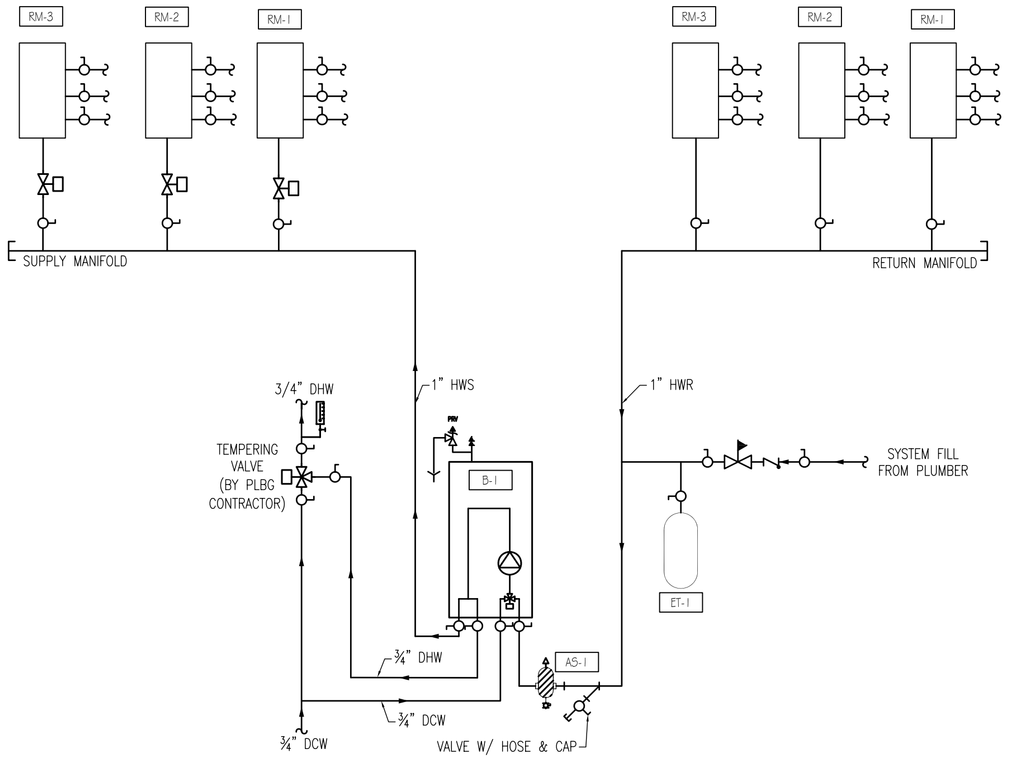

1 RESIDENCE FLOW SCHEMATIC
H0.0 N.T.S

OVERALL GOALS & OBJECTIVES

THE OVERALL DESIGN OBJECTIVE IS TO CREATE SPACES THAT ARE COMFORTABLE, HEALTHY AND SAFE FOR THE OCCUPANTS. SYSTEMS WILL BE DESIGNED TO PROVIDE HEATING, COOLING, AND VENTILATION IN AN EFFICIENT AND EFFECTIVE MANNER WHILE BEING CONSCIOUS OF THE ENVIRONMENTAL IMPACT OF DOING SO.

CODES & STANDARDS

THE FOLLOWING CODES APPLY TO THE DESIGN OF THE MECHANICAL SYSTEM:

CODES:
BUILDING CODE: 2003 IBC
MECHANICAL CODE: 2003 IMC
VENTILATION: ASHRAE 62.1–2004
ASHRAE 62.2–2004
ENERGY CODE: 2003 IECC

CLIMATE

CLIMATE DATA IS TAKEN FROM 2005 ASHRAE HANDBOOK – FUNDAMENTALS. WINTER CONDITIONS ARE TAKEN FROM THE 99.6% COLUMN AND SUMMER CONDITIONS ARE TAKEN FROM THE 0.4% COLUMN. THIS MEANS THAT HISTORIC CONDITIONS ARE COLDER OR MORE WARM AND HUMID 0.4% OF THE TIME ANNUALLY, RESPECTIVELY.

LOCATION: PORTLAND, ME

WINTER DESIGN CONDITIONS: OUTDOOR AIR DB: –1.6°F
INDOOR AIR DB: 70°F

SUMMER DESIGN CONDITIONS: OUTDOOR AIR DB: 86.7°F
MEAN COINCIDENT WB: 71.0°F
INDOOR AIR DB: 75°F

OCCUPANCY

THE BUILDING CONSISTS OF TWO DISTINCT OCCUPANCIES:

RESIDENCE

THE UPPER FLOOR OF THE BUILDING IS RESIDENTIAL SPACE. THIS ALSO INCLUDES THE LOFT/STUDY SPACE. THE EXCERCISE ROOM IS TREATED AS A BEDROOM FOR PURPOSES OF VENTILATION DESIGN.

OFFICE

THE LOWER FLOOR OF THE BUILDING IS COMMERCIAL OFFICE SPACE. THE OFFICE IS ASSUMED TO HAVE NO MORE THAN 7 EMPLOYEES AT ONE TIME.

VENTILATION

ASHRAE 62.2–2004 IS USED AS THE GUIDELINE FOR VENTILATION REQUIREMENTS IN THE RESIDENTIAL OCCUPANCY. ASHRAE 62.1–2004 IS USED AS THE GUIDELINE FOR VENTILATION REQUIREMENTS IN THE OFFICE OCCUPANCY.

RESIDENCE

TOTAL FLOOR AREA: 1280 SF
NUMBER OF BEDROOMS: 2
REQUIRED VENTILATION AIR: 45 CFM

OFFICE

			ASHRAE 62.1 2004			
Space	Area (ft²)	Known # of Occupants (by seating)	People Outdoor Air Rate (cfm/person)	Area Outdoor Air Rate (cfm/SqFt)	Outdoor Air CFM	Exhaust Air (cfm)
Entry	140	0	5	0.06	8	
Office Space	542	6	5	0.06	63	
Reception Area	208	1	5	0.06	17	
Kitchen	112	0	5	0.06	7	
Conference Room	150	4	5	0.06	29	
Storage	47	0	0	0.12	6	
Mechanical Room	45	0	0	0	0	
Bathroom	40	0	0	0	0	50
Copier/Printer Area	43	0	0	0	0	22
		11			130	72

THERMAL ENVELOPE CHARACTERISTICS SUMMARY

THE FOLLOWING ASSEMBLY R–VALUES ARE ASSUMED IN THE HEAT LOSS CALCULATIONS:

ASSEMBLY	R–VALUE
LOFT–ABOVE GRADE WALL:	29.7
OFFICE–ABOVE GRADE WALL:	23.8
CLERESTORY WALL:	28.0
PARTITION WALL:	8.2
ROOF:	54.3
SLAB:	23.8
WINDOW:	5.26

INFILTRATION 0.15 AIR CHANGES PER HOUR

HEAT LOSS & GAIN CALCULATIONS

Heating

	Area	Wall	Roof	Window	Skylight	Door	Floor	Infil.	Vent.	Total BTU/HR	BTU/HSF	Total with 20% Pickup
Office	1,350	2,289	134	1,253	0	339	5,280	2,011	3,594	**14,900**	**11.1**	**17,868**
Loft - Living Area	1,070	3,067	1,611	1,740	21	1,165	0	2,252	1,241	**11,097**	**10.4**	**13,316**
Loft - Master Bedroom	200	1,213	267	406	21	0	0	421	1,248	**3,620**	**18.1**	**4,344**
										29,682	**11.3**	**35,618**

Cooling

	Area	Wall	Roof	Window	Skylight	Door	Floor	Infil.	Vent.	Light	Elec.	People	Total BTU/HR	Total with 10% Pickup	Tons	SF/Ton
Office	1,350	419	73	2,938	0	661	0	369	1,010	3,664	2,303	3,150	**14,507**	**15,958**	**1.3**	**1,015**
Loft - Living Area	1,070	771	1,336	3,797	2	1,095	0	568	464	2,920	1,825	1,100	**13,898**	**15,288**	**1.3**	**840**
Loft - Master Bedroom	200	230	235	1,292	0	0	0	91	370	546	0	1,100	**3,864**	**4,250**	**0.4**	**565**
													32,269	**35,496**	**3.0**	

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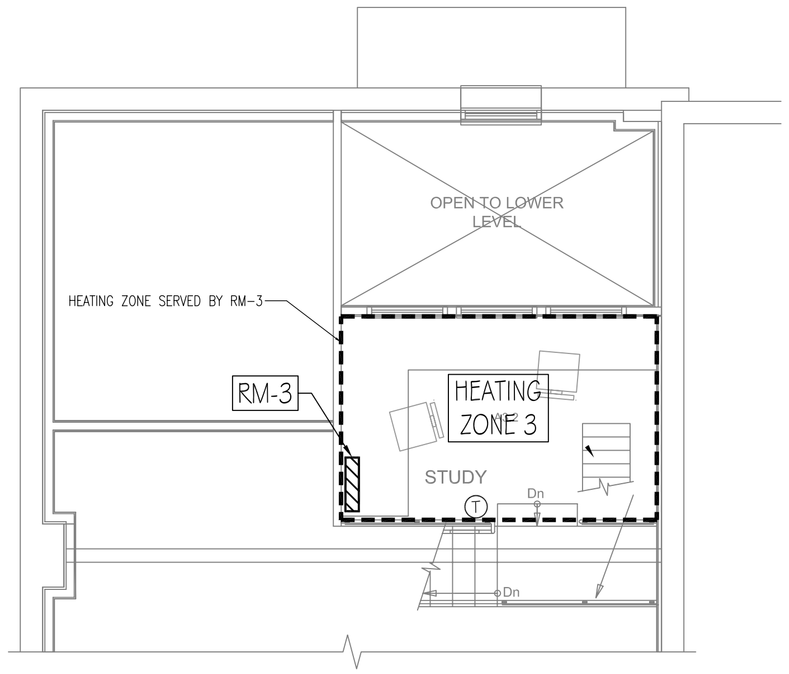
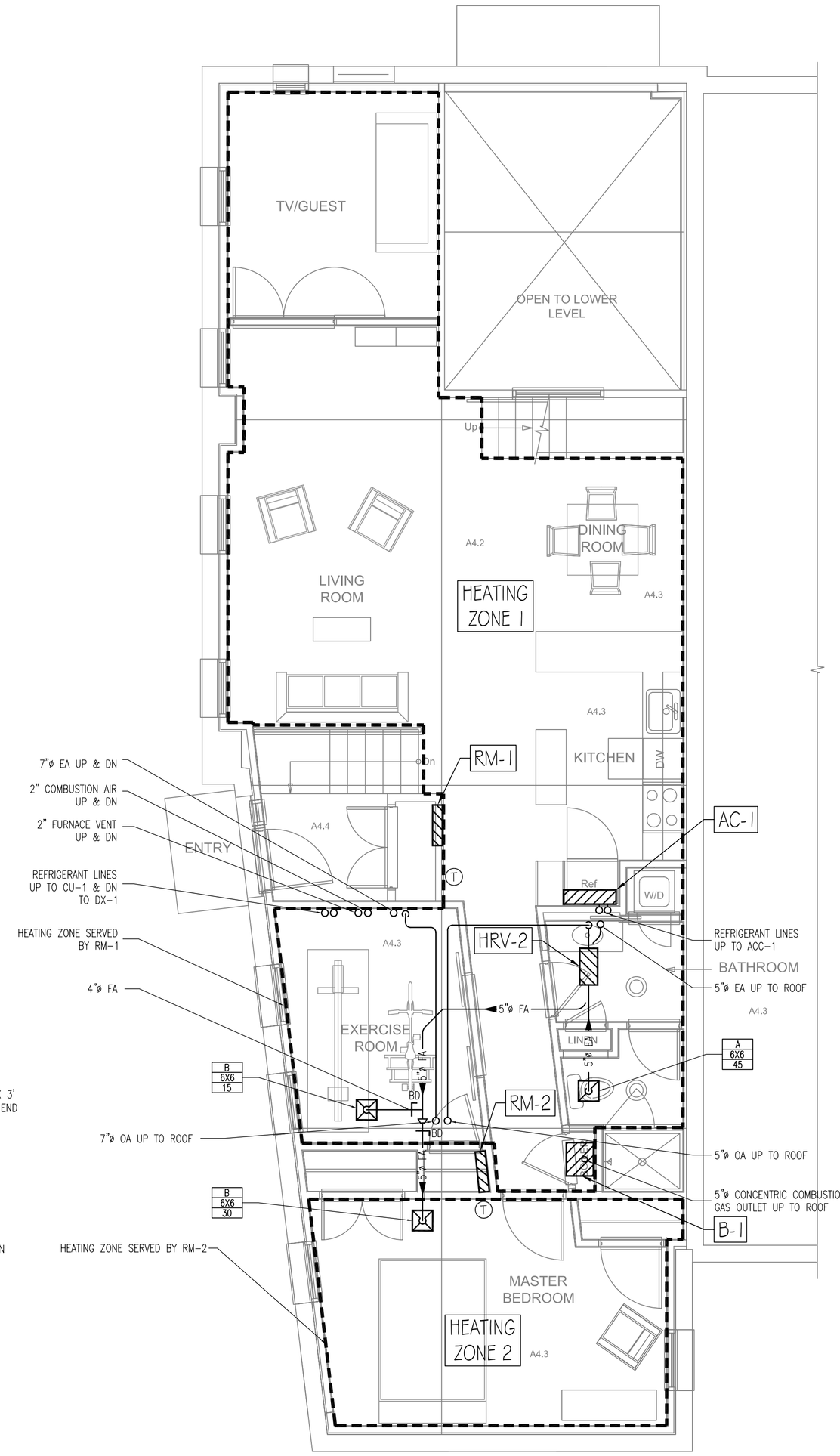
HVAC BASIS OF DESIGN
Drawn by: JDS
Scale: N.T.S
Date: 12/20/06
File Name:
Project No. 0630
Revised:

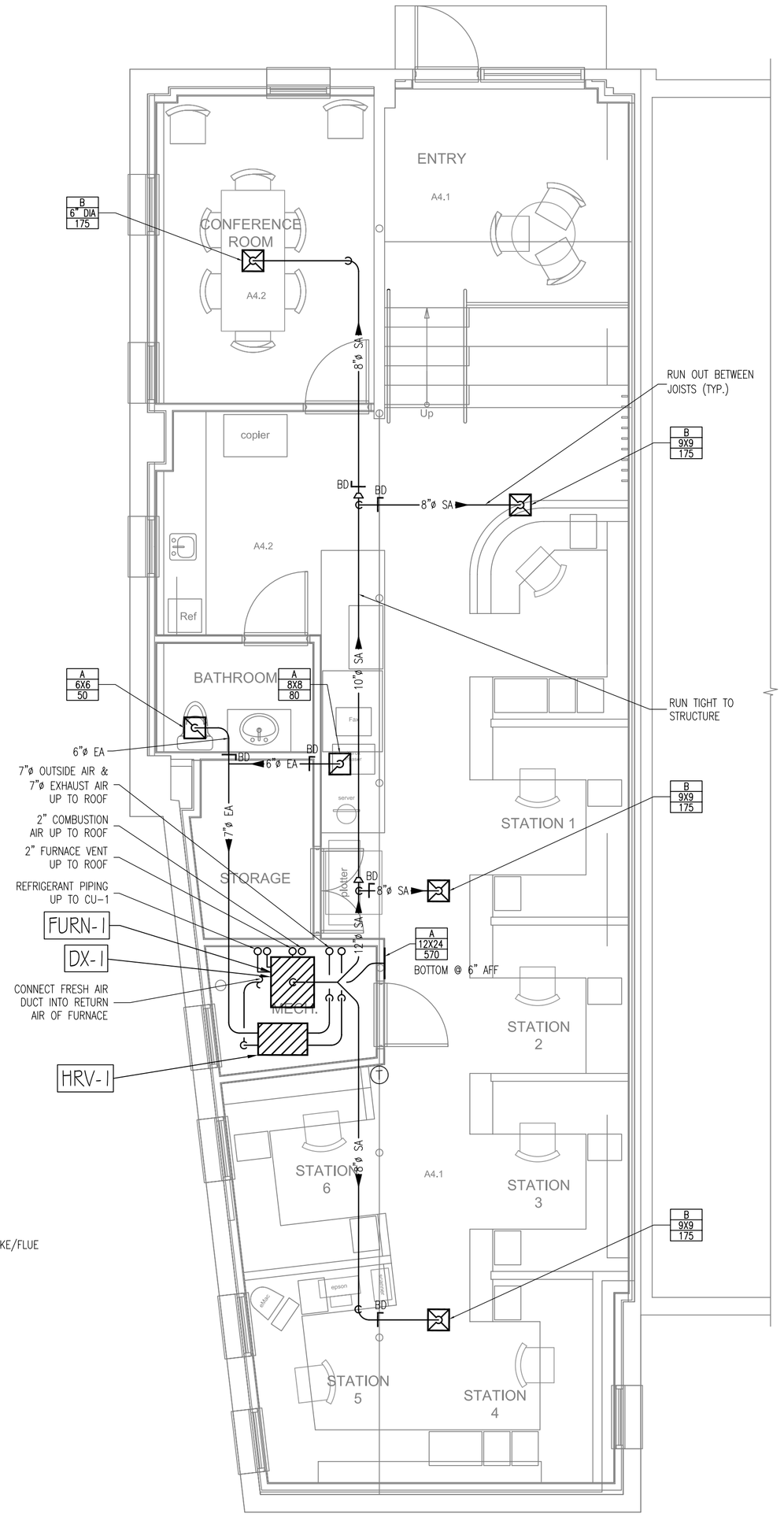
H0.0



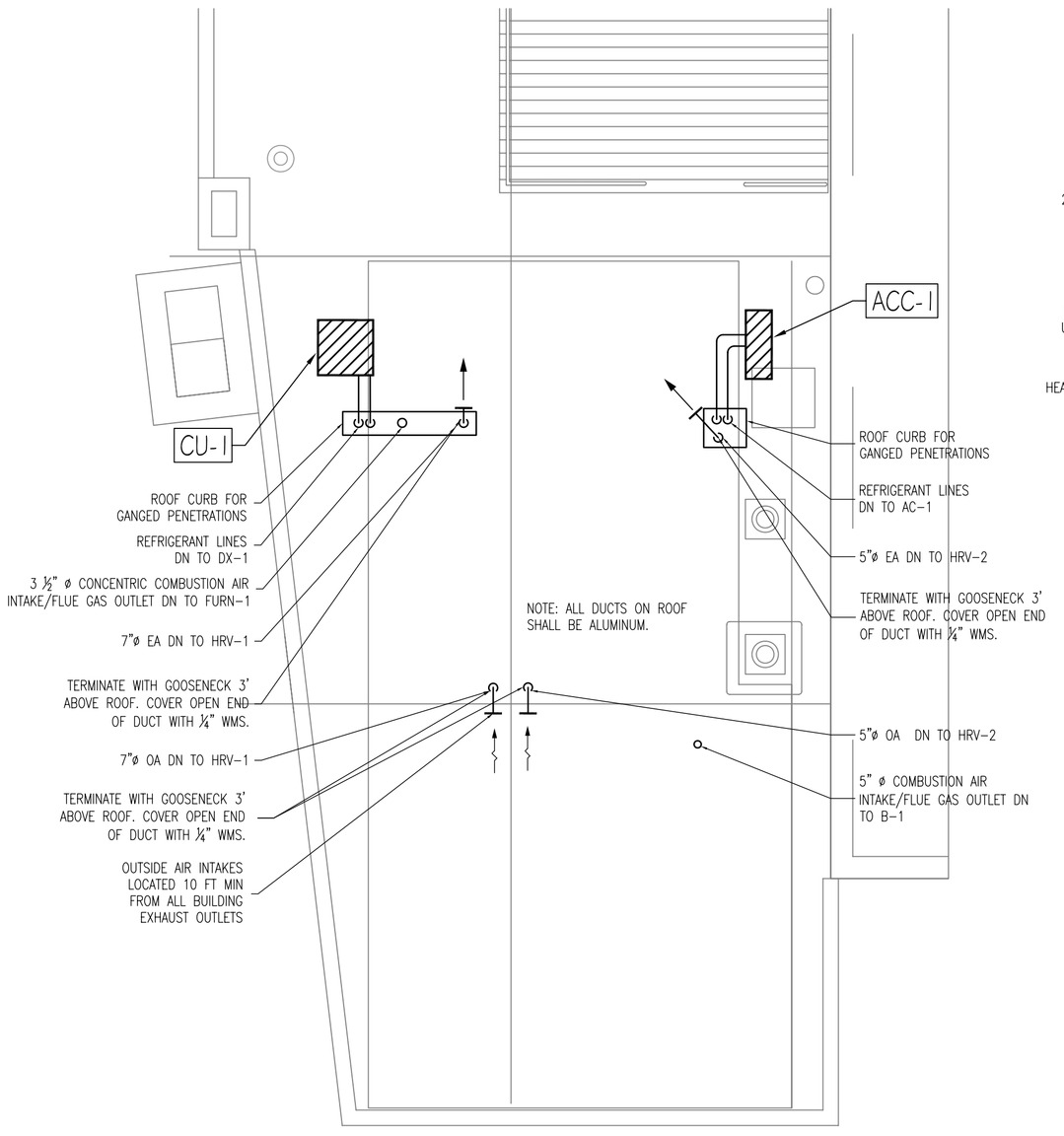
4 H1.1 LOFT/STUDY HVAC PLAN
1/4" = 1'-0"



2 H1.1 UPPER FLOOR HVAC PLAN
1/4" = 1'-0"



1 H1.1 LOWER FLOOR HVAC PLAN
1/4" = 1'-0"



3 H1.1 ROOF HVAC PART PLAN
1/4" = 1'-0"

TN
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HVAC FLOOR PLAN

Drawn by: JDS
Scale: AS NOTED
Date: 12/20/06
File Name:
Project No. 0630
Revised:

H1.1

GENERAL SPECIFICATIONS:

1. WORK INCLUDED
IT IS THE INTENT OF THESE DRAWINGS THAT ALL NECESSARY MECHANICAL COMPONENTS BE INCLUDED FOR COMPLETE HVAC SYSTEMS AS SHOWN.

2. COMPLETE SYSTEM
IT IS NOT THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EVERY ITEM NECESSARY FOR COMPLETE SYSTEMS BE SHOWN. THE CONTRACTOR'S WORK SHALL INCLUDE INSTALLATION OF ALL ITEMS REQUIRED FOR A HIGH QUALITY, COMPLETE INSTALLATION. INFORMATION PROVIDED IN OTHER SPECIFICATION SECTIONS WHICH RELATE TO THE CONTRACTOR'S WORK SHALL BE FOLLOWED AS IF IN THIS SPECIFICATION.

3. SHOP DRAWINGS
SIX (6) SETS OF SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL FOR ALL EQUIPMENT AND MATERIALS.

4. PERMITS, FEES AND REGULATIONS
THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND CERTIFICATES.

5. OPERATION AND MAINTENANCE MANUALS AND INSTRUCTIONS
PRIOR TO SUBSTANTIAL COMPLETION, THE CONTRACTOR SHALL PROVIDE THREE (3) BOUND COPIES OF PRINTED OPERATIONS INSTRUCTIONS AND MAINTENANCE INFORMATION FOR EQUIPMENT AND SYSTEMS PROVIDED UNDER THIS CONTRACT, INCLUDING PREVENTATIVE MAINTENANCE PROCEDURES.

6. DRAWINGS
THE DRAWINGS SHOW APPROXIMATE LOCATION OF EQUIPMENT, DUCTS AND PIPES. THE EXACT LOCATION SHALL BE DETERMINED BASED ON FIELD CONDITIONS. EQUIPMENT, DUCT WORK AND PIPING SHALL FIT INTO THE SPACES SHOWN ON THE DRAWINGS ALLOWING FOR ACCEPTABLE CLEARANCES FOR INSTALLATION, REPLACEMENT AND MAINTENANCE. IT IS NOT INTENDED THAT THE DRAWINGS SHOW IN DETAIL EVERY FITTING, DEVICE, ETC. ALL MATERIAL NECESSARY TO SATISFY REGULATIONS, THE BEST PRACTICES OF THE TRADE AND TO THE COMPLETE SATISFACTION OF THE ENGINEER SHALL BE FURNISHED WITHOUT ADDITIONAL RECOMPENSE.

7. STORAGE OF MATERIALS
THE CONTRACTOR SHALL COORDINATE STORAGE OF HIS MATERIALS AND EQUIPMENT WITH THE GENERAL CONTRACTOR AND SHALL BE RESPONSIBLE FOR ALL LOSS AND DAMAGE.

8. GUARANTEE
THE CONTRACTOR SHALL GUARANTEE ALL WORK FOR A PERIOD OF ONE (1) YEAR AFTER SUBSTANTIAL COMPLETION. THE CONTRACTOR SHALL REPAIR OR CORRECT THE WORK WITHIN TEN (10) DAYS OF WRITTEN NOTIFICATION. IF THE CONTRACTOR DOES NOT COMPLY, THE OWNER MAY HAVE THE WORK CORRECTED AND CHARGE ALL SUCH TO THE CONTRACTOR.

9. REFERENCE STANDARDS AND INDUSTRY SPECIFICATIONS
ANY MATERIAL OR OPERATION SPECIFIED BY REFERENCE TO PUBLISHED SPECIFICATIONS OF A MANUFACTURER, A SOCIETY, AND ASSOCIATION, A CODE, OR OTHER PUBLISHED STANDARD, SHALL COMPLY WITH REQUIREMENTS OF THE LISTED DOCUMENT. ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF STATE, LOCAL AND OTHER CODES WHICH APPLY TO THIS PROJECT OR HAVE JURISDICTION.
(1) INTERNATIONAL BUILDING CODE (2003).
(2) MAINE STATE INTERNAL PLUMBING CODE.
(3) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).
(4) UNDERWRITERS LABORATORY (UL).
(5) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
(6) NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA).
(7) AMERICAN SOCIETY OF TESTING MATERIALS (ASTM).
(8) NATIONAL ELECTRICAL CODE (NEC).
(9) ASSOCIATED AIR BALANCE COUNCIL (AABC).
(10) NATIONAL FIRE PROTECTION ASSOCIATION (NFPA).
(11) SHEET METAL AND AIR CONDITIONING CONTRACTORS. NATIONAL ASSOCIATION (SMACNA).
(12) AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).

10. WORKMANSHIP
ALL WORK SHALL BE EXECUTED IN A WORKMANLIKE MANNER, BY EXPERIENCED MECHANICS OF THE TRADE IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND THE MOST MODERN TRADE PRACTICE AND SHALL PRESENT A NEAT APPEARANCE.

11. SITE INSPECTION
BEFORE BEGINNING WORK, THE CONTRACTOR IS EXPECTED TO INSPECT THE SITE AND SURVEY THE CONDITIONS TO BE ENCOUNTERED IN THE PERFORMANCE OF THE WORK. FAILURE TO FAMILIARIZE HIMSELF WITH THE CONDITIONS SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR FULL COMPLETION OF THE WORK IN ACCORDANCE WITH THESE DOCUMENTS.

12. COORDINATION
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THEIR WORK WITH ALL OTHER TRADES SUCH THAT ALL BUILDING SYSTEMS AND COMPONENTS CAN BE ASSEMBLED WITHOUT CONFLICT AND IN CONFORMANCE WITH ALL CONSTRUCTION DOCUMENTATION, INCLUDING THOSE OF OTHER TRADES.

13. DISCREPANCIES AND CLARIFICATIONS
IN THE EVENT OF A DISCOVERED DISCREPANCY OR AMBIGUITY, IT SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION IN WRITING AND IN A TIMELY FASHION. THE CONTRACTOR SHALL NOT PROCEED WITH RELATED WORK WITHOUT A WRITTEN RESOLUTION CLARIFICATION FROM THE ARCHITECT.

14. ON-SITE SUPERVISION
THE CONTRACTOR SHALL MAINTAIN ON-SITE SUPERVISION OF HIS OWN WORK FORCE AND HIS SUB-SUBCONTRACTORS.

15. CHANGES
NO CHANGES SHALL BE MADE TO SYSTEMS, PIPING LAYOUTS, ETC., WITHOUT ENGINEER'S APPROVAL.

DUCT AND INSULATION MATERIALS:
INTERIOR DUCTS SHALL BE GALVANIZED WITH SUPPLY AND OUTSIDE AIR DUCTS INSULATED WITH 1½" FIBERGLASS WRAP AND FSK JACKET.
EXTERIOR DUCTS SHALL BE ALUMINUM, UNINSULATED.

PIPING, VALVES, AND INSULATION MATERIALS:
HEATING PIPING SHALL BE COPPER, TYPE L, (INSULATED WITH 1" FIBERGLASS AND ASJ), OR PEX (UNISULATED), CONTRACTOR OPTION.
PEX SHALL INCLUDE AN OXYGEN DIFFUSION BARRIER, SIM TO WIRSBO hePEX PLUS.
BALL VALVES SHALL BE FULL PORT, SIMILAR TO WATTS B6081.
BALANCE VALVES SHALL BE SIMILAR TO DANFOSS MSV-U, MULTI-TURN OPERATION.
STRAINERS SHALL BE SIMILAR TO WATTS 7775.
ALL EXPOSED PIPING SHALL BE IDENTIFIED INCLUDING CONTENTS & DIRECTION OF FLOW.
ALL VALVES AND PIPING ACCESSORIES SHALL BE TAGGED AND THEIR FUNCTIONS SHALL BE LISTED IN THE OPERATIONS AND MAINTENANCE MANUAL.

EQUIPMENT & MATERIALS SUBSTITUTIONS:
SCHEDULED EQUIPMENT AND MATERIALS ARE THE BASIS OF DESIGN. ALTERNATE MANUFACTURERS WILL BE CONSIDERED, BUT MUST BE APPROVED AS AN EQUAL BY THE ENGINEER.

REGISTER, GRILLE & DIFFUSER SCHEDULE

TAG	MAKE	MODEL	TYPE	CONSTRUCTION	FUNCTION	NOTES
A	METAL-AIRE	RH	GRILLE	ALUMINUM	EXHAUST/RETURN	
B	METAL-AIRE	5500	DIFFUSER	ALUMINUM	SUPPLY	
C	ACUTHERM	TF-HC	THERMA-DIFFUSER	STEEL	SUPPLY	

WALL-HUNG CONDENSING BOILER SCHEDULE

TAG	MAKE	MODEL	TYPE	FLUID	FUEL	INPUT (MBH)	OUTPUT (MBH)	GPM	EWT (F)	LWT (F)	A.F.U.E	VENT (IN.) CONNECTION	WATER CONTENT (US GAL.)	NOTES
B-1	VIESSMANN	VITODENS 200 6-24C	CONDENSING	WATER	NAT.GAS	25-91	22-81	-	110	120	95.1%	3 1/4"	1.1	(1)

(1) INTEGRAL PUMP

SPLIT SYSTEM A/C OUTDOOR CONDENSING UNIT SCHEDULE

TAG	MAKE	MODEL	NOM. TONS	REF	SEER	VOLTAGE/ PHASE	MCA	MAX FUSE	RLA	LRA	DIMENSIONS	WEIGHT (LBS.)	REFRIG. LINE CONN.	NOTES
CU-1	CARRIER	24ANA124	2	R-410A	21	208/230/1/06	13.9	20	10.3	52.2	36"Wx40"Lx48"H	330 LBS	3/8" O.D. LIQUID 7/8" O.D. SUCTION	

DX COIL SCHEDULE

TAG	MAKE	MODEL	NOMINAL COOLING	CFM	COOLING CAPACITY SENSIBLE	COOLING CAPACITY TOTAL	EDB/EWB (°F)	LDB/LWB (°F)	APD ("W.C.)	NOTES
DX-1	CARRIER	CNPVP24	2 TONS	700	24 MBH	20 MBH	75/63	55/55	0.2	(1)

(1) MOUNT ON TOP OF FURN-1

GAS FURNACE SCHEDULE

TAG	MAKE	MODEL	TYPE	FUEL	INPUT (MBH)	OUTPUT (MBH)	CFM	VOLTAGE	MCA	MAX FUSE	DIMENSIONS	WEIGHT (LBS.)	NOTES
FURN-1	CARRIER	58MVB040-14	CONDENSING	NAT.GAS	40	25-38	700	115/1/60	8.9	15	30"X25"X40"	200	

DUCTLESS SPLIT SYSTEM AIR CONDITIONER - OUTDOOR CONDENSING UNIT SCHEDULE

TAG	MAKE	MODEL	COOLING CAP. MBH	SEER	REF	VOLTAGE/ PHASE	MIN. CIRC. AMPACITY	MAXIMUM FUSE SIZE	WEIGHT (LBS)	DIMENSIONS	REFRIG. LINE CONN.	NOTES
ACC-1	FUJITSU	AOU18CL	18	19	R-410A	208-230/1/60	16	20	88	11 3/16"x31 1/8"x22 3/4"	1/4" LIQUID 1/2" SUCTION	

DUCTLESS SPLIT SYSTEM AIR CONDITIONER - INDOOR UNIT SCHEDULE

TAG	MAKE	MODEL	STYLE	COOLING CAP. MBH	SEER	REF	WEIGHT (LBS)	DIMENSIONS	NOTES
AC-1	FUJITSU	ASU18CL	WALL MOUNTED	18	19	R-410A	20	8 7/16"x31 1/8"x10 13/16"	(1)

(1) POWERED FROM ACC-1

HEAT RECOVERY VENTILATOR SCHEDULE

TAG	MAKE	MODEL	SA CFM	SA ESP	EA CFM	EA ESP	EFFECTIVENESS	WATTS	VOLTAGE	LOCATION	SERVES	NOTES
HRV-1	FANTECH	SHR2004	130	0.9	130	0.9	70	160	115/60/1	MECH. ROOM	OFFICE	(1)
HRV-2	FANTECH	SH704	50	0.4	50	0.4	67	35	115/60/1	BATHROOM	RESIDENCE	(2)

(1) ACCESSORIES: EDF-1 CONTROLS
(2) ACCESSORIES: FDT 7 (7 DAY PROGRAMMABLE TIME CLOCK)

RADIANT MANIFOLD SCHEDULE

TAG	ZONE #	TUBING	CONFIGURATION	LOCATION	CIRCUITS	GPM	HEAD LOSS FT H2O	EWT (°F)	LWT (°F)	TUBE SPACING	AREA (SQ. FT.)	BTUH REQUIRED
RM-1	1	-" PEX	UNDER FLOOR	LIVING AREA	(-) -'	-	-	-	-	8"	830	11,500
RM-2	1	-" PEX	UNDER FLOOR	MASTER BEDROOM	(-) -'	-	-	-	-	8"	200	4,160
RM-3	2	-" PEX	UNDER FLOOR	LOFT/STUDY	(-) -'	-	-	-	-	8"	90	2,300

HVAC LEGEND

CIRCULATOR PUMP
BALL VALVE
PRESSURE GAUGE
MULTIPURPOSE VALVE
SRV SAFETY REDUCING VALVE
THERMOMETER
T THERMOSTAT
T TEMPERATURE SENSOR
P WALL SWITCH
S WALL SWITCH
PIPE RISE & PIPE DROP
PIPE OR DUCT REDUCER

SUPPLY AIR
RETURN OR EXHAUST AIR
SUPPLY & RETURN AIR TURN DOWN
BD MANUAL BALANCING DAMPER
SUPPLY AIR FLOW
RETURN/EXHAUST AIR FLOW
HPWS HPWR HEAT PUMP WATER SUPPLY & RETURN
G GAS PIPING
HWS HWR HOT WATER SUPPLY & RETURN
CONNECT TO EXISTING
M MOTORIZED CONTROL DAMPER
FLEX CONNECTOR
PIPE TEE AND 90 ELBOW
MECHANICAL EQUIPMENT

APD	AIR PRESSURE DROP	LAT	LEAVING AIR TEMPERATURE
AWT	AVERAGE WATER TEMPERATURE	LF	LINEAL FOOT
BHP	BRAKE HORSE POWER	LWT	LEAVING WATER TEMPERATURE
CD	CONDENSATE DRAIN	MCA	MINIMUM CIRCUIT AMPACITY
COP	COEFFICIENT OF PERFORMANCE	RA	RETURN AIR
EA	EXHAUST AIR	SA	SUPPLY AIR
EAT	ENTERING AIR TEMPERATURE	SC	SENSIBLE COOLING CAPACITY
EER	ENERGY EFFICIENCY RATIO	TC	TOTAL COOLING CAPACITY
ESP	EXTERNAL STATIC PRESSURE	WPD	WATER PRESSURE DROP
EWT	ENTERING WATER TEMPERATURE	A 46x12 1000	RGD TAG, NECK SIZE, CFM
FLA	FULL LOAD AMPS		
FO	FLAT OVAL DUCT		
HC	HEATING CAPACITY		
HE	HEAT OF EXTRACTION		
HR	HEAT OF REJECTION		

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HVAC SCHEDULES, FLOW
SCHEMATIC, SPECS, LEGEND &
CONTROL SEQUENCES

Drawn by: JDS
File Name:
Project No. 0630
Scale: AS NOTED
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Revised:

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