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Executive Summary

The electrical system of The Virginia Commonwealth University Life Sciences Building is a typical radial system with one main power source and therefore on primary feeder. It is provided from an existing utility feeder located to the northwest of The VCU Life Sciences Building. Emergency power is also generated on-site through the use of a 900kW diesel generator.

The NEC building design load was calculated to check the existing feeder sizes for the main feeders. The NEC 2005 Code was referenced in performing these calculations. Everything was found to be correctly sized with growth and voltage drop considerations taken into effect.

Power Distribution System

Electrical Distribution System

The electrical distribution system in The Virginia Commonwealth University Life Sciences Building is radial. There is only one source of power, the utility transformer, and therefore one primary feeder from this. The primary feeder serves main switchboard, SB-NG which provides power to the rest of the building.

Utility System

The main electrical room is located in the basement of the laboratory building in the northwest corner. The building's main switchboard is fed from a transformer provided by Virginia Power. The transformer is located north of the electric room, on the southwest corner of the existing Science and Education Building. Virginia Power is responsible for providing and maintaining the transformer, but The Virginia Commonwealth University is responsible for the power system from that point on.

Voltage Systems

The voltage systems include 480Y/277V for lighting, including dimming panels, mechanical equipment, and some laboratory equipment. Receptacles and more laboratory equipment are on 208Y/120V systems. This voltage level is provided through the use of dry-type step down transformers located throughout The VCU Life Sciences Building.

Transformers

As stated previously, there are transformers located throughout The VCU Life Sciences Building to provide 208Y/120V voltage. All of the transformers are dry-type, step down.

TRANSFORMER SCHEDULE							
TAG	PRIMARY VOLTAGE	SECONDARY VOLTAGE	SIZE (kVA)	TYPE	TEMP. RISE	TAPS	MOUNTING
T-1		480Y/277V,3PH,4W	N/A	N/A	N/A	N/A	Pad Mounted by VA Power Co.
T15K	480V,3PH,3W.	208Y/120V,3PH,4W	15	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T30K	480V,3PH,3W.	208Y/120V,3PH,4W	30	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T75K	480V,3PH,3W.	208Y/120V,3PH,4W	75	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T150K	480V,3PH,3W.	208Y/120V,3PH,4W	150	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T30	480V,3PH,3W.	208Y/120V,3PH,4W	30	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T45	480V,3PH,3W.	208Y/120V,3PH,4W	45	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T75	480V,3PH,3W.	208Y/120V,3PH,4W	75	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T225	480V,3PH,3W.	208Y/120V,3PH,4W	225	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T300	480V,3PH,3W.	208Y/120V,3PH,4W	300	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
T500	480V,3PH,3W.	208Y/120V,3PH,4W	500	DRY TYPE	115 Degree C	(6) 2.5%	Pad Mounted On Floor
NOTES: Subscript "K" denotes K-rated transformers.							

Table 1.1 Transformer Schedule

Emergency Power

The Virginia Commonwealth University also has a separate on-site emergency/ standby power system that includes lighting and power panels. This system is fed from the main switchboard through 3 automatic transfer switches. The incoming voltage is 480V and is utilized at 480V and 208/120V. Should the normal power system shut down, there is a 900kW diesel generator that will provide power.

Overcurrent Protective Devices

Overcurrent protective devices used throughout The Virginia Commonwealth University Life Sciences building include fuses, disconnect switches, and circuit breakers. There are Class RK1, time delay fuses for motor branch circuits and Class RK5, non-time delay for other branch circuits. The disconnect switches are enclosed and either nonfusible or fusible. Both disconnect switches are NEMA KS 1, Type HD. Molded-Case circuit breakers are used for switching fluorescent lighting loads, heating, air-conditioning, and refrigerating equipment.

Electrical Equipment Locations

There is a main electric room located on the basement level of the laboratory building that houses the main switchboard, some lighting panels, power panels, a motor control center, and a few transformers. The other electrical equipment is located in electric and mechanical rooms on the basement, first, second, and third floors. On the basement level, there is the main electric room, one mechanical room and one electric room. On the first, second, and third floors there are three electric closets; east, central, and west. There are also various panelboards that are located throughout these floors.

Typical Lighting Systems

For the interior of the building, typical lighting systems include fluorescent, compact fluorescent, metal halide, incandescent, and LED. Metal halide and high pressure sodium lamps are used to illuminate the exterior area. The different luminaires operate at 277V or 120V. This systems is controlled through wall switches and dimming panels.

ASHRAE/IESNA 90.1 Shutoff Requirements

ASHRAE/IESNA 90.1 shutoff requirements are met through the use of electronic time clocks that control the lighting in the animal and aquatics facilities. Occupancy sensors control the lighting in the classrooms located in the classroom building.

Power Factor Correction

There is no power factor correction in The Virginia Commonwealth University Life Sciences Building.

Design Requirements

Voltage drop is one of the main considerations as The Virginia Commonwealth University Life Sciences building is 132,500 sf. There are panelboards located on all levels in at least 3 locations, however, it is still a long distance overall and if the voltage drops the equipment that they are servicing may not run properly.

Lighting and Mechanical Loads

LUMINAIRE SCHEDULE							
Type	LAMP		BALLAST				Voltage
	Number	Type	PF	BF	Watts	Input Current	
B1	2	7.2W T-5 TUNGSTEN HALOGEN	n/a	n/a	n/a	0.03	120/277
C1	1	70W MH PULSE START 3000K	>0.97	0.95	80	0.3	277
D1	1	150W A-21 IF	n/a	n/a	n/a	1.25	120
D1A	1	150W PAR-38FL	n/a	n/a	n/a	1.25	120
D2	1	70W MH 3200K	>0.97	0.95	80	0.3	120
D3	1	70W MH 3200K	>0.97	0.95	80	0.3	277
D4	2	18W QUAD 3500K	0.97	1.00	19	0.08	277
D5	1	15W A15	n/a	n/a	n/a	0.05	277
	1	150W A21	n/a	n/a	n/a	1.25	120
D6	2	26W QUAD 3500K	0.99	1.00	54	0.45	277
D7	2	18W QUAD 3500K	0.97	1.00	19	0.08	277
D8	1	70W MH 3200K	>0.97	0.95	80	0.3	277
E1	1	LED	n/a	n/a	n/a	0.03	120/277
E2	2	LED	n/a	n/a	n/a	0.03	120/277
E3	1	LED	n/a	n/a	n/a	0.03	120/277
E5	2	6W T5 2700K	0.59	1.00	15	0.27	120
E6	2	9W TT 2700K	0.98	1.00	22	0.44	277
F1	3	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
F2	3	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
F3	2	40W BIAX 3500K	0.99	1.00	102	0.85	277
F4	3	31W T8 U-1 5/8" 3500K	>0.97	0.88	28	.24/.10	277
F4A	3	31W T8 U-1 5/8" 3500K	>0.97	0.88	28	.24/.10	277
F5	2	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
F5A	3	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
F6	2	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
F6A	3	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
F7	2	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
P1	3	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
P2	2	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
P3	4	26W QUAD 2700K	0.99	1.00	54	0.45	277
P4	2	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
S1	2	F32- T8 3500K	>0.97	0.88	28	.24/.10	277

S2	1	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
W1	1	F32- T8 3500K	>0.97	0.88	28	.24/.10	277
W2	2	9W TT 2700K	0.98	1.00	22	0.44	120
W3	1	70WMH 4100K	>0.97	0.95	80	n/a	277
W4	1	100W MH 4100K	>0.97	0.95	112	0.95/0.40	277
W5	1	100W MH 4100K	>0.97	0.95	112	0.95/0.40	277
W6	1	175W MH 4100K	0.90	1.00	191	0.7	277
WW1	2	55W BIAX 3500K	0.98	1.00	120	1	277
WW2	1	26W QUAD 3500K	0.99	1.00	54	0.45	277
WW2	1	150W TUNGSTEN	n/a	n/a	n/a	1.25	120
X1	1	150W HPS 4000K	0.90	1.00	166	0.6	277
X2	1	100W E17 MH 4000K	0.90	1.00	109	0.4	277

Table 1.2 Luminaire Schedule

MECHANICAL EQUIPMENT								
Equipment Tag	**Description**	**Volt**	**Phase**	**HP**	**KW**	**F.L.A.**	**Type of Connection**	**KVA**
	CHILLERS							
CH-1	CHILLER #1 RM 019	480	3		345.0	415.0	NON-FUSED DISCONNECT SWITCH	345.00
CH-2	CHILLER #2 RM 019	480	3		345.0	415.0	NON-FUSED DISCONNECT SWITCH	345.00
	BOILERS							
B-1	BOILER #1 RM 019	480	3	7 1/2		11.0	NON-FUSED DISCONNECT SWITCH	9.13
B-2	BOILER #2 RM 019	480	3	7 1/2		11.0	NON-FUSED DISCONNECT SWITCH	9.13
B-3	BOILER #3 ROOF	208	3			40.0	NON-FUSED DISCONNECT SWITCH	4.79
	COOLING TOWERS							
CT-1	COOLING TOWER ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	53.98
CT-2	COOLING TOWER ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	53.98
SH-1	COOLING TOWER SUMP HEATER	480	3		8.0	9.6	NON-FUSED DISCONNECT SWITCH	8.00
SH-2	COOLING TOWER SUMP HEATER	480	3		8.0	9.6	NON-FUSED DISCONNECT SWITCH	8.00

	ROOF TOP AIR HANDLING UNITS							
SF-1	RTU-1 SUPPLY FAN ROOF	480	3	75		96.0	NON-FUSED DISCONNECT SWITCH	79.72
SF-2	RTU-2 SUPPLY FAN ROOF	480	3	60		77.0	NON-FUSED DISCONNECT SWITCH	63.94
SF-3	RTU-3 SUPPLY FAN ROOF	480	3	100		124.0	NON-FUSED DISCONNECT SWITCH	102.97
SF-4	RTU-4 SUPPLY FAN ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	53.98
SF-5	RTU-5 SUPPLY FAN ROOF	480	3	15		21.0	NON-FUSED DISCONNECT SWITCH	17.44
SF-6	RTU-6 SUPPLY FAN ROOF	480	3	15		21.0	NON-FUSED DISCONNECT SWITCH	17.44
SF-7	RTU-7 SUPPLY FAN ROOF	480	3	15		21.0	NON-FUSED DISCONNECT SWITCH	17.44
SF-8	RTU-8 SUPPLY FAN ROOF	480	3	10		14.0	NON-FUSED DISCONNECT SWITCH	11.63
HC-7	RTU-7 HEATER COIL	480	3		80.0	96.2	NON-FUSED DISCONNECT SWITCH	79.88
HC-8	RTU-8 HEATER COIL	480	3		50.0	60.1	NON-FUSED DISCONNECT SWITCH	49.91
RF-2	RTU-2 RETURN FAN ROOF	480	3	15		21.0	NON-FUSED DISCONNECT SWITCH	17.44
RF-4	RTU-4 RETURN FAN ROOF	480	3	7 1/2		11.0	NON-FUSED DISCONNECT SWITCH	9.13
RF-5	RTU-5 RETURN FAN ROOF	480	3	7 1/2		11.0	NON-FUSED DISCONNECT SWITCH	9.13
RF-6	RTU-6 RETURN FAN ROOF	480	3	7 1/2		11.0	NON-FUSED DISCONNECT SWITCH	9.13
CU-6	FCU-1 CONDENSING UNIT ROOF	277	1	1/4		1.5	NON-FUSED DISCONNECT SWITCH	0.42
CU-7	RTU-7 CONDENSING UNIT ROOF	480	3		49.6	59.7	NON-FUSED DISCONNECT SWITCH	49.57
CU-8	RTU CONDENSING UNIT ROOF	480	3		36.1	43.4	NON-FUSED DISCONNECT SWITCH	36.04

	PUMPS							
CHP-1	CHILLED WATER PUMP #1 RM 019	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
CHP-2	CHILLED WATER PUMP #2 RM 019	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
CHP-3	CHILLED WATER PUMP #3 RM 019	480	3	75		96.0	NON-FUSED DISCONNECT SWITCH	79.72
CHP-4	CHILLED WATER PUMP #4 RM 019	480	3	75		96.0	NON-FUSED DISCONNECT SWITCH	79.72
CWP-1	CONDENSED WATER PUMP#1 RM 019	480	3	75		96.0	NON-FUSED DISCONNECT SWITCH	79.72
CWP-2	CONDENSED WATER PUMP#1 RM 019	480	3	75		96.0	NON-FUSED DISCONNECT SWITCH	79.72
HWP-1	HOT WATER PUMP #1 RM 019	480	3	5		7.6	NON-FUSED DISCONNECT SWITCH	6.31
HWP-2	HOT WATER PUMP #2 RM 019	480	3	5		7.6	NON-FUSED DISCONNECT SWITCH	6.31
HWP-3	HOT WATER PUMP #3 RM 019	480	3	25		34.0	NON-FUSED DISCONNECT SWITCH	28.23
HWP-4	HOT WATER PUMP #4 RM 019	480	3	25		34.0	NON-FUSED DISCONNECT SWITCH	28.23
SP-1	SUMP PUMP #1 ROOM 040L	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
SP-2	SUMP PUMP #2 RM 012B	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
SP-3	SUMP PUMP #3 RM 150B	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
	UNIT HEATERS							
UH-1	UNIT HEATER #1 RM 019	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
UH-2	UNIT HEATER #2 RM 019	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
CUH-1	CABINET UNIT HEATER RM 101	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
CUH-2	CABINET UNIT HEATER RM S002	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86

CUH-3	CABINET UNIT HEATER RM C108	120	1	1/3		7.2	MANUAL MOTOR RATED SWITCH	0.86
CUH-4	CABINET UNIT HEATER RM C105	120	1	1/10		2.3	MANUAL MOTOR RATED SWITCH	276.00
CUH-5	CABINET UNIT HEATER RM C105	120	1	1/10		2.3	MANUAL MOTOR RATED SWITCH	0.28
CUH-6	CABINET UNIT HEATER RM C103	120	1	1/10		2.3	MANUAL MOTOR RATED SWITCH	0.28
	WALL HEATERS							
EUH-1	WALL HEATER #1 RM 017	208	1		5.0	24.0	NON-FUSED DISCONNECT SWITCH	5.00
EUH-2	WALL HEATER RM 304C	208	1		5.0	24.0	NON-FUSED DISCONNECT SWITCH	5.00
	EXHAUST FANS							
EF-1	EXHAUST FAN #1 ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	0.70
EF-2	EXHAUST FAN #2 ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	0.70
EF-3	EXHAUST FAN #3 ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	0.70
EF-4	EXHAUST FAN #4 ROOF	480	3	50		65.0	NON-FUSED DISCONNECT SWITCH	0.70
EF-5	EXHAUST FAN #5 ROOF	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
EF-6	EXHAUST FAN #6 ROOF	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
EF-7	EXHAUST FAN #7 ROOF	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
EF-8	EXHAUST FAN #8 ROOF	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
EF-9	EXHAUST FAN #9 ROOF	480	3	1 1/2		3.0	NON-FUSED DISCONNECT SWITCH	2.49
EF-10	EXHAUST FAN #10 ROOF	120	1	1/4		5.8	NON-FUSED DISCONNECT SWITCH	0.86
EF-11	EXHAUST FAN #11 ROOF	120	1	1/4		5.8	NON-FUSED DISCONNECT SWITCH	0.86
EF-12	EXHAUST FAN #12	480	3	7 1/2		11.0	NON-FUSED	9.13

	ROOF						DISCONNECT SWITCH	
EF-13	EXHAUST FAN #13 ROOF	480	3	7 1/2		11.0	NON-FUSED DISCONNECT SWITCH	9.13
EF-14	EXHAUST FAN #14 ROOF	480	3	2		3.4	NON-FUSED DISCONNECT SWITCH	2.82
EF-15	EXHAUST FAN #15 ROOF	480	3	2		3.4	NON-FUSED DISCONNECT SWITCH	2.82
EF-16	EXHAUST FAN #16 ROOF	480	3	3		4.8	NON-FUSED DISCONNECT SWITCH	3.99
EF-17	EXHAUST FAN #17 ROOF	480	3	3		4.8	NON-FUSED DISCONNECT SWITCH	3.99
EF-18	EXHAUST FAN #18 ROOF	480	3	5		7.6	NON-FUSED DISCONNECT SWITCH	6.31
EF-19	EXHAUST FAN #19 ROOF	480	3	3		4.8	NON-FUSED DISCONNECT SWITCH	3.99
	FAN COIL UNITS							
FCU-1	FAN COIL UNIT #1 RM 042	277	1	1		9.1	NON-FUSED DISCONNECT SWITCH	2.52
	HUMIDIFIERS							
HU-1	HUMIDIFIER UNIT RM 340C	120	1		0.6	5.0	MANUAL MOTOR RATED SWITCH	1.20
HU-2	HUMIDIFIER UNIT RM 340C	120	1		0.6	5.0	MANUAL MOTOR RATED SWITCH	1.20
HU-3	HUMIDIFIER UNIT RM 312B	120	1		1.2	10.0	MANUAL MOTOR RATED SWITCH	1.20
HU-4	HUMIDIFIER UNIT RM 312B	120	1		1.2	10.0	MANUAL MOTOR RATED SWITCH	1.20
HU-5	HUMIDIFIER UNIT RM 312B	120	1		1.2	10.0	MANUAL MOTOR RATED SWITCH	1.20
HU-6	HUMIDIFIER UNIT RM 312B	120	1		0.6	5.0	MANUAL MOTOR RATED SWITCH	1.20
HU-7	HUMIDIFIER UNIT RM 208B	120	1		1.2	10.0	MANUAL MOTOR RATED SWITCH	1.20
HU-8	HUMIDIFIER UNIT RM 208B	120	1		1.2	10.0	MANUAL MOTOR RATED SWITCH	1.20
HU-9	HUMIDIFIER UNIT	120	1		1.2	10.0	MANUAL	1.20

	RM 208B						MOTOR RATED SWITCH	
HU-10	HUMIDIFIER UNIT RM 208B	120	1		1.2	10.0	MANUAL MOTOR RATED SWITCH	1.20
	MISCELLANEOUS							
RP-1	WATER PURIFIER RM 019	480	3	3		4.8	NON-FUSED DISCONNECT SWITCH	3.99
DAC-1	DESICANT UNIT ROOF	480	3			44.1	NON-FUSED DISCONNECT SWITCH	36.62
LCV-1	CENTRAL VACCUM RM 019	480	3	10		14.0	NON-FUSED DISCONNECT SWITCH	11.63
AC-1	AIR COMPRESSOR RM 019	480	3	30		40.0	NON-FUSED DISCONNECT SWITCH	33.22
AC-2	AIR COMPRESSOR RM 019	480	3	1		1.8	NON-FUSED DISCONNECT SWITCH	1.49
ESF-1	STAIR FAN C301 WEST	480	3	3/4		1.6	NON-FUSED DISCONNECT SWITCH	1.16
ESF-2	STAIR FAN C301 EAST	480	3	3/4		1.6	NON-FUSED DISCONNECT SWITCH	1.16
ESF-3	STAIR FAN C301	480	3	1/2		1.1	NON-FUSED DISCONNECT SWITCH	0.83
EWH-1	ELECTRIC WATER HEATER RM 150	120	1		1.5	12.5	NON-FUSED DISCONNECT SWITCH	1.50
GWH-1	GAS WATER HEATER RM 019	120	1	1/4		5.8	MANUAL MOTOR RATED SWITCH	0.70
GWH-2	GAS WATER HEATER RM 019	120	1	1/4		5.8	MANUAL MOTOR RATED SWITCH	0.70
HP-1	HEAT PUMP PENTHOUSE	277	1		2.4	8.6	NON-FUSED DISCONNECT SWITCH	2.40
HSF-1	SUPPLY FAN ROOF	120	1	1/4		5.8	MANUAL MOTOR RATED SWITCH	0.70
HSF-2	SUPPLY FAN RM 340C	120	1		0.1	1.0	MANUAL MOTOR RATED SWITCH	0.12
							TOTAL kVA	**2502.84**

Table 1.3 Mechanical Equipment Schedule

NEC Load Calculations

NEC LOAD CALCULATIONS- Lighting										
Occupancy Type	Unit Load (VA/sf)	Basement		1st Floor		2nd Floor		3rd Floor		TOTAL LOAD (KVA)
		Area (sf)	Demand (kVA)	Area (sf)	Demand (kVA)	Area (sf)	Demand (kVA)	Area (sf)	Demand (kVA)	
Auditorium	1	0	0.00	7120	7.12	0	0.00	0	0	7.12
Restroom	1	850	0.85	705	0.71	700	0.70	675	0.675	2.93
Classroom	3	7795	23.39	7685	23.06	13398	40.19	1905	5.715	92.35
Corridors	0.5	2476	1.24	6900	3.45	6053	3.03	1832	0.916	8.63
Laboratory	3	6933	20.80	7215	21.65	15375	46.13	14703	44.109	132.68
Lobby	1	0	0.00	1575	1.58	260	0.26	0	0	1.84
Lounge	1.5	0	0.00	0	0.00	265	0.40	0	0	0.40
Office	3.5	4339	15.19	5290	18.52	1820	6.37	6676	23.366	63.44
Equipment	1	4576	4.58	662	0.66	556	0.56	1370	1.37	7.16
Storage	0.25	407	0.10	1675	0.42	400	0.10	160	0.04	0.66
									TOTAL	**317.20**

Table 1.4 NEC Lighting Load Calculations

CONNECTED RECEPTACLE LOADS				
Floor	Normal	Emergency	Normal KVA	Emergency KVA
Basement	889	0	160.1	0.0
1st Floor	979	0	176.3	0.0
2nd Floor	1311	0	236.0	0.0
3rd Floor	1566	0	281.9	0.0
			TOTAL KVA	**854.3**
			DEMAND KVA	**432.2**

Table 1.5 Connected Receptacle Loads

Feeder Sizing

FEEDER SCHEDULE			
FEEDER NO.	**FEEDER SIZE**	**CONDUIT SIZE**	**AMPS**
2Y	4- #12	½"	25
3Y	4- #10	½"	35
5	3- #8	¾"	50
5Y	4- #8	1"	50
7	3- #6	1"	65
7Y	4- #6	1"	65
10	3- #2	1 ¼"	115
10Y	4- #2	1 ¼"	115
10YK	3- #2 + #3/0 N	1 ½"	115
15Y	4- #1/0	2"	150
15YK	3- #1/0 + #2/0 N	2"	150
20Y	4- #3/0	2"	200
23YK	5- #4/0	2 ½"	230
30YK	5- 350kcmil	3"	310
40	3- 500kcmil	3"	380
40Y	4- 500kcmil	4"	380
40YK	5- 500kcmil	3 ½"	380
50Y	2 sets 4- 250kcmil	2- 2 ½"	510
80	2 sets 3- 500kcmil	2- 3"	760
80Y	2 sets 4- 500kcmil	2- 4"	760
NOTE: FEEDER LOCATION SEE SINGLE LINE DIAGRAM FIG. 1.1			

Table 1.6 Feeder Schedule

Feeder serving T-500

Wire:	2 sets 3- 500kcmil
Connected KVA:	500
Connected Amps:	500kVA/ (1.732*0.480V) = 601.4 A
+25% Growth:	752 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 Sets 3- 500 kcmil- 760A

Therefore the wire is properly sized.

Feeder 80Y serving Panel DPNG2W

Wire:	2 sets 4- 500kcmil
Connected KVA:	435.2
Connected Amps:	435.2kVA/ (1.732*0.480V) = 523.5 A
+25% Growth:	654 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 Sets 4- 500 kcmil- 760A

Therefore the wire is properly sized.

Feeder serving T-225K

Wire:	3- 500kcmil
Connected KVA:	225
Connected Amps:	225kVA/ (1.732*0.480V) = 270.6 A
+25% Growth:	338 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 3- 500 kcmil- 380A

Therefore the wire is properly sized.

Feeder serving ATS-1

Wire:	4- #2
Breaker:	100 A
Connected KVA:	47.7
Connected Amps:	47.7kVA/ (1.732*0.480V) = 67.5 A
+25% Growth:	85 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 4- #2- 115A

Therefore the wire and breaker are properly sized.

Feeder serving ATS-2

Wire:	3- 500kcmil
Amp Rating:	400 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 3- 500 kcmil- 380A

Therefore the wire is properly sized.

Feeder serving ATS-3

Wire:	2 sets 3- 500kcmil
Amp Rating:	800
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 Sets 3-500 kcmil- 760A

Therefore the wire is properly sized.

Feeder 80Y serving MCC-N3M

Wire:	2 sets 4- 500kcmil
Rated Amps:	800 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 Sets 500 kcmil- 760A

Therefore the wire is properly sized.

Feeder 40Y serving DPN12C

Wire:	3- 500kcmil
Connected KVA:	282.5
Connected Amps:	282.5kVA/ (1.732*0.480V) = 340 A
+25% Growth:	425 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 3- 500 kcmil- 380A

Therefore the wire is properly sized.

Feeder 20Y serving MCC-NGG

Wire:	4- #3/0
Rated Amps:	200 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 4- #3/0- 200A

Therefore the wire is properly sized.

Feeder 50Y serving CHILLER 1

Wire:	2 sets 4- 250kcmil
Connected KVA:	345
Connected Amps:	345kVA/ (1.732*0.480V) = 415 A
+25% Growth:	519 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 sets 4- 250kcmil- 510A

Therefore the wire is properly sized.

Feeder 50Y serving CHILLER 2

Wire:	2 sets 4- 250kcmil
Connected KVA:	345
Connected Amps:	345kVA/ (1.732*0.480V) = 415 A
+25% Growth:	519 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 sets 4- 250kcmil- 510A

Therefore the wire is properly sized.

Feeder 80Y serving MCC-NGM

Wire:	2 sets 4- 500kcmil
Rated Amps:	800 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 Sets 500 kcmil- 760A

Therefore the wire is properly sized.

Feeder serving T-300

Wire:	2 sets 3- #4/0
Connected KVA:	300
Connected Amps:	300kVA/ (1.732*0.480V) = 360.9 A
+25% Growth:	451 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 2 sets 3- #4/0- 460A

Therefore the wire is properly sized.

Feeder serving NG2W

Wire:	4- 500kcmil
Connected KVA:	157.3
Connected Amps:	157.3kVA/ (1.732*0.480V) = 189.2 A
+25% Growth:	237 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 4- 500 kcmil- 380 A

Therefore the wire is properly sized.

Total Building Load

Lighting:	317.2 kVA
Mechanical:	2503 kVA
Receptacle:	854.3 kVA
Total:	3674.5 kVA
Wire:	9- 500 kcmil
Connected Amps:	3674.5/ (1.732*0.480V) = 4419.7 A
+25% Growth:	5524.6 A
Checking wire size:	From Table 310.16- 75 degree C- Copper: 9- 500kcmil- 5580 A

Therefore the wire is properly sized.

Utility Information

Eileen Dean, Utilities Coordinator, 804-828-4618 eldeane@vcu.edu
Joe Mannix, Building Contact jgmannix@vcu.edu

I am in the process of getting this information.

Lindsay Rekuc
Virginia Commonwealth University Life Sciences Building
Richmond, VA

Communication Systems

Telephone and Data Systems

The telephone and data systems are accessible in almost every room in The VCU Life Sciences Building. Conduit is run on each of the floors along each side of the main hallway and then tap out into each room. Telephone lines and internet lines can then be accessed from almost any room in the building. This is very useful since an internet connection can be used to research information in the laboratories or for demonstrations during class. There are also emergency telephone lines for public use installed near the stairwells in the corridors.

Area of Rescue Assistance System

Area of rescue assistance system is available at each of the stairwell landings. It is an emergency intercom system that allows people who are unable to reach safety by themselves to call for for assistance from rescue personnel.

Fire Alarm System

The fire alarm system is installed throughout The VCU Life Sciences Building. Its equipment includes control panels, annunciator panels, digital alarm communication transmitters, electro-magnetic door hold open devices, heat and smoke detectors, sprinkler flow switches, alarm pressure switches, sprinkler valve tamper switches, monitor and control modules, and combination horn and strobes.

FOR ALL FILES REFER TO:

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