

TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
POWER DISTRIBUTION SYSTEMS	
DRAWING LIST	3
SUMMARY DESCRIPTION	3
UTILITY COMPANY INFORMATION	4
SERVICE ENTRANCE	4
VOLTAGE SYSTEM	4
EMERGENCY POWER SYSTEM	5
LOCATION OF SWITCHGEAR	6
OVER-CURRENT DEVICES	13
TRANSFORMERS	14
SPECIAL EQUIPMENT	15
LIGHTING LOADS	15
MECHANICAL & OTHER LOADS	17
SERVICE ENTRANCE SIZE	21
ENVIRONMENTAL STEWARDSHIP DESIGN	22
DESIGN ISSUES	22
COMMUNICATION SYSTEMS	23
DRAWING LIST	23
SUMMARY REPORT	
FIRE PROTECTION	23
TELECOMMUNICATIONS	23
TRANSPORTATION	24
AUDIO / VISUAL SYSTEM	24
APPENDIX	
FEEDER SCHEDULE	
BALLAST CUT SHEETS	
RISER DIAGRAMS	
MODIFIED	
ORIGINALS	

EXECUTIVE SUMMARY

TECHNICAL REPORT 2: THE ELECTRICAL SYSTEM EXISTING CONDITIONS AND BUILDING LOAD SUMMARY EXAMINES THE JOHN PAUL JONES ARENA LOCATED ON THE CAMPUS OF THE UNIVERSITY OF VIRGINIA. THE REPORT DISCUSSES THE POWER DISTRIBUTION SYSTEMS AND THE COMMUNICATION SYSTEMS THAT ALLOW THE ARENA TO FUNCTION AT AN OPTIMAL LEVEL ON A DAILY BASIS. WITHIN EACH SECTION IS AN ANALYSIS OF THE ENTIRE SPACE STARTING AT THE SERVICE ENTRANCE MOVING THROUGH THE BUILDING ALL THE WAY DOWN TO INDIVIDUAL EQUIPMENT AND PANELBOARDS. AN APPENDIX AT THE CONCLUSION OF THE REPORT DISCUSSES BALLAST CUT SHEETS AND PRESENTS SINGLE LINE DIAGRAMS CREATED FROM AN IN-DEPTH LOOK THROUGH DRAWINGS AND SPECIFICATIONS.

THE ARENA USES A RADIAL-TYPE ELECTRICAL DISTRIBUTION SYSTEM, AND SUPPLIES THE BUILDING WITH 480Y/277V, 3-PHASE POWER. DOMINION VIRGINIA POWER IS THE UTILITY SUPPLIER TO THE ENTIRE CAMPUS, WITH DISTRIBUTION POINTS AROUND CAMPUS FEEDING THE INDIVIDUAL BUILDINGS. THE POWER IS SUPPLIED AT 12.47KV TO THE MAIN TRANSFORMER, WITH (5) SMALLER TRANSFORMERS STEPPING THE POWER DOWN TO 480Y/277V.

LOADS ON THE SYSTEM ARE PRIMARILY LIGHTING AND MECHANICAL EQUIPMENT LOADS. LIGHTING IS TYPICALLY POWERED BY A 277V SYSTEM, ALTHOUGH SOME ARE POWERED BY A 120V SYSTEM. THE MECHANICAL LOADS CONSIST MAINLY OF AIR-HANDLING UNITS AND EQUIPMENT FANS THAT RUN ON 480V POWER, WITH SOME RUNNING ON 120V POWER. AN EMERGENCY, DIESEL-POWERED GENERATOR IS USED AS MEANS TO BACK-UP THE NORMAL SYSTEMS AS WELL AS PROVIDE FOR STAND-BY AND LIFE-SAFETY SYSTEMS.

SIZING THE SERVICE ENTRANCE WAS CALCULATED USING 3 METHODS: THE SQUARE FOOT METHOD, NEC LOAD METHOD AND THE ACTUAL BUILDING LOAD METHOD. EACH VERSION HAS ITS OWN ADVANTAGES/DISADVANTAGES, BUT ALL WERE PIVOTAL IN ANALYZING THE INCOMING SERVICE TO THE ARENA.

ELECTRICAL SYSTEMS EXISTING CONDITIONS & BUILDING LOAD SUMMARY REPORT (30%)

POWER DISTRIBUTION SYSTEMS

DRAWINGS:

E800 - ONE LINE DIAGRAM - CENTRAL PLANT
E801 - ONE LINE DIAGRAM - MAIN SWITCHBOARDS
E802 - ONE LINE DIAGRAM - NW & NE QUADRANTS
E803 - ONE LINE DIAGRAM - SW & SE QUADRANTS
E804 - ONE LINE DIAGRAM - EMERGENCY
E805 - ONE LINE DIAGRAM - SHOW POWER

SUMMARY DESCRIPTION OF DISTRIBUTION SYSTEM

THE ELECTRICAL SERVICE FOR THE JOHN PAUL JONES ARENA IS PROVIDED BY THE UNIVERSITY OF VIRGINIA PHYSICAL PLANT AND IS LOCATED ON THE NORTHEAST SIDE OF THE SITE. PRIMARY SERVICE IS RUN UNDERGROUND THROUGH A DUCTBANK SYSTEM WHERE IT IS CONNECTED TO 2 EXTERIOR PAD-MOUNTED SWITCH GEAR UNITS, WITH SPACE FOR 2 FUTURE CONNECTIONS. THE SERVICE ENTERS AT 12.47KV AND STEPS DOWN TO 480Y/277V USING 4 TRANSFORMERS (2000, 2000, 1500, 1500 KVA) AND 1 TRANSFORMER AT 4160/2400V (2500 KVA). ALL TRANSFORMERS ARE OWNED AND OPERATED BY THE UNIVERSITY OF VIRGINIA.

THE MAIN TRANSFORMERS FEED DISTRIBUTION PANELS THROUGHOUT THE BUILDING AND ARE LOCATED ON 3 LEVELS: EVENT, LOWER CONCOURSE AND UPPER CONCOURSE. THE STANDARD POWER BRANCHES ARE EITHER RUN OFF 2000A OR 3000A FEEDERS. ADDITIONAL TRANSFORMERS ARE LOCATED ON EACH FLOOR, WITHIN A GIVEN QUADRANT'S ELECTRICAL ROOM, WHERE THE VOLTAGE IS STEPPED DOWN TO 208Y/120V.

THE EMERGENCY SYSTEM IS RUN FROM A FOUR-CYCLE, DIESEL-FUELED, DIRECT-INJECTION GENERATOR MOUNTED ON A STEEL BASE WITH VIBRATION ISOLATION. THE GENERATOR IS RATED AT 2000KW AND SUPPORTS A MAIN EMERGENCY SWITCHBOARD.

THROUGHOUT THE SYSTEM THERE ARE 6 AUTOMATIC TRANSFER SWITCHES, 3 IN THE CENTRAL PLANT AND 3 LOCATED AROUND THE ARENA. ALL THE SWITCHES ARE CONNECTED TO THE 480Y/277V SYSTEM AND RANGE FROM 70A TO 1200A. THERE IS ONE DESIGNATED FOR THE LIFE SAFETY BRANCH, LEGALLY

REQUIRED AS A STANDBY SYSTEM AND THE FINAL ONE LEFT AS AN OPTIONAL STANDBY SYSTEM.

UTILITY COMPANY INFORMATION

THE UNIVERSITY OF VIRGINIA IS SUPPLIED WITH ALL OF ITS POWER FROM DOMINION VIRGINIA POWER. DOMINION IS ONE OF THE NATION'S 10 LARGEST INVESTOR OWNED ELECTRIC UTILITIES.

COMPANY: DOMINION VIRGINIA POWER
ADDRESS: P.O. BOX 26666
RICHMOND, VA 23261
WEBSITE: [HTTP://WWW.DOM.COM/INDEX.JSP](http://www.dom.com/index.jsp)
RATE: .02232\$ / KWH

SERVICE ENTRANCE

THE OUTDOOR SERVICE IS RUN FROM A SERIES OF DUCTBANKS ON THE NORTHEAST SIDE OF THE BUILDING. THERE ARE TWO MAIN ENTRANCES WHERE THE SERVICE BREAKS THROUGH THE EXTERIOR: THE CENTRAL PLANT AND ELECTRICAL ROOM. THE FIRST SET OF DUCT RUNS FROM UTILITY MANHOLES TO THE CENTRAL PLANT, WITH THE OTHER DUCTBANKS RUNNING ALONG THE EAST FACE OF THE BUILDING AND CONNECTING TO THE ADDITIONAL TRANSFORMERS LOCATED OUTSIDE THE MAIN AND EMERGENCY ELECTRICAL ROOMS. THE SWITCHGEAR IS RATED AT 15KV AND 600A. ALL METERS ARE TO BE PLACED WITHIN THE REQUIRED SPACING ALLOWANCES AS SET OUT IN THE SPECS FOR METER LOCATION.

THE DISTRIBUTION SYSTEM COMES FROM ONE OF THREE MAIN CENTERS LOCATED ON THE CAMPUS. THESE CENTERS ARE FED BY THE DOMINION VIRGINIA POWER COMPANY. THE ACTUAL POWER TO THE BUILDING IS SUPPLIED BY THE UNIVERSITY OF VIRGINIA AFTER IT IS PROCESSED IN THESE CENTRAL HUBS. ALL SWITCHGEAR IS TO BE SUPPLIED AND INSTALLED BY UVA FACILITIES.

THE NORMAL AND EMERGENCY DISTRIBUTION SYSTEMS ARE LOCATED IN SEPARATE ROOMS THROUGHOUT THE BUILDING.

VOLTAGE SYSTEMS

THE SYSTEMS WITHIN THE BUILDING ARE SPLIT BETWEEN 480Y/277V AND 208Y/120V, WITH MOST WIRING BEING 3 PHASE WITH 4 WIRES.

THE MAJOR EQUIPMENT IS LOCATED ON THE 480Y SYSTEM, WITH ALL OTHER EQUIPMENT AND PANELBOARDS BEING SPLIT BETWEEN THE 480Y AND 208Y SYSTEMS. TRANSFORMERS ALL HAVE A PRIMARY VOLTAGE OF THE 480Y SYSTEM WITH THEIR SECONDARY BEING THE 208Y SYSTEM.

LUMINAIRES AND THE LIGHTING SYSTEM ARE ON EITHER 277V OR 120V SYSTEMS, WITH THE MAJORITY BEING 277V. BUILDING RECEPTACLES ARE A 120V SYSTEM. MECHANICAL EQUIPMENT IS MAINLY ON THE 480Y SYSTEM, WITH THE SMALLER EQUIPMENT BEING PLACED ON THE 120V SYSTEM.

EMERGENCY POWER SYSTEMS

THE EMERGENCY POWER IS PROVIDED BY AT 2000KW, 480/277V, 3 PHASE, (4) WIRE 60 HZ DIESEL-FUELED, DIRECT-INJECTED GENERATOR. THIS GENERATOR IS PAD-MOUNTED AND LOCATED ON THE EVENT LEVEL. IT FEEDS TWO MAIN SWITCHBOARDS (MS-EM, MS-EM-CP) THAT ARE SUPPORTED WITH FOUR AUTOMATIC TRANSFER SWITCHES. EACH ATS IS 4-POLE, CONNECTED TO THE SWITCHBOARDS AND HAS AMPERAGE LEVELS OF 225A, 600A AND 1200A.

ATS-1 (600A) IS ATTACHED TO MS-EM AND IS RESPONSIBLE FOR CONTROLLING THE LIFE SAFETY BRANCH AND IS CONNECTED TO A MAIN DISTRIBUTION PANEL (D3E-1NW1). THIS SWITCH WILL CONNECT D3E-1NW1 WITH MS-1.

ATS-2 (225A) IS ATTACHED TO MS-EM AND IS RESPONSIBLE FOR THE ELEVATORS. IT IS CONNECTED TO A DISTRIBUTION PANEL (D3E-1NW2) LOCATED NEAR THE PANEL FOR ATS-1. THIS SWITCH WILL ALSO CONNECT PANEL D3E-1NW2 WITH MS-1

ATS-3/4 (1200A) IS ATTACHED TO MS-EM AND IS MAINLY RESPONSIBLE FOR ALL THE MECHANICAL EQUIPMENT THROUGHOUT THE ARENA. IT IS CONNECTED TO A DISTRIBUTION PANEL (D3E-1NW3) AND WILL SWITCH POWER BETWEEN THAT PANEL AND MS-1 AND MS-2.

LOCATIONS OF SWITCHGEAR

THE MAIN ELECTRICAL ROOMS ARE LOCATED ON THE EVENT FLOOR NEAR THE NORTHEASTERN FACE, WITH THE EMERGENCY ELECTRICAL ROOM BEING LOCATED RIGHT NEXT TO THE MAIN ELECTRICAL ROOM. EACH FLOOR HAS BETWEEN 2 AND 4 ADDITIONAL ELECTRICAL ROOMS SCATTERED AROUND THE ARENA. THE ROOMS ARE CENTRALLY LOCATED IN ONE OF EACH OF THE FOUR QUADRANTS THAT THE ARENA IS BROKEN UP INTO. ALL OF THE MAIN ELECTRICAL EQUIPMENT AND PANELBOARDS ARE LOCATED IN THEIR CORRESPONDING ROOM, WITH THE SMALLER ROOMS HOUSING BOTH NORMAL AND EMERGENCY POWER.

EQUIPMENT TABLE						
TAG	TYPE	FLOOR	ROOM#	ROOM NAME	DRAWING #	ENLARGED DRAWING #
ATS-1CP1	ATS	FIRST	1C32	CENTRAL PLANT	E201E	E700
ATS-1CP2	ATS	FIRST	1C32	CENTRAL PLANT	E201E	
ATS-1CP3	ATS	FIRST	1C32	CENTRAL PLANT	E201E	
ATS-1	ATS	ARENA		ARENA	E201C	E701
ATS-2	ATS	ARENA		ARENA	E201C	E701
ATS-3	ATS	ARENA		ARENA	E201C	E701
MS-1	SWITCHBOARD	EVENT	1C32	MAIN ELECTRIC	E201C	E701
MS-3	SWITCHBOARD	FIRST	1C32	CENTRAL ELECTRIC RM.	E201E	E700
MS-4	SWITCHBOARD	FIRST	1C32	CENTRAL ELECTRIC RM.	E201E	E700
D3N-1SE1	DISTRIBUTION PANEL	EVENT	1C32	ELECTRIC	E201C	E701
D3N-1NWI	DISTRIBUTION PANEL	EVENT	1C32	ELECTRIC	E201C	E701
D3N-1NE1	DISTRIBUTION PANEL	EVENT	1C32	ELECTRIC	E201C	E701
D1N-1SE1	DISTRIBUTION PANEL	EVENT	1A08A	ELECTRIC	E201A	E701
D1N-1SW1	DISTRIBUTION PANEL	EVENT	1B08	ELECTRIC	E201B	E701
D1N-1NWI	DISTRIBUTION PANEL	EVENT	1C32	ELECTRIC	E201C	E701
D1N-1NW2	DISTRIBUTION PANEL	EVENT	1C32	ELECTRIC	E201C	E701
D1N-1NE1	DISTRIBUTION PANEL	EVENT	1D11	ELECTRIC	E201D	E701
D1N-3SE1	DISTRIBUTION PANEL	LOWER	3A04	ELECTRIC	E203A	E702
D1N-3SW1	DISTRIBUTION PANEL	LOWER	3B29	ELECTRIC	E203B	E702
D1N-3NWI	DISTRIBUTION PANEL	LOWER	3C19	ELECTRIC	E203C	E702
D1N-3NE1	DISTRIBUTION PANEL	LOWER	3D17	ELECTRIC	E203D	E702
D1N-4SE1	DISTRIBUTION PANEL	UPPER	4A09	ELECTRIC	E204A	E702
D1N-4SW1	DISTRIBUTION PANEL	UPPER	4B17	ELECTRIC	E204B	E702
D1N-4NWI	DISTRIBUTION PANEL	UPPER	4C23	ELECTRIC	E204C	E702
D1N-4NE1	DISTRIBUTION PANEL	UPPER	4D04	ELECTRIC	E204D	E702
D3N-7SE1	DISTRIBUTION PANEL	CATWALK		SE CATWALK	E207	
D3N-7NE1	DISTRIBUTION PANEL	CATWALK		NE CATWALK	E207	

DIN-7SE1	DISTRIBUTION PANEL	CATWALK		SE CATWALK	E207	
DIN-7NE1	DISTRIBUTION PANEL	CATWALK		NE CATWALK	E207	
MS-EM	SWITCHBOARD	FIRST	1C32A	EMERG. ELECTRIC	E201C	E701
P3N-1CPI	DISTRIBUTION PANEL	FIRST	1C32	CENTRAL ELECTRIC RM.	E201E	
P3N-1CP2	DISTRIBUTION PANEL	FIRST	1C32	CENTRAL ELECTRIC RM.	E201E	
P3E-1CP3	DISTRIBUTION PANEL	FIRST		CENTRAL BOILER	E201E	
P3N-1CP4	DISTRIBUTION PANEL	FIRST		CENTRAL BOILER	E201E	
D3E-1SE1	DISTRIBUTION PANEL	EVENT	1A08	ELECTRIC	E201A	E701
D3E-1SW1	DISTRIBUTION PANEL	EVENT	1B08	ELECTRIC	E201B	E701
D3E-1NW1	DISTRIBUTION PANEL	EVENT	1C32A	ELECTRIC	E201C	E701
D3E-1NW2	DISTRIBUTION PANEL	EVENT	1C32A	ELECTRIC	E201C	E701
D3E-1NW3	DISTRIBUTION PANEL	EVENT	1C32A	ELECTRIC	E201C	E701
D3E-1NE-1	DISTRIBUTION PANEL	EVENT	1D11	ELECTRIC	E201D	E701
P3E-1CPI	DISTRIBUTION PANEL	FIRST		CENTRAL BOILER	E201E	
P3E-1CP2	DISTRIBUTION PANEL	FIRST		CENTRAL BOILER	E201E	
T-1	MAIN TRANSFORMER	FIRST		EXTERIOR	E201E	E700
T-2	MAIN TRANSFORMER	FIRST		EXTERIOR	E201E	E700
T-3	MAIN TRANSFORMER	FIRST		EXTERIOR	E201E	E700
T-4	MAIN TRANSFORMER	FIRST		EXTERIOR	E201E	E700
T-SP	MAIN TRANSFORMER	FIRST		EXTERIOR	E201E	E700
T3N-1CPI	TRANSFORMER	EVENT		CENTRAL PLANT	E201E	
T1N-1CPI	TRANSFORMER	EVENT		CENTRAL PLANT	E201E	
T1E-1CPI	TRANSFORMER	EVENT		CENTRAL PLANT	E201E	
T-1NW1	TRANSFORMER	EVENT	1C32	MAIN ELECTRIC	E201C	E701
T-1NW2	TRANSFORMER	EVENT		ACADEMIC CENTER	E203B/C	
T-3NW1	TRANSFORMER	LOWER	3C19	ELECTRIC	E203C	E702
T-4NW1	TRANSFORMER	UPPER	4C23	ELECTRIC	E204C	E702
T-1SW1	TRANSFORMER	EVENT	1B08	ELECTRIC	E201B	E701
T-3SW1	TRANSFORMER	LOWER	3B29	ELECTRIC	E203B	E702
T-4SW1	TRANSFORMER	UPPER	4B17	ELECTRIC	E204B	E702

T-3SW2	TRANSFORMER	LOWER		SW CATWALK	E207	
T-1NE1	TRANSFORMER	EVENT	1D11	ELECTRIC	E201D	E701
T-3NE1	TRANSFORMER	LOWER	3D17	ELECTRIC	E203D	E702
T-4NE1	TRANSFORMER	UPPER	4D04	ELECTRIC	E204D	E702
T-7NE1	TRANSFORMER	CATWALK		NE CATWALK	E207	
T-1SE1	TRANSFORMER	EVENT	1A08A	ELECTRIC	E201A	E701
T-3SE3	TRANSFORMER	LOWER	3A04	ELECTRIC	E203A	E702
T-4SE1	TRANSFORMER	UPPER	4A09	ELECTRIC	E204A	E702
T-7SE1	TRANSFORMER	CATWALK		SE CATWALK	E207	
TE-1NE1	TRANSFORMER	EVENT	1D11	ELECTRIC	E201D	E701
TE-3NE1	TRANSFORMER	LOWER	3D17	ELECTRIC	E203D	E702
TE-4NE1	TRANSFORMER	UPPER	4D04	ELECTRIC	E201D	E702
TE-7NE1	TRANSFORMER	CATWALK		NE CATWALK	E207	
TE-1NW1	TRANSFORMER	EVENT	1C32	MAIN ELECTRIC	E201C	E701
TE-3NW1	TRANSFORMER	LOWER	3C19	ELECTRIC	E203C	E702
TE-3NW2	TRANSFORMER	LOWER	3C19	ELECTRIC	E203C	E702
TE-4NW1	TRANSFORMER	UPPER	4C23	ELECTRIC	E204C	E702
TE-7NW1	TRANSFORMER	CATWALK		NW CATWALK	E207	
TE-1SE1	TRANSFORMER	EVENT	1A08A	ELECTRIC	E201A	E701
TE-3SE1	TRANSFORMER	LOWER	3A04	ELECTRIC	E203A	E702
TE-4SE1	TRANSFORMER	UPPER	4A09	ELECTRIC	E204A	E702
TE-7SE1	TRANSFORMER	CATWALK		SE CATWALK	E207	
TE-1SW1	TRANSFORMER	EVENT	1B08	ELECTRIC	E201B	E701
TE-3SW1	TRANSFORMER	LOWER	3B29	ELECTRIC	E203B	E702
TE-4SW1	TRANSFORMER	UPPER	4B17	ELECTRIC	E204B	E702
T-SP5	TRANSFORMER	EVENT	1C32	MAIN ELECTRIC	E201C	E701
T-SP6	TRANSFORMER	EVENT	1A12	SHOW POWER MAIN	E201A	E701
T-SP7	TRANSFORMER	EVENT	1D04	SHOW POWER LIGHTING	E201D	E701

PANELBOARD TABLE

TAG	VOLTAGE SYSTEM	MAIN SIZE	LEVEL	ROOM #	ROOM NAME	DRAWING #	ENLARGED DRAWING #
L3N-ISW1	480Y/277V, 3PH, 4W	100A MLO	EVENT	1B08	ELECTRIC	E201B	E701
L3N-INW1	480Y/277V, 3PH, 4W	100A MLO	EVENT	1C32	ELECTRIC	E201C	E701
L3N-INE1	480Y/277V, 3PH, 4W	100A MLO	EVENT	1D11	ELECTRIC	E201D	E701
P3N-ISE1	480Y/277V, 3PH, 4W	225A MLO	EVENT	A108A	ELECTRIC	E201A	E701
P3N-ISW1	480Y/277V, 3PH, 4W	225A MLO	EVENT	1B08	ELECTRIC	E201B	E701
P3N-INW1	480Y/277V, 3PH, 4W	100A MLO	EVENT	1C32	ELECTRIC	E201C	E701
P3N-INE1	480Y/277V, 3PH, 4W	225A MLO	EVENT	1D11	ELECTRIC	E201D	E701
P3N-INE2	480Y/277V, 3PH, 4W	100A MLO	EVENT	1D11	ELECTRIC	E201D	E701
PIN-ISE1	208Y/120V, 3PH, 4W	225A MLO	EVENT	1A08A	ELECTRIC	E201A	E701
PIN-ISE2	208Y/120V, 3PH, 4W	225A MLO	EVENT	1A08A	ELECTRIC	E201A	E701
PIN-ISW1	208Y/120V, 3PH, 4W	225A MLO	EVENT	1B08	ELECTRIC	E201B	E701
PIN-ISW2	208Y/120V, 3PH, 4W	225A MLO	EVENT	1B08	ELECTRIC	E201B	E701
PIN-ISW3	208Y/120V, 3PH, 4W	100A MLO	EVENT	1B16M	STORAGE	E201B	
PIN-ISW4	208Y/120V, 3PH, 4W	225A MLO	EVENT	1B16I	CONTROL ROOM	E201B	
PIN-INW1	208Y/120V, 3PH, 4W	100A MLO	EVENT	1C32	ELECTRIC	E201C	E701
PIN-INW2	208Y/120V, 3PH, 4W	225A MLO	EVENT	ACADEMIC CENTER			
PIN-INW3	208Y/120V, 3PH, 4W	225A MLO	EVENT	1C26	MAINTENANCE	E201C	
PIN-INE1	208Y/120V, 3PH, 4W	225A MLO	EVENT	1D11	ELECTRIC	E201D	E701
PIN-INE2	208Y/120V, 3PH, 4W	225A MLO	EVENT	1D11	ELECTRIC	E201D	E701
PIN-INE3	208Y/120V, 3PH, 4W	400A MLO	EVENT	1D18E	X-RAY	E201D	
PIN-INE4	208Y/120V, 3PH, 4W	100A MLO	EVENT	1C31D	CONTROL ROOM	E201C	
FIN-ISW1	208Y/120V, 3PH, 4W	225A MLO	EVENT	1B14	COMMISSARY	E201B	
L3N-3SE1	480Y/277, 3PH, 4W	100A MLO	LOWER	3A04	ELECTRIC	E203A	E702
L3N-3SW1	480Y/277, 3PH, 4W	100A MLO	LOWER	3B29	ELECTRIC	E203B	E702
L3N-3NW1	480Y/277, 3PH, 4W	100A MLO	LOWER	3C19	ELECTRIC	E203C	E702
L3N-3NE1	480Y/277, 3PH, 4W	100A MLO	LOWER	3D17	ELECTRIC	E203D	E702

P3N-3SE1	480Y/277, 3PH, 4W	100A MLO	LOWER	3A04	ELECTRIC	E203A	E702
P3N-3SW1	480Y/277, 3PH, 4W	225A MLO	LOWER	3B29	ELECTRIC	E203B	E702
P3N-3NW1	480Y/277, 3PH, 4W	100A MLO	LOWER	3C19	ELECTRIC	E203C	E702
P3N-3NE1	480Y/277, 3PH, 4W	100A MLO	LOWER	3D17	ELECTRIC	E203D	E702
PIN-3SE2	208Y/120V, 3PH, 4W	100A MLO	LOWER	3A04	ELECTRIC	E203A	E702
PIN-3SW1	208Y/120V, 3PH, 4W	100A MLO	LOWER	3B29	ELECTRIC	E203B	E702
PIN-3SW2	208Y/120V, 3PH, 4W	100A MLO	LOWER	3B29	ELECTRIC	E203B	E702
PIN-3NW1	208Y/120V, 3PH, 4W	225A MLO	LOWER	3C19	ELECTRIC	E203C	E702
PIN-3NW2	208Y/120V, 3PH, 4W	100A MLO	LOWER	3C19	ELECTRIC	E203C	E702
PIN-3NE1	208Y/120V, 3PH, 4W	100A MLO	LOWER	3D17	ELECTRIC	E203D	E702
PIN-3NE2	208Y/120V, 3PH, 4W	100A MLO	LOWER	3D17	ELECTRIC	E203D	E702
FIN-3SE1	208Y/120V, 3PH, 4W	225A MLO	LOWER	3A08B	PREP	E203A	
FIN-3SW1	208Y/120V, 3PH, 4W	400A MLO	LOWER	3B18A	PREP	E203B	
FIN-3SW2	208Y/120V, 3PH, 4W	225A MLO	LOWER	3B05B	PREP	E203B	
FIN-3SW3	208Y/120V, 3PH, 4W	225A MLO	LOWER	3B18A	PREP	E203B	
FIN-3SW4	208Y/120V, 3PH, 4W	100A MLO	LOWER	3B18A	PREP	E203B	
FIN-3NW1	208Y/120V, 3PH, 4W	225A MLO	LOWER	3C12B	PREP	E203C	
FIN-3NE1	208Y/120V, 3PH, 4W	225A MLO	LOWER	3D24B	PREP	E203D	
L3N-4SE1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4A09	ELECTRIC	E204A	E702
L3N-4SW1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4B17	ELECTRIC	E204B	E702
L3N-4NW1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4C23	ELECTRIC	E204C	E702
L3N-4NE1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4D04	ELECTRIC	E204D	E702
P3N-4SE1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4A09	ELECTRIC	E204A	E702
P3N-4SW1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4B17	ELECTRIC	E204B	E702
P3N-4NW1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4C23	ELECTRIC	E204C	E702
P3N-4NE1	480Y/277V, 3PH, 4W	100A MLO	UPPER	4D04	ELECTRIC	E204D	E702
PIN-4SE1	208Y/120V, 3PH, 4W	225A MLO	UPPER	4A09	ELECTRIC	E204A	E702
PIN-4SE2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4A09	ELECTRIC	E204A	E702
PIN-4SW1	208Y/120V, 3PH, 4W	100A MLO	UPPER	4B17	ELECTRIC	E204B	E702
PIN-4SW2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4B17	ELECTRIC	E204B	E702

PIN-4NW1	208Y/120V, 3PH, 4W	225A MLO	UPPER	4C23	ELECTRIC	E204C	E702
PIN-4NW2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4C23	ELECTRIC	E204C	E702
FIN-4SE1	208Y/120V, 3PH, 4W	225A MLO	UPPER	4A03B	PREP	E204A	
FIN-4SE2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4A13B	PREP	E204A	
FIN-4SW1	208Y/120V, 3PH, 4W	225A MLO	UPPER	4B03B	PREP	E204B	
FIN-4SW2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4B11	VENDOR	E204B	
FIN-4SW3	208Y/120V, 3PH, 4W	225A MLO	UPPER	4B06	PREP	E204B	
FIN-4NW1	208Y/120V, 3PH, 4W	225A MLO	UPPER	4C15B	PREP	E204C	
FIN-4NW2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4C11A	PREP	E204C	
FIN-4NW2	208Y/120V, 3PH, 4W	400A MLO	UPPER	4C11A	PREP	E204C	
FIN-4NE1	208Y/120V, 3PH, 4W	225A MLO	UPPER	4D09B	PREP	E204D	
FIN-4NE2	208Y/120V, 3PH, 4W	225A MLO	UPPER	4D12B	PREP	E204D	
FIN-4NE3	208Y/120V, 3PH, 4W	225A MLO	UPPER	4D02	VENDOR	E204D	
L3N-7SW1	480Y/277V, 3PH, 4W	100A MLO	CATWALK	SW CATWALK		E207	
L3N-7NW1	480Y/277V, 3PH, 4W	100A MLO	CATWALK	NW CATWALK		E207	
L3N-7NE1	480Y/277V, 3PH, 4W	100A MLO	CATWALK	NE CATWALK		E207	
PIN-7SE1	208Y/120V, 3PH, 4W	225A MLO	CATWALK	SE CATWALK		E207	
PIN-7SE2	208Y/120V, 3PH, 4W	600A MLO	CATWALK	JUMBOTRON		E207	
PIN-7SW1	208Y/120V, 3PH, 4W	225A MLO	CATWALK	SW CATWALK		E207	
PIN-7NW1	208Y/120V, 3PH, 4W	225A MLO	CATWALK	NW CATWALK		E207	
PIN-7NE1	208Y/120V, 3PH, 4W	225A MLO	CATWALK	NE CATWALK		E207	
L3N-ICPI	480Y/277V, 3PH, 4W	60A MCB	CENTRAL	CENTRAL ELECTRIC		E201E	
PIN-ICPI	208Y/120V, 3PH, 4W	100A MCB	CENTRAL	CENTRAL ELECTRIC		E201E	

EMERGENCY PANELBOARD TABLE

TAG	VOLTAGE SYSTEM	MAIN SIZE	LEVEL	ROOM #	ROOM NAME	DRAWING #	ENLARGED DRAWING #
L3E-1SEI	480Y/277 V, 3PH, 4W	400A MLO	EVENT	1A08	ELECTRIC	E201A	E701
L3E-1SWI	480Y/277 V, 3PH, 4W	225A MLO	EVENT	1B08	ELECTRIC	E201B	E701
L3E-1NWI	480Y/277 V, 3PH, 4W	225A MLO	EVENT	1C32A	ELECTRIC	E201C	E701
L3E-1NEI	480Y/277 V, 3PH, 4W	400A MLO	EVENT	1D11	ELECTRIC	E201D	E701
PIE-1SEI	208Y/120V, 3PH, 4W	100A MCB	EVENT	1A08	ELECTRIC	E201A	E701
PIE-1SWI	208Y/120V, 3PH, 4W	100A MCB	EVENT	1B08	ELECTRIC	E201B	E701
PIE-1NWI	208Y/120V, 3PH, 4W	100A MCB	EVENT	1C32A	ELECTRIC	E201C	E701
PIE-1NEI	208Y/120V, 3PH, 4W	100A MCB	EVENT	1D11	ELECTRIC	E201D	E701
L3E-3SEI	480Y/277V, 3PH, 4W	100A MLO	LOWER	3A04	ELECTRIC	E203A	E702
L3E-3SWI	480Y/277V, 3PH, 4W	100A MLO	LOWER	3B29	ELECTRIC	E203B	E702
L3E-3NWI	480Y/277V, 3PH, 4W	100A MLO	LOWER	3C19	ELECTRIC	E203C	E702
L3E-3NEI	480Y/277V, 3PH, 4W	100A MLO	LOWER	3D17	ELECTRIC	E203D	E702
P3E-3SEI	480Y/277V, 3PH, 4W	100A MCB	LOWER	3A04	ELECTRIC	E203A	E702
P3E-3SWI	480Y/277V, 3PH, 4W	100A MCB	LOWER	3B29	ELECTRIC	E203B	E702
P3E-3NWI	480Y/277V, 3PH, 4W	100A MCB	LOWER	3C19	ELECTRIC	E203C	E702
P3E-3NEI	480Y/277V, 3PH, 4W	100A MCB	LOWER	3D17	ELECTRIC	E203D	E702
PIE-3SWI	208Y/120V, 3PH, 4W	100A MCB	LOWER	3B29	ELECTRIC	E203B	E702
PIE-3NWI	208Y/120V, 3PH, 4W	100A MCB	LOWER	3C19	ELECTRIC	E203C	E702
PIE-3NW2	240Y/120V, 3PH, 4W	100A MCB	LOWER	3C21	AV CONTROL	E203C	E702
PIE-3NEI	208Y/120V, 3PH, 4W	100A MCB	LOWER	3D17	ELECTRIC	E203D	E702
L3E-4SEI	480Y/277V, 3PH, 4W	100A MLO	UPPER	4A09	ELECTRIC	E204A	E702
L3E-4SWI	480Y/277V, 3PH, 4W	100A MLO	UPPER	4B17	ELECTRIC	E204B	E703
L3E-4NWI	480Y/277V, 3PH, 4W	100A MLO	UPPER	4C23	ELECTRIC	E204C	E704
L3E-4NEI	480Y/277V, 3PH, 4W	100A MLO	UPPER	4D04	ELECTRIC	E204D	E705
PIE-4SEI	208Y/120V, 3PH, 4W	100A MCB	UPPER	4A09	ELECTRIC	E204A	E706
PIE-4SWI	208Y/120V, 3PH, 4W	100A MCB	UPPER	4B17	ELECTRIC	E204B	E707
PIE-4NWI	208Y/120V, 3PH, 4W	100A MCB	UPPER	4C23	ELECTRIC	E204C	E708
PIE-4NEI	208Y/120V, 3PH, 4W	100A MCB	UPPER	4D04	ELECTRIC	E204D	E709
L3E-7SEI	480Y/277V, 3PH, 4W	225A MLO	CATWALK	SE CATWALK		E207	
L3E-7NEI	480Y/277V, 3PH, 4W	225A MLO	CATWALK	NE CATWALK		E208	
PIE-7NWI	240Y/120V, 3PH, 4W	225 MCB	CATWALK	NW CATWALK		E209	
L3E-1CPI	480Y/277V, 3PH, 4W	100A MCB	CENTRAL	CENTRAL EMERGENCY RM.		E201E	
PIE-1CPI	208Y/120V, 3PH, 4W	100A MCB	CENTRAL	CENTRAL EMERGENCY RM.		E201E	

OVER-CURRENT DEVICES

THE MAIN OVER-CURRENT DEVICE OF THE SUBSTATION IS LOCATED ON THE PRIMARY SIDE AND RATED FOR 15KV AND 600A WITH A 25000 AIC. PROTECTION IS PROVIDED BY FUSES LOCATED ON DRAW-OUT TYPE BREAKERS THAT ARE ABLE TO BE REMOVED AND SERVICED IF NEEDED. THE FUSES ARE K-RATED AND ARE 600A TRIP AND 600A FRAME.

THE MAIN PANELS HAVE SHUNT TRIP AND SINGLE-PHASE PROTECTION. THE SWITCHES WILL BE 100 PERCENT RATED BOLTED PRESSURE TYPE WITH CLASS L FUSE MOUNTINGS.

BRANCH OVER-CURRENT DEVICES WILL BE SIMILAR TO THE MAINS EXCEPT THEY WILL HAVE A MINIMUM OF THREE CYCLE DELAYS FOR THE INDICATED FAULT VALUES. ACCORDING TO SPECS, CERTAIN BREAKERS WILL BE EQUIPPED WITH SHUNT TRIPS AND COIL CLEARING CONTACTS.

THE TYPICAL DISTRIBUTION PANELS HAVE STANDARD THERMAL MAGNETIC BREAKERS. THIS APPLIES TO THE MAIN AND SECONDARY BREAKERS.

THE TYPICAL LIGHTING PANELS ARE MAIN LUG ONLY, BUT SOME OF THOSE ON THE EMERGENCY CIRCUIT ARE MAIN CIRCUIT BREAKERS (MCB). THE MAGNITUDE OF THE PROJECT ALLOWS FOR VARIOUS SIZES OF PANELS TO EXIST. THERE ARE FUSED DISCONNECTS LOCATED IN EACH ELECTRICAL ROOM TO PROTECT THE PANELS.

TRANSFORMERS

THE BUILDING HAS 5 MAIN TRANSFORMERS THAT ARE CONNECTED TO THE SERVICE FEEDERS AND SWITCHGEAR. FOUR OF THE TRANSFORMERS RUN OFF 480Y/277V POWER, WITH THE LAST ONE RUNNING OFF 4160/2400V. ALL OF THESE TRANSFORMERS ARE K-RATED AND ARE USED TO STEP DOWN THE UTILITY SERVICE (12.47 KV) TO THE 480Y/277V BUILDING SERVICE. THERE ARE NORMAL POWER AND EMERGENCY POWER TRANSFORMERS LOCATED ON EACH FLOOR IN DESIGNATED ELECTRICAL ROOMS. THE SMALLER ONES ARE USED TO STEP DOWN THE MAIN SYSTEM OF 480Y TO A SYSTEM OF 208Y/120V.

INDIVIDUAL TRANSFORMER TABLE

TAG	PRIMARY VOLTAGE	SECONDARY VOLTAGE	SIZE	TYPE	TEMP. RISE	TAPS	MOUNTING	REMARKS
T-1	12470V, 3PH, 3W	480Y/277V, 3PH, 4W	2000	DRY TYPE	150 DEGREE C	(2) 5%	PAD MOUNTED ON FLOOR	K-RATED
T-2	12470V, 3PH, 3W	480Y/277V, 3PH, 4W	2000	DRY TYPE	150 DEGREE C	(2) 5%	PAD MOUNTED ON FLOOR	K-RATED
T-3	12470V, 3PH, 3W	480Y/277V, 3PH, 4W	1500	DRY TYPE	150 DEGREE C	(2) 5%	PAD MOUNTED ON FLOOR	K-RATED
T-4	12470V, 3PH, 3W	4160/2400V, 3PH, 4W	2500	DRY TYPE	150 DEGREE C	(2) 5%	PAD MOUNTED ON FLOOR	K-RATED
T-SP	12470V, 3PH, 3W	480Y/277V, 3PH, 4W	1500	DRY TYPE	150 DEGREE C	(2) 5%	PAD MOUNTED ON FLOOR	K-RATED
T3N-ICPI	4160V, 3PH, 3W	480Y/277V, 3PH, 4W	4160	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T1N-ICPI	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T1E-ICPI	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-1NW1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-1NW2	480V, 3PH, 3W	120/208, 3PH, 3W	75	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-3NW1	480V, 3PH, 3W	120/208, 3PH, 3W	150	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-4NW1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-1SW1	480V, 3PH, 3W	120/208, 3PH, 3W	150	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-3SW1	480V, 3PH, 3W	120/208, 3PH, 3W	300	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-4SW1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-3SW2	480V, 3PH, 3W	120/208, 3PH, 3W	300	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-1NE1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-3NE1	480V, 3PH, 3W	120/208, 3PH, 3W	150	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-4NE1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-7NE1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED ON CATWALK	
T-1SE1	480V, 3PH, 3W	120/208, 3PH, 3W	150	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-3SE3	480V, 3PH, 3W	120/208, 3PH, 3W	150	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-4SE1	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED	
T-7SE1	480V, 3PH, 3W	120/208, 3PH, 3W	500	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED ON CATWALK	
TE-1NE1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-3NE1	480V, 3PH, 3W	120/208V, 3PH, 3W	15	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-4NE1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-7NE1	480V, 3PH, 3W	120/208, 3PH, 3W	75	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED ON CATWALK	
TE-1NW1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-3NW1	480V, 3PH, 3W	120/208V, 3PH, 3W	15	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-3NW2	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-4NW1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-7NW1	480V, 3PH, 3W	120/208, 3PH, 3W	75	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED ON CATWALK	
TE-1SE1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-3SE1	480V, 3PH, 3W	120/208V, 3PH, 3W	15	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-4SE1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-7SE1	480V, 3PH, 3W	120/208, 3PH, 3W	75	DRY TYPE	150 DEGREE C	(2) 5%	FLOOR MOUNTED ON CATWALK	
TE-1SW1	480V, 3PH, 3W	120/208V, 3PH, 3W	30	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-3SW1	480V, 3PH, 3W	120/208V, 3PH, 3W	15	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
TE-4SW1	480V, 3PH, 3W	120/208V, 3PH, 3W	15	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
T-SP5	480V, 3PH, 3W	120/208V, 3PH, 3W	750	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	
T-SP6	480V, 3PH, 3W	120/208, 3PH, 3W	225	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	K13 SHIELDED
T-SP7	480V, 3PH, 3W	120/208, 3PH, 3W	300	DRY TYPE	150 DEGREE C	(2) 5%	WALL MOUNTED	K13 SHIELDED

SPECIAL EQUIPMENT

THE TVSS SYSTEM (TRANSIENT VOLTAGE SURGE SUPPRESSION) IS A SPECIAL PIECE OF EQUIPMENT THAT THE JPJ ARENA USES ON A MAJORITY OF DISTRIBUTION PANELS. IT IS USED AS A MEANS TO PROTECT ELECTRICAL DEVICES FROM VOLTAGE SPIKES. A REASON TO USE THE TVSS IS TO PROTECT AGAINST LIGHTING STRIKES AND WHEN CERTAIN EQUIPMENT IS TURNED ON AND OFF.

LIGHTING LOADS

THE LIGHTING SYSTEMS FOR THE ARENA ARE PREDOMINANTLY A MIXTURE OF FLUORESCENT AND METAL HALIDE FIXTURES WITH A FEW INCANDESCENT AND HALOGEN FIXTURES SPREAD THROUGHOUT THE SPACE. THE FLUORESCENT LUMINAIRES ARE COMBINATIONS OF LINEAR STRIPS, DOWNLIGHTS, WALL SCONCES, STEP LIGHTS, PENDANTS AND RECESSED FIXTURES. THESE SYSTEMS ARE PRIMARILY USED ALONG THE CONCOURSE LEVEL WHERE PEDESTRIAN TRAFFIC IS PREVALENT, AS WELL AS IN THE MORE PRIVATE SPACES OF THE ARENA INCLUDING THE LOCKER ROOMS, TRAINING SPACES, WORK AREAS AND MEETING SPACES. THE METAL HALIDE FIXTURES ARE A MIXTURE OF HIGH BAY PENDANTS, RECESSED DOWNLIGHTS, SURFACE MOUNTED DOWNLIGHTS AND STEP LIGHTS. THEY ARE USED AROUND THE CONCOURSE IN COORDINATION WITH THE FLUORESCENT FIXTURES TO AID IN PEDESTRIAN MOVEMENT AS WELL AS IN THE MAIN GYMNASIUM FOR EVENT LIGHTING. THE COMBINATION OF SYSTEMS PROVIDES HIGHER ILLUMINANCE LEVELS THROUGH THE SPACES THAT HAVE HIGHER CEILINGS AND ARE GENERALLY LARGER IN COMPARISON TO THE SMALLER SPACES. THE CATWALKS ABOVE THE ARENA FLOOR USE A SYSTEM OF QUARTZ-TYPE FIXTURES.

THE EXTERIOR LIGHTING SYSTEMS FOLLOW THOSE OF THE INTERIOR BY USING FLUORESCENT AND METAL HALIDE FIXTURES. THE UNIFORMITY OF SYSTEMS MAKES IT EASY FOR THE OCCUPANTS TO ADJUST FROM OUTSIDE CONDITIONS TO THOSE OF THE INTERIOR. IT ALSO CREATES VISUAL UNITY BETWEEN THE INTERIOR AND EXTERIOR THROUGH THE LARGE GLASS CURTAIN WALL THAT MAKES UP THE ENTRY CORRIDOR. THE METAL HALIDE FIXTURES ARE POLE MOUNTED ON THE ENTRANCE COLONNADE TO GIVE A MONOLITHIC APPEARANCE AND CREATE A STRONG VISUAL IMAGE UPON ENTERING THE ARENA.

	LAMP TYPE	INDIVIDUAL LAMP WATTAGE	# OF LAMPS	BALLAST TYPE	OPERATING VOLTAGE	FIXTURE INPUT WATTS	BALLAST FACTOR	CURRENT AT STARTING / OPERATING	P.F. AT STARTING / OPERATING
A1	Fluorescent 2x4 Troffer	32	2	Electronic	277	62	0.88	0.21	0.98
A3	Fluorescent 2x4 Troffer	32	3	Electronic	277	94	1.03	0.24	0.99
A4	Fluorescent 2x2 Troffer	40	3	Electronic	277	130	1.03	0.38	0.98
A5	Fluorescent 2x4 Troffer	32	4	Electronic	277	124	0.88	0.41	0.99
A7	Fluorescent 2x4 Troffer	32	3	Electronic	277	109	1.03	0.24	0.99
B2	Fluorescent 2x2 Troffer	42	3	Electronic	277	109	1.03	0.38	0.99
B3	Fluorescent Linear	32	Multiple	Electronic	277	41 per 4'	0.92	0.12	0.98
B4	Fluorescent Wall Washer	32	1	Electronic	277	40	0.92	0.12	0.98
B5	Fluorescent 2x4 Recessed	32	2	Electronic	277	80	0.88	0.21	0.98
B6	Fluorescent Wall Slot	32	2	Electronic	277	76	0.88	0.21	0.98
B8	Fluorescent Wall Mount	32	2	Electronic	277	76	0.88	0.21	0.98
B9	Flourescent Wall Washer	54	1	Program Start	277	60	0.03	0.23	0.98
C1	Flourescent Undercabinet	28	1	Program Start	120	36	1.04	0.28	0.98
C2	Fluorescent Cove	32	1	Electronic	277	41 per 4'	0.92	0.12	0.98
C4	Fluorescent Undercabinet	21	1	Program Start	120	30	1.03	0.21	0.99
C6	Compact Fluorescent Cove	26	Multiple	Electronic	277	142 per 4'	1.1	0.24	0.98
D1	Fluorescent Downlight	18	1	Electronic	120	22	0.97	0.26	0.99
D2	Compact Fluorescent Downlight	26	2	Electronic	277	65	0.98	0.49	0.99
D3	Compact Fluorescent Downlight	26	1	Electronic	120	26	0.98	0.11	0.99
D5	Compact Fluorescent Downlight	9	1	Electronic	120	10	0.92	0.2	0.99
D6	Compact Fluorescent Downlight	42	1	Electronic	120	50	0.98	0.18	0.99
D7	Compact Fluorescent Downlight	32	2	Electronic	120	75	0.98	0.58	0.99
D9	Compact Fluorescent Downlight	18	1	Electronic	277	18	0.98	0.08	0.99
F1	Compact Fluorescent High Bay	42	8	Electronic	277	420	0.98	0.18	0.99
F2	Compact Fluorescent Downlight	32	1	Electronic	277	37	0.98	0.14	0.99
F7	Compact Fluorescent Downlight	42	2	Electronic	277	94	0.98	0.36	0.99
G6	Metal Halide Wall Sconce	70	1	Magnetic	277	94	0.95	.37 / .45	0.9
H1	Fluorescent Wall Bracket	13	2	Electronic	277	30	0.92	0.35	0.98
L0	Exterior Sharp Cutoff	250	1	Magnetic	277	313	0.95	1.00 / 1.10	0.9
M1	Metal Halide High Bay	400	1	Magnetic	277	500	0.95	1.30 / 1.80	0.9
M3	Metal Halide High Bay	100	1	Magnetic	277	125	0.95	.95 / .48	0.9
M5	Metal Halide Downlight	150	1	Magnetic	277	188	0.95	.75 / .70	0.9
M7	Metal Halide Downlight	100	1	Magnetic	277	125	0.95	.95 / .48	0.9
M8	Metal Halide Downlight	175	1	Magnetic	277	220	0.95	.36 / .75	0.9
M10	Metal Halide Downlight	250	1	Magnetic	277	313	0.95	1.00 / 1.10	0.9
T1	Incandescent Track	75	1	-	120	75	-	-	-
X1	LED Exit Sign	-	1	-	277	5	-	-	-
X2	Emergency Sign	-	1	-	277	18	-	-	-
Z1	Cold Cathode	-	1	-	120	400	-	-	-

MECHANICAL & OTHER LOADS

MECHANICAL LOAD CALCULATIONS

LOAD TAG	LOAD DESCRIPTION	LOAD MAGNITUDE	LOAD UNITS	MOTOR AMPS	VOLTAGE	PHASE	ASSUMED P.F.	LOAD IN KVA	LOAD IN KW
AHU 1	AIR HANDLING UNIT	20	HP	27	480	3	0.91	22.45	18.20
AHU 2	AIR HANDLING UNIT	10	HP	14	480	3	0.91	11.64	9.10
AHU3	AIR HANDLING UNIT	7.5	HP	11	480	3	0.82	9.14	6.15
AHU 101	AIR HANDLING UNIT	150	HP	180	480	3	0.95	149.64	142.50
CT 1	COOLING TOWER	75	HP	96	480	3	0.95	79.81	71.25
CT 2	COOLING TOWER	75	HP	96	480	3	0.95	79.81	71.25
CT 3	COOLING TOWER	75	HP	96	480	3	0.95	79.81	71.25
AHU 102	AIR HANDLING UNIT	150	HP	180	480	3	0.95	149.64	142.50
AHU 103	AIR HANDLING UNIT	150	HP	180	480	3	0.95	149.64	142.50
AHU 104	AIR HANDLING UNIT	150	HP	180	480	3	0.95	149.64	142.50
AHU 105	AIR HANDLING UNIT	15	HP	21	480	3	0.91	17.46	13.65
AHU 106	AIR HANDLING UNIT	10	HP	14	480	3	0.91	11.64	9.10
AHU 107	AIR HANDLING UNIT	15	HP	21	480	3	0.91	17.46	13.65
AHU 108	AIR HANDLING UNIT	15	HP	21	480	3	0.91	17.46	13.65
AHU 109	AIR HANDLING UNIT	5	HP	7.6	480	3	0.9	6.32	4.50
AHU 110	AIR HANDLING UNIT	10	HP	14	480	3	0.91	11.64	9.10
AHU 111	AIR HANDLING UNIT	5	HP	7.6	480	3	0.9	6.32	4.50
AHU 112	AIR HANDLING UNIT	15	HP	21	480	3	0.91	17.46	13.65
AHU 113	AIR HANDLING UNIT	15	HP	21	480	3	0.91	17.46	13.65
AHU 114	AIR HANDLING UNIT	3	HP	4.8	480	3	0.84	3.99	2.52
AHU 301	AIR HANDLING UNIT	20	HP	27	480	3	0.91	22.45	18.20
EF 105A	EXHAUST FAN	1.50	HP	3	480	3	0.82	2.49	1.23
EF 150B	EXHAUST FAN	1.50	HP	3	480	3	0.82	2.49	1.23
EF 106	EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
EF 107A	EXHAUST FAN	1.50	HP	3	480	3	0.82	2.49	1.23
EF 107B	EXHAUST FAN	1.50	HP	3	480	3	0.82	2.49	1.23
EF 108	EXHAUST FAN	10.00	HP	14	480	3	0.91	11.64	9.10
EF 601	EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
EF 602	EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
EF 603	EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
EF 604	EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
EF 605	EXHAUST FAN	0.17	HP	4.4	120	1	0.72	0.91	0.12
EF 606	EXHAUST FAN	3.00	HP	4.8	480	3	0.84	3.99	2.52
EF 607	EXHAUST FAN	2.00	HP	3.4	480	3	0.83	2.83	1.66
EF 608	EXHAUST FAN	5.00	HP	7.6	480	3	0.9	6.32	4.50
EF 609	EXHAUST FAN	0.25	HP	4.4	120	1	0.75	0.91	0.19
EF 610	EXHAUST FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
EF 611	EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
EF 612	EXHAUST FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
EF 613	EXHAUST FAN	0.50	HP	4.4	120	1	0.8	0.91	0.40
EF 614	EXHAUST FAN	2.00	HP	3.4	480	3	0.83	2.83	1.66
EF 615	EXHAUST FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
EF 616	EXHAUST FAN	0.17	HP	4.4	120	1	0.72	0.91	0.12
EF 617	EXHAUST FAN	0.17	HP	4.4	120	1	0.72	0.91	0.12
EF 701	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 702	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 703	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 704	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 705	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 706	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 707	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
EF 708	EXHAUST FAN	25.00	HP	34	480	3	0.92	28.27	23.00
SPF 601	STAIRWELL PRESSURE FAN	0.50	HP	4.4	120	1	0.83	0.91	0.42
XEF 601	X-RAY EXHAUST	0.17	HP	4.4	120	1	0.72	0.91	0.12
KE 601	KITCHEN EXHAUST FAN	3.00	HP	4.8	480	3	0.84	3.99	2.52
KE 602	KITCHEN EXHAUST FAN	5.00	HP	7.6	480	3	0.9	6.32	4.50
KE 603	KITCHEN EXHAUST FAN	5.00	HP	7.6	480	3	0.9	6.32	4.50
KE 604	KITCHEN EXHAUST FAN	5.00	HP	7.6	480	3	0.9	6.32	4.50
KE 605	KITCHEN EXHAUST FAN	5.00	HP	7.6	480	3	0.9	6.32	4.50

KE 606	KITCHEN EXHAUST FAN	3.00	HP	4.8	480	3	0.84	3.99	2.52
RE 102	RETURN/EXHAUST FAN	1.50	HP	3	480	3	0.82	2.49	1.23
RE 109	RETURN/EXHAUST FAN	3.00	HP	4.8	480	3	0.84	3.99	2.52
RE 110	RETURN/EXHAUST FAN	5.00	HP	7.6	480	3	0.9	6.32	4.50
RE 111	RETURN/EXHAUST FAN	3.00	HP	4.8	480	3	0.84	3.99	2.52
RE 112	RETURN/EXHAUST FAN	10.00	HP	14	480	3	0.91	11.64	9.10
RE 113	RETURN/EXHAUST FAN	10.00	HP	14	480	3	0.91	11.64	9.10
RE 114	RETURN/EXHAUST FAN	1.00	HP	4.2	480	3	0.82	3.49	0.82
RE 301	RETURN/EXHAUST FAN	7.50	HP	11	480	3	0.91	9.14	6.83
RF 101	RETURN FAN	15.00	HP	21	480	3	0.91	17.46	13.65
RF 102	RETURN FAN	15.00	HP	21	480	3	0.91	17.46	13.65
RF 103	RETURN FAN	15.00	HP	21	480	3	0.91	17.46	13.65
RF 104	RETURN FAN	15.00	HP	21	480	3	0.91	17.46	13.65
RF 105	RETURN FAN	7.50	HP	11	480	3	0.91	9.14	6.83
RF 107	RETURN FAN	7.50	HP	11	480	3	0.91	9.14	6.83
TF 101	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 102	TRANSFER FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
TF 103	TRANSFER FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
TF 104	TRANSFER FAN	0.25	HP	1.1	480	3	0.75	0.91	0.19
TF 105	TRANSFER FAN	0.25	HP	1.1	480	3	0.75	0.91	0.19
TF 108	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 109	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 110	TRANSFER FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
TF 111	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 112	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 113	TRANSFER FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
TF 114	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 115	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 301	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 302	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 303	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 304	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 305	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 306	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 307	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 308	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 309	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 310	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 311	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 312	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 401	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 402	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 403	TRANSFER FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
TF 404	TRANSFER FAN	0.33	HP	4.4	120	1	0.76	0.91	0.25
TF 405	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 406	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 407	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 408	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 409	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 410	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 411	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
TF 412	TRANSFER FAN	0.75	HP	1.6	480	3	0.81	1.33	0.61
101-F01	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
101-F02	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
101-F03	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
101-F04	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
101-F05	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
102-F01	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
102-F02	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
102-F03	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
102-F04	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19

**LOGAN BROWN
LIGHTING / ELECTRICAL OPTION
ADVISOR: PROFESSOR DANNERETH**

**JOHN PAUL JONES ARENA
CHARLOTTESVILLE, VA
NOVEMBER 4, 2008**

102-F05	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
103-F01	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
103-F02	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
103-F03	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
103-F04	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
103-F05	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
104-F01	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
104-F02	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
104-F03	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
104-F04	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
104-F05	FAN-POWERED CVT UNIT	0.25	HP	1.1	277	1	0.75	0.53	0.19
BCU 101	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 102	BLOWER COIL UNIT	0.75	HP	1.6	480	3	0.81	1.33	0.61
BCU 103	BLOWER COIL UNIT	0.75	HP	1.6	480	3	0.81	1.33	0.61
BCU 104	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 105	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 106	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 108	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 114	BLOWER COIL UNIT	1.00	HP	4.2	480	3	0.82	3.49	0.82
BCU 115	BLOWER COIL UNIT	1.00	HP	4.2	480	3	0.82	3.49	0.82
BCU 116	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 302	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 303	BLOWER COIL UNIT	0.50	HP	4.4	120	1	0.83	0.91	0.42
BCU 401	BLOWER COIL UNIT	0.75	HP	1.6	480	3	0.81	1.33	0.61
BCU 402	BLOWER COIL UNIT	0.33	HP	4.4	120	1	0.76	0.91	0.25
BCU 403	BLOWER COIL UNIT	1.50	HP	3	480	3	0.82	2.49	1.23
BCU 404	BLOWER COIL UNIT	1.50	HP	3	480	3	0.82	2.49	1.23
THWP 101	TERTIARY WATER PUMP	50.00	HP	65	480	3	0.95	54.04	47.50
THWP 102	TERTIARY WATER PUMP	50.00	HP	65	480	3	0.95	54.04	47.50
WSHP 101	WATER SOURCE HEAT PUMP	0.17	HP	4.4	208	1	0.72	1.59	0.12
C1	AIR COMPRESSOR	0.75	HP	1.6	120	1	0.81	0.33	0.61
C2	AIR COMPRESSOR	0.75	HP	1.6	120	1	0.81	0.33	0.61
C3	AIR COMPRESSOR	0.75	HP	1.6	120	1	0.81	0.33	0.61
CUH1	CABINET UNIT HEATER	0.02	KW	0	120	1	1	0.00	0.02
CUH2	CABINET UNIT HEATER	0.02	KW	0	120	1	1	0.00	0.02
CUH3	CABINET UNIT HEATER	0.02	KW	0	120	1	1	0.00	0.02
HWRP 101	HOT WATER RETUN PUMP	0.75	HP	1.6	480	3	0.81	1.33	0.61
HWRP 102	HOT WATER RETUN PUMP	0.75	HP	1.6	480	3	0.81	1.33	0.61
HWRP 103	HOT WATER RETUN PUMP	0.50	HP	4.4	120	1	0.83	0.91	0.42
HWRP 104	HOT WATER RETUN PUMP	0.50	HP	4.4	120	1	0.83	0.91	0.42
SEP 101	SEWAGE EJECTION PUMP	1.50	HP	3	480	3	0.82	2.49	1.23
SEP 102	SEWAGE EJECTION PUMP	1.50	HP	3	480	3	0.82	2.49	1.23
SEP 103	SEWAGE EJECTION PUMP	3.00	HP	4.8	480	3	0.84	3.99	2.52
OH 1	OVERHEAD DOOR OPERATOR	1.20	KW	0	120	1	1	0.00	1.20
OH 2	OVERHEAD DOOR OPERATOR	1.20	KW	0	120	1	1	0.00	1.20
OH 3	OVERHEAD DOOR OPERATOR	1.20	KW	0	120	1	1	0.00	1.20
DL	DOCK LEVELER	0.60	KW	0	480	3	1	0.00	0.60
HOIST	CATWALK HOIST	3.10	KW	0	480	3	1	0.00	3.10
WH	WATER HEATER	8.00	KW	0	208	2	1	0.00	8.00
PCHP 1	PRIMARY CHILLED WATER PUMP	30.00	HP	40	480	3	0.94	33.25	28.20
PCHP 2	PRIMARY CHILLED WATER PUMP	30.00	HP	40	480	3	0.94	33.25	28.20
PCHP 3	PRIMARY CHILLED WATER PUMP	15.00	HP	21	480	3	0.91	17.46	13.65
SCHP 1	SECONDARY CHILLED WATER PUMP	60.00	HP	77	480	3	0.95	64.01	57.00
SCHP 2	SECONDARY CHILLED WATER PUMP	60.00	HP	77	480	3	0.95	64.01	57.00
SCHP 3	SECONDARY CHILLED WATER PUMP	25.00	HP	34	480	3	0.92	28.27	23.00
CWP 1	CONDENSER WATER PUMP	75.00	HP	96	480	3	0.95	79.81	71.25
CWP 2	CONDENSER WATER PUMP	75.00	HP	96	480	3	0.95	79.81	71.25
CWP 3	CONDENSER WATER PUMP	25.00	HP	34	480	3	0.95	28.27	23.75
FPP 1	FREEZE PROTECTION	1.00	HP	4.2	480	3	0.82	3.49	0.82
FPP 2	FREEZE PROTECTION	1.00	HP	4.2	480	3	0.82	3.49	0.82
PHWP 1	PRIMARY HOT WATER PUMP	5.00	HP	7.6	480	3	0.9	6.32	4.50
PHWP 2	PRIMARY HOT WATER PUMP	5.00	HP	7.6	480	3	0.9	6.32	4.50
PHWP 3	PRIMARY HOT WATER PUMP	5.00	HP	7.6	480	3	0.9	6.32	4.50
PHWP 4	PRIMARY HOT WATER PUMP	5.00	HP	7.6	480	3	0.9	6.32	4.50
SHWP 1	SECONDARY HOT WATER PUMP	20.00	HP	27	480	3	0.91	22.45	18.20
SHWP 2	SECONDARY HOT WATER PUMP	20.00	HP	27	480	3	0.91	22.45	18.20
FOP 01	FUEL OIL PUMP	0.75	HP	1.6	208	1	0.81	0.58	0.61
FOP 02	FUEL OIL PUMP	0.75	HP	1.6	208	1	0.81	0.58	0.61
TOTAL LOAD								2244.75	1896.16

ARCHITECTURAL LOAD CALCULATIONS									
LOAD TAG	LOAD DESCRIPTION	LOAD MAGNITUDE	LOAD UNITS	MOTOR AMPS	VOLTAGE	PHASE	ASSUMED P.F.	LOAD IN KVA	LOAD IN KW
ELEV 1	ELEVATOR	50.00	HP	65	480	3	0.95	54.0384	47.5
ELEV 2	ELEVATOR	50.00	HP	65	480	3	0.95	54.0384	47.5
ELEV 3	ELEVATOR	50.00	HP	65	480	3	0.95	54.0384	47.5
ELEV 4	ELEVATOR	50.00	HP	65	480	3	0.95	54.0384	47.5
TOTAL LOAD								216.15	190.00

SERVICE ENTRANCE SIZE

SERVICE ENTRANCE SIZE: SQUARE FOOT METHOD						
Building Size (Ft ²)	VA/Ft ²	VA	Voltage	Phase	Multiplier	Total Building Amps
365,916	13	4756908	480	3	1.732	17164.51

SERVICE ENTRANCE SIZE: NEC LOADING						
Load	Ft ²	VA/Ft ²	VA	Phase	Multiplier	Building Amps
Lighting	365,916	3	1097748	3	1.732	3961.04
Receptacles	365,916	1	187958	1	1	391.58
HVAC Cooling	365,916	12	4390992	3	1.732	15844.16
Fans / Pumps	365,916	2	731832	3	1.732	2640.69
Elevators	-	-	216150	3	1.732	779.94
Warming Kitchen	400	10	4000	3	1.732	14.43
TOTAL AMPS @480V						23631.85

SERVICE ENTRANCE SIZE: ACTUAL LOADS			
Load Description	Load (kVA)	Demand Factor	Demand Load
Lighting	1097.75	-	1097.748
Receptacles	187.96	-	187.958
Mechanical Equipment	2244.75	0.8	1795.8
Architectural Equipment	216.15	-	216.15
TOTAL AMPS @480V			3297.656

SUMMARY TABLE			
Phase	Load -kVA	Voltage System	Load - Amps
Conceptual / Schematic	4756.91	480V/277	17164.51
Design Development	6628.68	480V/277	23631.85
Working Drawings	3746.61	480V/277	3297.66
Total Actual Conditions	15132.20	-	44094.02

ENVIRONMENTAL STEWARDSHIP DESIGN

THERE IS NO LEED RATING FOR THE BUILDING AS DISCUSSED IN THE DRAWINGS AND SPECS. THE BUILDING USES PREDOMINANTLY FLUORESCENT AND METAL HALIDE FIXTURES WHICH CUT DOWN ON ENERGY CONSUMPTION WHEN COMPARED TO INCANDESCENT OR HALOGEN SYSTEMS.

THE EXTERIOR CLADDING FOR THE BUILDING IS MADE UP OF HISTORICAL VIRGINIA RED BRICK. THIS METHOD OF RENEWAL AND RECYCLING OF MATERIAL HELPS CUT DOWN ON THE NEED TO IMPORT MATERIAL FROM OTHER AREAS AS WELL AS SHOWING THE IMPORTANCE THE CAMPUS PUTS ON UNITY AND TIES TO THE PAST.

DESIGN ISSUES

ONE DESIGN ISSUE THAT WAS LOOKED AT WAS THE AMOUNT OF VOLTAGE DROP THAT OCCURS IN THE ARENA. THIS IS DUE TO THE LARGE FOOTPRINT OF THE SPACE AND THE DISTANCE BETWEEN THE MAIN ELECTRICAL ROOM AND SPACES ON THE OPPOSITE CORNER OF THE ARENA. AFTER PERFORMING A FEW SAMPLE CALCULATIONS, IT WAS FOUND THAT MOST OF THE RUNS THAT WOULD BE IN QUESTION ARE UNDER THE ALLOWABLE PERCENTAGE. THE NEC CODE STATES THAT THERE SHOULD BE NO MORE THAN 5% VOLTAGE DROP AT ANY OUTLETS.

VOLTAGE DROP CALCULATIONS - Arena Site

Circuit	Length of Run (FT)	Voltage	Load (AMPS)	Wire Size	Voltage Drop	Volts at Load	% Voltage Drop
L3N-1SE1-2	500	277	6	10	7.26	269.74	2.62
L3N-1SE1-4	550	277	6	8	5.04	271.96	1.82
L3N-1SE1-6	700	277	6	8	6.42	270.58	2.32
L3N-3SW1-2	290	277	5	12	5.6	271.4	2.02
L3N-3SW1-4	300	277	6	12	6.95	270.05	2.51
P1N-3SW1-42	260	120	8	8	3.18	116.82	2.65
L3N-1NW1-2	400	277	9	8	5.5	271.5	1.99
L3N-1NW1-4	500	277	8	8	6.11	270.89	2.21
L3N-3NW1-2	320	277	5	12	6.18	270.82	2.23
L3N-3NW1-4	300	277	7	12	8.11	268.89	2.93

COMMUNICATION SYSTEMS

DRAWINGS

AFO1 – FIRE PROTECTION PLAN
E807 – TELECOM RISER DIAGRAM
E808 – FIRE ALARM RISER DIAGRAM

SUMMARY DESCRIPTION

FIRE PROTECTION

THE SPRINKLER AND STANDPIPE SERVICE MAIN ENTERS THE BUILDING ON THE SUITE LEVEL, WITH THE FIRE DEPARTMENT CONNECTION BEING LOCATED IN THE GRASS AREA NEAR THE SOUTHEAST CORNER OF THE BUILDING. ALL SPECIFIC LOCATIONS OF SPRINKLERS FOLLOW GENERAL LAYOUT REQUIREMENTS UNLESS THEY VIOLATE ANY NFPA 13 OR VUSBC CODES. THERE IS ALSO A 6-INCH SIAMESE CONNECTION PIPE LOCATED 5 FEET FROM THE STRUCTURE NEAR THE SOUTHEAST ENTRANCE.

STANDPIPES ARE TO BE LOCATED IN EACH OF THE FOUR QUADRANTS ON THE EVENT LEVEL OF THE BUILDING PER THE DRAWINGS. THE SYSTEM IS DESIGNED AS A MANUAL WET SYSTEM WITH THE PIPING SIZED TO PROVIDE 500 GPM. THERE ARE 22" DRAIN RISERS LOCATED AT EACH OF THE STANDPIPE LOCATIONS.

THE PROTECTION SYSTEM FOR THE BUILDING IS A PREACTION SYSTEM. THE WATER FOR FIRE SUPPRESSION WILL ONLY ENTER THE SYSTEM ONCE THE HEAT/SMOKE DETECTORS ARE TRIPPED AND WILL ONLY BE RELEASED INTO THE SPACE WHEN THE FUSE WITHIN THE DETECTOR IS BROKEN. ALL SUPPRESSION DENSITIES WILL USE THE AREA/DENSITY METHOD AND THE SYSTEM SHALL BE SIZED TO PROVIDE A 10% PRESSURE MARGIN AT THE REQUIRED FLOW.

TELECOMMUNICATIONS

THE TELECOM SYSTEM FOR THE ARENA COMES FROM (4) UNDERGROUND CONDUIT FEEDS OFF OF THE MAIN UNIVERSITY COMMUNICATION SYSTEM. THEY ENTER THE BUILDING ON THE NORTH FACE AND RUN INTO THE CENTRAL PLANT WHERE THEY ARE DISTRIBUTED THROUGHOUT THE REST OF THE ARENA. EACH QUADRANT OF THE ARENA IS SERVICED BY A STANDARD TELECOM ROOM AND ONE THAT IS RUN BY THE UNIVERSITY.

THE VOICE AND DATA NETWORKS WILL RUN THROUGH THE ENTIRE BUILDING AND PROVIDE SERVICES TO ALL THE SPACES IN THE ARENA. THERE IS ALSO A LARGE AUDIO VISUAL SYSTEM THAT IS

USED IN THE ACTUAL ARENA AND COURT AREA AND INTEGRATED THROUGH THE SPEAKERS THAT ARE SPACED AROUND THE CONCOURSE LEVELS. ALONG WITH THE AV SYSTEM, THERE ARE FLAT-SCREEN TELEVISIONS PLACED AROUND THE ARENA TO GIVE VISITORS INFORMATION ABOUT UPCOMING EVENTS AND HAPPENINGS THAT ARE OCCURRING AT THE ARENA.

TRANSPORTATION

THERE ARE (4) ELECTRIC OPERATED, OIL-HYDRAULIC ELEVATORS THROUGHOUT THE BUILDING, (3) BEING FOR PASSENGERS AND (1) BEING FOR GENERAL SERVICE. THE PASSENGER ELEVATORS ALL CARRY A CAPACITY OF 3500 POUNDS AND RUN ON 480V-3 PHASE-60 CYCLE AT 50 HP. THE SERVICE ELEVATOR RUNS ON A VARIABLE VOLTAGE, 2-WAY LEVELING SYSTEM WITH A CARRYING CAPACITY OF 800 POUNDS. THERE IS ONE ELEVATOR LOCATED IN EACH QUADRANT OF THE BUILDING, WITH THE SERVICE ONE BEING LOCATED NEAR THE DINING ROOM AND KITCHEN AREA.

THERE ARE (7) MAIN STAIRCASES THROUGHOUT THE ARENA LOCATED IN HIGH TRAFFIC AREAS AND NEAR THE TEAM LOCKER ROOMS. THE ENTRANCES TO THE COURT AREA ARE FED BY (14) HALF LEVEL STAIRCASES FOR OCCUPANTS TO GET TO THE SEATING AREAS.

AUDIO VISUAL SYSTEMS

THERE ARE A SERIES OF MOTORIZED FRONT PROJECTION SCREENS LOCATED THROUGHOUT THE ARENA RANGING IN SIZE FROM 6'X8' TO 6'X10'. THE ARENA ALSO HAS A COMBINATION OF MICROPHONES THAT ARE PODIUM-MOUNTED, WIRELESS OR STRAIGHT MOUNTED. THESE ARE CONNECTED TO THE SPEAKER SYSTEM THAT RUNS ON 8", 70 VOLT SPEAKERS WITH A SENSITIVITY RATING AT LEAST 93 DB AND THE CLOSED CIRCUIT TELEVISION CONNECTION THAT RUNS THROUGHOUT.