



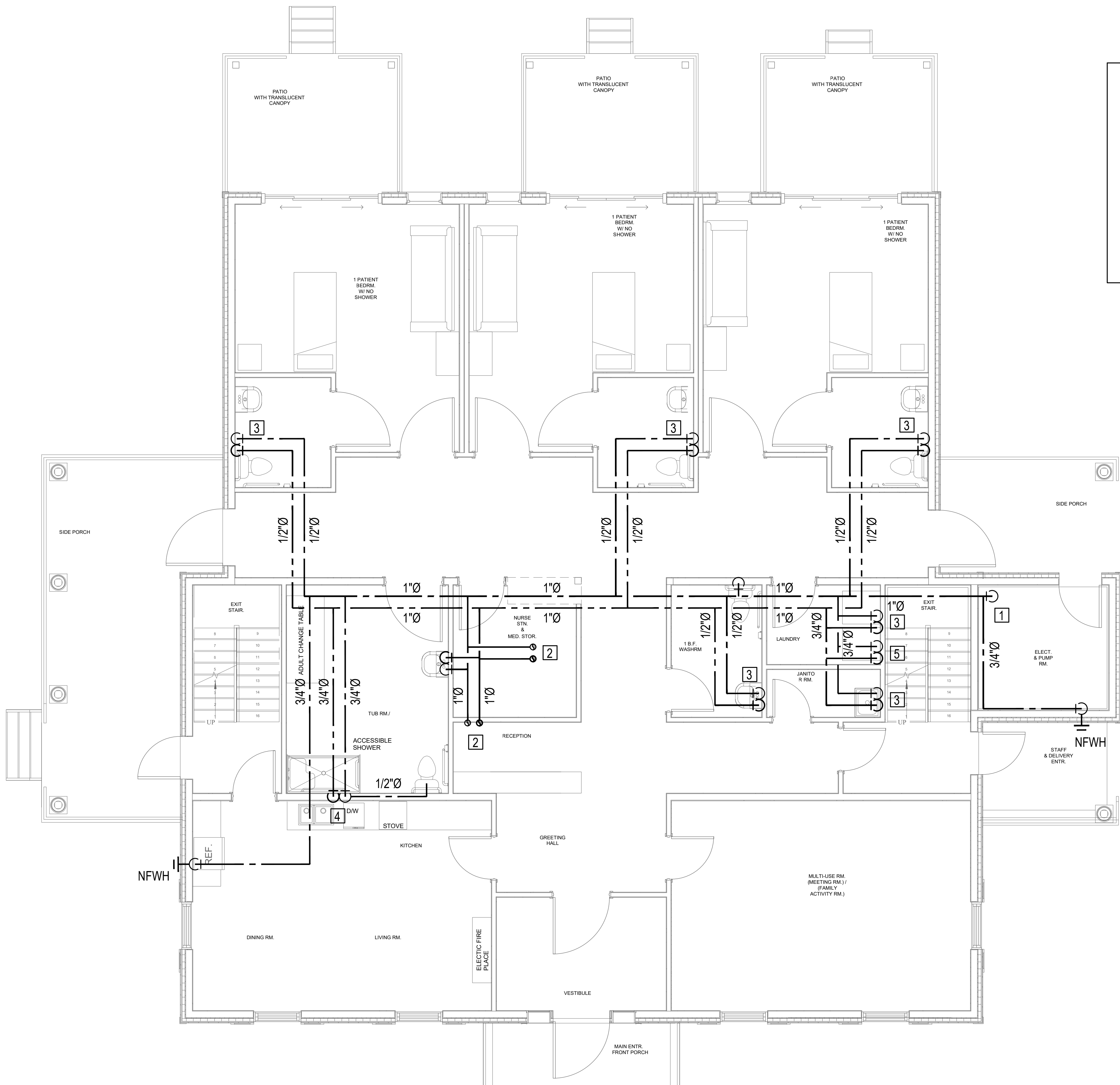
KEYED NOTES:

- 1 CONNECT CONDENSATE DRAIN FROM SPLIT AC UNIT UNDERGROUND TO FLOOR DRAIN.
- 2 CONNECT CONDENSATE DRAIN FROM SPLIT AC UNIT UNDERGROUND TO FLOOR DRAIN.
- 3 4"Ø SANITARY STACK DOWN BELOW GRADE c/w C.O.
- 4 STANDPIPE FOR WASHER DISCHARGE.
- 5 CONNECT DRAIN TO SITE SERVICE PROVISION. COORDINATE INVERT AND LOCATION PRIOR TO ANY WORK. SUPPLY AND INSTALL BWV AND COVERED BY THERMAL INSULATION AS REQUIRED.
- 6 4"Ø STACK FOR FUTURE.
- 7 PROVIDE 2"Ø SANITARY CONNECTION FOR DISHWASHER.

NOTES:

ALL UNDERGROUND SANITARY PIPING SHALL BE 4"Ø UNLESS SPECIFIED OTHERWISE.

COMPLETE VENTING PER N.P.C.



KEYED NOTES:

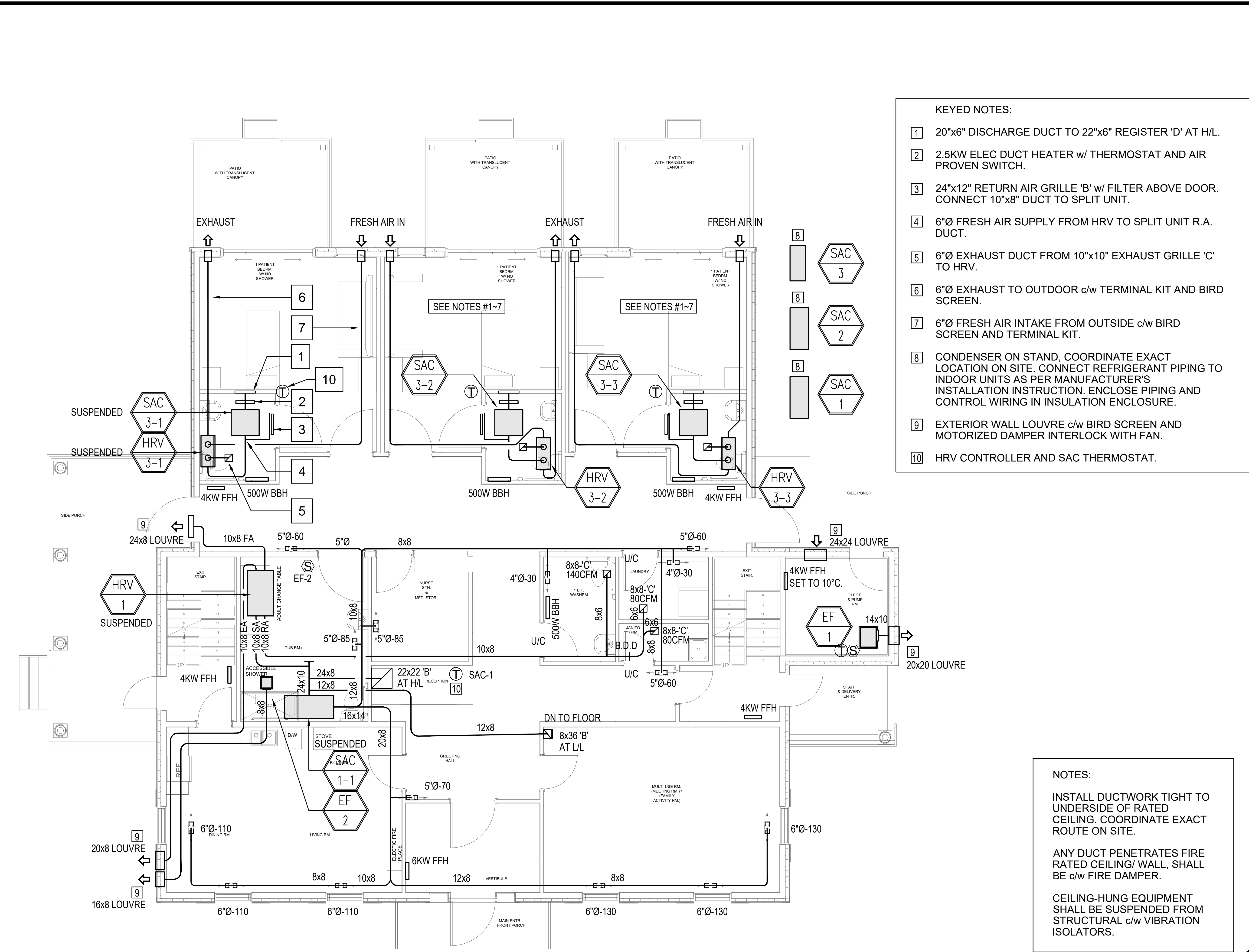
- 1 INCOMING WATER BY OTHER.
- 2 1"Ø H&CW UP TO 2ND FLOOR.
- 3 1/2"Ø H&C.W. TO SERVE FIXTURES.
- 4 1/2"Ø H&C.W. TO EACH FIXTURE. PROVIDE 1/2"Ø H.W. FOR DISHWASHER.
- 5 1/2"Ø H&C.W. PROVISION FOR WASHER.

NOTES:

INSTALL PIPE AS HIGH AS POSSIBLE.

PIPE TO BE INSULATED TO INSULATION SCHEDULE.

OFFSET PIPING AS REQUIRED TO SUIT SITE CONDITION AND AVOID CONFLICT WITH OTHER SYSTEMS.



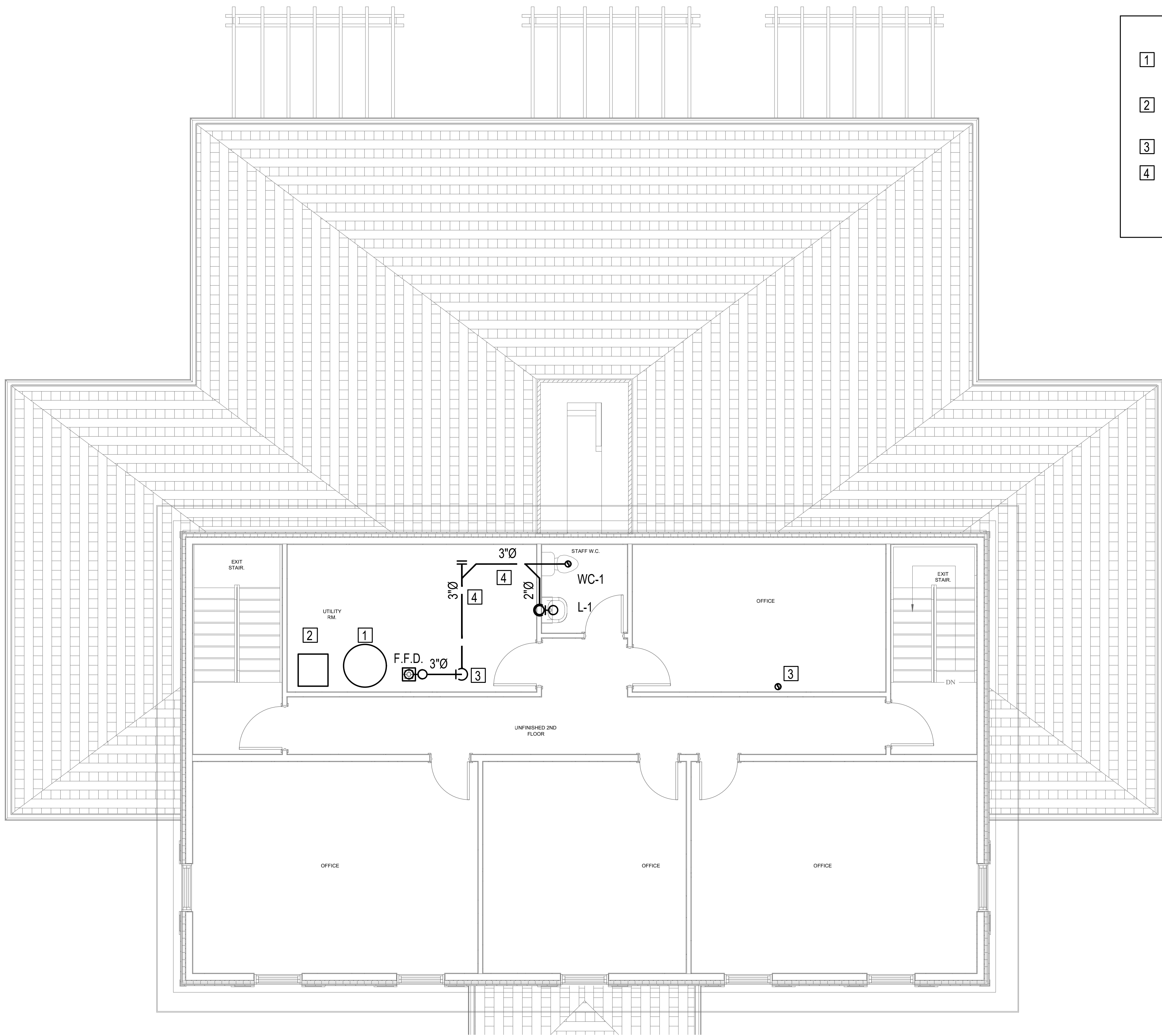
- KEYED NOTES:
- 1 20"x6" DISCHARGE DUCT TO 22"x6" REGISTER 'D' AT H/L.
 - 2 2.5KW ELEC DUCT HEATER w/ THERMOSTAT AND AIR PROVEN SWITCH.
 - 3 24"x12" RETURN AIR GRILLE 'B' w/ FILTER ABOVE DOOR. CONNECT 10"x8" DUCT TO SPLIT UNIT.
 - 4 6"Ø FRESH AIR SUPPLY FROM HRV TO SPLIT UNIT R.A. DUCT.
 - 5 6"Ø EXHAUST DUCT FROM 10"x10" EXHAUST GRILLE 'C' TO HRV.
 - 6 6"Ø EXHAUST TO OUTDOOR c/w TERMINAL KIT AND BIRD SCREEN.
 - 7 6"Ø FRESH AIR INTAKE FROM OUTSIDE c/w BIRD SCREEN AND TERMINAL KIT.
 - 8 CONDENSER ON STAND, COORDINATE EXACT LOCATION ON SITE. CONNECT REFRIGERANT PIPING TO INDOOR UNITS AS PER MANUFACTURER'S INSTALLATION INSTRUCTION. ENCLOSE PIPING AND CONTROL WIRING IN INSULATION ENCLOSURE.
 - 9 EXTERIOR WALL LOUVRE c/w BIRD SCREEN AND MOTORIZED DAMPER INTERLOCK WITH FAN.
 - 10 HRV CONTROLLER AND SAC THERMOSTAT.

NOTES:

INSTALL DUCTWORK TIGHT TO UNDERSIDE OF RATED CEILING. COORDINATE EXACT ROUTE ON SITE.

ANY DUCT PENETRATES FIRE RATED CEILING/ WALL, SHALL BE c/w FIRE DAMPER.

CEILING-HUNG EQUIPMENT SHALL BE SUSPENDED FROM STRUCTURAL c/w VIBRATION ISOLATORS.

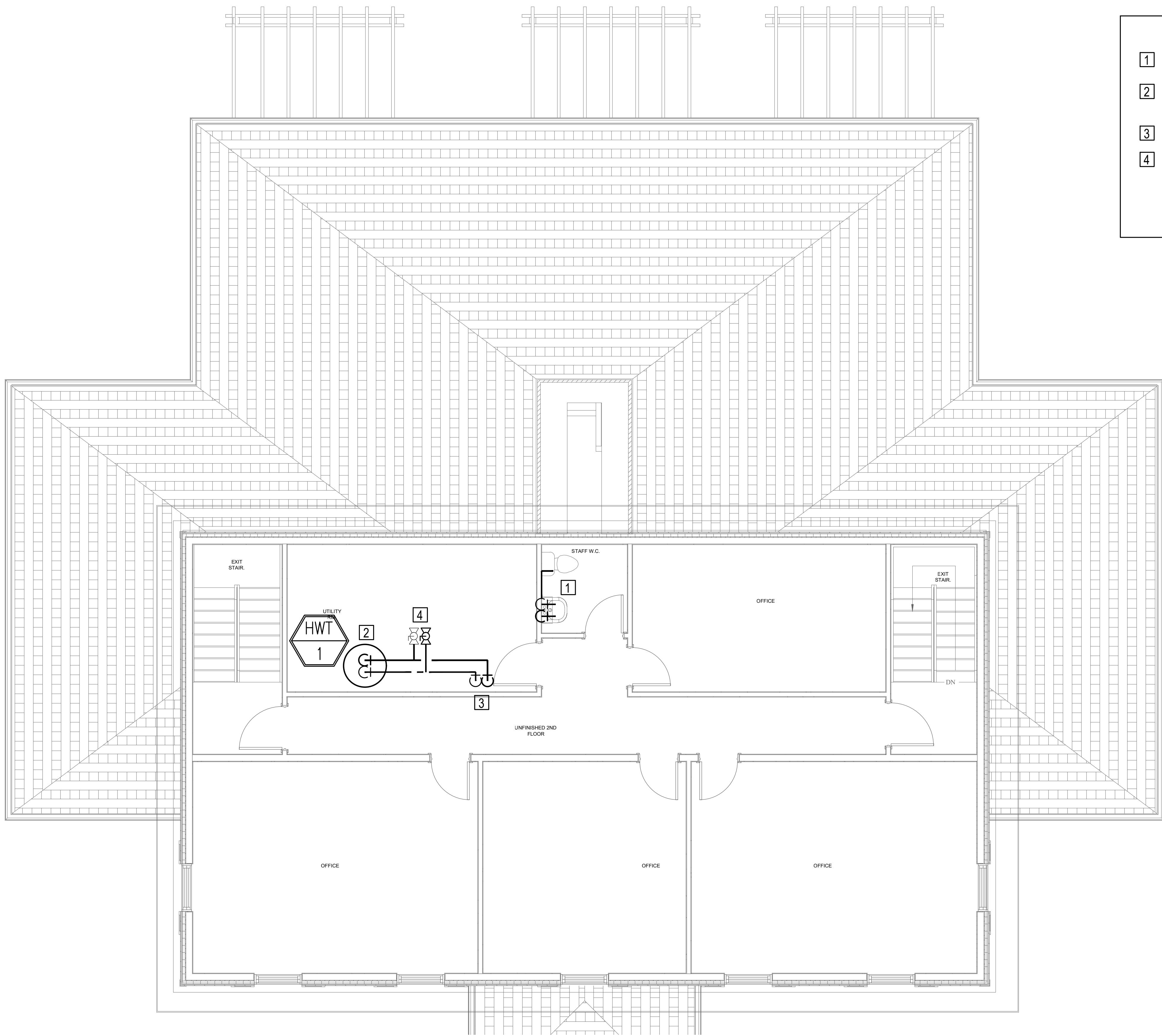


KEYED NOTES:

- 1 HOT WATER TANK PIPE RELIED TO FUNNEL FLOOR DRAIN.
- 2 CONNECT CONDENSATE DRAIN FROM SPLIT AC UNIT TO FUNNEL FLOOR DRAIN.
- 3 4"Ø SANITARY STACK BELOW.
- 4 DRAIN PIPE UNDER SLAB AS HIGH AS POSSIBLE.

NOTES:

COMPLETE VENTING PER N.P.C.



KEYED NOTES:

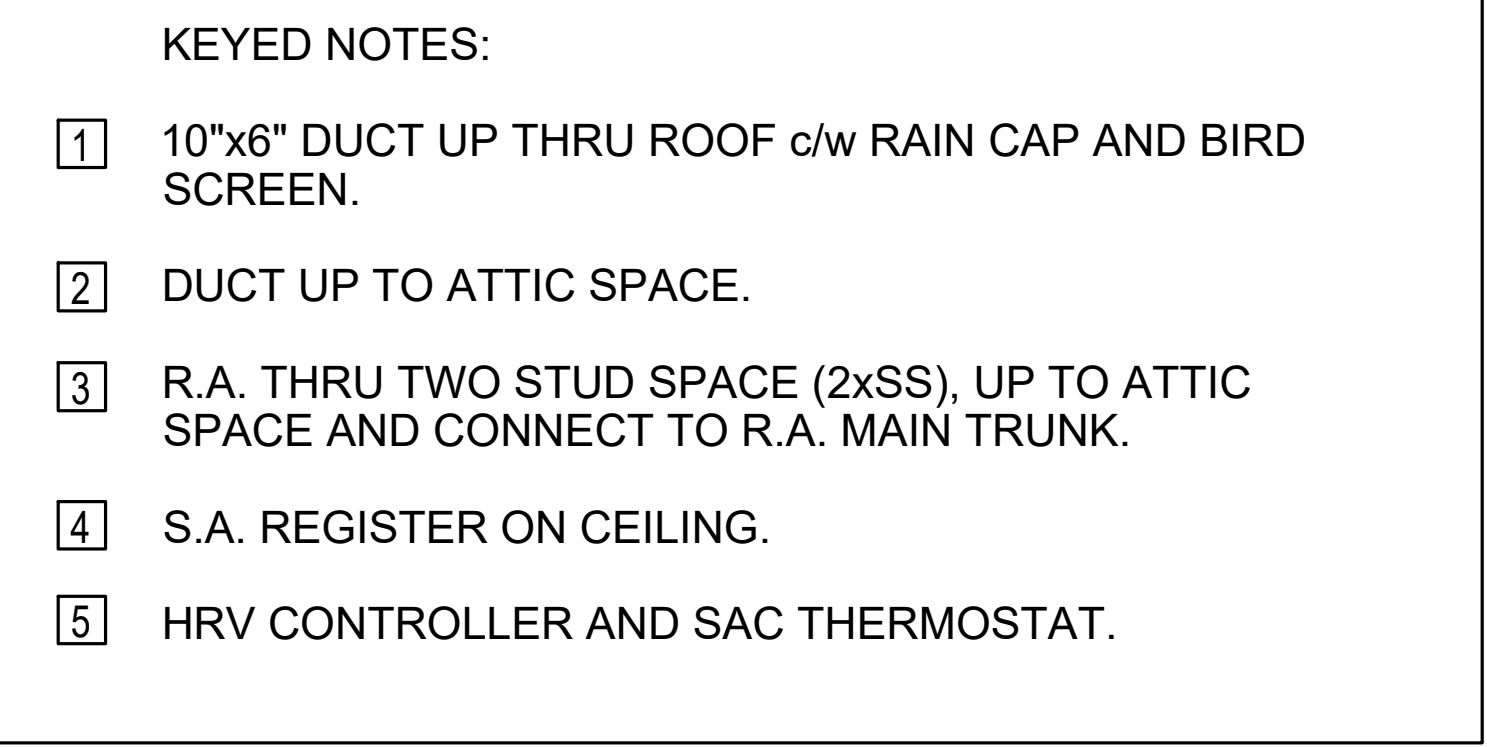
- 1 1/2"Ø H&C.W. FROM BELOW TO SERVE FIXTURES.
- 2 HOT WATER TANK ON FLOOR STAND. CONNECT 1"Ø H&C.W.
- 3 1"Ø H&C.W. DOWN TO GROUND FLOOR.
- 4 3/4"Ø H&C.W. VALVED FOR FUTURE.

NOTES:

INSTALL PIPE AS HIGH AS POSSIBLE.

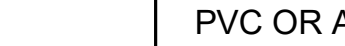
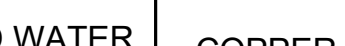
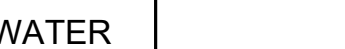
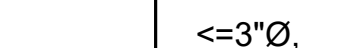
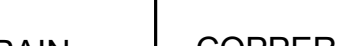
PIPE TO BE INSULATED TO INSULATION SCHEDULE.

OFFSET PIPING AS REQUIRED TO SUIT SITE CONDITION AND AVOID CONFLICT WITH OTHER SYSTEMS.



CEILING-HUNG EQUIPMENT
SHALL BE SUSPENDED FROM
STRUCTURAL c/w VIBRATION
ISOLATORS.

DIFFUSER AND GRILLE SCHEDULE		
DESIGNATION	TYPE	DESCRIPTION
A	CEILING MOUNTED REGISTER	RESIDENTIAL TYPE CEILING REGISTER WITH BOOT AND BALANCING DAMPER (ACCESS FROM GRATE).
B	EGGCRATE RETURN AIR GRILLE	E.H.PRICE MODEL 80 RETURN GRILLE, 1/2"x1/2"x1/2" EGGCRATE GRILLE. TYPE NF FRAME FOR T-BAR. 1-1/4" FLAT SURFACE MOUNTED TYPE F w/ COUNTERSUNK SCREWHOLES TYPE A FOR DRYWALL CEILING.
C	EGGCRATE EXHAUST AIR GRILLE	E.H.PRICE MODEL 80D EXHAUST GRILLE, 1/2"x1/2"x1/2" ALUMINUM EGGCRATE GRID CORE c/w O.B. DAMPER.
NOTES: ALL COLOR TO BE B12 WHITE POWDER COAT FINISH, VERIFY WITH ARCHITECTURAL SPECIFICATION. ACCEPTABLE ALTERNATES: NAILOR, TITUS.		

PIPING SCHEDULE		
SYMBOL	ITEM	DESCRIPTION
	ABOVE FLOOR SANITARY DRAINS	<=3"Ø, COPPER GRADE DWV. URINAL DRAIN PIPING SHALL BE CAST IRON. >3"Ø, CAST IRON WITH MECHANICAL JOINTS.
	BURIED SANITARY DRAINS	PVC OR ABS. TO MINIMIZE CRUSHING DAMAGE, USE SCH.40 PVC FROM BASE OF RWL TO 10 FEET AWAY.
 	DOMESTIC COLD WATER DOMESTIC HOT WATER	COPPER L WITH SOLDERED FITTINGS.
	VENT	<=3"Ø, COPPER GRADE DWV. >3"Ø, CAST IRON WITH MECHANICAL JOINTS.
	CONDENSATE DRAIN	COPPER L WITH SOLDERED FITTINGS.

INSULATION SCHEDULE	
ITEM	DESCRIPTION
DOMESTIC COLD WATER SYSTEM INCLUDING FITTINGS	1" THICK DUAL TEMPERATURE RIGID FIBRE GLASS INSULATION WITH FIRE RESISTANT VAPOUR BARRIER JACKET (WHITE) AND FIREPROOF ADHESIVE AT ALL JOINTS. BUTT JOINTS SHALL BE WRAPPED WITH WHITE 4" WIDE VAPOUR BARRIER STRIPS SAME MATERIAL AS JACKET. SEAL ALL LONGITUDINAL AND CIRCUMFERENTIAL JOINTS WITH ADHESIVE. THE INSULATION SHALL PASS UNBROKEN THROUGH ALL PIPE SLEEVES.
DOMESTIC HOT WATER SYSTEM INCLUDING FITTINGS	2" THICK DUAL TEMPERATURE RIGID FIBRE GLASS INSULATION WITH FIRE RESISTANT VAPOUR BARRIER JACKET (WHITE) AND FIREPROOF ADHESIVE AT ALL JOINTS. BUTT JOINTS SHALL BE WRAPPED WITH WHITE 4" WIDE VAPOUR BARRIER STRIPS SAME MATERIAL AS JACKET. SEAL ALL LONGITUDINAL AND CIRCUMFERENTIAL JOINTS WITH ADHESIVE. THE INSULATION SHALL PASS UNBROKEN THROUGH ALL PIPE SLEEVES.
REFRIGERANT PIPING	2" THICK CLOSED CELL INSULATION TYPE ARMAFLEX OR EQUAL. OUTDOOR APPLICATION: SHALL BE COMPLETE WITH SUITABLE INSULATION MINIMUM RATING R25, ARMAFLEX OR EQUAL.
VENT PIPING AT ROOF	1" THICK DUAL TEMPERATURE RIGID FIBRE GLASS INSULATION WITH FIRE RESISTANT VAPOUR BARRIER JACKET AND FIREPROOF ADHESIVE AT ALL JOINTS START FROM 12" BELOW FINISHED ROOF.
DUCTWORK PASSING THROUGH SPACE WITH NO MECHANICAL COOLING (ATTIC SPACE) AND DUCTWORK TO AND FROM ENERGY/ HEAT RECOVERY UNIT	SEAL JOINTS WITH DUCT SEALER. USE 2" RIGID FIBRE GLASS INSULATION WITH VAPOUR BARRIER. SECURE THE INSULATION USING APPROVED ADHESIVE AND BY IMPALING ON MECHANICAL FASTENERS. SEAL WITH VAPOUR BARRIER TAPE SO THAT THE VAPOUR BARRIER IS CONTINUOUS. FINISH WITH 6 OZ CANVAS JACKET AND PAINT WITH 2 COATS OF WHITE FIRE RETARDANT PAINT.
EXHAUST DUCTWORK	INSULATE FINAL 5 FEET WITH 1" ACOUSTIC LINER. JOINTS SHALL BE SEALED WITH DUCT SEALER.

General Notes:

Provide all labour, materials and equipment necessary to execute the work shown and described. Installation shall meet all applicable National, Provincial, Federal and Municipal requirements and to be in accordance with all authorities having jurisdiction.

Before submitting tenders, the contractor shall examine site, existing services and familiar himself with all drawings, notes, and phases.; submit questions to the engineer to clarify any concerns. No extra will be entertained for failure to do so.

The contractor is to obtain permits and pay all fees for works and required inspections.

Maintain Liability Insurance to protect owner and the contractor from any and all claims under the Worker's Compensation Act.

The drawings shall be considered diagrammatic only. All measurements shall be taken from building site and architect's drawings.

All materials shall confirm to NBC, CSA, HEPC and CEC requirements and shall bear CSA label.

All existing services must be maintained at all times during construction. The contractor shall provide all necessary temporary provisions to meet this requirement. After-hour work will be considered to minimize interrupt. All shall be included in the tender price.

All cutting, drilling, X-ray, and patching for mechanical work will be the responsibility of the mechanical contractor. Hire specialized trades to conduct these work.

Do all excavating and backfilling for mechanical work: Backfill from bottom of trench, around pipe and to 24" above pipe shall be clean sand, compacted mechanically in 6" layers to 95% modified proctor density. Remainder of trench shall be backfilled utilizing native material compacted in 6" layers.

Pipe hangers shall be Clevis split type with mild steel rods. For copper pipe use plastic inserts. Use oversized hangers and saddles for cold water piping. Do not support equipment, ducts or piping from ceiling panel. Supply and install necessary steel to transfer load to structural members.

Shop drawings shall be submitted to the engineer for review and approval prior to order.

Supply and install all necessary devices including flexible connections, isolators, spring hangers, sound curbs, silencers, acoustic insulations to reduce the transmission of noise and vibration.

Provide concrete or metal curbs or sleeves around all mechanical penetrations and seal all openings watertight.

All surfaces must be left clean and smooth, and ready for painting by others.

Balance all systems to quantities shown. Supply and install all necessary balancing devices to achieve design requirements. Submit a detailed report upon completion.

Piping passing through fire-rated structural shall be wrapped with two hour rated, fire resistant, ULC approved fire wrap. Provided fire dampers at all rated walls. Refer to architectural drawings for locations.

Identify all piping and duct using stencils or colour codes and directional arrows.

Identify all equipment and starters/ thermostats/control panels using Lamacoid nameplate.

Prepare and submit asbuilts when completion. Buried services must be dimensioned.

After acceptance, instruct the owner in equipment operation and provide him with operation and maintenance manuals.
Fully guarantee the entire installation from startup to one year thereafter. The mechanical contractor is to repair any faults including parts and labours at his cost.

Ductwork shall be fabricated and installed in strict accordance with the latest SMACNA standards and shall be manufactured of galvanized steel unless specified otherwise.

Where 1-1/2" radius turns on supply air duct are not possible, use double width turning vanes.

All ductwork dimensions shown on the drawings indicate clear inside dimensions. increase duct size accordingly.

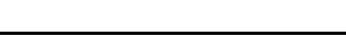
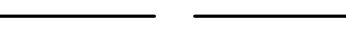
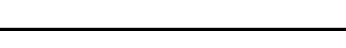
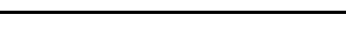
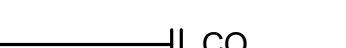
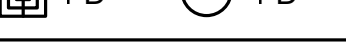
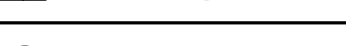
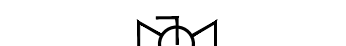
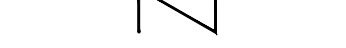
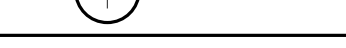
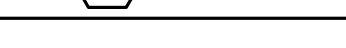
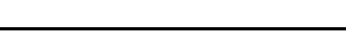
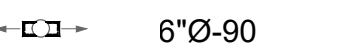
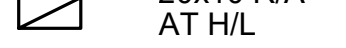
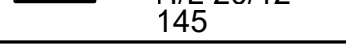
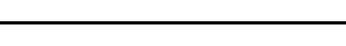
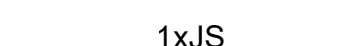
Install balancing dampers at all branch takeoffs and in other locations where necessary for system balancing.

All plumbing and drainage system shall be installed as required by the latest NBC and NPC.

All piping shall be installed as high as possible. Offset down and back-up to high level where required.

All piping shall be installed straight. Supply and install expansion devices to Codes.

Insulation as per insulation schedule.

LEGEND	
	SUSPENDED SANITARY DRAIN
	BURIED SANITARY DRAIN
	SANITARY VENT
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	CONDENSATE DRAIN
	CLEANOUT PLUG
	FLOOR CLEANOUT
	PLUMBING TRAP
	FLOOR DRAIN
	FUNNEL FLOOR DRAIN
	HUB DRAIN
	PIPE UP/ DOWN/ T-OFF AND DOWN
	BALL VALVE
	SHUT-OFF VALVE
	BACKWATER PREVENTOR
	THERMOSTAT
	STARTER/ SPEED CONTROLLER
	FIRE DAMPER
	S/A
	R/A
	E/A
	F/A
	H/L
	L/L
	CTE
	U/C
	6"Ø-90
	20x10 R/A AT H/L
	2xSS H/L 20/12 145
	DUCT UP
	DUCT DOWN, DUCT SIZE, 16"x8"
	1xSS
	1xJS

EQUIPMENT SCHEDULE:
SAC-1/ SAC-1-1: MOOVAIR MODEL MSHMB36R2AN1/ MAHMA36R4AS1, 36 MBH HTG/CLG, 27.8MBH HTG @ -30°C. 208/1/60, OUTDOOR MCA 29. INDOOR MCA 6, 1189CFM @ 0.7" ESP. c/w 8KW BUILT-IN ELEC HEATER, R454b, REFRIGERANT DETECTOR, CRANKCASE HEATER, BASE PAN HEATER, THERMOSTAT.
SAC-2/ SAC-2-1: MOOVAIR MODEL MSHMA30R2AN1/ MAHMA30R4AS1, 30 MBH HTG/CLG, 20.1MBH HTG @ -30°C. 208/1/60, OUTDOOR MCA 29.5. INDOOR MCA 6, 988CFM @ 0.7" ESP. c/w 8KW BUILT-IN ELEC HEATER, R454b, REFRIGERANT DETECTOR, CRANKCASE HEATER, BASE PAN HEATER, THERMOSTAT.
SAC-3/ SAC-3-1/2/3: MOOVAIR MODEL MXHA2742AV1 CONDENSER, 27 MBH HTG/ CLG, 14MBH HTG @ -30°C. 208/1/60, MCA 30. c/w R454b, REFRIGERANT DETECTOR, CRANKCASE HEATER, BASE PAN HEATER. THREE (3) INDOOR DUCTED UNIT MODEL GDHRA09C2AS1, 9MBH HTG/CLG, 344CFM @ 0.7" ESP c/w MINIM DRAIN PUMP, THERMOSTAT. ELEC DUCT HEATER SHOULD BE TIE INTO INDOOR DUCTED UNITS AS AUXILIARY HEAT AND SET AS FOLLOWING: THE LOGIC OF THE UNIT WILL BRING AUX HEAT ON IF ALL 3 CONDITIONS BELOW ARE MET: 1. -2°C OR GREATER DELTA BETWEEN THE T1 (ROOM TEMP) AND SET POINT. 2. T2 (INDOOR COIL TEMP) IS LESS THAN OR EQUAL TO 45°C. 3. THE INDOOR UNIT FAN IS ON.
HRV-1: LIFEBREATH MODEL350DCS, 300CFM, 0.5"WCESP. 120V, 6.3A. c/w WALL CONTROLS, FILTERS.
HRV-2: LIFEBREATH MODEL350DCS, 220CFM, 0.5"WCESP. 120V, 6.3A. c/w WALL CONTROLS, FILTERS.
HRV-3-1/2/3: LIFEBREATH MODEL100ECM, 100CFM, 0.5"WCESP. 120V. c/w WALL CONTROLS, FILTERS.
EF-1: ELEC/ PUMP ROOM VENTILATOR. CARNES MODEL VCDD090C, 800CFM, 0.25"ESP, 289W, 120/1/60, c/w REVERSE ACTING THERMOSTAT, STARTER, HANGER RODS, VIBRATION ISOLATORS, GRILLE, B.D.D.
EF-2: TUB ROOM EXHAUST. CARNES MODEL VCDD025C, 250CFM, 0.25"ESP, 169W, 120/1/60, c/w STARTER, HANGER RODS, VIBRATION ISOLATORS, GRILLE, B.D.D.
HWT-1: ELECTRIC HOT WATER TANK. RHEEM HEAVY DUTY MODEL E120, 120GAL, 9 ELEMENTS, 36KW, 240/1/60, 150A, IMMERSION THERMOSTAT. c/w T & P VALVE PIPED TO CLOSEST DRAIN.

PLUMBING FIXTURES				
PLUMBING FIXTURES	DRAIN SIZE	VENT SIZE	HW	CW
MOP SINK	3"Ø	1-1/2"Ø	1/2"Ø	1/2"Ø
LAVATORY	1-1/2"Ø	1-1/4"Ø	1/2"Ø	1/2"Ø
OTHER SINK	2"Ø	1-1/2"Ø	1/2"Ø	1/2"Ø
BATH TUB	2"Ø	1-1/2"Ø	1/2"Ø	1/2"Ø
WATER CLOSET (FT)	3"Ø	1-1/2"Ø	-	1/2"Ø
FLOOR DRAIN	3"Ø	1-1/2"Ø	-	-
PLUMBING FIXTURES ARE TO BE SPECIFIED BY THE OWNER, SUPPLIED AND INSTALLED BY THE PLUMBER.				
ALL HOT AND COLD WATER CONNECTIONS FOR PLUMBING FIXTURES SHALL BE c/w SHUT-OFF VALVES.				

HYDRAULIC LOAD (WATER SUPPLY)			
PLUMBING FIXTURE	F.U.	QTY.	TOTAL
WASHROOM	8	7	56
WASHER AND SINK	4.5	1	4.5
MOP SINK	3	1	3
DISHWASHER	4	1	4
KITCHEN SINK	3	1	3
HOSE BIBB	3	2	6
BATH TUB	2	1	2
TOTAL FU			78.5
PEAK FLOW RATE: 40 GPM			

HYDRAULIC LOAD (DRAINAGE)			
PLUMBING FIXTURE	F.U.	QTY.	TOTAL
WASHROOM	8	7	56
WASHER AND SINK	4.5	1	4.5
MOP SINK	3	1	3
DISHWASHER	4	1	4
KITCHEN SINK	3	1	3
FLOOR/HUB DRAIN	3	10	30
BATH TUB	3	1	3
TOTAL FU			103.5
MAXIMUM HYDRAULIC LOAD FOR 4"Ø SAN @ 1%: 180 F.U.			