

ELECTRICAL DISTRIBUTION SYSTEM

1. PRIMARY & SITE DISTRIBUTION FEEDERS (FACILITY CAMPUS): *(SEE ATTACHED DRAWINGS FOR ELECTRICAL DISTRIBUTION SYSTEM)*

Two Avista 13.8 KV service feeders supply electrical power to the Medical Center campus at Building 20 dedicated to high voltage switchboard. Both service feeders are fused and are normally energized. Service feeder **NW 12F2** is called the preferred "feeder" and **NW 12F4** is the alternate feeder.

Feeder NW 12F2 originates from AVISTA power pole located across Wellesley Avenue from Building 20. This pole is equipped with a ground level operated switch on which AVISTA has installed their lock. This switch may be operated under load. Feeder NW 12 F4 originates from AVISTA power pole located across Assembly Street and is not equipped with a ground operated switch.

Avista has recommended for the fuses not to be pulled on this service when the service is connected via Building 20, as this will single phase the facility while the fuses are being pulled. Both power poles are fed from the same substation. **The phone number for AVISTA is (509) 482-8565.**

A programmable controller that is located inside a section of the high voltage switchboard selects the preferred service feeder when properly energized; otherwise the alternate feeder is selected and connected. Each service feeder can be electronically locked out via keyed locksets tied to the programmable controller. These locksets are located in front of the switchboard control/status panel and are labeled accordingly.

High voltage feeders are routed underground from Building 20 switchboard to all facility buildings through pad mounted transformers by two (2) sets of grounded conductors titled radial A and B. Both sets of conductors are sized to carry the full load of the facility. These conductors may be manually switched at each transformer and are presently configured for normal operations as listed in section "SCOPE OF WORK". An exception to this configuration is the transformer for Building 27 which ties into the campus radial conductors at manhole EHM E with load break elbows.

All transformers are equipped with load-break switches with the exception of the transformer for Building 27 and are designed for switching under full load. It is not recommended that this be done, however, due to the potential for generating transient currents through the system.

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2. BUILDING 1:

Building 1 (Main Bldg) Main Switchboards A and B are actually located in a switchgear room called Building 19 which is adjacent and located on the SW corner of building 1. These switchboards are fed from 1500 KVA transformer number 19. Secondary 208V, 3 phase feeders are routed via enclosed copper bus ways from transformer to switchboards A and B. Each switchboard is equipped with an adjustable Over Current Protection (Circuit Breaker) rated at 2500 amp. Switchboards A and B are equipped with various Circuit Breakers with different amp rating having Inboard Trip Unit . **See power riser diagram.**

MAIN SWITCHBOARD DISTRIBUTION SYSTEM A & B – BREAK DOWN BUILDING 19 DISCONNECTS FOR BUILDINGS 1, 10, AND 12

SWITCHBOARD A

Essential Life Safety Branch
Essential Critical Branch
Essential Equipment Branch
Panel 1M, Bldg 1
Panel F, Bldg 1
Panel M, Bldg
Panel N
Cat Scan

SWITCHBOARD B

Panel 1B1
Panel 1D1
Panel 2M
Panel 2M1
Panel 3M1
Panel 5M
Panel 5M1
Panel 7M
Panel 7M1
Panel 8U
Panel AC1 & AC2
Panel C1
Panel X-Ray
Panel MB1
Panel PT Bldg
800/3

The three essential feeders (Life Safety, Critical, and Equipment Branches) as listed above are routed to the **Emergency Distribution Synchronized Switchboard (EDSS)** located in Room B010 of Building 1 basement.

An Emergency Generator rated at 600 KW feeds the EDSS switchboard as well. Emergency Generator is located in Building 10 located SW of building 1. The Emergency Generator is the alternate source of power for the essential electrical feeders for Buildings 1, 12 and 27.

In a case of power failure to any of these essential electrical feeders, the failed power condition is detected by logic controller in EDSS. The EDSS will then start the 600 KW Emergency Generator and route power via the EDSS electrically operated circuit breakers to the essential distribution feeders.

This function is automatic and there is a 10-second time delay from the generator start command. The EDSS also contains automatic and manual load shedding capabilities. If

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assistance is needed with the EDSS logic program, please contact Mark Geitz with
Programmable Controls at 466-2656

EDSS BREAK DOWN:

EDSS DISCONNECTS (emergency Power) FOR BUILDINGS 1, 12 AND 27, ROOM B010-1

Electronic Circuit Breakers (Shunt Trip, Closing relay and Spring winding motor)

Life Safety, Normal and Generator Breakers
Critical, Normal and Generator Breakers
Equipment, Normal and Generator Breakers
Elevator No. 1, Disconnect Switch 10M1
Elevator No. 2, Disconnect Switch 10M2
Elevator No. 3, Disconnect Switch 10M3

Manually Operated Circuit Breakers

Panel A, located in Dietetics, Room A007
Equipment Buss Duct
Panels: **1M3**, XRAY 3 & **4**, & 1M2

LIFE SAFETY, CRITICAL AND ESSENTIAL ELECTRICAL BRANCH BUSS DISCONNECTS

All life safety and critical branch power for the entire facility is dispersed by encased copper vertical busses located in a vertical chase outside the southwest corner of the elevator shafts for Building 1. Distribution panels are supplied by labeled buss plugs (fused) from the locations listed below:

Life Safety Distribution

Location	Location	Label	Area Controlled
A007	Bsmt	2LS2	North Stair Tower
A007		BLS	Basement N & Center
Stair Tower			
A119		Unlabeled	Unused (Depmeds
Disconnect)			
A119		E1	NHCU
A205		1LS	First Floor
A205		2LS	Second Floor
A205		Unlabeled	Outpatient Building 7
A312		3LS	Third Floor
A400A		4LS	Fourth Floor
A527		5LS	Fifth Floor
A631		6LS	Sixth Floor
A709		7LS	Seventh Floor

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A709
Tenth Floors

8LS

Eighth, Ninth, &

Critical Branch Distribution Buss “Stacked Electrical Closets” (electrical shaft)

Critical and Life safety are in the same shaft

Location	Label	Area Controlled
A007	BCB	Basement
A119	Unlabeled	Panel CREL, Bldg.19
A119	Transtector	Transient Suppressor
A119	1CB2	First Floor N
A205	1CB	First Floor S
A205	2CB3	Second Floor, Radiology
A205	2CB2	Second Floor, Laboratory
A205	2CB	Second Floor S
A205	N/A	Outpatient Building 27
A312	ICU	ICU, A208
A312	3CB	Third Floor
A400A	4CB	Fourth Floor
A527	5CB	Fifth Floor
A631	8CB3	Recovery Room B814
A631	6CB	Sixth Floor
A709	7CB	Seventh Floor
A709	8CB2	Eighth Floor
A709	8CB2	Surgery

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Essential Equipment Branch

Buss begins on second floor from basement conduit to 2nd floor.

The essential equipment branch power is routed by encased copper buss way from the second to seventh floors of Building 1 with fused buss plugs in the following locations listed below:

Location	Label	Supplies Panel, Location
A203	2M	2M, A203
A203	Unassigned	MCC & EB, 025-27
A308	3M	3M, A308
A407	4M	4M, A407
A504	5M	5M, A504
A607	6M	6M, A607
A704	9M	9M, A900
A704	7M	7M, A704

3. BUILDINGS 2, 3, 8, AND 16:

Secondary power from 500 KVA pad mounted transformer is routed to a main distribution breaker located in the switchboard of Building 2, Room A119. This switchboard supports the boiler operations in Building 2 as well as Buildings 3 and 8. Panel E in Building 14 is also supported by this switchboard. Building 16 is fed via Building 3. A second pad mounted transformer (750 KW) routes power to the chiller plant which is located in Building 2 through a main distribution breaker in Building 2, Room 124. A 150 KW Generator located in Building 11 is the alternate source of power for the boiler operation, & panel E in Building 14. This 150 KW generator is connected through a transfer switch located in Room A119. Each of these emergency loads can be manually shed at the switchboard in Building 2, Room A119.

BUILDING 2, SWITCHBOARD DISCONNECTS FOR BUILDINGS 2, 3, 8, 14, AND 16

Normal Power only

Building 3 Electrical
Building 3 Lighting
Transfer Switch
Building 8
Laundry Main Disconnect

With Generator Power

Boiler HS (Unknown)
Boiler Plant MMC
Building 14 Panel E
Panel PH
Panel PL (PNLS L2 & 2L2)

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4. BUILDING 12:

In addition, the normal power that the building receives via campus radial A through the NHCU transformer, power is also supplied by Building 1 to panel E1 & NH1M which are located in Room 107 of the NHCU. Power is routed from the life safety distribution buss by an unlabeled fused buss plug in the closet of Room A119 in Building 1. This feeder for panel E1 is supported by the 600 KW generator. Panel E1 supports the requisite life safety features within the NHCU building.

BUILDING 12 MAIN DISCONNECTS
MCC, MOTOR CONTROL CENTER
CHILLER
BUILDING DISCONNECT (ALL PANELS LESS E1)

Note: For panel E1, see Building 1, Life Safety distribution
For panel NH1M, see Building 1, Essential Equipment Distribution.

5. BUILDING 14

A 75 KVA, 13.2V to 208V, 3 phase pad mounted transformer located outside and to the east of the building serves the Main panel in the building. An Emergency source of power is also serving this building. Panel E located in Building 14, Room 105, is fed from Building 2 switchboard, Room 119. This switchboard is fed by a 150 KVA, 13.2V to 208 V, 3 phase Emergency Generator outside the building.

6. BUILDING 27:

A 300 KVA, 13.2 to 208V, 3 phase pad mounted transformer located outside and to the north of the building serves the Main panel (MSD). Only one set of campus radials, Radial B, supply the 300 KVA transformer for this building from the east side of the electrical vault located to the south of Building 2. Emergency power is primarily provided by the 600KW emergency generator. Connections to emergency power branches are made on the 2nd floor of the main building. Part of the building on the 1st floor old building 25 space is provided emergency life safety power via battery backup lighting.

7. BUILDINGS 4, 5, 6, AND 7:

These buildings receive power from a 225 KVA pad mounted transformer located just south of Building 2. These buildings are either designated as business or outpatient occupancies and therefore, are not supported by an alternate source of power in case of a power failure. Each building is fitted with one or more electrical distribution panel(s) with main breakers or main disconnects on the following locations:

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MAIN ELECTRICAL PANELS

Building Number	Room #, Building	Panel
4	104-4	4E
5	101-5	5E
6	121-6	6W
7	126-7	7EB

BUILDING 1 EMERGENCY POWER ELECTRICAL DISTRIBUTION PANELS

Name	Location	Branch
CREL	Bldg. 19	Critical BRANCH
BCB	CB-A1 (Freight Elev. Lobby)	Critical
BLS	CB-A1 (Freight Elev. Lobby)	Life Safety
1M2	B010	Equipment
A	A007	Equipment
K	B017	Equipment
E	B008	Equipment
N	A007	Equipment
CW	017A	Equipment
Telephone UPS	B010	Equipment
1-CB	C1-A1 (Freight Elev. Lobby)	Critical
1-LS	C1-A1 (Freight Elev. Lobby)	Life Safety
1-CB2	C116	Critical
1-A2	A102	Equipment
2LS	C2-A1 (Freight Elev. Lobby)	Life Safety
2CB	C2-A1 (Freight Elev. Lobby)	Critical
2LAB1	C2-C1 (2N Corridor)	Critical
2LAB2	C2-C1 (2N Corridor)	Critical
2M2	C2-C1 (2N Corridor)	Equipment
2LS-2	C2-C1	Life Safety
2CB2	C2-C2 (Radiology Wing)	Critical
2CB3	A208	Critical
2M	A203	Equipment
2B2	A203	Equipment
2C2	C2-C2 (Radiology Wing)	Equipment
XRAY-B	C2-C2	Equipment
3LS	C3-A1 (Freight Elev. Lobby)	Life Safety
3CB	C3-A1 (Freight Elev. Lobby)	Critical
3M	A308D	Equipment
MCC-1	CC-3E (Penthouse over Radiology)	Equipment

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4LS	C4-A1 (Freight Elev. Lobby)	Life Safety
4CB	C4-A1 (Freight Elev. Lobby)	Critical
4M	A444	Equipment
MCC-2	B407 (Access from Room B314B)	Equipment
4B1	A444	Equipment
5LS	C5-A1 (Freight Elev. Lobby)	Life Safety
5CB	C5-A1 (Freight Elev. Lobby)	Critical
5M1	A534	Equipment
5B1	A534	Equipment
6LS	C6-A1 (Freight Elev. Lobby)	Life Safety
6CB	C5-A1 (Freight Elev. Lobby)	Critical
6M	A644	Equipment
7LS	C7-A1 (Freight Elev. Lobby)	Life Safety
7CB	C7-A1 (Freight Elev. Lobby)	Critical
7CB2	A703	Critical
7M	A704	Equipment
8LS	C8-A1 (Freight Elev. Lobby)	Life Safety

Name	Location	Branch
8CB	C8-A1 (Freight Elev. Lobby)	Critical
8CB2	C8-A1 (Freight Elev. Lobby)	Critical
8C	Surgery	Critical
8D	Surgery	Critical
8E	Surgery	Critical
8F	Surgery	Critical
8M	B810	Equipment
9M	9th PH	Equipment
9A	9th PH	Equipment
MCC3	9th PH	Equipment
9B	9th PH	Equipment
9B1	9th PH	Equipment
9D1	9th PH	Equipment
Elev Disc's	10th PH	Equipment

OUTPATIENT BUILDING 27 EMERGENCY POWER ELECTRICAL DISTRIBUTION PANELS

LS-L	023	Life Safety
LS-1	1C2 (ER Corridor)	Life Safety
CB-1	1C2 (ER Corridor)	Critical
MCC	025	Equipment
EB	025	Equipment

ESSENTIAL ELECTRICAL DISTRIBUTION SYSTEM EQUIPMENT INVENTORY

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1. Service Entrance Conductors:

Two underground service laterals in concrete encased PVC conduits from WWP feeders NW 12F2 and NW 12F4 to the load-break interrupter switchboard.

2. Building 20, Service Load-Break Interrupter Switchboard:

Mfgr: Powercon Corporation of Severn, Maryland

Model: Use either customer number 13213 or shop order 00-71243

3. Campus Distribution:

Radials **A** and **B** serve all loads on station, 13.8 KV, 3 phase, 4 wire, with ground, located in underground concrete encased PVC duct.

4. Pad Mounted Distribution Transformers:

Location Building	Mfgr	Serial Number	Area Served	KVA
13	Sq D	830622-1	Bldg. 12	300
18	GE	P189847TWC	Bldg. 2	500
19	GE	P491203TVC	Bldg. 1	1500
24	GE	871084-A1	Bldg. 2	750
27	GE	Q525194-TVM	Bldg. 27	300
30	Sq D	00J183246	Bldg. 30	300

5. Building 19, Service Switchboard for Building 1:

Houses a enclosed copper 5000 amp main bus which divides into two 2500 amp buses which supply breaker lineups A and B respectively. Each lineup consists of one AV-Line switchboard and four-power break switchboards.

a. Mfgr: General Electric Co.

Project Type: AV-5

Job No: 54420 (No C-127322, 50 of 5, line up A)
(No C-127272, 1 of 5, line up B)

b. Mfgr: General Electric Co.

Product Type: Power Break

Job No: 54420 (No C-127322, 1,2,3, and 4 of 5, line up A)
(No C-127272, 2, 3, 4, and 5 of 5, line up B)

6. Equipment located in Building 1, Room B010:

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a. EDSS (EMERGENCY DISTRIBUTION-SYNCHRONIZING SWITCHBOARD)

Mfgr: Pederson Power Products, Division of EA Pederson Co.

Model: Use Order No. VA Project 668-048

S/N Section No. 1 through 5

The EDSS requires the support of two separate battery power sources. Each source consists of a lead acid battery system supported by a charger as follows:

48 Volt system for electronic breakers:

- (1) Battery type: Type Interstate, 6 volt, 8 each
- (2) Battery charger: Mfgr: ALCAD Standby Batteries
Model: ISCRF 048-012
S/N: 7718NA

24 Volt system for control processor:

- (1) Battery Type: GNB, Lead acid/AGM/2 volts x 12 each
- (2) Battery Charger: Mfgr: Ratelco Inc.
Model: 111-3258-02
S/N:
- (3) Ground Detection Panel: Mfgr: Ratelco Inc
Model: 111-3258-2
S/N None

b. ADP Distribution System (item 3 located in Room B005A)

- (1) Lightning Protector:

Mfgr: lightning Elimination Associates, Inc.

Model: MB-200/3 120/208-3P-WYE

S/N None

- (2) UPS:

Mfgr: Liebert Corp (Square D Co)

Model: Series 300

S/N C177677

c. Telephone System UPS Equipment:

- (1) C&D Rectifier: Mfgr: C&D Charter Power System
Assembly No: 5-17682

For Reference Only - System Description Not Current

S/N 5-17682

7. Building 10, 600 KW emergency generator for Building 1, NHCU, and Outpatient Building 27:

a. Cummins Standby Power Emergency Duty Generator Set:

Cummins Engine No: 25191429
Cummins Engine Type: VTA28G5
S/N

Onan AC Generator Model: 600DFGB
Onan S/N: C032765/01

Onan Generator Controller Model: S/N: F930511743

Fuel Consumption: 30 gal/hr.
Fuel Tank Size: 3000 gal
Operating Time on Full Tank: 100 hours

b. Generator Control Panel:

Mfgr: Onan
Model: Intregal to Generator

c. 24 Volt Lead Acid Battery System w/charger:

(1) Battery Type: 10 Lead Acid 12 volt wet cells
Mfgr: Optima
Catalog No: SC34A

(2) Charging Unit: Mfgr: LaMarch Mfg Co
Model: A46-20-24V
S/N B55279

d. Generator AV2 Product Type Switchboard:

Mfgr: General Electric
Job No: 55822, Item 1, Section 1
S/N: None, Plant product Code T321

e. Fuel Oil Day Tank:

For Reference Only - System Description Not Current

Mfgr: Simplex
Model: SST Series
S/N: None

8. GE 2500 amp encased copper feeder busway, Bldg. 10 to Bldg. 1

9. Encased copper distribution buses:

Life Safety:	400 amp
Critical:	600 amp
Equipment:	1200 amp

The life safety and critical branch distribution busses are vertical type, Manufactured by GE, installed upside down and the essential equipment branch is horizontal type installed vertically, manufactured by Square D.

10. Building 2 (boiler plant) Equipment, Room 119:

- a. AV-Line Switchboard: Mfgr: General Electric Co.
Job No: 54420
- b. 600A Transfer Switch: Mfgr: Automatic Switch Co.
Model: 940360046XC
S/N 47778-Y

11. Building 11, 150 KW emergency generator for Building 2:

a. Cummins Standby Power Emergency Duty Generator Set:

Cummins Part No:	209786
Model No:	500FDC3042ABW
S/N	BJ-96766-325-2
VA PM No:	6115-0242

Fuel Consumption: 18 gal/hr

Fuel Tank Size: 1000 gal

Operating Time on Full Tank: 55 ½ Hours

b. Generator Control Panel:
Mfgr: Onan
Model: Integral to Generator
S/N 142

c. 24 Volt Lead Acid Battery System w/charger:

1. Battery Type: 8 Lead Acid 12 Volt wet cells

For Reference Only - System Description Not Current

Mfgr: Optima
Model: SC34A

2. Charging Unit: Mfgr: LaMarch Mfg Co
Model: A46-6-24V
S/N B55278