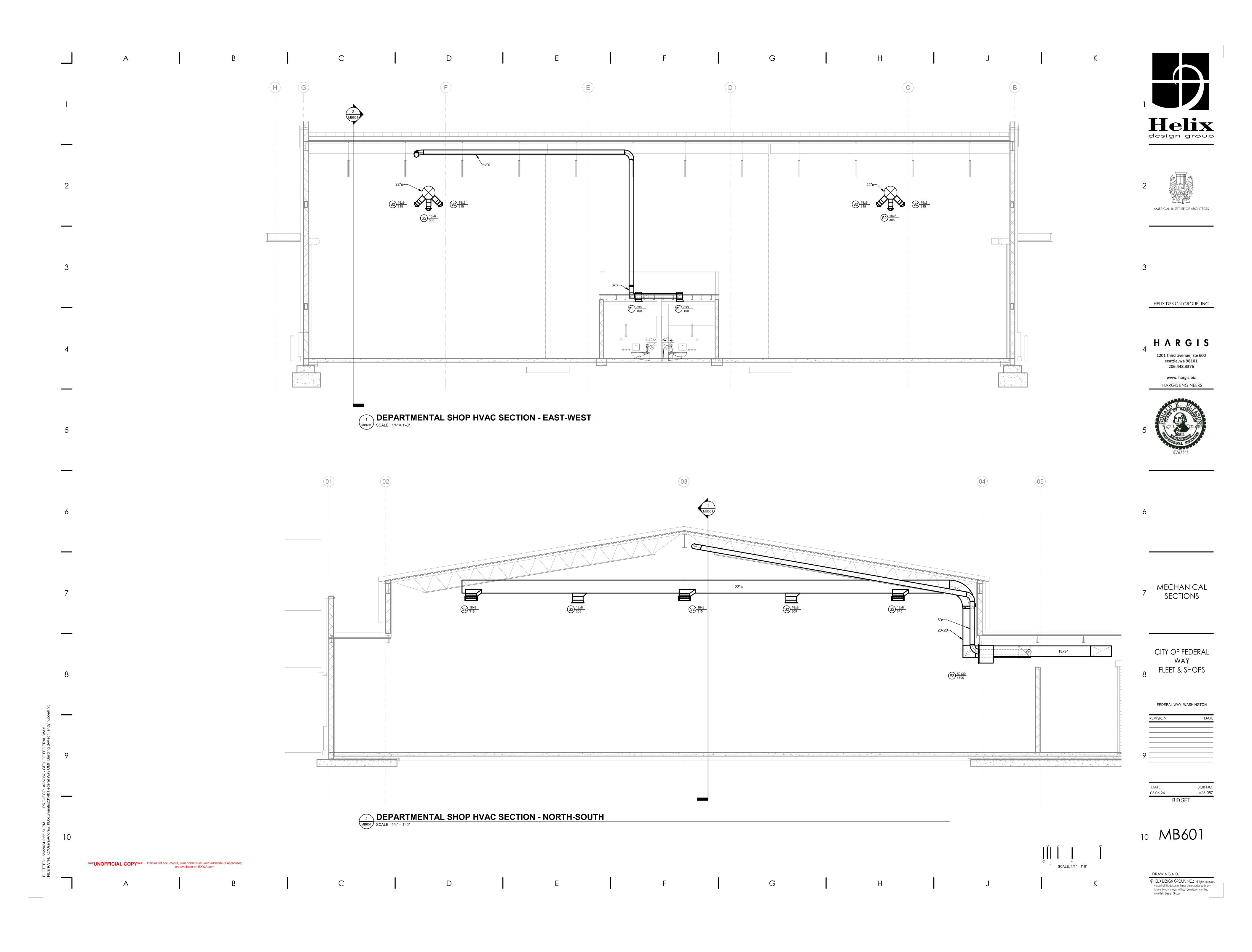
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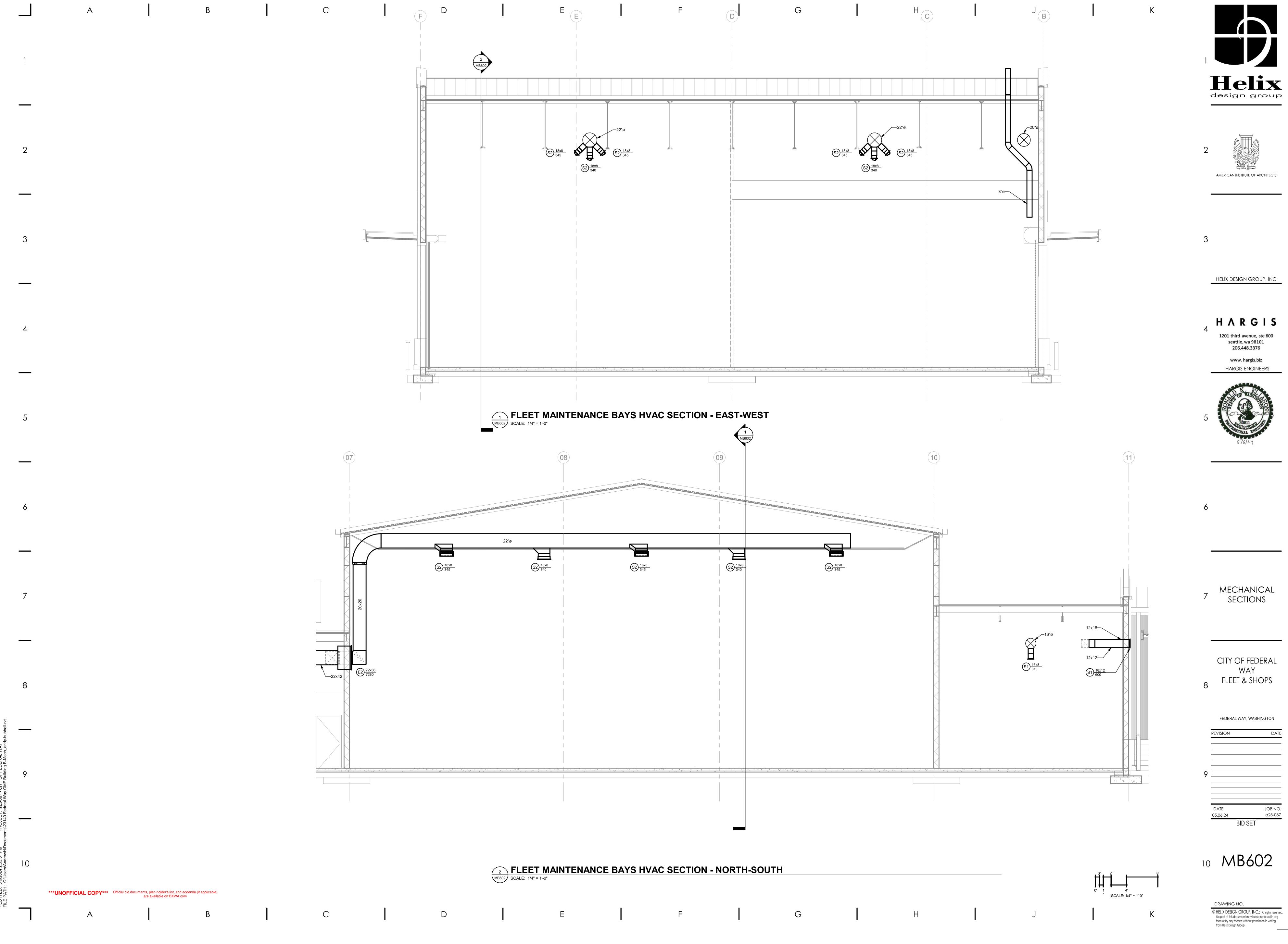
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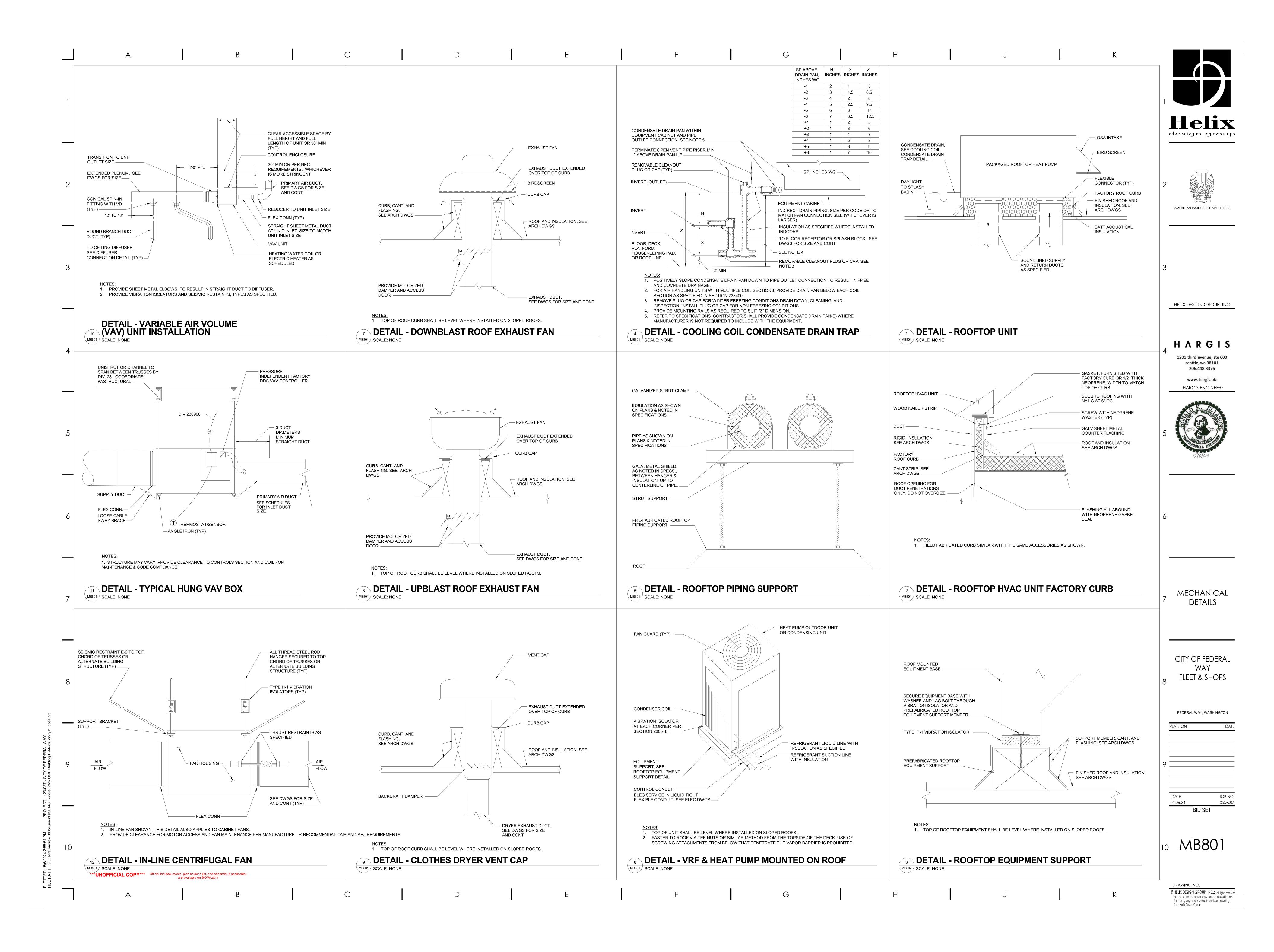
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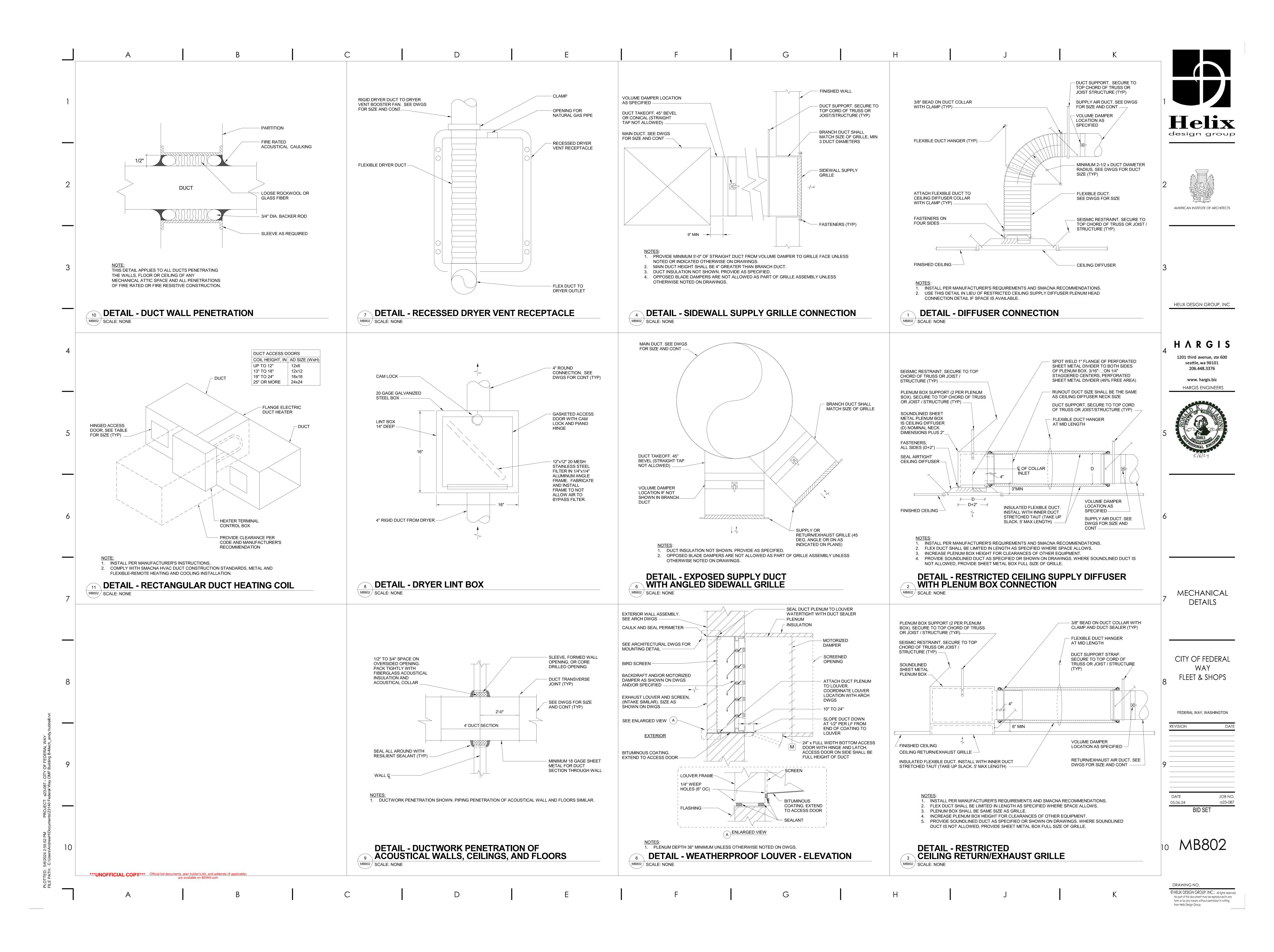
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<u>SEQUENCE OF OPERATION - HEAT RECOVERY UNITS WITH OUTDOOR HEAT PUMPS</u>

1. HEAT RECOVERY UNIT WITH SUPPLY FAN AND EXHAUST FAN CONTROLLED BY ECM MOTORS, OUTDOOR AIR DAMPER, OUTDOOR AIR BYPASS DAMPER, EXHAUST DAMPER, OUTDOOR AIR FILTER (MERV 14), RETURN AIR FILTER (MERV 8), AIR TO AIR PLATE AND FRAME HEAT EXCHANGER, AND DX REFRIGERANT COIL. DX COIL IS CONNECT TO OUTDOOR UNIT THROUGH HRU EXPANSION VALVE INTEGRATION KIT WITH W-CONGTROLLER. HRU-B-01 REQUIRES ONE INTEGRATION KIT AND W-CONTROLLER AND HRU-B-2 REQUIRES TWO INTEGRATION KITS AND W-CONTROLLERS.

2. CONTROL DIAGRAM IS GENERAL IN NATURE AND DOES NOT SHOWN ALL CONTROL WIRING REQUIRED. DDC CONTRACTOR SHALL VERIFY REQUIREMENTS WITH MANUFACTURER AND PROVIDE NECESSARY WIRING AND CONTROLS FOR AN OPERATION SYSTEM. 3. BUILDING AUTOMATION SYSTEM (BAS) INTERFACE. PROVIDE WITH FACTORY INSTALLED CONTROLLER WITH BACNET IP COMMUNICATION CARD.

4. PROVIDE WITH FACTORY INSTALLED COMPONENTS AS INDICATED. 5. PROVIDE WITH FIELD INSTALLED COMPONENTS AS INDICATED. 6. ALL SETPOINTS SHALL BE ADJUSTABLE.

7. DDC CONTRACTOR SHALL PROVIDE ALL CONTROL COMPONENTS THAT ARE NOT FACTORY INSTALLED AND ALL CONTROL WIRING AND PROGRAMMING FOR A COMPLETE OPERATIONAL

8. DDC CONTRACTOR SHALL PROVIDE BACNET INTEGRATION AND FRONT END GRAPHICS AT THE EXISTING OPERATORS WORKSTATION.

UNIT CONTROLS: BUILDING AUTOMATION SYSTEM (BAS) INTERFACE. PROVIDE WITH FACTORY INSTALLED CONTROLLER WITH BACNET IP COMMUNICATION CARD. PROVIDE WITH FACTORY INSTALLED

COMPONENTS AS INDICATED. **RUN CONDITIONS - SCHEDULED:**

THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN OCCUPIED MODE. THE UNIT SHALL BE OFF DURING UNOCCUPIED MODE AND DURING MORNING WARM-UP OR COOL-DOWN. OCCUPIED MODE - SUPPLY AND EXHAUST FANS ON, OUTDOOR AIR AND EXHAUST DAMPERS OPEN, OUTDOOR AIR BYPASS DAMPER MODULATES.

UNOCCUPIED MODE (HRU-B-01) - FANS ARE OFF, OUTDOOR AND EXHAUST DAMPERS CLOSED UNLESS REQUIRED TO OPERATE TO MEET UNOCCUPIED TEMPERATURE SETPOINTS. UNOCCUPIED MODE (HRU-B-02) - UNIT PROVIDES VENTILATION IN ACCORDANCE WITH GAS DETECTION SEQUENCE OF OPERATION.

ZONE TEMPERATURE SETPOINTS: 1. OCCUPIED SETPOINTS: 65 DEG F - HEATING, 80 DEG F - COOLING. 2. UNOCCUPIED SETPOINTS: 60 DEG F - HEATING, 85 DEG F - COOLING.

3. CONSULT WITH PIERCE COUNTY FOR SCHEDULE TIME FRAMES. OPTIMAL START - MORNING WARM-UP AND COOL-DOWN:

THE CONTROLLER SHALL USE START UP HISTORY, OUTDOOR AIR TEMPERATURE, AND SPACE TEMPERATURE TO DETERMINE THE OPTIMAL TIME FOR THE SYSTEM TO START.

HEAT RECOVERY UNITS			l	Points					
Point Name	Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
Schedule					Х			Х	
Return Air Temperature	Х					Х		Х	
Return Air Filter	X					Х	Х	Х	
Exhaust Air Temperature	Х					Х		Х	
Exhaust Fan Start/Stop				Х				Х	
Exhaust Fan Speed	X					Х		Х	
Exhaust Fan Pressure	Х	Х				Х	Х	Х	
Exhaust Air Damper			Х	Х		Х		Х	
Outdoor Air Damper			Х	Х		Х		Х	
Outdoor Air Temperature	Х					Х		Х	
Outdoor Air Filter	Х					Х	Х	Х	
Outdoor Air Bypass Damper	X	X				Х		Х	
Supply Air Temperature	Х					Х		Х	
Supply Fan Start/Stop				Х				Х	
Supply Fan Speed	Х					Х		Х	
Supply Fan Pressure	Х	Х				Х	Х	Х	
Discharge Air Temperature	Х					Х		Х	
Supply Duct Static Pressure	Х					Х		Х	
Roll-Up Door Sensor			X			Х		Х	
CO and NO2 Gas Sensor	Х					Х	Х	Х	4-20 mA Output to DDC

SUPPLY AND EXHAUST FAN CONTROL:

SUPPLY FAN SPEED CONTROLLED FROM SUPPLY DUCT STATIC PRESSURE, INITIALLY SET AT 0.6 INCHES WG. TAB CONTRACTOR TO OPTIMIZE SETPOINT DURING BALANCING. EXHAUST FAN TRACKS THE SUPPLY FAN WITH AN OFFSET PER THE EQUIPMENT SCHEDULES. AIRFLOW VOLUMES ARE MEASURED/CALCULATED BY MEASURING THE DIFFERENCE BETWEEN THE STATIC AND DYNAMIC PRESSURES ACROSS THE FANS. REFER TO VAV TERMINAL UNIT EQUIPMENT SCHEDULES AND SEQUENCE OF OPERATION FOR MINIMUM AND MAXIMUM ZONE AIRFLOWS IN OCCUPIED, UNOCCUPIED, WARM-UP, AND COOL-DOWN MODES.

TEMPERATURE CONTROL:

THE CONTROLLER SHALL VARY OUTDOOR AIRFLOW THROUGH THE OUTDOOR AIR BYPASS AND HEAT EXCHANGER THROUGH MODULATION OF THE OUTDOOR AIR BYPASS DAMPER. WHEN HEAT FULL HEAT RECOVERY IS REQUIRED TO MEET HEATING AND COOLING SETPOINTS THE BYPASS DAMPER SHALL BE CLOSED AND ALL AIRFLOW DIRECTED THROUGH THE HEAT EXCHANGER. WHEN FULL HEAT RECOVERY IS NOT REQUIRED TO MEET SETPOINTS THE BYPASS DAMPER SHALL MODULATE BETWEEN CLOSED AND FULLY OPEN TO MEET SETPOINT.

DISCHARGE AIR TEMPERATURE SHALL BE RESET TO SATISFY THE ZONE THAT REQUIRES LOWEST COOLING TEMPERATURE RESET SHALL BE LIMITED TO 1 DEG F EVERY 10 MINUTES FOR CONTROL

WHEN THE COOLING AND HEATING DISCHARGE AIR TEMPERATURE CANNOT BE SATISFIED BY HEAT RECOVERY MECHANICAL COOLING AND HEATING WILL BE PROVIDED BY THE OUTDOOR HEAT PUMP SPLIT DX SYSTEM. MECHANICAL HEATING AND COOLING SHALL BE LOCKED OUT WHEN ANY ROLL-UP DOOR IN THE SPACE SERVED BY THE HRU IS OPEN.

FROST PROTECTION: THE CONTROLLER SHALL MONITOR THE EXHAUST AIR TEMPERATURE AND MODULATE THE OUTDOOR AIR BYPASS DAMPER TO MAINTAIN THE EXHAUST TEMPERATURE ABOVE 38 DEG F.

DOOR SENSORS: THE CONTROLLER SHALL SHUT DOWN SYSTEMS WHEN ANY ROLL-UP DOOR IN A ZONE IS OPEN FOR MORE THAN 5 MINUTES (ADJUSTABLE). NORMAL OPERATION SHALL RESUME WHEN ALL DOORS IN A GIVEN ZONE SERVED BY THE HEAT RECOVERY UNIT ARE CLOSED FOR MORE THAN 5 MINUTES (ADJUSTABLE).

GAS DETECTION SYSTEM (HRU-B-02 ONLY):

THE FLEET BAY MAINTENANCE SHOP SHALL BE PROVIDED WITH A GAS DETECTION SYSTEM FOR MONITORING CO AND NO2 LEVELS. REFER TO THE HVAC ZONE PLAN FOR PROPOSED SENSOR LOCATIONS. THE CONTROLLER SHALL MONITOR GAS CONCENTRATIONS AT SENSORS AND OVERRIDE VENTILATION AIRFLOW WHEN SENSORS EXCEED SETPOINTS. SETPOINTS ARE 35 PPM FOR CO AND 3 PPM FOR NO2. WHEN SETPOINTS ARE EXCEEDED, THE TERMINAL UNIT AIRFLOWS FOR UNITS SERVING THE FLEET MAINTENANCE SHOP AREA WILL BE SET TO MAXIMUM AIRFLOWS UNTIL GAS LEVELS DROP BELOW SETPOINT FOR 5 MINUTES (ADJUSTABLE). DURING UNOCCUPIED HOURS THE TEMPERATURE CONTROL FOR THE SYSTEM SHALL CONTROL TO THE UNOCCUPIED SETPOINTS AND TERMINAL UNITS SERVING THE FLEET MAINTENANCE SHOP SHALL BE SET TO THE MINIMUM SCHEDULED AIRFLOW TO PROVIDE CONTINUOUS VENTILATION UNLESS SETPOINTS ARE EXCEEDED. IF SO, THE TERMINAL UNITS WILL BE CONTROLLED TO MAXIMUM AIRFLOW AS DESCRIBED ABOVE.

		ŀ	Points					
Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
		Х					Х	Outdoor Unit Point
		Х					Х	Outdoor Unit Point
		Х				X	Х	Outdoor Unit Point
		Х					Х	Outdoor Unit Point
		Х					Χ	Outdoor Unit Point
	AI	AI AO	AI AO BI X X X X X	AI AO BI BO X X X X X X X	Al AO BI BO Sched X X X X X X	Al AO BI BO Sched Trend X X X X X X	Al AO BI BO Sched Trend Alarm X X X X X X X	Al AO BI BO Sched Trend Alarm Graphic X X X X X X X X X X X X X

HEAT RECOVERY UNITS WITH SPLIT DX HEAT PUMP(S)

SCR CONTROLLER -HRU-B-01 AND SINGLE DUCT PRIMARY AIR VAV DAMPER

ELECTRIC HEATING COIL FLAT PLATE THERMOSTAT/SENSOR WHERE SHOWN ON HVAC DRAWINGS

7. SYSTEM REQUESTS

a. COOLING SAT RESET REQUESTS 1) IF THE COOLING LOOP IS LESS THAN 85%, SEND 0 REQUESTS.

2) IF THE COOLING LOOP IS GREATER THAN 95%, SEND 1 REQUEST 3) IF THE ZONE TEMPERATURE EXCEEDS THE ZONE'S COOLING SETPOINT BY 3°F FOR 2 MINUTES, SEND 2

4) IF THE ZONE TEMPERATURE EXCEEDS THE ZONE'S COOLING SETPOINT BY 5°F FOR 2 MINUTES, SEND 3 REQUESTS.

b. STATIC PRESSURE RESET REQUESTS

1) IF THE DAMPER LOOP IS LESS THAN 85%, SEND 0 REQUESTS.

4) IF THE MEASURED AIRFLOW IS LESS THAN 50% OF SETPOINT FOR 1 MINUTE, SEND 3 REQUESTS.

THE COOLING LOOP AND THE HEATING LOOP. 1) THE HEATING LOOP SHALL BE ENABLED WHENEVER THE SPACE TEMPERATURE IS BELOW THE

CURRENT ZONE TEMPERATURE HEATING SETPOINT, AND DISABLED OTHERWISE 2) THE COOLING LOOP SHALL BE ENABLED WHENEVER THE SPACE TEMPERATURE IS ABOVE THE CURRENT ZONE TEMPERATURE COOLING SETPOINT, AND DISABLED OTHERWISE.

THE OUTPUT OF THE LOOP SHALL BE A VIRTUAL POINT RANGING FROM 0% (NO COOLING) TO 100% (FULL COOLING).

d. LOOPS SHALL BE USE PROPORTIONAL + INTEGRAL LOGIC OR FUZZY LOGIC. PROPORTIONAL-ONLY

e. SEE OTHER SECTIONS FOR HOW THE OUTPUTS FROM THESE LOOPS ARE USED.

b. COOLING: WHEN THE OUTPUT OF THE SPACE COOLING CONTROL LOOP IS NONZERO AND THE OUTPUT

FORCE ZONE AIRFLOW SETPOINT TO VMIN FORCE ZONE AIRFLOW SETPOINT TO VHEAT-MAX

g. RESET REQUEST-HOURS ACCUMULATOR POINT TO ZERO (PROVIDE ONE POINT FOR EACH RESET TYPE

1) IF THE ELECTRIC HEATING COIL IS PROVEN ON AND THE SUPPLY AIR DISCHARGE TEMPERATURE

EXCEEDS SETPOINT PLUS 10°F FOR MORE THAN 10 MINUTES, GENERATE ALARM. c. AIRFLOW SENSOR CALIBRATION. IF THE FAN SERVING THE ZONE HAS BEEN OFF FOR 10 MINUTES AND

AIRFLOW SENSOR READING IS ABOVE 20 CFM, GENERATE ALARM.

2) SUPPRESS ZONE TEMPERATURE ALARMS AS FOLLOWS: a) AFTER ZONE SETPOINT IS CHANGED FOR A PERIOD OF 10 MINUTES PER DEGREE OF DIFFERENCE BETWEEN THE ZONE TEMPERATURE AT THE TIME OF THE CHANGE AND THE NEW SETPOINT. THIS

VAV TERMINAL UNITS				Points					
Point Name	Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
Zone Temperature	Х					Х	Х	Х	
Zone Temperature Setpoint	Х				X			Х	
Airflow	Х					Х		Х	
Discharge Air Temperature	X					Х		Х	
Zone Damper		Х						Х	
Electric Heating Coil		Х				Х		Х	
Zone Override			Х			Х		Х	
Airflow Setpoint		Х						Х	
Schedule					X			Х	
Heating Setpoint		Х				Х		Х	
Cooling Setpoint		Х				Х		Х	
Low Zone Temperature							Х	Х	
High Zone Temperature							Х	Х	
Low Supply Temperature							Х	Х	
High Supply Temperature							Х	Х	

VAV TERMINAL UNITS

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2) IF THE DAMPER LOOP IS GREATER THAN 95%, SEND 1 REQUEST. 3) IF THE MEASURED AIRFLOW IS LESS THAN 70% OF SETPOINT FOR 1 MINUTE, SEND 2 REQUESTS

a. TWO SEPARATE CONTROL LOOPS SHALL OPERATE TO MAINTAIN SPACE TEMPERATURE AT SETPOINT,

b. THE COOLING LOOP SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE COOLING SETPOINT.

c. THE HEATING LOOP SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT. THE OUTPUT OF THE LOOP SHALL BE A VIRTUAL POINT RANGING FROM 0% (NO HEATING) TO 100% (FULL

CONTROL IS NOT ACCEPTABLE, ALTHOUGH THE INTEGRAL GAIN SHALL BE SMALL RELATIVE TO THE PROPORTIONAL GAIN. P AND I GAINS SHALL BE ADJUSTABLE BY THE OPERATOR.

a. HEATING: WHEN THE OUTPUT OF THE SPACE HEATING CONTROL LOOP IS NONZERO AND THE OUTPUT OF THE COOLING LOOP IS EQUAL TO ZERO.

OF THE HEATING LOOP IS EQUAL TO ZERO. c. DEADBAND: WHEN NOT IN EITHER HEATING OR COOLING.

10. TESTING/COMMISSIONING OVERRIDES: PROVIDE SOFTWARE POINTS THAT INTERLOCK TO A SYSTEM LEVEL

a. FORCE ZONE AIRFLOW SETPOINT TO ZERO FORCE ZONE AIRFLOW SETPOINT TO VCOOL-MAX

e. FORCE DAMPER FULL CLOSED/OPEN

f. FORCE HEATING TO OFF/CLOSED LISTED BELOW)

11. ALARMS a. LOW AIRFLOW

1) IF THE MEASURED AIRFLOW IS LESS THAN 70% OF SETPOINT FOR 5 MINUTES, GENERATE ALARM. b. LOW SUPPLY AIR TEMPERATURE 1) IF ELECTRIC HEATING COIL IS PROVEN ON AND THE SUPPLY AIR DISCHARGE TEMPERATURE IS 15°F LESS THAN SETPOINT FOR 10 MINUTES, GENERATE ALARM.

c. HIGH SUPPLY AIR TEMPERATURE

d. ZONE TEMPERATURE ALARMS 1) IF THE ZONE IS 5°F ABOVE COOLING OR BELOW HEATING SETPOINT FOR 10 MINUTES, GENERATE ALARM.

SUPPRESSION PERIOD APPLIES ANY TIME THAT THE ZONE SETPOINT IS CHANGED. b) WHILE ZONE GROUP IS IN WARM-UP OR COOL-DOWN MODES.

FEDERAL WAY, WASHINGTON

MECHANICAL

DIAGRAMS

SEQUENCE

OF

OPERATIONS

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SEQUENCE OF OPERATION - VAV TERMINAL UNITS

OPERATING MODES.

SETUP MODE.

d. THE SOFTWARE SHALL PREVENT

80°F, INITIALLY SET TO 78°F

72°F, INITIALLY SET TO 68°F

ORDER FROM HIGHEST TO LOWEST PRIORITY:

1) SETPOINT OVERLAP RESTRICTION (SECTION 1.D.1)

3. DESIGN AIRFLOW RATES SHALL BE AS SCHEDULED ON PLANS:

b. ZONE MINIMUM AIRFLOW SETPOINT (VMIN)

THE ZONE IS A PART OF:

Setpoint

Cooling Maximum

Heating Maximum

6.E BELOW.

SHALL BE LOCKED OUT.

THE ACTIVE SETPOINT.

3) SCHEDULED SETPOINTS BASED ON ZONE GROUP MODE

a. ZONE MAXIMUM COOLING AIRFLOW SETPOINT (VCOOL-MAX)

c. ZONE MAXIMUM HEATING AIRFLOW SETPOINT (VHEAT-MAX)

4. THE OCCUPIED MINIMUM AIRFLOW VMIN* SHALL BE EQUAL TO VMIN.

Occupied

Vcool-max

Vmin*

BELOW THE MINIMUM SETPOINT. SEE 6.E BELOW.

TO MAINTAIN THE DISCHARGE TEMPERATURE AT SETPOINT.

A SUPPLY AIR TEMPERATURE NO LOWER THAN 50°F.

a. EACH ZONE SHALL HAVE SEPARATE OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS.

1) THE SETPOINTS SHALL BE THE OCCUPIED SETPOINT DURING OCCUPIED MODE, WARM-UP MODE, AND

1) THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT MINUS 1°F (I.E. THE MINIMUM

2) THE UNOCCUPIED HEATING SETPOINT FROM EXCEEDING THE OCCUPIED HEATING SETPOINT; AND

3) THE UNOCCUPIED COOLING SETPOINT FROM BEING LESS THAN THE OCCUPIED COOLING SETPOINT

a) AS A DEFAULT, THE ACTIVE OCCUPIED COOLING SETPOINT SHALL BE LIMITED BETWEEN 74°F AND

b) AS A DEFAULT, THE ACTIVE OCCUPIED HEATING SETPOINT SHALL BE LIMITED BETWEEN 65°F AND

2) THE ACTIVE HEATING AND COOLING SETPOINTS SHALL BE INDEPENDENTLY ADJUSTABLE, RESPECTING

3) THE ADJUSTMENT SHALL ONLY BE EFFECTIVE IN OCCUPIED MODE, AND SHALL BE ZERO IN ALL OTHER

f. HIERARCHY OF SETPOINT ADJUSTMENTS: THE FOLLOWING ADJUSTMENT RESTRICTIONS SHALL PREVAIL IN

2. LOCAL OVERRIDE: WHEN THERMOSTAT OVERRIDE BUTTONS ARE DEPRESSED, THE CALL FOR OCCUPIED

5. ACTIVE MAXIMUM AND MINIMUM SETPOINTS SHALL VARY DEPENDING ON THE MODE OF THE ZONE GROUP

Cool-down Setup

6. CONTROL LOGIC IS DEPICTED SCHEMATICALLY IN THE FIGURE BELOW AND DESCRIBED IN THE FOLLOWING

SECTIONS. RELATIVE LEVELS OF VARIOUS SETPOINTS ARE DEPICTED FOR OCCUPIED MODE OPERATION.

a. WHEN THE ZONE IS IN COOLING, THE COOLING LOOP OUTPUT SHALL BE MAPPED TO THE AIRFLOW

SETPOINT FROM THE MINIMUM TO THE COOLING MAXIMUM AIRFLOW SETPOINTS. THE ELECTRIC HEATING

COIL IS DE-ENERGIZED UNLESS THE SUPPLY AIR TEMPERATURE IS BELOW THE MINIMUM SETPOINT. SEE

b. IF SUPPLY AIR TEMPERATURE FROM AIR HANDLER IS GREATER THAN ROOM TEMPERATURE, COOLING

c. WHEN THE ZONE IS IN DEADBAND, THE ACTIVE AIRFLOW SETPOINT SHALL BE THE MINIMUM AIRFLOW

SETPOINT. THE ELECTRIC HEATING COIL IS DE-ENERGIZED UNLESS THE SUPPLY AIR TEMPERATURE IS

d. WHEN THE ZONE IS IN HEATING, THE ELECTRIC HEATING COIL SHALL MAINTAIN SPACE TEMPERATURE

e. IN ANY MODE EXCEPT UNOCCUPIED, THE ELECTRIC HEATING COIL SHALL BE MODULATED TO MAINTAIN

f. THE VAV DAMPER SHALL BE MODULATED BY A CONTROL LOOP TO MAINTAIN THE MEASURED AIRFLOW AT

AT THE HEATING SETPOINT. THE ELECTRIC HEATING COIL SHALL ENERGIZE CONTROL STEPS AS REQUIRED

Max(Vheat-max, Vmin*) Vheat-max 0 Vcool-max Vcool-max

Warm-up Setback Unoccupied

Vcool-max Vcool-max 0 0 0

2) THE SETPOINTS SHALL BE UNOCCUPIED SETPOINTS DURING UNOCCUPIED MODE, SETBACK MODE, AND

b. THE ACTIVE SETPOINTS SHALL BE DETERMINED BY THE OPERATING MODE OF THE ZONE GROUP

DEFAULT SET POINTS SHALL BE BASED ON ZONE TYPE, SEE M-1002

e. WHERE THE ZONE HAS A LOCAL SETPOINT ADJUSTMENT KNOB/BUTTON

THE LIMITS AND ANTI-OVERLAP LOGIC DESCRIBED ABOVE.

1) THE ADJUSTMENT SHALL BE CAPABLE OF BEING LIMITED IN SOFTWARE.

2) ABSOLUTE LIMITS ON LOCAL SETPOINT ADJUSTMENT (SECTION 1.E.1)

MODE OPERATION SHALL BE SENT UP TO THE ZONE GROUP CONTROL FOR 60 MINUTES.

DIFFERENCE BETWEEN HEATING AND COOLING SETPOINTS SHALL BE 1°F)

SEQUENCE OF OPERATION - DOMESTIC WATER BOOSTER PACKAGE

DOMESTIC WATER BOOSTER PACKAGE WITH DUPLEX PUMPS OPERATED BY VARIABLE FREQUENCY DRIVES FOR BOOSTING PRESSURE OF INCOMING WATER SERVICE FOR BUILDING. CONTROLLER SHALL BE PROVIDED WITH BACNET IP INTEGRATION MODULE FOR DDC INTEGRATION. INCOMING AND DISCHARGE PRESSURE SENSORS ARE PROVIDED BY THE DDC CONTRACTOR AND WIRED TO THE CONTROL PANEL.

THE DOMESTIC WATER BOOSTER PACKAGE SHALL BE ENABLED TO RUN WHEN SCHEDULED.

THE CONTROLLER SHALL MONITOR THE INCOMING AND DISCHARGE PRESSURE AND CONTROL TO A CONSTANT PRESSURE SETPOINT, INITIALLY SET AT 60 PSIG (ADJ).

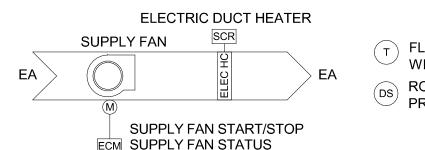
ALARMS SHALL BE PROVIDED AS FOLLOWS: LOW DISCHARGE PRESSURE IF 10 PSIG BELOW SETPOINT (ADJ.)

HIGH DISCHARGE PRESSURE IF 10 PSIG BELOW SETPOINT (ADJ.)

DOMESTIC WATER BOOSTER PACKAGE				Points					
Point Name	AI	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
DWBP Start/Stop				Х				Х	
Pump 1 Status			Х			Х		Х	
Pump 2 Status			Х			Х		Х	
Incoming Pressure	Х					Х		Х	
Discharge Pressure	Х					Х		Х	
Pressure Setpoint		Х						Х	
Low Discharge Pressure							Х	Х	
High Discharge Pressure							Х	Х	

DOMESTIC WATER BOOSTER PACKAGE

MB902 SCALE: NONE



SPEED CONTROL

FLAT PLATE THERMOSTAT/SENSOR WHERE SHOWN ON HVAC DRAWINGS ROLL-UP DOOR SENSORS PROVIDE AT EACH ROLL-UP DOOR

SEQUENCE OF OPERATION - SUPPLY FAN (SF-B-01 AND EDH-B-01)

RUN CONDITIONS - SCHEDULED:

THE FAN SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES: OCCUPIED MODE - FAN IS ON. WHEN TEMPERATURE FALLS BELOW 50 DEG F THE DUCT HEATER SHALL BE UTILIZED TO INCREASE SPACE TEMPERATURE TO 55 DEG F. WHEN 55 DEG F SPACE TEMPERATURE IS ACHIEVED THE HEATER SHALL TURN OFF. HEATER SHALL BE DISABLED WHEN THE FAN IS OFF.

UNOCCUPIED MODE - FAN IS OFF UNLESS SPACE TEMPERATURE FALLS BELOW 50 DEG F. WHEN TEMPERATURE FALLS BELOW 50 DEG F THE FAN SHALL START AND THE DUCT HEATER SHALL BE UTILIZED TO INCREASE SPACE TEMPERATURE TO 55 DEG F. WHEN 55 DEG F SPACE TEMPERATURE IS ACHIEVED THE HEATER SHALL TURN OFF AND THE FAN SHALL STOP. HEATER SHALL BE DISABLE WITH THE FAN IS OFF.

THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN PER THE SCHEDULE OR WHEN TEMPERATURE FALLS BELOW SETPOINT IN UNOCCUPIED MODE.

THE CONTROLLER SHALL MONITOR THE FAN STATUS.

THE CONTROLLER SHALL ALLOW SPEED ADJUSTMENT OF THE ECM MOTOR TO SET AIRFLOW. THE FAN SPEED SHALL BE MONITORED.

THE CONTROLLER SHALL MONITOR THE ROLL-UP DOOR SWITCH AND SHUT OFF THE FAN AND HEATER WHEN THE DOOR IS OPEN.

 FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FANS				Points					
Point Name	Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
Supply Fan Start/Stop				Х				Х	
Supply Fan Status			Х			Х		Х	
Supply Fan Speed Adjust		Х						Х	
Supply Fan Speed	X							Х	
Roll-Up Door Sensor			Х					Х	
Schedule					Х			Х	
Electric Heating Enable		Х				Х		Х	
Electric Heating Status			Х			Х		Х	
Fan Failure							Х	Х	
Fan In Hand							Х	Х	

SUPPLY FAN WITH ELECTRIC DUCT HEATER

MB902 SCALE: NONE

FAN & HEATING COIL-— FLAT PLATE SENSOR ROOM FLAT PLATE THERMOSTAT/SENSOR WHERE SHOWN ON HVAC DRAWINGS

SEQUENCE OF OPERATION - ELECTRIC UNIT HEATER

THE UNITS SHALL RUN IN ACCORDING TO A USER DEFINABLE TIME SCHEDULE.

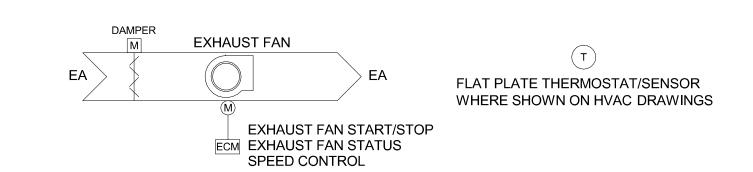
THE CONTROLLER SHALL MONITOR THE ROOM TEMPERATURE AND PROVIDE SIGNAL TO THE UNIT HEATER TO HEAT THE SPACE. HEATING SETPOINT - 50°F (ADJ.) RANGE + OR - 3°F.

ALARMS SHALL BE PROVIDED AS FOLLOWS: LOW ROOM TEMP: IF THE ROOM TEMPERATURE IS LESS THAN 40°F (ADJ.).

ELECTRIC UNIT HEATER				Points					
Point Name	Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
Schedule					Х			Х	
Unit Heater Status				Х		Х			
Space Temperature	Х					Х		Х	
Low Temperature							Х	Х	

ELECTRIC UNIT HEATER

MB902 SCALE: NONE



SEQUENCE OF OPERATION - EXHAUST FANS (EF-B-01, EF-B-02)

RUN CONDITIONS - SCHEDULED: THE FAN SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES: COOLING MODE - WHEN THE SPACE EXCEEDS 85 DEG F THE FAN SHALL START AND RUN UNTIL THE SPACE TEMPERATURE DROPS BELOW 80 DEG F.

THE EXHAUST FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN PER THE SCHEDULE.

THE CONTROLLER SHALL MONITOR THE FAN STATUS.

THE CONTROLLER OPEN THE TWO POSITION DAMPER PRIOR TO STARTING THE FAN. DAMPER SHALL BE CLOSED WHEN THE FAN IS OFF. DDC SHALL MONITOR THE DAMPER POSITION.

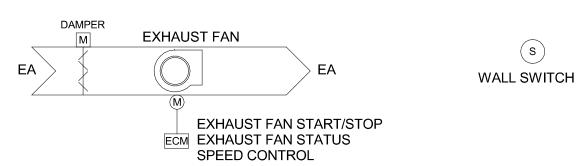
THE CONTROLLER SHALL ALLOW SPEED ADJUSTMENT OF THE ECM MOTOR TO SET AIRFLOW. THE FAN SPEED SHALL BE MONITORED.

 FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FANS	Points								
Point Name	Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
Exhaust Fan Start/Stop				X				Х	
Exhaust Fan Status			Х			Х		Х	
Exhaust Fan Speed Adjust		Х						Х	
Exhaust Fan Speed	X							Х	
Space Temperature	X					Х		Х	
Damper			Х	Х				Х	
Schedule					Х			X	
Fan Failure							Х	Х	
Fan In Hand							Х	Х	

EXHAUST FAN - SCHEDULED WITH THERMOSTAT

MB902 SCALE: NONE



SEQUENCE OF OPERATION - EXHAUST FANS (EF-B-03)

RUN CONDITIONS - WALL SWITCH: THE FAN SHALL RUN WITH THE WALL SWITCH IN THE ON POSITION AND BE OFF WHEN THE WALL SWITCH IS IN THE OFF POSITION.

THE CONTROLLER SHALL MONITOR THE FAN STATUS.

THE CONTROLLER OPEN THE TWO POSITION DAMPER PRIOR TO STARTING THE FAN. DAMPER SHALL BE CLOSED WHEN THE FAN IS OFF. DDC SHALL MONITOR THE DAMPER POSITION.

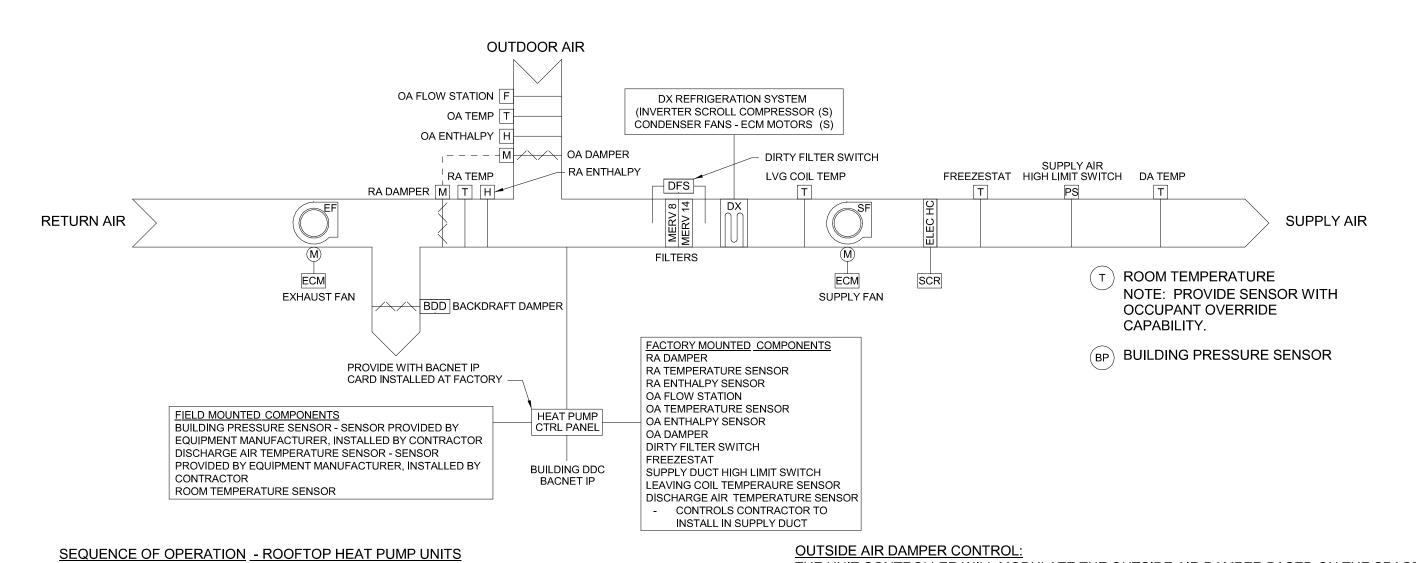
THE CONTROLLER SHALL ALLOW SPEED ADJUSTMENT OF THE ECM MOTOR TO SET AIRFLOW. THE FAN SPEED SHALL BE MONITORED.

 FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

EXHAUST FANS				Points					
Point Name	Al	AO	BI	ВО	Sched	Trend	Alarm	Graphic	Comments
Exhaust Fan Start/Stop		Х						Х	
Exhaust Fan Status			Х			Х		Х	
Exhaust Fan Speed Adjust		Х						Х	
Exhaust Fan Speed	Х							Х	
Damper			Х	Х				Х	
Wall Switch			Χ					Х	
Fan Failure							Х	Х	
Fan In Hand							Х	Х	

EXHAUST FAN - SWITCH CONTROLLED

MB902 SCALE: NONE



THE UNIT CONTROLLER WILL MODULATE THE OUTSIDE AIR DAMPER BASED ON THE SPACE CO2

1. DISCHARGE AIR CONTROL: IN THE COOLING MODE, THE UNIT CAPACITY WILL MODULATE

2. COOLING DAT RESET: THE COOLING DAT SETPOINT WILL BE RESET BY THE ROOM

AS THE RESET VARIABLE CHANGES THE DAT WILL ADJUST ACCORDING TO THE

THE ECONOMIZER DAMPERS AND THE VARIABLE SPEED COMPRESSOR IN SEQUENCE TO

MAINTAIN THE UNIT COOLING DISCHARGE AIR SET POINT. FOR MECHANICAL COOLING THE

UNIT CAPACITY WILL BE MODULATED BY THE VARIABLE SPEED COMPRESSOR OPERATION.

TEMPERATURE. A LINEAR RELATIONSHIP BETWEEN THE RETURN AIR TEMPERATURE AND

THE RESET VARIABLE WILL BE CREATED FOR THE MINIMUM AND MAXIMUM DAT SETPOINTS.

COMPARATIVE ENTHALPY SHALL BE ENGAGED WHENEVER THE OUTDOOR ENTHALPY IS LESS

SHALL BE DISABLED WITH OUTDOOR AIR TEMPERATURE IS ABOVE 75 DEG F. OUTSIDE AIR AND

RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN SUPPLY AIR TEMPERATURE SET POINT.

COOLING IS REQUIRED TO MEET THE LOAD. OUTDOOR AIR AND RETURN AIR DAMPERS SHALL

1. DISCHARGE AIR CONTROL: IN THE HEATING MODE, THE UNIT CAPACITY WILL MODULATE

POINT. UNIT CAPACITY WILL BE MODULATED BY THE VARIABLE SPEED COMPRESSOR

WHEN THE HEAT PUMP CAPACITY CANNOT SATISFY THE LOAD. SUPPLEMENTAL HEAT

TEMPERATURE. A LINEAR RELATIONSHIP BETWEEN THE DAT AND THE RESET VARIABLE

WILL BE CREATED FOR THE MINIMUM AND MAXIMUM DAT SETPOINTS. AS THE RESET

DETERMINES FROST BUILD UP. DURING THE DEFROST CYCLE THE UNIT WILL REVERSE THE

PROVIDE FREEZESTAT AND A HARDWIRED UNIT SHUTDOWN IF FREEZESTAT TRIPS. INITIAL

INDOOR AND OUTDOOR COIL OPERATION TO SEND HOT GAS TO THE OUTDOOR COIL. DURING

SHALL BE LOCKED OUT WHEN OUTDOOR TEMPERATURE IS ABOVE 40 DEG F.

2. HEATING DAT RESET: THE HEATING DAT SETPOINT WILL BE RESET BY THE ROOM

VARIABLE CHANGES THE DAT WILL ADJUST ACCORDING TO THE RELATIONSHIP.

DEFROST WILL BE ACTIVATED WHEN A FACTORY MOUNTED TEMPERATURE SENSOR

DEFROST MODE THE ELECTRIC HEATING COIL WILL BE UTILIZED.

OPERATION. THE ELECTRIC HEATING COIL WILL PROVIDE THE SECOND STAGE OF HEAT

THE VARIABLE SPEED COMPRESSOR TO MAINTAIN THE UNIT HEATING DISCHARGE AIR SET

THAN THE RETURN AIR ENTHALPY TO UTILIZE OUTSIDE AIR FOR COOLING. ECONOMIZER

ECONOMIZER COOLING SHALL BE THE FIRST STAGE OF COOLING. ECONOMIZER SHALL BE

CONFIGURED TO ALLOW PARTIAL COOLING OPERATION WHEN ADDITIONAL MECHANICAL

BE CONFIGURED TO PROVIDE UP TO 100% OUTDOOR AIR FOR COOLING.

SENSOR, EXCEPT WITH THE UNIT IS IN ECONOMIZER MODE.

RELATIONSHIP.

DEFROST CONTROL:

FREEZE PROTECTION:

SETPOINT IS 36 DEG F

1. ROOFTOP HEAT PUMP SYSTEM WITH SUPPLY FAN AND POWERED EXHAUST FAN (IF EQUIPPEDONTROLLED BY ECM MOTORS, DX REFRIGERATION SYSTEM WITH VARIABLE SPEED INVERTER COMPRESSORS AND CONDENSER FANS WITH ECM MOTORS, 0-100% ECONOMIZER WITH COMPARATIVE ENTHALPY CONTROL, MERVEREFILTER SECTION, AND ELECTRIC HEATING COIL WITH SCR CONTROL.

2. PROVIDE WITH FACTORY INSTALLED CO MPONENTS AS INDICATED. 3. PROVIDE WITH FIELD INSTALLED COMPONENTS AS INDICATED.

4. ALL SETPOINTS SHALL BE ADJUSTABLE. 5. DDC CONTRACTOR SHALL PROVIDE ALL CONTROL COMPONENTS THAT ARE NOT FACTORY INSTALLED AND ALL CONTROL WIRING AND PROGRAMMING FOR A COMPLETE

6. DDC CONTRACTOR SHALL PROVIDE BACNET INTEGRATION AND FRONT END GRAPHICS.

OCCUPIED MODE - FANS, DAMPERS, AND HEATING COOLING EQUIPMENT OPERATE PER

2. UNOCCUPIED MODE - FANS AND HEATING COOLING EQUIPMENT OFF, OUTDOOR AIR DAMPER CLOSED.

UNIT CONTROLS:

WARM-UP AND COOL DOWN - REFERENCE OPTIMAL START SEQUENCE BELOW.

1. BUILDING AUTOMATION SYSTEM (BAS) INTERFACE. PROVIDE WITH FACTORY INSTALLED CONTROLLER WITH BACNET COMMUNICATION CARD.

2. HEAD PRESSURE CONTROL: THE CONDENSER HEAD PRESSURE WILL BE MONITORED BY THE UNIT CONTROLLER TO MAINTAIN HEAD PRESSURE AND THE COMPRESSOR OPERATING ENVELOPE AT ALL TIMES TO AVOID HIGH PRESSURE TRIPS ON HIGH LOAD DAYS. CONDENSER FANS WITH ECM MOTORS SHALL BE PROVIDED AS WELL AS FACTORY

SENSORS TO PROVIDE THIS PROTECTION. 3. COMPRESSOR ENVELOPE CONTROL: THE UNIT CONTROLLER WILL CONTINUALLY MONITOR THE SUCTION AND DISCHARGE PRESSURE AND TEMPERATURE CONDITIONS DURING COMPRESSOR OPERATION. THE UNIT WILL MODULATE THE COMPRESSOR, CONDENSER HEAD PRESSURE, AND ELECTRONIC EXPANSION VALVE TO MAINTAIN A SAFE COMPRESSOR OPERATING CONDITIONS TO ADD RELIABILITY, AND LIMIT UNIT SHUT DOWN DURING FRINGE

CHANGE OVER SETPOINTS:

OPERATING CONDITIONS

RETURN AIR TEMPERATURE SHALL DRIVE THE CHANGE OF UNIT STATES. THE UNIT STATE WILL CHANGE FROM COOLING, FAN ONLY OR HEATING BASED ON THE CHANGEOVER HEATING OR COOLING SETPOINTS.

1. OCCUPIED SETPOINTS: 70 DEG F - HEATING, 75 DEG F - COOLING. 2. UNOCCUPIED SETPOINTS: 60 DEG F - HEATING, 85 DEG F - COOLING. UNIT OUTSIDE AIR

DAMPERS SHALL BE CLOSED AND THE SYSTEM SHALL START UP AND RECIRCULATE AIR UNTIL ROOM TEMPERATURE IS 3 DEG F ABOVE THE HEATING SETPOINT OR 3 DEG F BELOW THE COOLING SETPOINT.

3. CONSULT WITH PIERCE COUNTY FOR SCHEDULE TIME FRAMES.

OPTIMAL START - MORNING WARM-UP AND COOL-DOWN THE CONTROLLER SHALL USE START UP HISTORY, OUTDOOR AIR TEMPERATURE, AND SPACE TEMPERATURE TO DETERMINE THE OPTIMAL TIME FOR THE SYSTEM TO START. THE OUTDOOR AIR DAMPER SHALL BE CLOSED AND THE SYSTEM SHALL BE IN RECIRCULATION MODE.

THE HEAT PUMP WILL BE FACTORY SUPPLIED WITH A DIRECT DRIVE SUPPLY FAN WITH AN ECM MOTOR. THE SUPPLY FAN WILL OPERATE CONTINUOUSLY BETWEEN A SPECIFIED MINIMUM AND MAXIMUM SPEED. THE UNIT WILL MODULATE THE SUPPLY FAN BETWEEN THE MINIMUM AND MAXIMUM BASED ON HOW NEAR OR FAR THE ROOM TEMPERATURE IS AWAY FROM SETPOINT. REFERENCE THE ABOVE FOR OCCUPIED AND UNOCCUPIED SETPOINTS. THE MINIMUM SPEED SHALL BE INITIALLY SET FOR 50 PERCENT OF THE SCHEDULED DESIGN

THE POWERED EXHAUST FAN WILL BE DIRECT DRIVE WITH AN ECM MOTOR . THE FAN WILL BE

CONTROLLED BY BASED ON SPACE PRESSURE COMPARED TO AMBIENT. INITIAL SETPOINT SHALL BE 0.03 INCHES WG.

ROOFTOP HEAT PUMPS Point Name Al AO BI BO Sched Trend Alarm Graphic Comments System Scheduling X Coordinate with Owner Exhaust Fan Start/Stop Exhaust Fan Status Exhaust Fan Speed XX Χ Return Air Damper Return Air Temperature Return Air Enthalpy Outdoor Airflow Outdoor Airflow Setpoint Outdoor Air Temperature Outdoor Air Enthalpy Outdoor Air Damper XX Dirty Filter Switch Χ DX Heating Status DX Heating Enable DX Cooling Status DX Cooling Enable Compressor Hours Economizer Status Economizer Hours Defrost Status X X X Leaving DX Coil Temperature Supply Fan Start/Stop X X X Supply Fan Status Supply Fan Speed Electric Heating Enable Electric Heating Status XX XX Supply Air High Limit Switch Discharge Air Temperature Discharge Air Temperature Setpoint X X X Room Temperature X X Room Temperature Setpoint X X X Building Pressure Sensor Χ Building Pressure Sensor Setpoint DDC CONTRACTOR SHALL PROVIDE ALL POINTS DIRECTLY OR VIA BACNET INTEGRATION WITH THE HEAT PUMPS CONTROL PANEL. DDC CONTRACTOR SHALL PROVIDE ADDITIONAL SENSORS, COMPONENTS, AND CONTROL PANELS FOR POINTS NOT AVAILABLE THROUGH BACNET INTEGRATION.

ROOFTOP HEAT PUMPS

MB902 SCALE: NONE





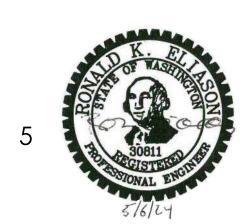
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MECHANICAL CONTROL DIAGRAMS **SEQUENCE** OF **OPERATIONS**

CITY OF FEDERAL

FEDERAL WAY, WASHINGTON

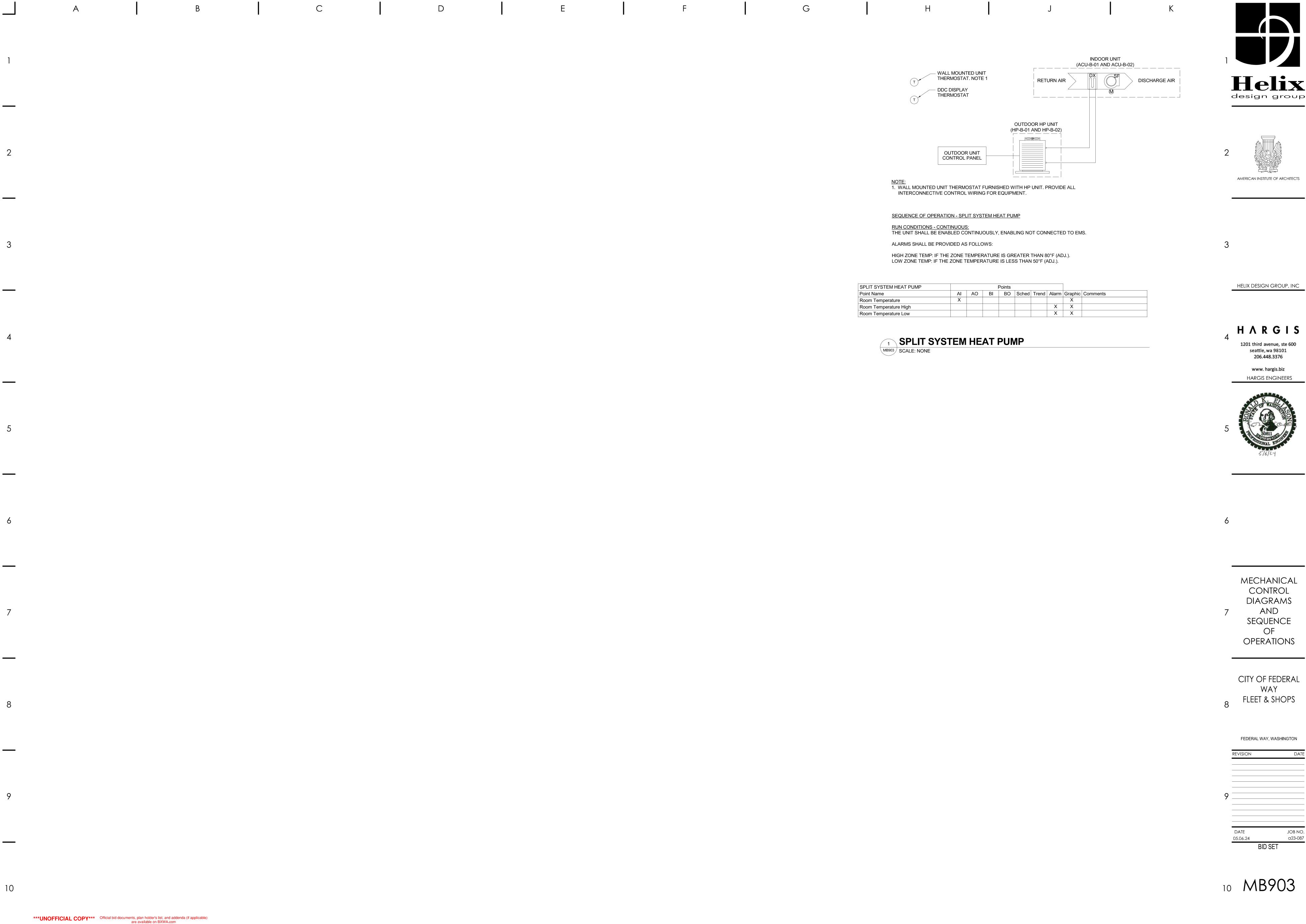
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MECHANICAL DIAGRAMS SEQUENCE **OPERATIONS**

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