



THE VIRGINIA ADVANCED

SHIPBUILDING and CARRIER

INTEGRATION CENTER

| ALYSON LARIMER | AE SENIOR THESIS | 13 APRIL 2011 |

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CIRCULATION | LOBBY
WORK SPACE | OPEN OFFICE
MULTI-PURPOSE | AUDITORIUM

LANDSCAPE DESIGN

EXTERIOR | GATHERING SPACE
LANDSCAPE BREADTH

ELECTRICAL DESIGN

FOUR SPACES
MOTOR CONTROL CENTER DESIGN
BUS DUCT VS. CONDUIT + FEEDERS

ACOUSTICAL STUDY

AUDITORIUM CEILING CHANGE



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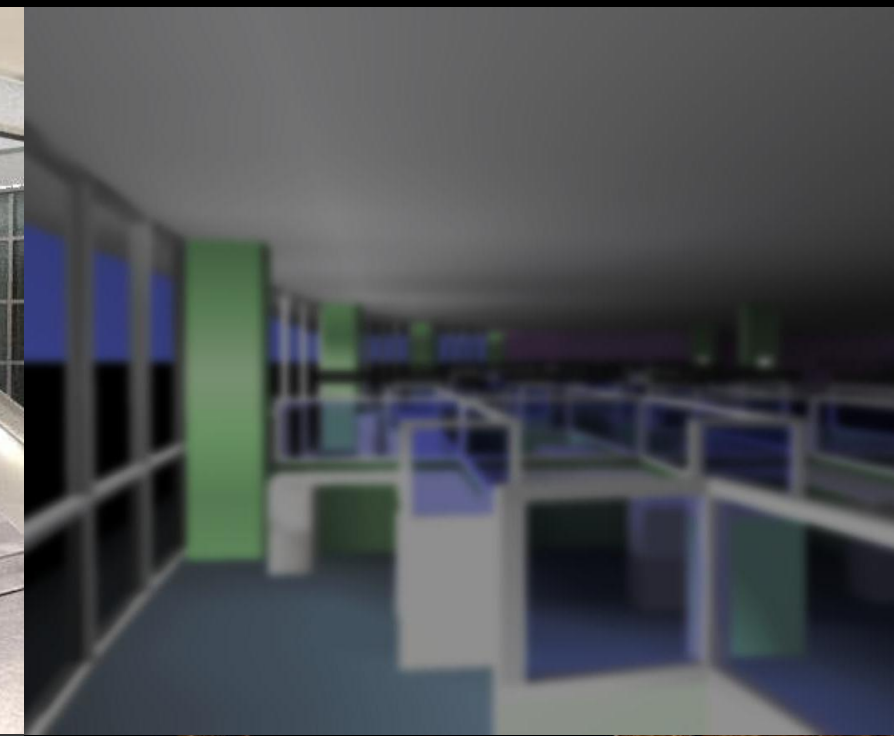
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VASCIC FACILITY

SITE AND LOCATION

NEWPORT NEWS, VIRGINIA
JAMES RIVER

BUILDING OCCUPANT

NORTHROP GRUMMAN NEWPORT
NEWS SHIPBUILDING

SIZE

241,000 SF.

LEVELS

7 STORY TECHNOLOGY TOWER
3 STORY LABORATORY WING

PRIMARY PROJECT TEAM
A | E

CLARK NEXSEN ARCHITECTURE AND
ENGINEERING

GC | CONSTRUCTION

W.M JORDAN COMPANY



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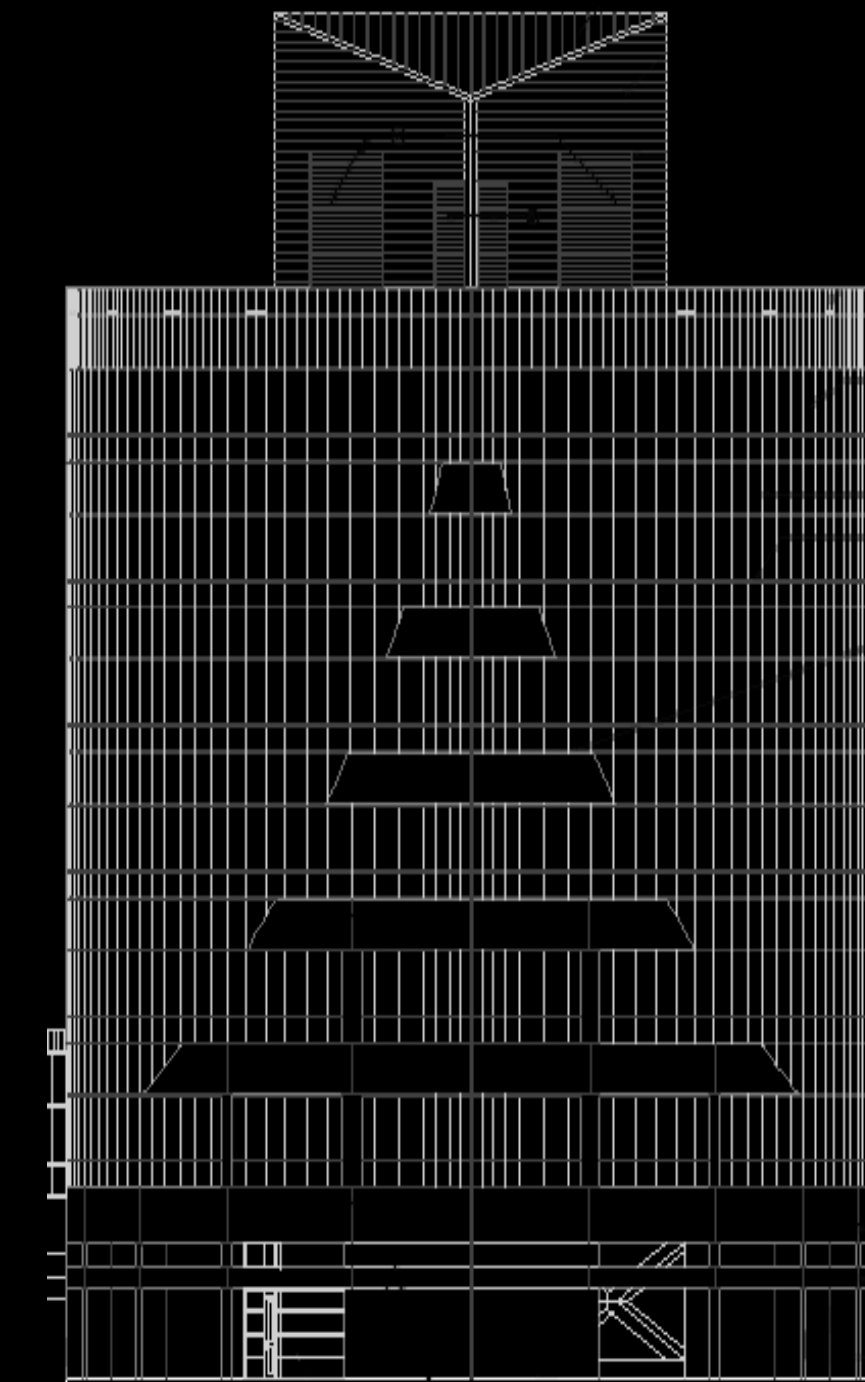
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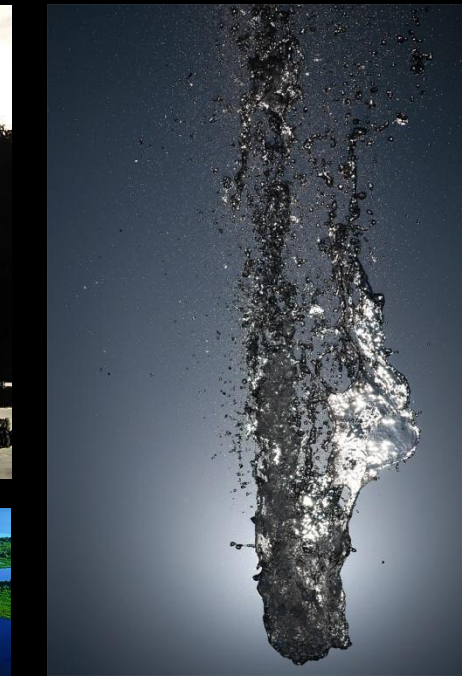
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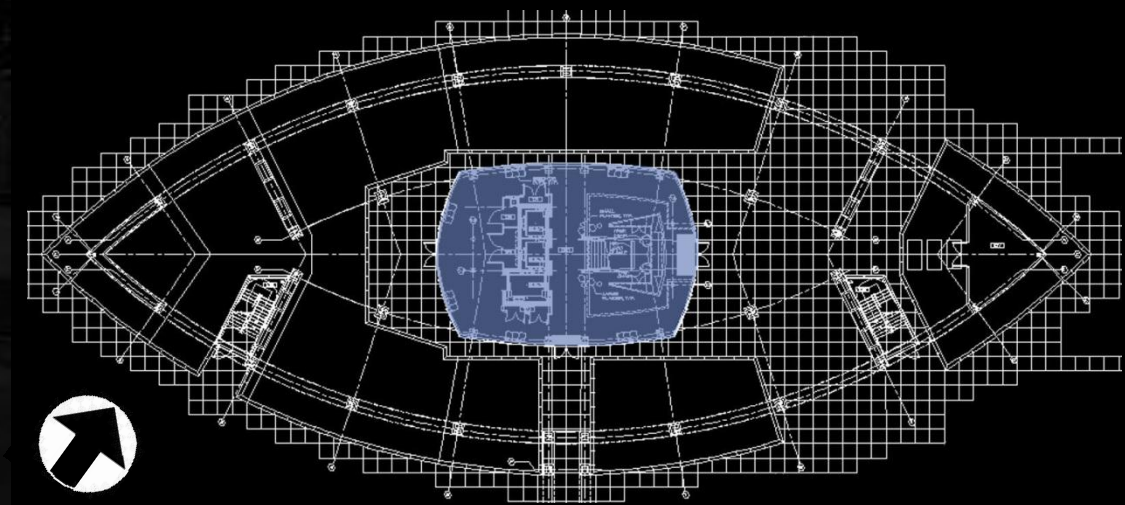
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CIRCULATION | LOBBY

EXTERIOR | LANDSCAPE
DESIGN | LIGHTING DESIGN



CIRCULATION | LOBBY

DESCRIPTION
LOCATION

GROUND FLOOR TECHNOLOGY TOWER
~ 2981 SF
13' 6" CEILING HEIGHT

PURPOSE

MAIN ENTRANCE TO FACILITY
PROVIDE FIRST IMPRESSION
SECURITY AND RECEPTIONIST

ARCHITECTURAL ELEMENTS

GLASS ENVELOPE
LARGE MARBLE STAIRCASE
ELEVATOR COLUMN
FLOATING BUILDING | REFLECTING POOLS



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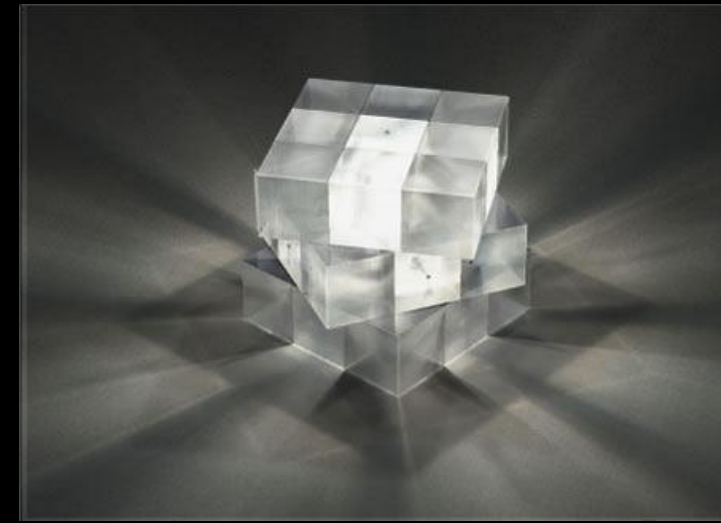
CIRCULATION | LOBBY

DESIGN CONCEPTS

MOVEMENT CONTROL
IDENTIFIABLE FROM EXTERIOR
HIERARCHY OF LIGHT
HIGHLIGHT KEY ELEMENTS

MATERIALS

TRANSPARENCY VS. TRANSLUCENCY
CONTRAST
GLOWING FROM WITHIN



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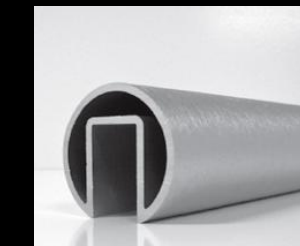
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CIRCULATION | LOBBY

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INTEGRATED DESK LED



INTEGRATED HANDRAIL LED



RECESSED LED WALL WASHER



RECESSED LED DOWNLIGHT



RECESSED LED WALL WASHER



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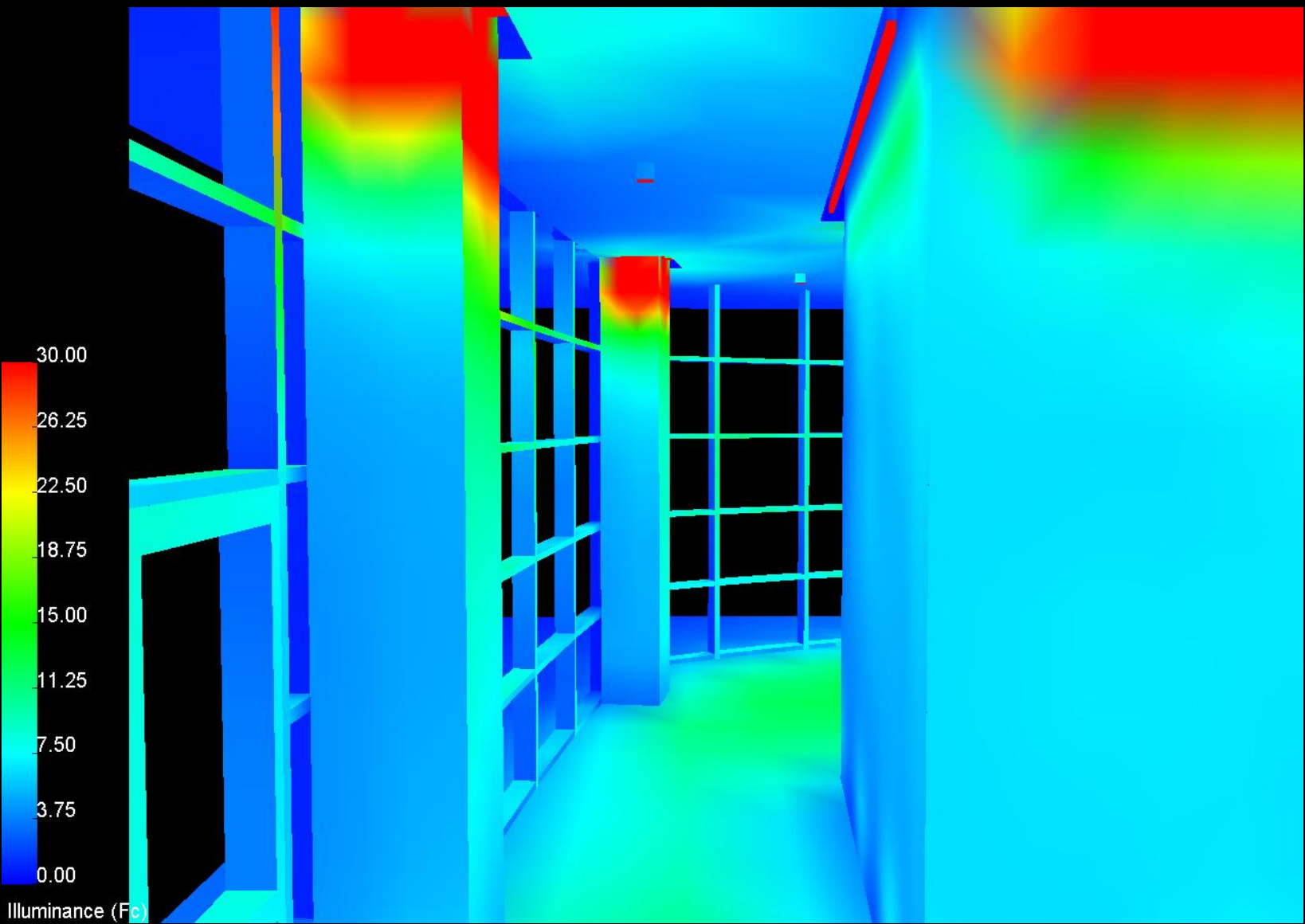
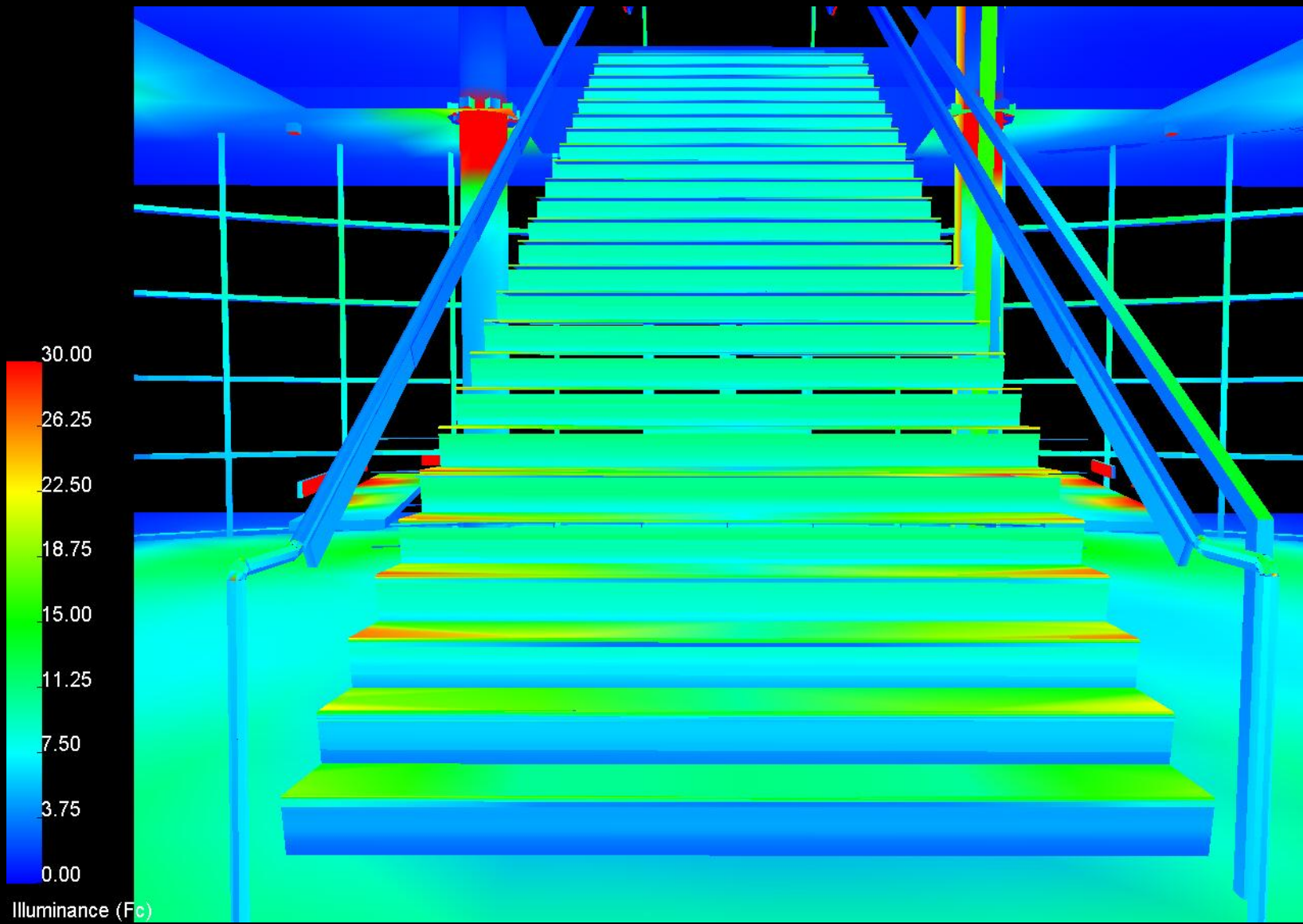
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CIRCULATION | LOBBY

EXTERIOR | LANDSCAPE DESIGN | LIGHTING DESIGN

CIRCULATION | LOBBY | SUMMARY

QUALITATIVE | EXPERIENCE | CONCEPT

EVOKE INTEREST OUTSIDE SPACE

MANIPULATED MOVEMENT

LIGHTING VIA MATERIAL TYPE

PRODUCE GLOWING EFFECT

CONTRAST PRODUCING SHADOWS

HIERARCHY OF LIGHT



QUANTITATIVE | IESNA RECOMMENDATIONS | ASHRAE 90.1

DESIGN CRITERIA	FOOT CANDLES
DESK	10.0
STAIRS	5.0
FLOOR	10.0
ELEVATOR	3.0 VERTICAL
COLUMNS	3.0 VERTICAL

LOBBY CALCULATION SUMMARY					
	Desk	Stairs	Floor	Elevator	Columns
AVG. ILLUMINANCE	14.4	6.0	11.68	5.94	6.3
AVG/MIN	1.64	6.67	3.50	4.43	12.8
CRITERIA	10.0	5.0	10.0	3.0	3.0
COMPLIANCE	YES	YES	YES	YES	YES

TOTAL SQ. FT.	2981 SQ.FT.
TOTAL LPD ALLOWABLE	1.3 W/FT ²
TOTAL LPD	0.37 W/FT ²
COMPLIANCE	YES



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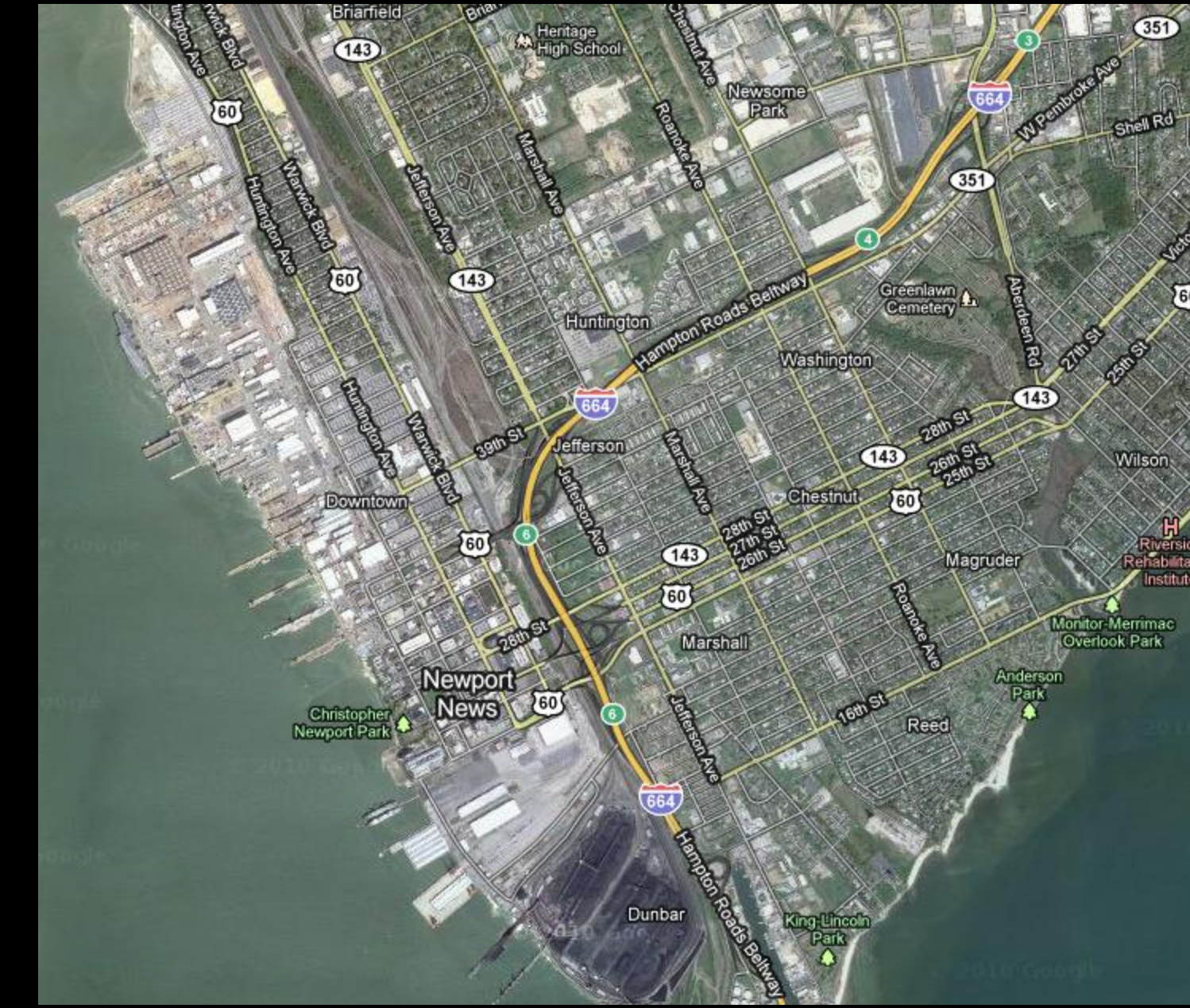
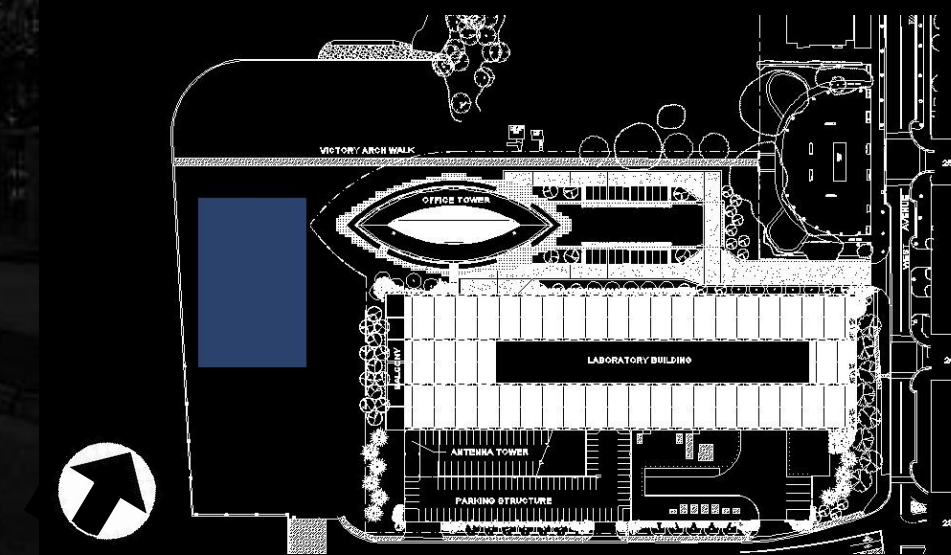
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LANDSCAPE DESIGN | LIGHTING DESIGN

CIRCULATION | LOBBY

EXTERIOR | LANDSCAPE DESIGN | LIGHTING DESIGN



EXTERIOR | LANDSCAPE DESIGN

DESCRIPTION
LOCATION

BEHIND TECHNOLOGY TOWER ALONG VICTORY WALKWAY

PURPOSE

CONNECT COMMUNITY WITH WATERFRONT WHILE PROVIDING A PLEASANT ATMOSPHERE

MARITIME CENTER

“FRAMEWORK FOR THE FUTURE 2030”

PLAN

NORTHROP GRUMMAN NN JOINED WITH CITY 5 YEAR PLAN

GOAL

“EVENTUALLY ACCOMMODATE TOUR BOATS TO THE AREA IN THE FUTURE WHILE EXPANDING COMMUNITY INTERACTION”
CONNECT EXISTING GATHERING SPACES ALONG SUPERBLOCK



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EXTERIOR | LANDSCAPE DESIGN

BASIS OF DESIGN

FOCUSED ON PURPOSE OF FACILITY

DORTHY

IMPLEMENTED GEOMETRIES OF SHIPS

IMPLEMENTED WATER FEATURES
SURROUNDING SEATING AREAS



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EXTERIOR | LANDSCAPE DESIGN | LIGHTING DESIGN



EXTERIOR | LIGHTING DESIGN

DESIGN CONCEPTS

LIGHT BECOMES PART OF THE LANDSCAPE

LUMINAIRES AESTHETICALLY PLEASING

FUNCTIONAL

POINTS OF INTEREST WHILE CREATING BOUNDARIES

CHOICES

ENHANCE THE LANDSCAPING VIA UP LIGHTING



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EXTERIOR | LANDSCAPE DESIGN | LIGHTING DESIGN



EXTERIOR | LANDSCAPE DESIGN

ELEMENTS

- SMALL SEATING AREAS
- LARGE SEATING AREA
- ROUND SEATING AREA ALONG PROMENADE



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**LANDSCAPE DESIGN |
LIGHTING DESIGN**

CIRCULATION | LOBBY

**EXTERIOR | LANDSCAPE
DESIGN | LIGHTING DESIGN**



EXTERIOR | LANDSCAPE DESIGN

ELEMENTS

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EXTERIOR | LANDSCAPE DESIGN

ELEMENTS

- SMALL SEATING AREAS
- LARGE SEATING AREA
- ROUND SEATING AREA ALONG PROMENADE





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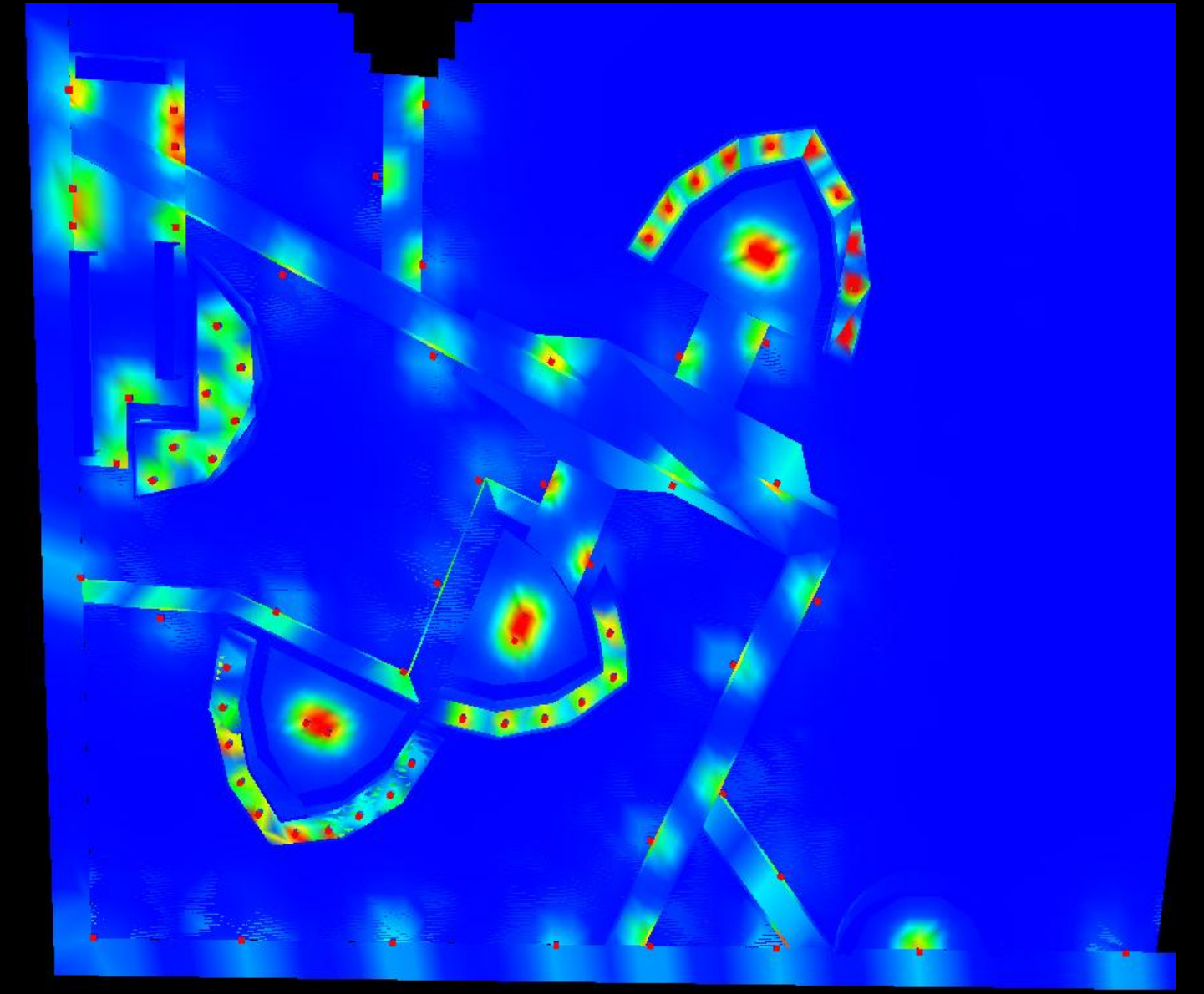
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Illuminance (Fc)





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EXTERIOR | LANDSCAPE DESIGN

QUALITATIVE | EXPERIENCE | CONCEPT

DEFINES PURPOSE OF FACILITY

DISAPPEARS INTO LANDSCAPE

LIGHT IS ART

IMITATE SHIP GEOMETRIES

INCORPORATING WATER



QUANTITATIVE | IESNA RECOMMENDATIONS | ASHRAE 90.1

EXTERIOR GATHERING SPACE					
	Main Pathway	Intermediate Pathway	Small Seating	Large Seating	Round Seating
Avg. Illuminance	1.09	1.73	1.95	2.03	1.00
Avg/Min	10.0	4.80	8.60	12.9	10.0
CRITERIA	1.0	1.0	1.5	2.0	1.0
COMPLIANCE	YES	YES	YES	YES	YES

TOTAL SQ. FT.	29888 SQ.FT.
TOTAL LPD ALLOWABLE	0.2 W/FT ²
TOTAL LPD	0.10 W/FT ²
COMPLIANCE	YES



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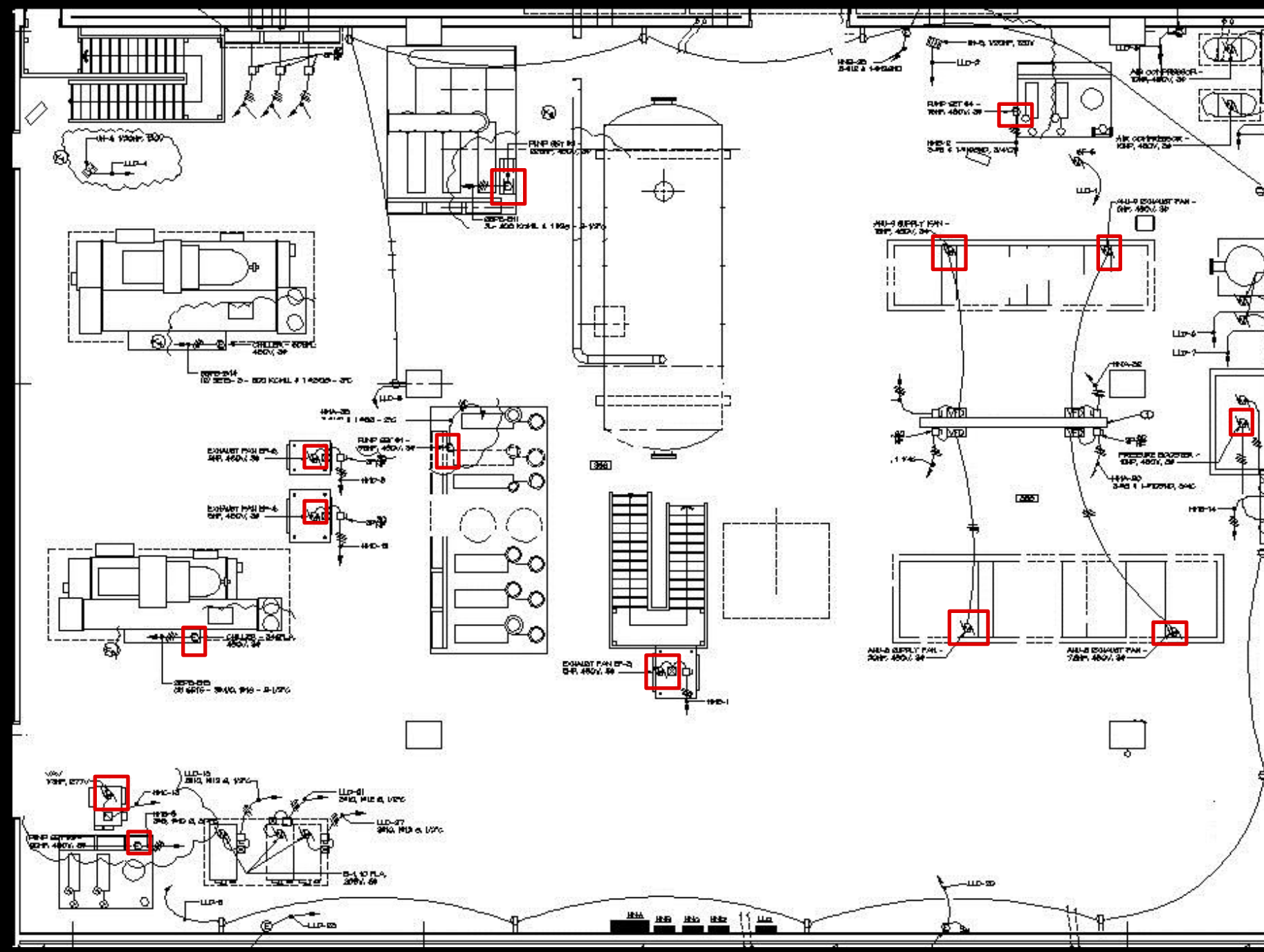
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ELECTRICAL DEPTH

MOTOR CONTROL CENTER

DESIGN DESCRIPTION

LOCATION | FLOOR PLAN



MOTOR CONTROL CENTER

LOCATION

LARGE MECHANICAL ROOM WITHIN LABORATORY WING

PURPOSE

VARIOUS PIECES OF EQUIPMENT CONTAINING MOTORS LOCATED HERE
MAKES MAINTENANCE MORE CONVENIENT
DUE TO ALL MOTORS LOCATED IN ONE AREA

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MOTOR CONTROL CENTER

DESIGN DESCRIPTION
LOCATION | FLOOR PLAN

MOTOR CONTROL CENTER

SIZING

ALL MOTORS TYPE A ENCLOSURE
EATON CONSULTING APPLICATION GUIDE
COMBINATION UNIT
VFD AND FVNR MOTOR STARTERS
MCB FRAME TYPE
NEMA RATING
BUCKET-SPACE SIZE
FULL UNIT SIZE

UNIT TAG	EQUIPMENT TAG	LOAD DESCRIPTION	LOAD (HP)	VOLTAGE	PHASE	PF	OVERCURRENT PROTECTION MCCB	STARTER TYPE	NEMA SIZE	SIZE (in.)	SPACES
A	AHU-SF-4	AIR HANDLING UNIT SUPPLY FAN	50	480	3	0.95	150	VFD	-	54	9
C	AHU-EF-4	AIR HANDLING UNIT EXHAUST FAN	15	480	3	0.95	50	VFD	-	24	4
F	AHU-SF-5	AIR HANDLING UNIT SUPPLY FAN	60	480	3	0.95	175	VFD	-	54	9
H	AHU-EF-5	AIR HANDLING UNIT EXHAUST FAN	25	480	3	0.95	80	VFD	-	36	6
J	AHU-SF-6	AIR HANDLING UNIT SUPPLY FAN	60	480	3	0.95	175	VFD	-	54	9
I	AHU-EF-6	AIR HANDLING UNIT EXHAUST FAN	20	480	3	0.95	60	VFD	-	36	6
L	AHU-SF-7	AIR HANDLING UNIT SUPPLY FAN	50	480	3	0.95	150	VFD	-	54	9
N	AHU-EF-7	AIR HANDLING UNIT EXHAUST FAN	20	480	3	0.95	60	VFD	-	36	6
O	AHU-SF-8	AIR HANDLING UNIT SUPPLY FAN	20	480	3	0.95	60	VFD	-	36	6
D	AHU-EF-8	AIR HANDLING UNIT EXHAUST FAN	7.5	480	3	0.75	25	VFD	-	24	4
E	AHU-SF-9	AIR HANDLING UNIT SUPPLY FAN	15	480	3	0.95	50	VFD	-	24	4
P	AHU-EF-9	AIR HANDLING UNIT EXHAUST FAN	5	480	3	0.95	15	VFD	-	24	4
G	PB-1	PRESSURE BOOST	10	480	3	0.95	150	FVNR	1	12	2
K	PB-2	PRESSURE BOOST	10	480	3	0.95	150	FVNR	1	12	2
M	A-COMP	AIR COMPRESSOR	10	480	3	0.95	150	FVNR	1	12	2
B	PS-1	PUMP SET #1	95	480	3	0.95	150	FVNR	4	18	3
Q	PS-2	PUMP SET #2	225	480	3	0.95	600	FVNR	6	48	8
R	PS-3	PUMP SET #3	20	480	3	0.95	150	FVNR	2	12	2
S	PS-4	PUMP SET #4	15	480	3	0.95	150	FVNR	2	12	2
T	EF-3	EXHAUST FAN #3	5	480	3	0.75	150	FVNR	1	12	2
U	EF-4	EXHAUST FAN #4	5	480	3	0.75	150	FVNR	1	12	2
V	EF-6	EXHAUST FAN #6	2	480	3	0.75	150	FVNR	1	12	2

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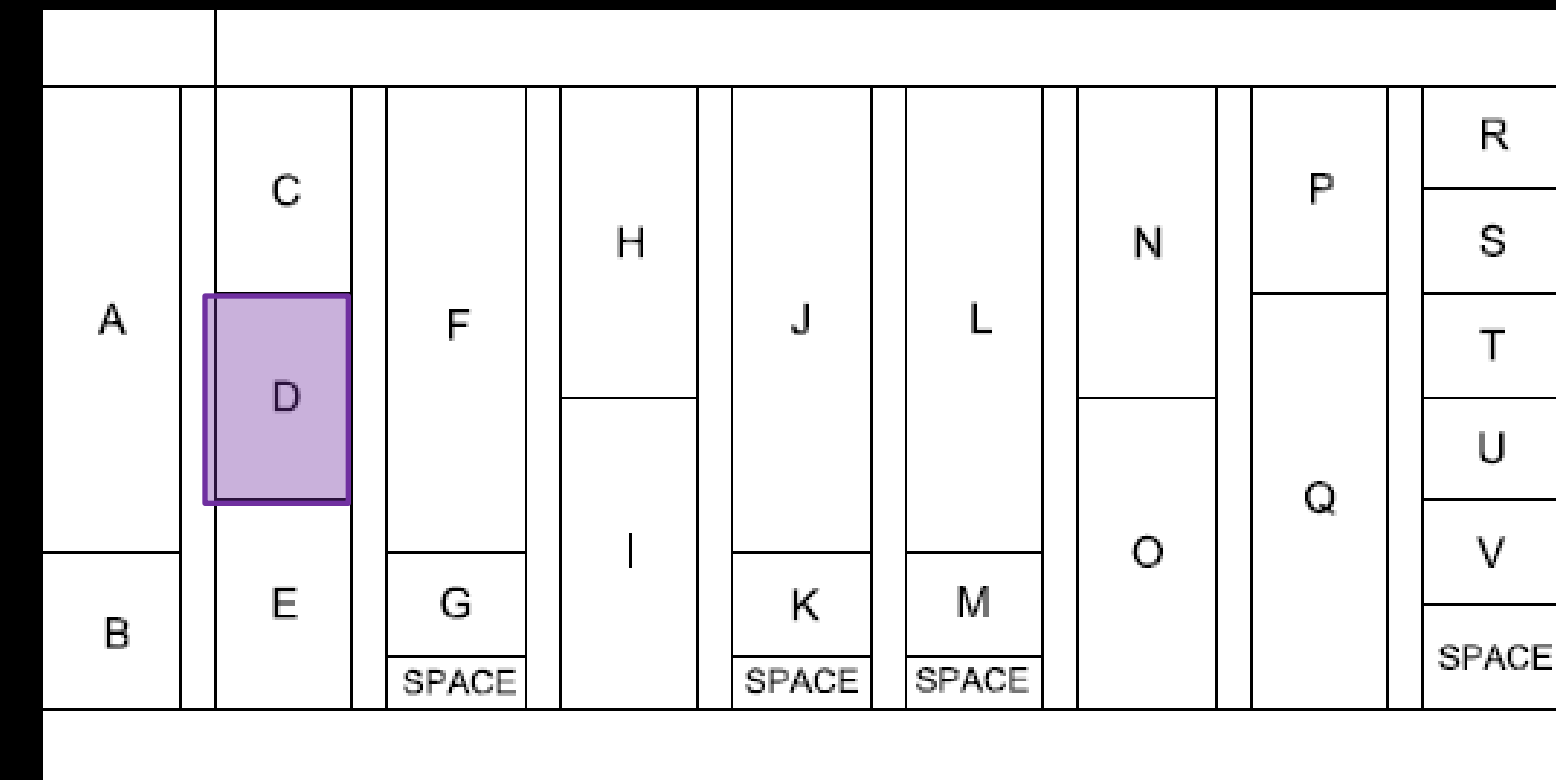
MOTOR CONTROL CENTER

DESIGN DESCRIPTION

LOCATION | FLOOR PLAN

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S	PS-4	PUMP SET #4	15	480	3	0.95	150	FVNR	2	12	2
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U	EF-4	EXHAUST FAN #4	5	480	3	0.75	150	FVNR	1	12	2
V	EF-6	EXHAUST FAN #6	2	480	3	0.75	150	FVNR	1	12	2

MOTOR CONTROL CENTER



SIZE

TOTAL UNIT DEPTH: 16"
 TOTAL UNIT HEIGHT: 90"
 WIDTH OF SINGLE UNIT SECTION: 20"
 TOTAL CONTROL CENTER LENGTH: 15'



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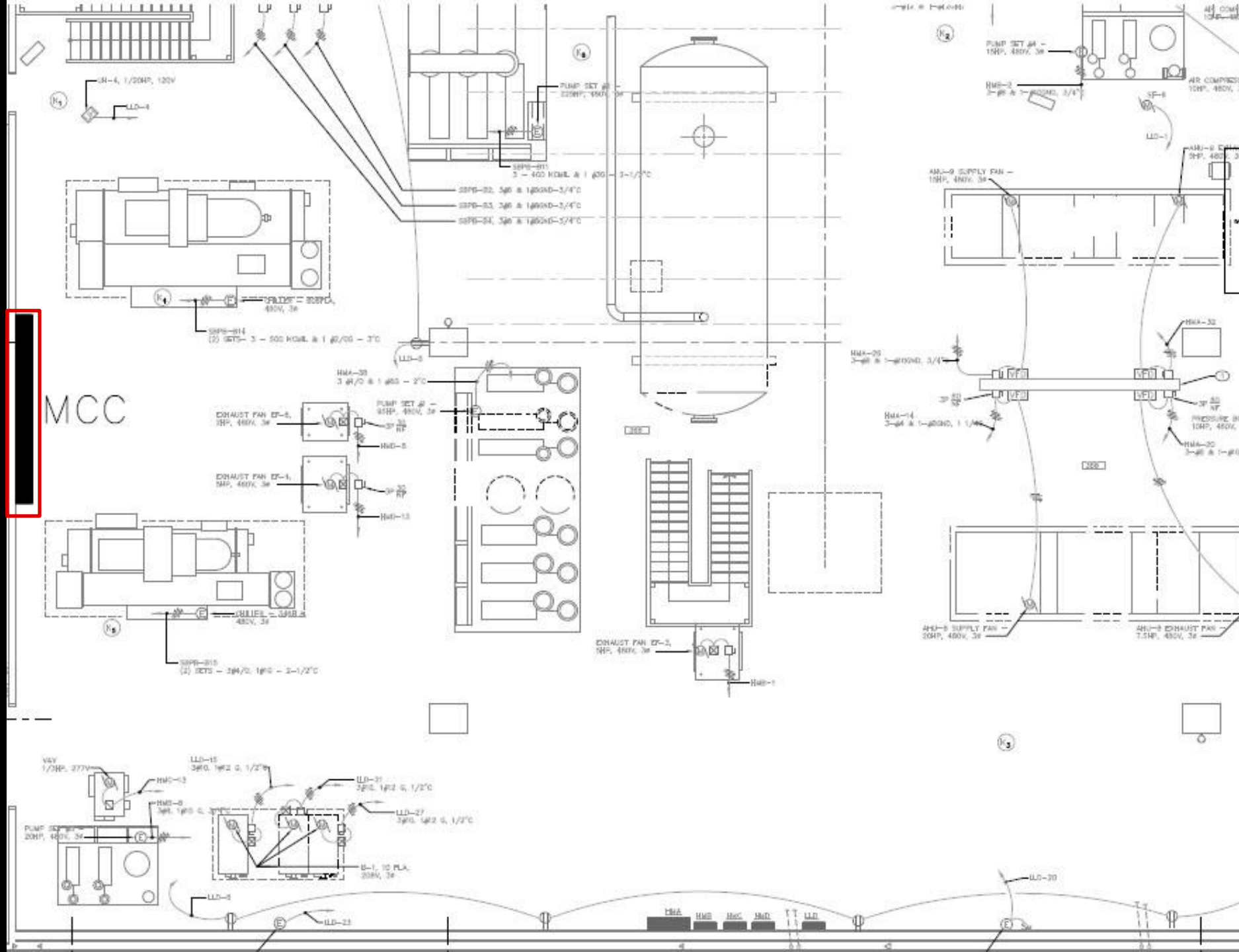
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LOCATION | FLOOR PLAN



MOTOR CONTROL CENTER



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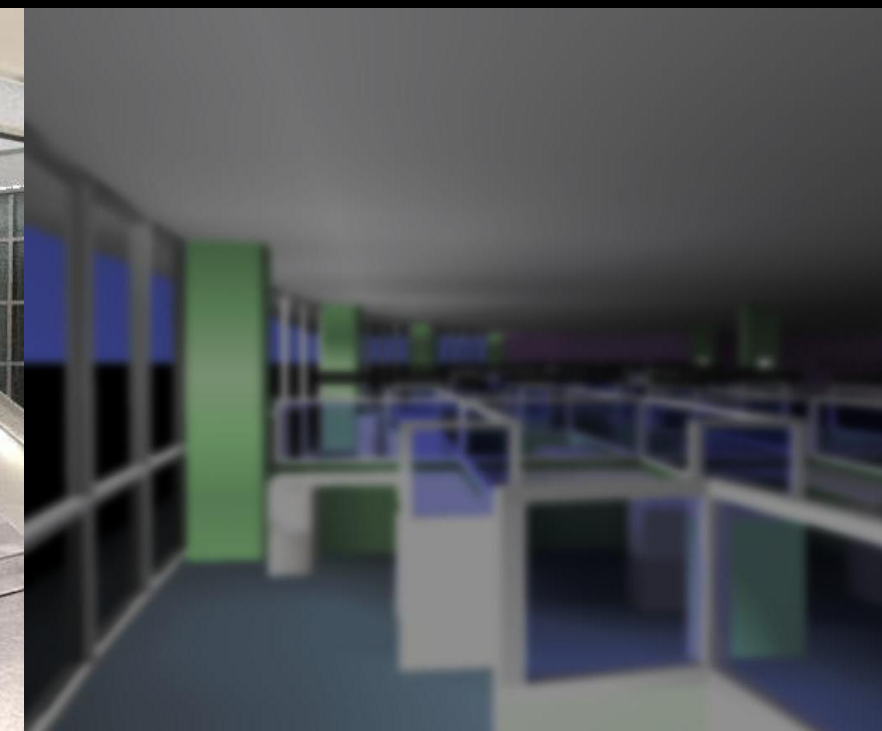
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CIRCULATION | LOBBY

MOVEMENT CONTROL
GLOWING FROM WITHIN
TRANSPARENT VS. TRANSLUCENT
LAYERS OF LIGHT CREATE CONTRAST

EXTERIOR | LANDSCAPE DESIGN

BRINGING COMMUNITY CLOSER
ENHANCING WATERFRONT
FOCUSING ON PURPOSE OF FACILITY
GEOMETRIES OF SHIPS



EXTERIOR | LIGHTING DESIGN
DISAPPEARING INTO LANDSCAPE
BECOMES ART WORK
POINTS OF INTEREST

ELECTRICAL | MOTOR CONTROL CENTER
CONVENIENT MAINTENANCE
FUTURE EXPANSION



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ACKNOWLEDGMENTS

SPECIAL THANKS TO....

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DR. HOUSER
PROF. DANNERTH
PROF. GOOD
PROF. HOLLAND
PROF. PARFITT

FRIENDS AND FELLOW AE STUDENTS
...THE LIGHTING KIDS

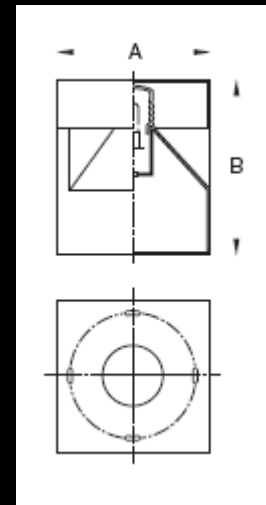
QUESTIONS?



LUMINAIRE EQUIPMENT SCHEDULE

TYPE	MANUFACTURER	CATALOGUE NUMBER	DESCRIPTION	LAMP	CCT	BALLAST (OR DRIVER)	LOCATION	ELECTRICAL	INPUT WATTAGE
C	METALUX-COOPER LIGHTING	MBF-2-54T5FB	4' (2)T5 industrial fixture die formed channel from 20 gauge rolled steel with pretreated iron phosphate for rust inhibitor, reflector minimum 95% total reflectivity, mounted with suspension cables or surface mounted, integral occupancy sensor available.	(2) F54W/T5/835/ECO	3500	99651 - GE254MVP590-F	AUDITORIUM	120/277	117
CW	FOCAL POINT	FL44-11LED-L40-277-SO-T L44-50-TD-TS	4.5" X 4.5" wall washing LED module with remote phosphor technology generating high system efficacy, luminaire design maintains form factors, lumen output, and thermal management for module and driver components, intelligent driver technology, flicker free. Housing made of die-cast aluminum incorporated with an angled MicroGlow lens redirecting light delivering asymmetric distribution.	Fortimo LED TDLM 1100 21 W/840 277V MODULE: 929000613903	4000	LED-120A-0012V-21-F	LOBBY	120	21
DN	FOCAL POINT	FL44-11LED-L40-277-SO-T L44-50-DN-TD-TS	4.5" X 4.5" downlight LED module with remote phosphor technology, powered by Philips' Fortimo LED and AdvanceTitanium LED driver, aluminum heat sink incorporated into die-cast aluminum housing, clear acrylic reflector cone for superior brightness control and 55 degree cutoff, easy replacement, 70% luminaire efficiency.	Fortimo LED TDLM 1100 21 W/840 277V MODULE: 929000613903	4000	LED-120A-0012V-21-F	LOBBY	120/277	21.6
DS	PRESCOLITE-HUBBELL LIGHTING	CF8W26QEB	8" wall mounted cylinder, 26W CFL, quad tube, electronic ballast	F26TBX/835/A/ECO	3500	97608 - F26DBX/835/ECO	AUDITORIUM	120/277	27
EC	THE LIGHTING QUOTIENT-FRAQTIR	S301-R06G-5-00-1-00-0-30-00	Cove LED system of extruded aluminum integrated with proper heat sinks, impact-resistant extruded acrylic lens and holographic diffuser, rotating/locking hinges to allow for proper alignment, Philips Lumiled LUXEON LEDs, remote driver in aluminum enclosure, mounting L-brackets can be interlocked for continuous acting luminaire, luminaire provides uniform asymmetric distribution utilizing reflection and inter-refraction of light.	LXM3-PW51	4000	LED-120A01400C0240F	LOBBY	120	42.1
GG	BEGA	5014	17.7" in diameter, portable garden luminaire with stainless steel base plate, white synthetic safety glass sphere housing one lamp, sphere distributes light softly and uniformly over surface.	CF7EL/SUPER/830/BL	3000	SELF BALLASTED	EXTERIOR	120	7
HR	IO by Cooper Lighting	0.06.SSS.2.PM.NR.65.3K.GB3.120	Handrail integrated LED chips delivers functional outputs effectively illuminating paths of egress, available in two rail diameters and three beam spread angles, constructed of steel and aluminum, practical for indoor and outdoor applications, ADA and ANSI compliant, proper LED thermal management in accordance with LED manufacture specifications, generally provided in 4' OC.	LED PROVIDED BY IO	3000	DR200AM	LOBBY	120/277	11
PS	BEGA	7785MH	1.3' W x 1.3' L x 1.5 H, two piece die-cast aluminum construction providing a symmetrical distribution, construction robust enough for human weight, spun aluminum lamp housing location inside lower top covering shielded, anchored with secured plates to lower casting with four stainless steel rods, finished in black, UL listed for wet locations.	CMH39T/U/942/G12	4000	GEMH39-MC-120	EXTERIOR	120	40
SB	CREE LED LIGHTING	LR6C-DR1000	6" recessed architectural downlight, Cree True White Technology LED, delivers 80 lumens/W, CRI 90	LMR040-0700-35F9-10100TW	3500	LED-120A-0350C-33-F	AUDITORIUM	120	11.9
SC	IVALO INC.-LUTRON	LNN-27SNL-2WNUMT	27" interior decorative sconce, direct/indirect, ADA compliant (3-7/8" off of wall), white LED strings, incorporated reflector within housing of luminaire, finished in case aluminium, mounts on wall from base bracket with locking screws.	5W 27' LED STRING	4000	LED-UNIA-0700C-12-F	OPEN OFFICE	120	5

SP	ERCO	EN-1-ERCO-72086-000	4.9" track spot light, powder coated cast aluminium with 180° tilt capabilities, able to connect with a DALI track system, LED module replaceable						
ST	IO LED-Cooper	0.01.SL.3K.N.100.3.0	5.9"x5.9" square LED step light for interior or exterior applications, UL listed for wet/damp locations, gasketed and corrosion resistant metal casting, polycarbonate lens, LED replaceable.						
TA	THE LIGHTING QUOTIENT-TAMBIENT	L201-3653-M-EL15-T-30	Task ambient luminaire 34.75" long with integral hang-on mounting, 1 21W T5 luminaire, high performance louver on top for maximum uplight coverage and minimal glare at eye height, clear prismatic acrylic task lens reducing veiling reflections, housed in extruded aluminum with downlight reflector.						
TS	IO by Cooper Lighting	0.09.I.3K.NG.1.6.1.1	1.39" W X .66" D X 36" L shelf integrated task light, LEDge is a part of the IO linear LED-based family, low voltage, neoprene gasketed, housing made of extruded aluminum, finished in anodized aluminum.						
TT	Bega	7502	1.3"W x 1.5"L x 8.85" H LED floorlight, housed in aluminum alloy, stainless steel, and clear safety glass, silicone gasketed, inner reflector made of anodised pure aluminum, mounting bos with 2 fixing holes for permanent locking, UL label for wet locations						



Lamp	Lumen	A	B	Anchorage
7785MH 1 39W T6 G12 MH	3300	15 3/4	18	890E

AUDITORIUM						
TYPE	MAINTENANCE CATEGORY	CALCULATIONS				TOTAL LLF
		BALLAST FACTOR	LUMINAIRE DIRT DEPRECIATION	LAMP LUMEN DEPRECIATION	LUMEN DEPRECIATION	
ST	Clean	1.0	0.93	0.70	0.65	
SP	Clean	1.0	0.93	0.70	0.65	
SB	Clean	1.0	0.93	0.70	0.65	
TL	Clean	1.0	0.93	0.70	0.65	
C	Clean	1.1	0.93	0.92	0.94	
DS	Clean	1.0	0.93	0.85	0.80	

CALCULATIONS						
TYPE	MAINTENANCE CATEGORY	BALLAST FACTOR	LUMINAIRE DIRT DEPRECIATION	LAMP LUMEN DEPRECIATION	LUMEN DEPRECIATION	TOTAL LLF
DN	Clean	1.0	0.93	0.70	0.65	
HR	Clean	1.0	0.93	0.70	0.65	
TS	Clean	1.0	0.93	0.70	0.65	
CW	Clean	1.0	0.93	0.70	0.65	
EC	Clean	1.0	0.93	0.70	0.65	

Open Office						
TYPE	MAINTENANCE CATEGORY	CALCULATIONS				TOTAL LLF
		BALLAST FACTOR	LUMINAIRE DIRT DEPRECIATION	LAMP LUMEN DEPRECIATION	LUMEN DEPRECIATION	
TA	Clean	1.0	0.93	0.92	0.86	
SC	Clean	1.0	0.93	0.70	0.65	

Exterior Gathering Space						
TYPE	MAINTENANCE CATEGORY	CALCULATIONS				TOTAL LLF
		BALLAST FACTOR	LUMINAIRE DIRT DEPRECIATION	LAMP LUMEN DEPRECIATION	LUMEN DEPRECIATION	
GG	Clean	1.0	0.93	0.89	0.83	
PS	Clean	1.0	0.93	0.81	0.75	
TT	Clean	1.0	0.93	0.70	0.65	

*Assuming Clean environment with a 12 month cleaning cycle

