MECHANICAL LEGEND

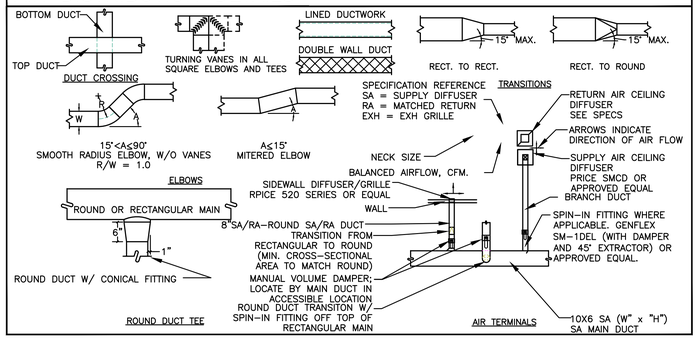
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- EXHAUST AIR DIFFUSER
- DIRECTIONAL AIR FLOW
- MANUAL VOLUME DAMPER
- SUPPLY AIR DUCT UP & DOWN
- RETURN AIR DUCT UP & DOWN
- EXHAUST OR OUTSIDE AIR DUCT UP & DOWN
- SUPPLY AIR DUCT UP & DOWN
- RETURN AIR DUCT UP & DOWN
- EXHAUST OR OUTSIDE AIR DUCT UP & DOWN
- VAV TERMINAL UNIT W/ REHEAT COIL
- DUCT SMOKE SENSOR
- DIFFERENTIAL PRESSURE SENSOR
- CONNECT TO EXISTING
- THERMOSTAT
- TEMPERATURE SENSOR
- NOTE
- EQUIPMENT DESIGNATOR
- GATE VALVE
- CHECK VALVE
- BALANCING VALVE
- THERMOMETER
- DIRECTION OF FLOW
- PUMP
- STRAINER
- PRESSURE GUAGE
- PETE'S PLUG
- DOUBLE CHECK ASSEMBLY
- PRESSURE REDUCING VALVE
- UNION
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- CAP
- MOTORIZED DAMPER
- BALL SHUT OFF VALVE
- FIRE DAMPER
- FIRE / SMOKE DAMPER
- SMOKE DAMPER

AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
B.D.	BOTTOM OF DUCT
BHP	BRAKE HORSEPOWER
BOG	BOTTOM OF GRILLE
BTU	BRITISH THERMAL UNITS
CFM	CUBIC FEET PER MINUTE
CONN.	CONNECTION
CONT.	CONTINUATION
CW	DOMESTIC COLD WATER
DB	DRY BULB
DIA.	DIAMETER
DIST.	DISTRIBUTION
EXH	EXHAUST AIR
EDB	ENTERING DRY BULB TEMPERATURE
EWB	ENTERING WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
FF	FINISH FLOOR
FIXT.	FIXTURE
F.O.B.	FLAT ON BOTTOM
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT.	FEET / FOOT
GA.	GAUGE
GEXH	GREASE EXHAUST AIR DUCT
GPM	GALLONS PER MINUTE
H	HEIGHT
HP	HORSEPOWER
I.D.	INSIDE DIAMETER
IN.	INCHES
L	LENGTH
LBS.	POUNDS
LDB	LEAVING DRY BULB
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MAKE UP AIR
MAX.	MAXIMUM
MBH	THOUSANDS OF BTUs PER HOUR
MD	MOTORIZED DAMPER
MIN.	MINIMUM
MVD	MANUAL VOLUME DAMPER
NC	NOISE CRITERIA
N.C.	NORMALLY CLOSED
N.I.M.	NOT IN MECHANICAL
NO.	NUMBER
N.O.	NORMALLY OPEN
O.A.	OUTSIDE AIR
P	PERSON
PSI	POUNDS PER SQUARE INCH
P/T	PRESSURE / TEMPERATURE
R.A.	RETURN AIR
RECT.	RECTANGULAR
REQ'D	REQUIRED
S.A.	SUPPLY AIR
S.P.	STATIC PRESSURE
SQ.	SQUARE
TEMP.	TEMPERATURE
TYP.	TYPICAL
VAV	VARIABLE AIR VOLUME
W	WIDTH
WB	WET BULB
WPD	WATER PRESSURE DROP
ø	DIAMETER

T/A SERIES 794 DIFFERENTIAL PRESSURE CONTROLLER — PILOT TUBE — BALANCING VALVE, T/A STAD SERIES

HWS	(HWS) HEATING WATER SUPPLY
HWR	(HWR) HEATING WATER RETURN
HWRR	(HWRR) HEATING WATER REVERSE RETURN
CHS	(CHS) CHILLED WATER SUPPLY
CHR	(CHR) CHILLED WATER RETURN
PC	PUMPED CONDENSATE
S	(HPS) HIGH PRESSURE STEAM
V4	(HT) HEAT TRACED DOMESTIC HOT WATER
SMR	(SMR) SNOWMELT RETURN
SMS	(SMS) SNOWMELT SUPPLY

AIR DISTRIBUTION DETAILS



CEILING FANS

MARK NUMBER	CF 1A / 1B	CF 2A / 2B	CF 3A / 3B	CF 4A / 4B	CF 5A / 5B	CF 6A / 6B
ROOM	SCIENCE 1102	SCIENCE 1101	SCIENCE 1218	BAND 1421	CHOIR 1415	FLEX 1414
MOUNTING	CEILING HUNG	CEILING HUNG	CEILING HUNG	CEILING HUNG	CEILING HUNG	CEILING HUNG
BLADE DIAMETER/FAN HEIGHT	52"/16.4"	52"/16.4"	52"/16.4"	52"/16.4"	52"/16.4"	52"/16.4"
CONTROLLED BY:	HAIKU L-SERIES HARD WIRED WALL CONTROL (1 CONTROLLER PER ROOM)					
MOUNTING HEIGHT (FROM CEILING)						
DESIGN WEIGHT (LBS)	11 LBS	11 LBS	11 LBS	11 LBS	11 LBS	11 LBS
DESIGNED MODEL: BIG ASS FAN/HAIKU	L-SERIES	L-SERIES	L-SERIES	L-SERIES	L-SERIES	L-SERIES

EXHAUST FANS

MARK NUMBER	EF E1	EF E2	EF E3	EF E4	EF E5
DESIGNED ELEVATION, FT	3500 FT				
TYPE	CABINET	CABINET	CABINET	CABINET	CABINET
SYSTEM	SCIENCE 1101	SCIENCE 1102	SCIENCE 1218	SCIENCE PREP	R.R.
CFM	1400	1400	1400	500	350
TOTAL SP. (IN H20)	0.50	0.50	0.50	0.50	0.50
DRIVE	DD	DD	DD	DD	DD
VFD	NO	NO	NO	NO	NO
FAN RPM	1590	1590	1590	883	807
MOTOR HP	738 W	738 W	738 W	160 W	106 WATTS
CONTROLLED BY	SWITCH	SWITCH	SWITCH	DDC, NOTE 5	DDC, NOTE 5
INTERLOCK WITH					
WHEEL TYPE	FC	FC	FC	FC	F.C.
BACK DRAFT DAMPER/MOTORIZED DAMPER	–/YES	–/YES	–/YES	–/YES	–/YES
ISOLATION	RIS	RIS	RIS	RIS	RIS
DESIGN WEIGHT (LBS)	60	60	60	35	35
MAX. SONES	4.0	4.0	4.0	7.7	1
NOTES:	1,2,3,4	1,2,3,4	1,2,3,4	1,3,4	1,3,4
BASIS OF DESIGN: GREENHECK	CSP-A1550	CSP-A1550	CSP-A1550	CSP-A700	CSP-A700
ELECTRICAL (V/PH)	120/1	120/1	120/1	120/1	120/1

1. PROVIDE WITH SPEED CONTROL NEAR FAN FOR BALANCING
2. 60 MIN TIMER SWITCH. SEE ELECTRICAL.
3. PROVIDE MOTORIZED DAMPER IN THE DISCHARGE DUCT.
4. PROVIDE UNIT WITH FACTORY DISCONNECT.
5. WITH FULL LOAD RATED CONTACTOR.

WATER TO WATER HEAT EXCHANGER

MARK NUMBER		HE 1
DESIGNED ALTITUDE, FT		3,500
TYPE		PLATE & FRAME
SYSTEM		SNOW MELT
CAPACITY, MBH		535
DIMENSION		4.9"WX13.2"HX6.5"D
COLD SIDE	GPM	46
	ENT. WATER (° F.)	140
	LVG. WATER (° F.)	114
	MAX PRESS DROP, FT. H20	6 FT
	% PROPYLENE GLYCOL	45%
HOT SIDE	GPM	28
	ENT. WATER (° F.)	180
	LVG. WATER (° F.)	140
	MAX PRESS DROP, FT. H20	2
OPERATING WEIGHT, LBS		25
BASIS OF DESIGN: PHE		GBS400H-70

NOTES:
1. SNOW MELT SYSTEM SHALL BE TREATED TO 40% PROPYLENE GLYCOL.
2. SPACE FOR NEW HEAT EXCHANGER AND PIPING IS LIMITED. IF UNIT WITH DIFFERENT DIMENSIONS IS PROVIDED, CONTRACTOR TO VERIFY EQUIPMENT FIT WITH EXISTING SITE CONDITIONS.

RETURN FANS

MARK NUMBER	RF E1	RF E2
DESIGNED ELEVATION, FT	3500 FT	
TYPE	IN-LINE	IN-LNE
SYSTEM	AHU-E1	AHU-E2
CFM	3995	5410
TOTAL SP. (IN H20)	0.75	0.75
DRIVE	DD	DD
VFD	YES	YES
FAN RPM	951	1095
MOTOR HP	5	5
CONTROLLED BY	DDC	DDC
INTERLOCK WITH	AHU-E1	AHU-E2
BACK DRAFT DAMPER/MOTORIZED DAMPER	–/–	–/–
ISOLATION	EXTERNAL SPRING	EXTERNAL SPRING
DESIGN WEIGHT (LBS)	370	370
MAX. SONES	SEE ACOUSTICAL REQ'T ON THIS SHEET	
DISCHARGE/CONFIGURATION	INLINE	INLINE
SMOKE DETECTOR	YES	YES
BASIS OF DESIGN: GREENHECK	QEID-20-90-A50	QEID-20-90-A50
ELECTRICAL (V/PH)	480/3	480/3

PUMPS

MARK NUMBER	(E) SMP 1 *	P E1	P E2
SERVICE	HE-1 COLD SIDE	AHU-E1/ HC-E1	AHU-E2/ HC-E2
DESIGNED ALTITUDE, FT	3500 FT	3500 FT	3500 FT
ARRANGEMENT	EXISTING PUMP IN-LINE	CENTRIFUGAL IN-LINE	CENTRIFUGAL IN-LINE
STARTER TYPE	(E)	COMBO STARTER/DISCONNECT	
FLOW RATE (GPM)	46	6	12
HEAD (FT)	65	20	20
MOTOR HP	2	1/6	1/6
RPM	1750	3250	3250
CONTROLLED BY	DDC		
FLUID	45% PROPYLENE GLYCOL		
SUCTION PIPE SIZE	(E)	1–1/2	1–1/2
DISCHARGE PIPE SIZE	(E)	1/1/2	1–1/2
BASE DESIGN MODEL, TACO:	KV1509		IL0013
ELECTRICAL (V/PH)	(E)480/3	120/1	120/1

* EXISTING PUMP. REPLACE (E)IMPELLARS WITH NEW 7.8" IMPELLARS AND BALANCE TO NEW FLOW.

AIR HANDLING UNIT

MARK NUMBER	AHU E1	AHU E2
DESIGNED ELEVATION, FT	3500 FT	
TYPE	VERTICAL AHU	VERTICAL AHU
SYSTEM	ADMIN	CLASSROOM
CFM	4350 CFM	6185 CFM
OSA (MIN)	790 CFM	1705 CFM
OSA (MIN/MIN)	80 CFM	180 CFM
EXT SP. (IN H20)	2.25"	2.50"
TOTAL SP. (IN H20)	3.25"	3.36"
FAN/WHEEL TYPE (QTY)	PLENUM/B.I. (2)	PLENUM/B.I (2)
DRIVE	D.D.	D.D.
FAN RPM	1800	1960
MOTOR HP**	(2)2.7 KW	(2)2.7 KW
CONTROLLED BY	DDC	DDC
ECONOMIZER	YES*	YES*
MAX. SONES	SEE ACOUSTICAL REQ'T ON THIS SHEET	
HEATING COIL	HC E1	HC E2
HEATING CFM	2775	4545
ENTERING AIR TEMP (°F.)	32.6	25.8
LEAVING AIR TEMP (°F.)	61.6	61.3
ENTERING WATER TEMP. (°F.)	140	140
LEAVING WATER TEMP (°F.)	110	110
TOTAL CAPACITY (MBH)	84.6	174.4
FLOW RATE (GPM)	5.73	11.7
MIXING VALVE TYPE	3-WAY	3-WAY
CONNECTION SIZE, INCH	3/4"	1"
MIN ROWS/FPI	1/12	1/12
MAX. FLUID PD, FT. W.C.	4.4	2.7
UNIT WEIGHT	1920 #	2765#
UNIT DIMENSIONS (LXWXH)	31"X56"X118"	38"X72"X120"
ELECTRICAL (V/PH)	480/3	480/3

VENTILATION AIR SCHEDULE - AHU-E1

ROOM NUMBER AND NAME	AREA (SQ. FT.)	OCCUPANT LOAD (#/1000 SQ. FT.)	NUMBER OF OCCUPANTS	OUTSIDE AIR REQUIREMENT (CFM/P)	OUTSIDE AIR REQUIREMENT (CFM/SQ FT.)	OUTSIDE AIR REQUIRED (CFM)		ZONE OSA (CFM)	SUPPLY AIR (CFM)	PRIMARY OSA FRACTION	RETURN AIR (CFM)	EXHAUST AIR (CFM)	Zone Ventilation Efficiency	Corrected OSA CFM	AIR SYSTEMS
	Az		Pz	Rp	Ra	Vbz	Ez	Voz	Vpz	Zp			Evz		
SCIENCE CLASSROOM 1218	1100	35	39	10	0.12	522	1.0	522	1200	0.44	1200	0	0.91	576.69	VAV E1.1
SCHEDULING 1215	102	5	1	5	0.06	11	1.0	11	175	0.06	175	0	1.28	12.29	VAV E1.2
FILING 1216	61	5	1	5	0.06	9	1.0	9	75	0.12	75	0	1.22	9.57	VAV E1.2
CONFERENCE 1212	252	50	13	5	0.06	80	1.0	80	300	0.27	300	0	1.07	88.51	VAVE1.3
GIRLS RR 1273	140	0	0	0	0	0	1.0	0	150	0.00	0	200	1.34	0.00	VAV E1.3
COUNSELOR 1217	110	5	1	5	0.06	12	1.0	12	150	0.08	150	0	1.26	12.82	VAV E1.4
COUNSELOR 1213	123	5	1	5	0.06	12	1.0	12	150	0.08	150	0	1.26	13.68	VAV E1.4
LOBBY	1095	0	0	0	0.06	66	1.0	66	2000	0.03	2000	0	1.31	72.58	VAV E1.5
TOTAL	**2983**		**56**			**711.58**		**711.58**	**4200**		**4050**	**200**	**0.91**	**786**	
								Vou	Vps				Ev		
						CORRECTED TOTAL OUTDOOR AIR FLOW RATE					**786**	CFM	Corrected OSA Fractio	Zs =	**0.19**

VENTILATION AIR SCHEDULE - AHU-E2

SCIENCE CLASSROOM 1102	1131	35	40	10	0.12	536	1.0	536	1200	0.45	1200	0	0.89	599.42	VAV E2.1
W. HALLWAY 1151	500	0	0	0	0.06	30	1.0	30	500	0.06	500	0	1.28	33.57	VAV E2.1
SCIENCE PREP/CLASS/OFFICE 1219	365	25	10	10	0.18	166	1.0	166	400	0.41	0	500	0.93	185.40	VAV E2.2
W. HALLWAY 1151	500	0	0	0	0.06	30	1.0	30	500	0.06	500	0	1.28	33.57	VAV E2.2
RR 1272	50	0	0	0	0	0	1.0	0	50	0.00	0	75	1.34	0.00	VAV E2.2
FAN 1281	68	5	1	5	0.06	9	1.0	9	75	0.12	0	75	1.22	10.16	VAV E2.2
SCIENCE CLASSROOM 1102	1131	35	40	10	0.12	536	1.0	536	1200	0.45	1200	0	0.89	599.42	VAV E2.3
EAST HALLWAY	680	0	0	0	0.06	41	1.0	41	500	0.08	500	0	1.26	45.65	VAV E2.4
WORK/BREAK/MAIL 102	102	5	1	5	0.06	11	1.0	11	100	0.11	100	0	1.23	12.44	VAV E2.4
NURSE OFFICE 1211	75	5	1	5	0.06	10	1.0	10	100	0.10	100	0	1.25	10.63	VAV E2.4
NURSE EXAM 1206	106	5	1	5	0.06	11	1.0	11	100	0.11	100	0	1.23	12.71	VAV E2.4
NURSE OFFICE 1211	91	5	1	5	0.06	10	1.0	10	100	0.10	100	0	1.24	11.70	VAV E2.4
RR 1271	50	0	0	0	0	0	1.0	0	50	0.00	0	75	1.34	0.00	VAV E2.4
CUST/FIRE/ALARM 1208	76	0	0	0	0	0	1.0	0	100	0.00	0	125	1.34	0.00	VAV E2.4
HALLWAY 1256	250	0	0	0	0.06	15	1.0	15	100	0.15	100	0	1.19	16.78	VAV E2.5
OFFICE MANAGER 1205	101	5	1	5	0.06	11	1.0	11	150	0.07	150	0	1.27	12.38	VAV E2.5
PRINICIPAL 1207	150	5	1	5	0.06	14	1.0	14	180	0.08	180	0	1.26	15.66	VAV E2.5
V. PRINCIPAL 1209	154	5	1	5	0.06	14	1.0	14	180	0.08	180	0	1.26	15.93	VAV E2.5
ATTENDANCE 1202	184	20	4	5	0.06	31	1.0	31	300	0.10	300	0	1.24	34.73	VAV E2.6
WAITING	216	30	7	5	0.06	48	1.0	48	300	0.16	300	0	1.18	53.66	VAV E2.6
TOTAL	**5980**		**109**			**1522.76**		**1523**	**6185**		**5510**	**850**	**0.89**	**1704**	
								Vou	Vps				Ev		
						CORRECTED TOTAL OUTDOOR AIR FLOW RATE					**1704**	CFM	Corrected OSA Fractio	Zs =	**0.28**

AHU ACOUSTICAL REQUIREMENTS

AHU-E1

	63	125	250	500	1000	2000	4000	8000
RA INLET	77	75	77	70	69	70	65	60
SA DISCHARGE	82	81	80	79	82	78	72	65
CASING RADIATED	70	64	62	57	55	46	38	29

AHU-E2

	63	125	250	500	1000	2000	4000	8000
RA INLET	78	75	77	71	68	69	67	64
SA DISCHARGE	82	81	81	83	84	79	75	69
CASING RADIATED	70	63	61	59	55	45	39	31

RETURN FANS ACOUSTICAL REQUIREMENTS

RF-E1

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	75	78	73	71	70	68	59	52	75	63	11.8
Outlet	78	77	73	75	74	68	59	50	77	66	13.2

LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

RF-E2

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	76	79	78	76	74	73	64	56	79	68	15.4
Outlet	81	78	77	79	78	74	65	55	82	70	17.1

LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

VAV BOXES WITH HOT WATER REHEAT

MARK NO.	TYPE	MAX COOLING CFM	20% OF COOLING CFM	MIN VENTILATION CFM	MIN 300 CFM	MAXIMUM DEADBAND CFM	MAXIMUM HEATING CFM 50% or VENT	HEATING CFM *** (CFM)	INLET IN.	OUTLET IN.	SA INLET TEMP DEG. F	SA TEMP AT HEATING DEG. F	REHEAT COIL LOAD MBH	INLET WATER TEMP (F)	OUTLET WATER TEMP (F)	GPM	CONN. SIZE IN.	VALVE TYPE	MAX. STATIC LOSS *	MAX. DISCHARGE SOUND POWER LEVEL **	MAX. RADIATED SOUND POWER LEVEL **	CONTROL TYPE
VAV-E1.1	VAV	**1200**	240	522	0	**522**	**600**	**1200**	**12**	16X15	55	85	38.9	140	110	**2.6**	3/4	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E1.2	VAV	**250**	50	22	125	**125**	**125**	**125**	**6**	12X8	55	100	6.1	140	110	**0.4**	1/2	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E1.3	VAV	**450**	90	88	0	**90**	**225**	**225**	**8**	12X10	55	100	10.9	140	110	**0.7**	1/2	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E1.4	VAV	**300**	60	27	150	**150**	**150**	**150**	**6**	12X8	55	100	7.3	140	110	**0.5**	1/2	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E1.5	VAV	**2150**	430	66	0	**430**	**1075**	**1075**	**16**	24X18	55	100	52.2	140	110	**3.5**	3/4	2-WAY CONTROL VALVE	0.75	67	59	DDC
	TOTAL	**4350**				**1317**	**2175**	**2775**					**115.425**			**7.7**						
VAV-E2.1	VAV	**1700**	340	625	0	**625**	**850**	**1700**	**14**	20X16	55	85	55.1	140	110	**3.7**	3/4	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E2.2	VAV	**1025**	205	265	0	**265**	**513**	**513**	**12**	16X15	55	100	24.9	140	110	**1.7**	3/4	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E2.3	VAV	**1200**	240	592	0	**592**	**600**	**1200**	**12**	16X15	55	85	38.9	140	110	**2.6**	3/4	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E2.4	VAV	**1050**	210	92	0	**210**	**525**	**525**	**12**	16X15	55	100	25.5	140	110	**1.7**	3/4	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E2.5	VAV	**610**	122	60	0	**122**	**305**	**305**	**8**	12X10	55	100	14.8	140	110	**1.0**	1/2	2-WAY CONTROL VALVE	0.75	67	59	DDC
VAV-E2.6	VAV	**600**	120	64	0	**120**	**300**	**300**	**8**	12X10	55	100	14.6	140	110	**1.0**	1/2	2-WAY CONTROL VALVE	0.75	67	59	DDC
	TOTAL	**6185**				**1934**	**3092.5**	**4543**					**174**			**11.6**						

* - INCLUDING COIL, SOUND ATTENUATOR SECTION & VAV BOX
** - THIRD OCTAVE CERTIFIED RATING IN ACCORDANCE WITH ARI STANDARD 880-94
*** - SCIENCE CLASSROOM VAV BOXES. DAMPER OPEN 100% WHEN EXHAUST FAN IS ACTIVATED. HEATING COIL MUST BE SIZED FOR COOLING AIRFLOW WHEN EXHAUST FAN IS ON.

City Of Bend Approval Stamp:

#	Date	Description

Revision Schedule

PERMIT SET

PILOT BUTTE MIDDLE SCHOOL - BLDGS E&F
1501 NE Neff Road,
Bend OR 97701

BLRB architects

Drawing Title:
MECHANICAL LEGEND AND SCHEDULES

Date : 02.09.2018	Drawn By : INITIALS
Revised Date :	Project No. 17.34B

Stamp

REGISTERED PROFESSIONAL ENGINEER 17887 JULY 25, 1997 SCOTT W. MILLER EXPIRES: 31DEC18

Sheet No.
M6.01

BLRB ARCHITECTS, P.S.