

Cathedral Place

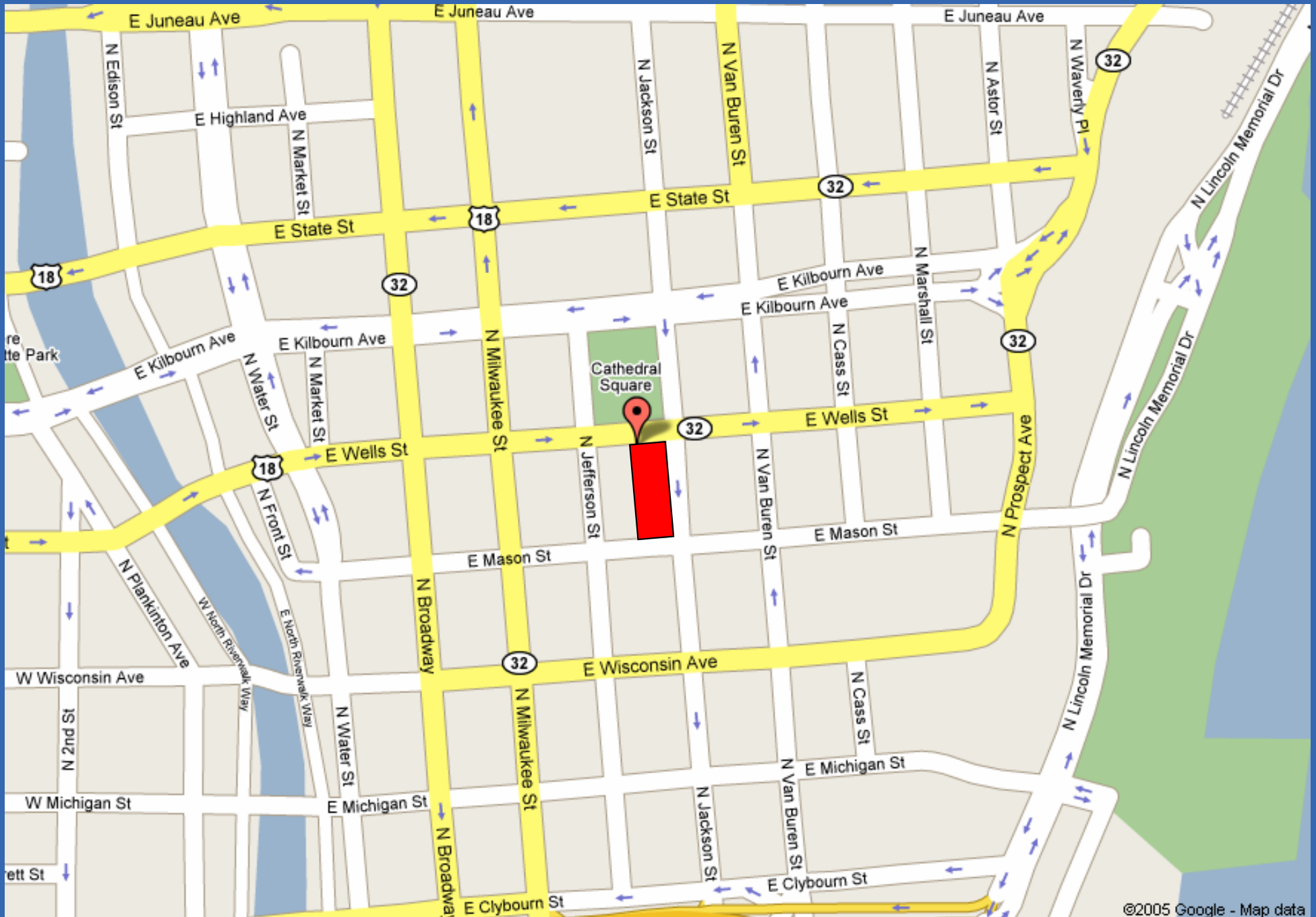
Milwaukee, Wisconsin



Steven Puchek
Final Thesis Presentation
Lighting / Electrical Emphasis
10 April 2006



Building Information



Building Information

- Multi-Use, “Multi-Owner”

- Condominium – 55,000 sf

- Office – 273,000 sf

- Retail – 18,000 sf

- Parking Garage – 373,000 sf

{ Owned by Individuals

{ Owned and Managed by Van Buren

{ Owned by Redevelopment Authority

- “Boot-shaped”

- Split into Distinct Sections

- Distinct Building Systems

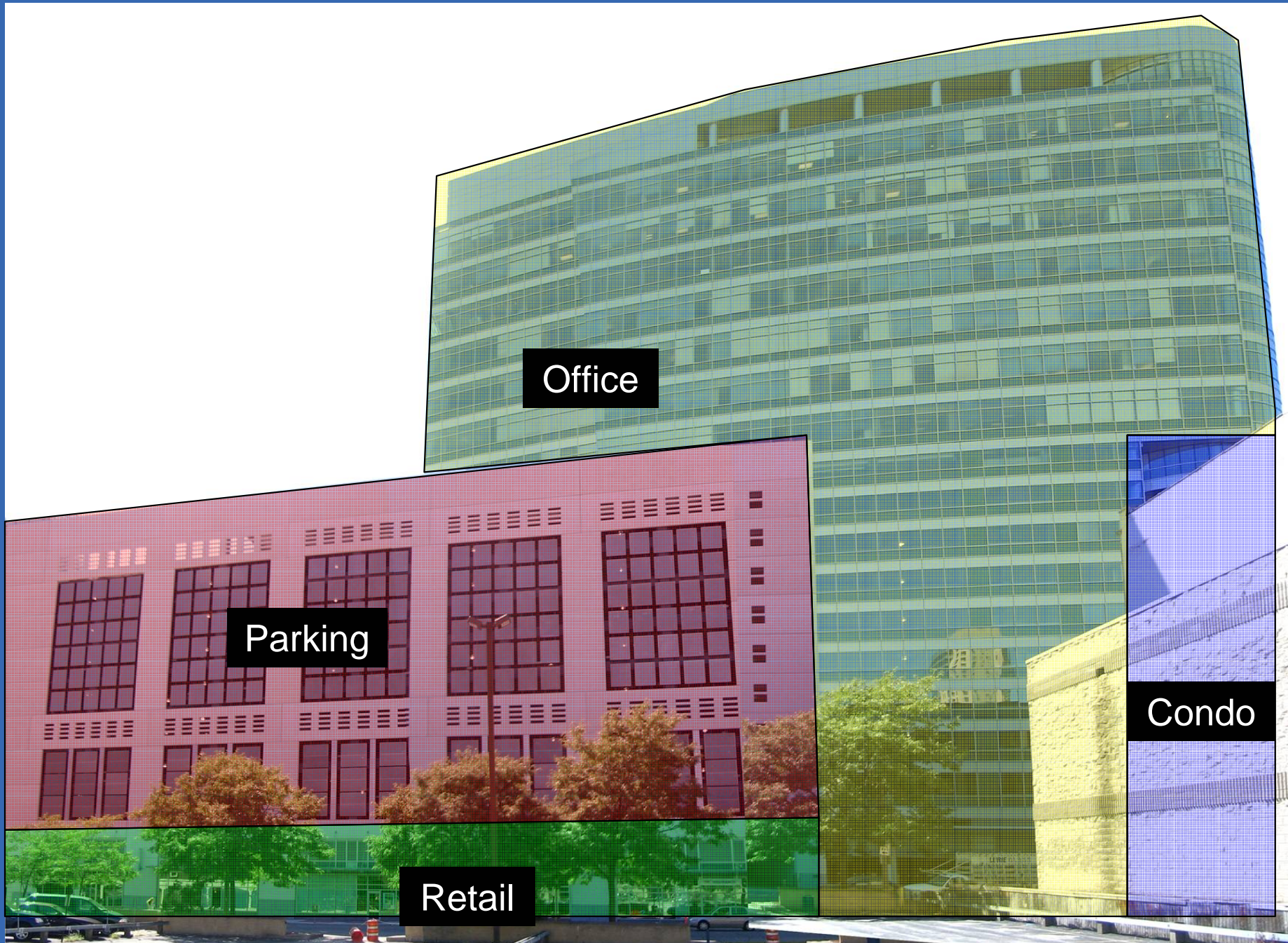
- Structural System Split

- Electrical System Split

- Mechanical System Split (less so)



Building Information



Outline of Thesis

- Lighting Depth

- Research

- Sculptural Luminaire Modeling
 - Area Source Reflector and Luminaire Design
 - LED Façade Lighting – Thermal, Electrical, Installation, and Output Considerations
 - Open Office Desk Luminaire Integration

- Spaces

- Parking Garage Section and Lobby
 - N & E Facades
 - Entrance Lobby
 - D&T Reception
 - D&T Conference Lobby
 - D&T Open Office

Outline of Thesis

- Architectural Breadth

- Deloitte & Touche – Office Development
- Lighting Design Impact

- Structural Breadth

- Canopy – Lighting Design Impact
- Skylight stair-Well – Lighting Design Impact

- Electrical Depth

- Analysis of Current System – Emergency Condition Emphasis
- New Distribution Design
- Mechanical Design Integration
- Lighting Design Impact

- Mechanical Breadth

- Steam and Electricity Yearly Utility Load Analysis
- Microturbine Research and Analysis
- Electrical System Integration

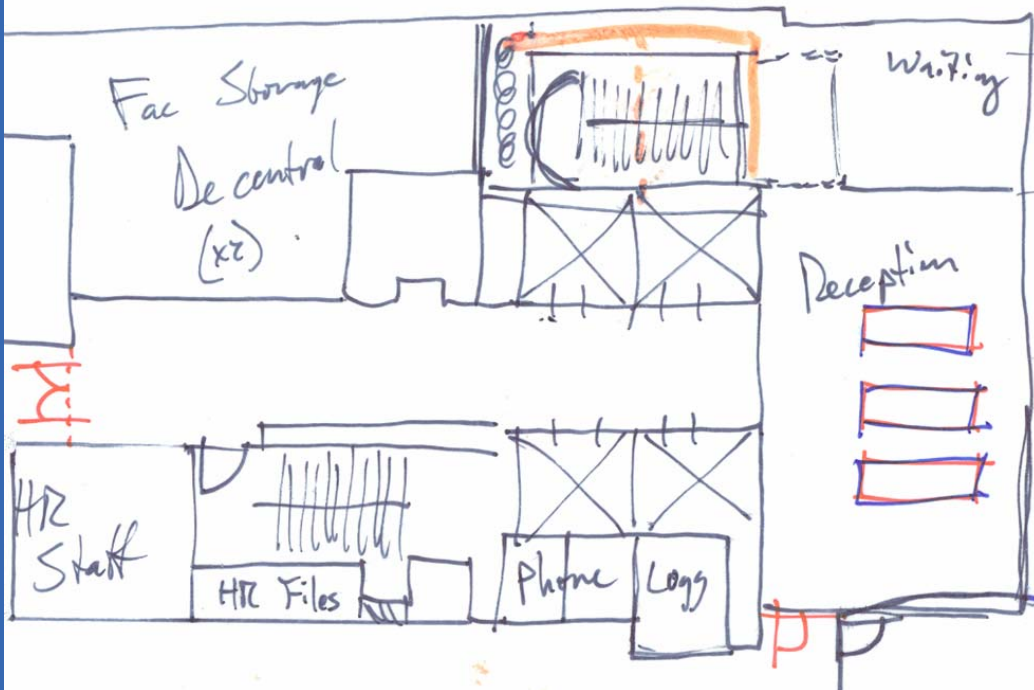
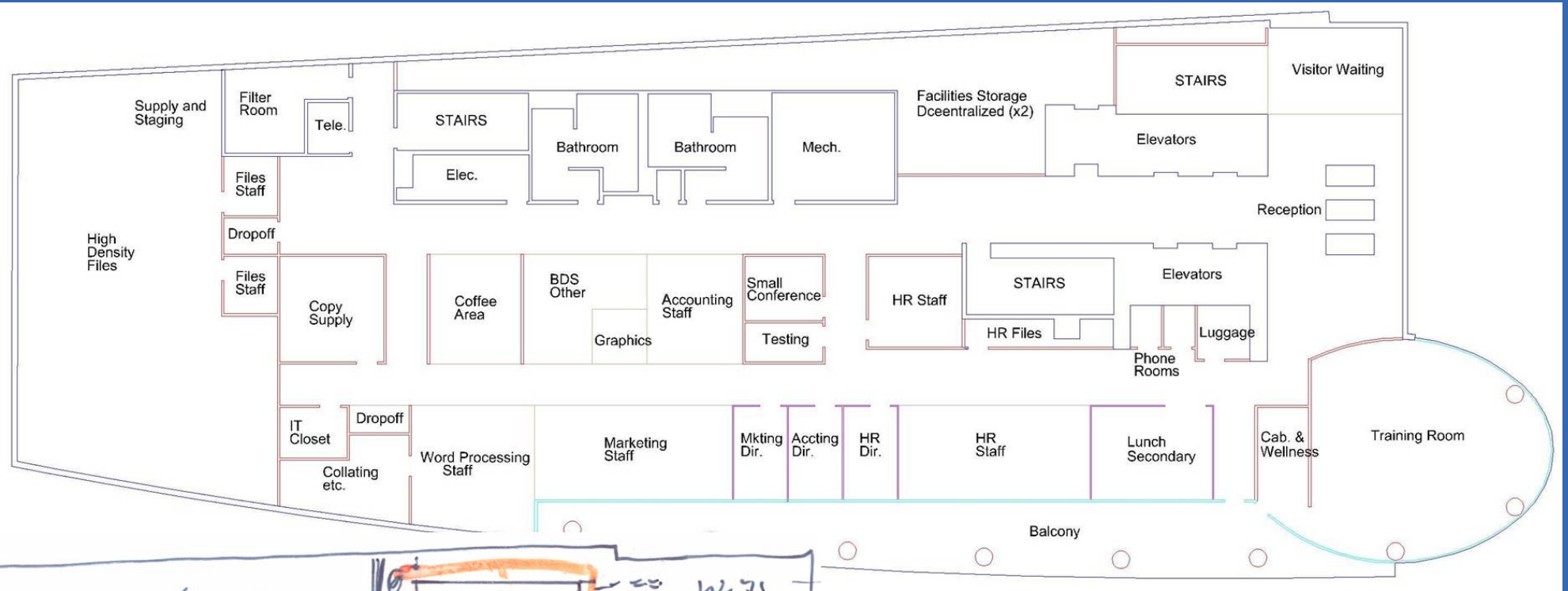
Architectural Breadth

Deloitte & Touche

- 3 Floors of Tenant Office Fit-out
- 79,000 Rentable Square Footage
- 379 staff

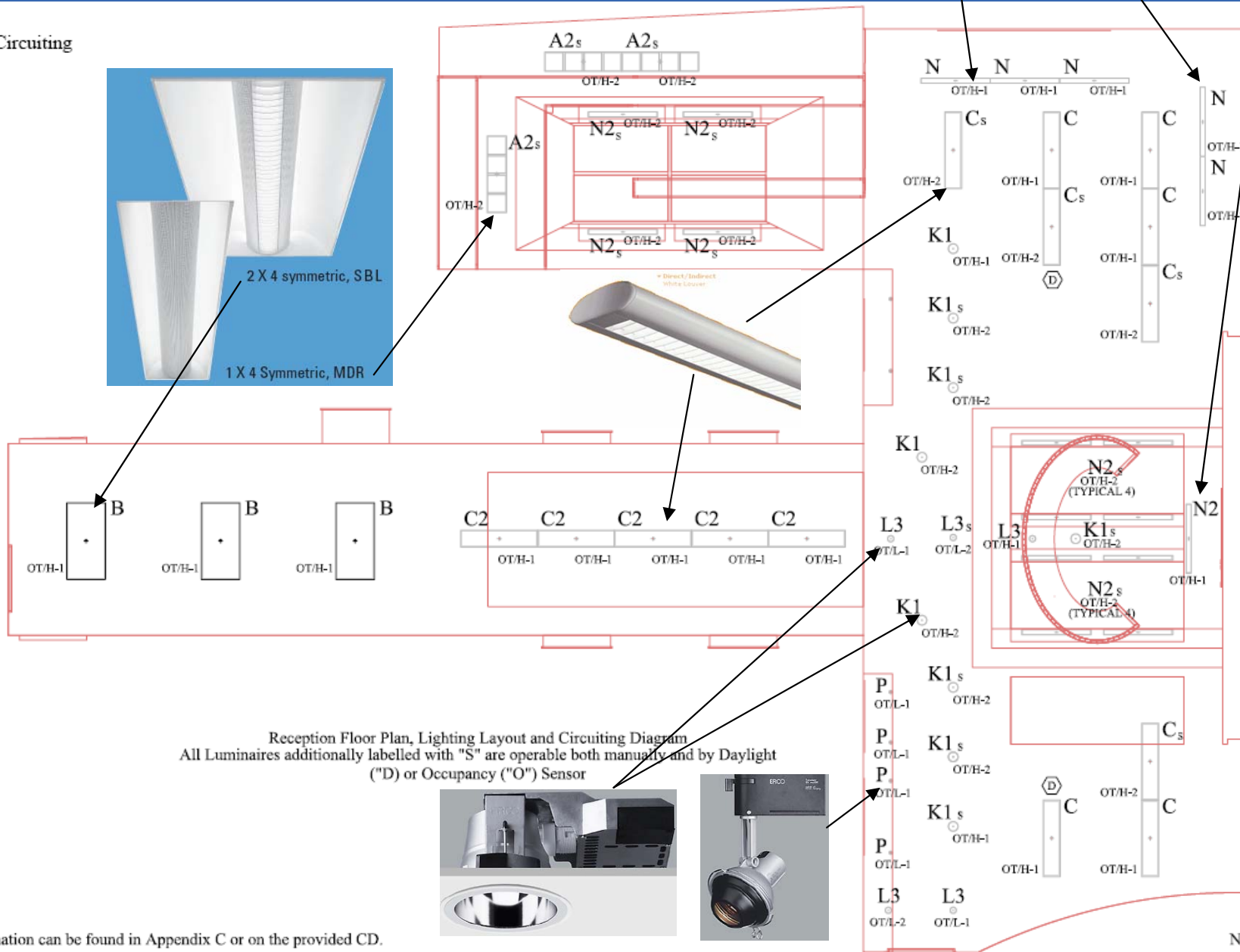
1. Analyze Entry to Business
2. Develop Client Circulation Paths
3. Client vs. Employee Circulation
4. Office Security
5. Orientation within Building
6. Easily Identifiable Points of Ingress and Egress
7. Daylight Integration and Penetration
8. Psychological Differentiation of Space through Materiality

Architectural Breadth



Lighting Depth

Layout and Circuited

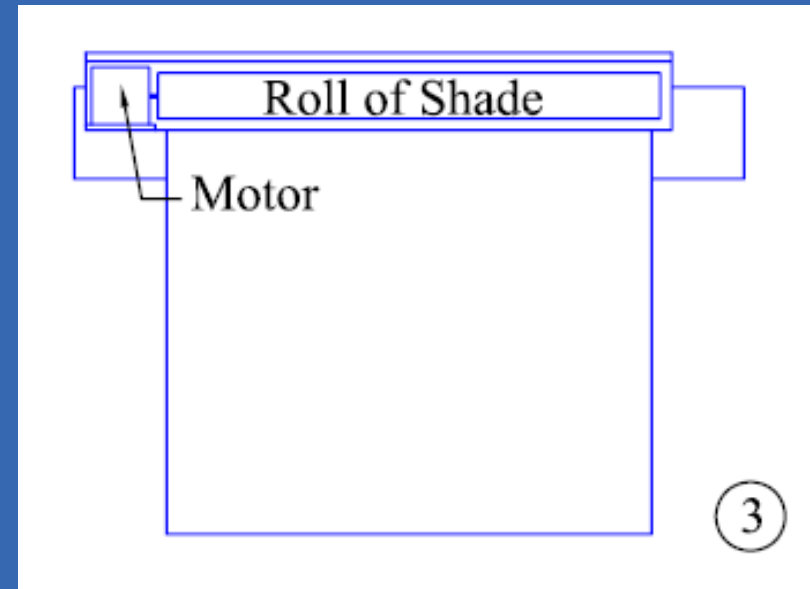
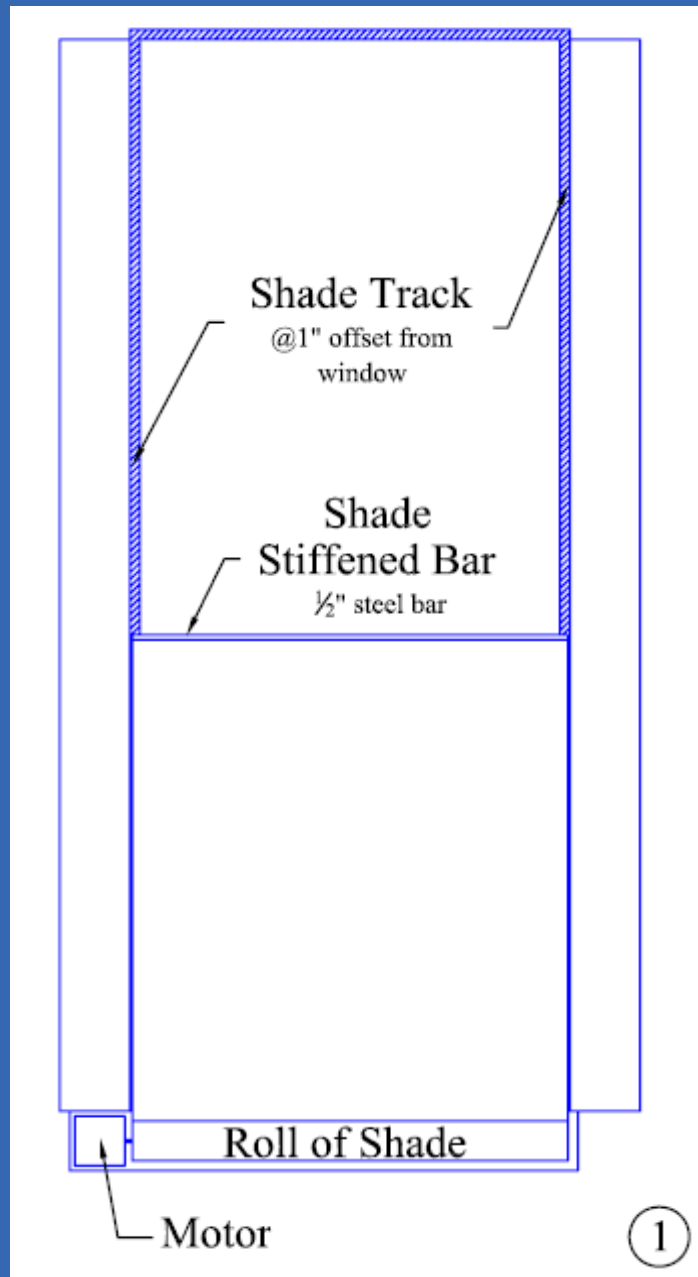


Reception Floor Plan, Lighting Layout and Circuited Diagram
All Luminaires additionally labelled with "S" are operable both manually and by Daylight ("D") or Occupancy ("O") Sensor

All Fixture information can be found in Appendix C or on the provided CD.

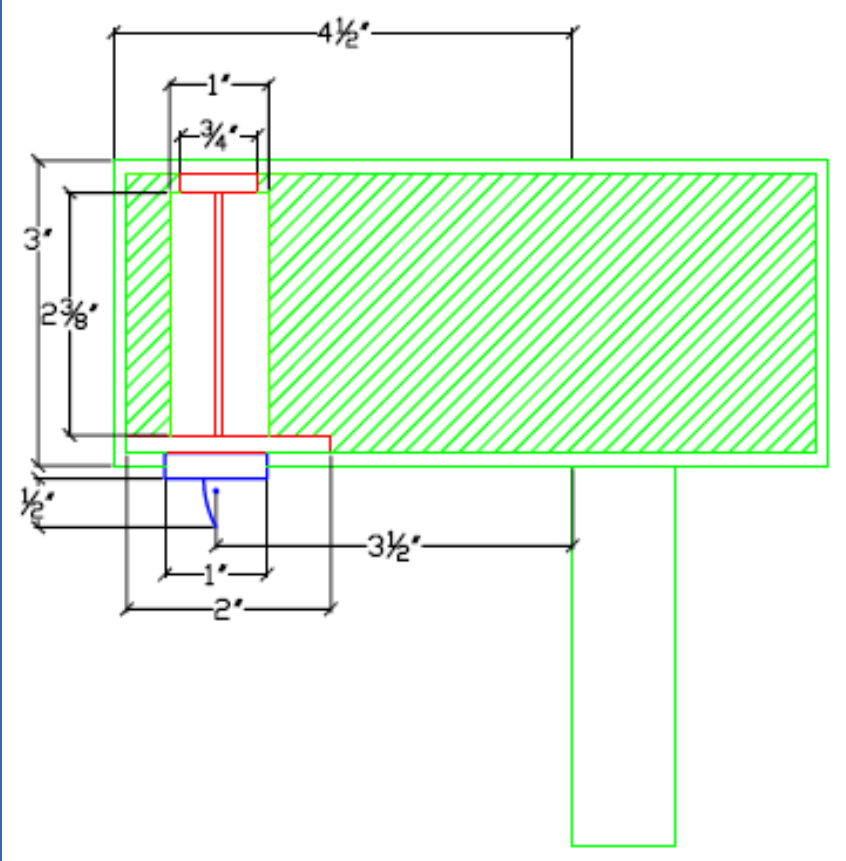
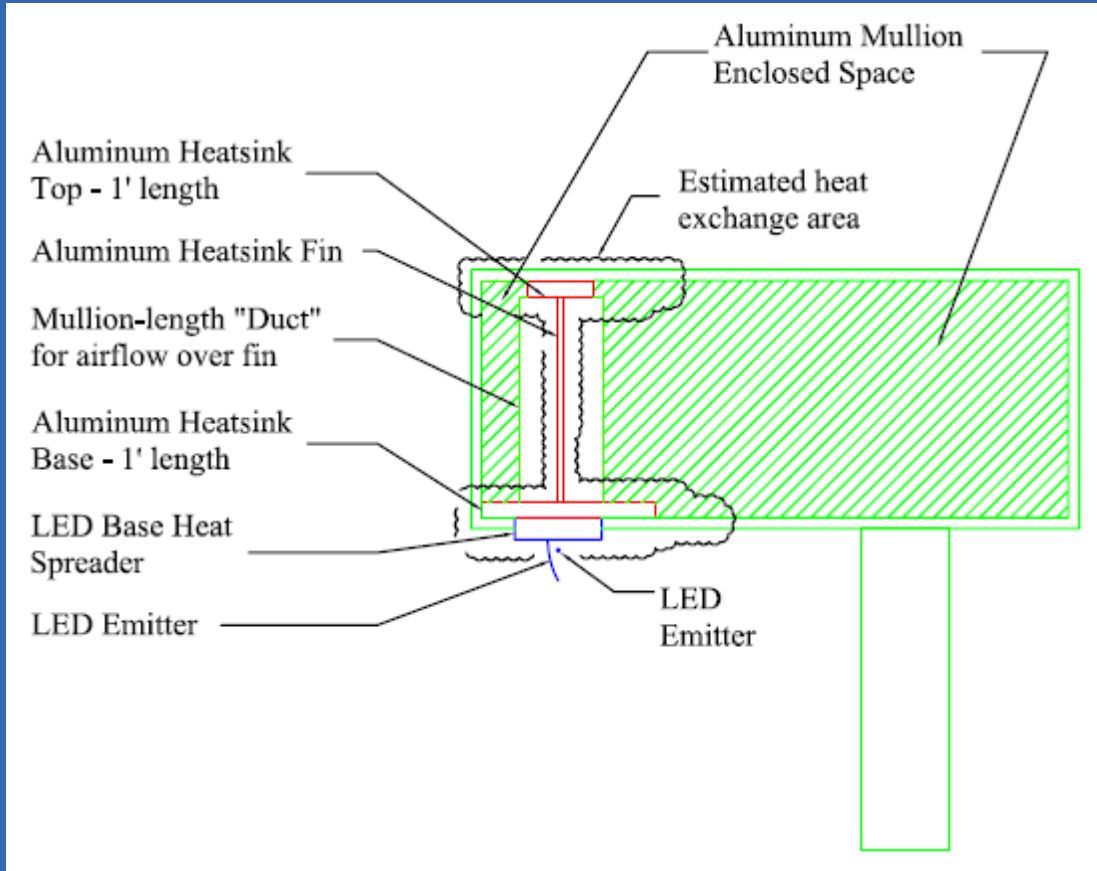
Not to Scale

Lighting Depth

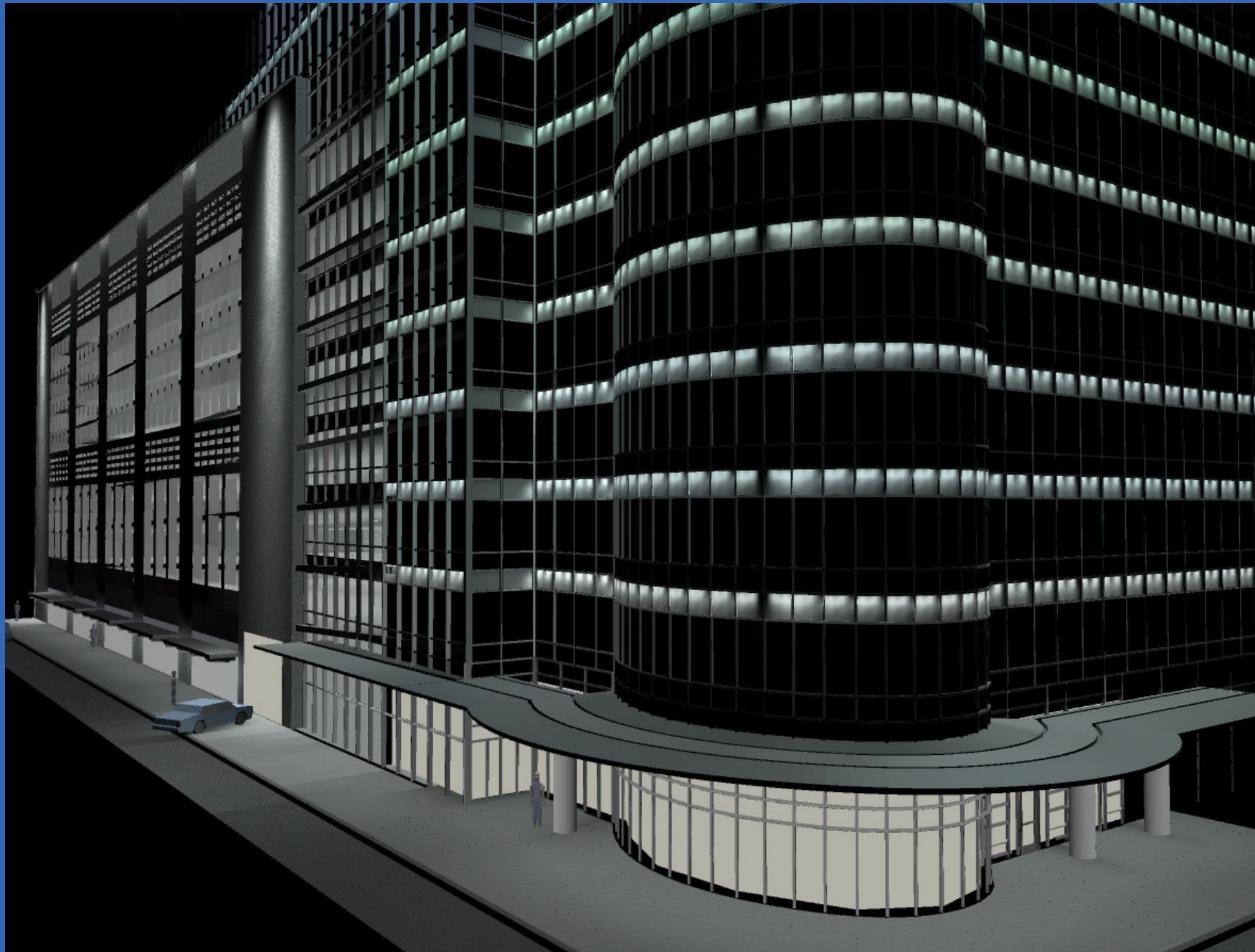


Lighting Depth

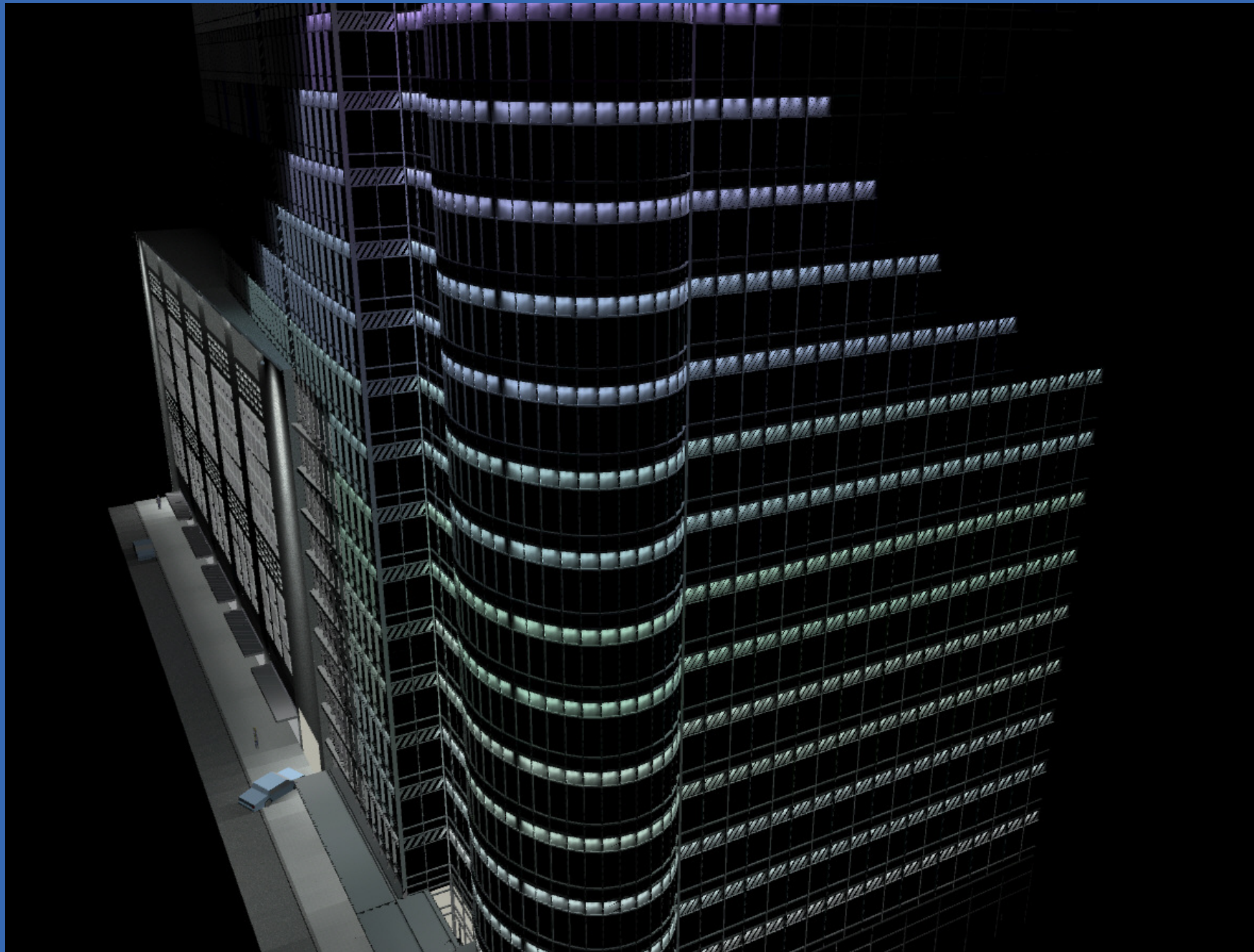




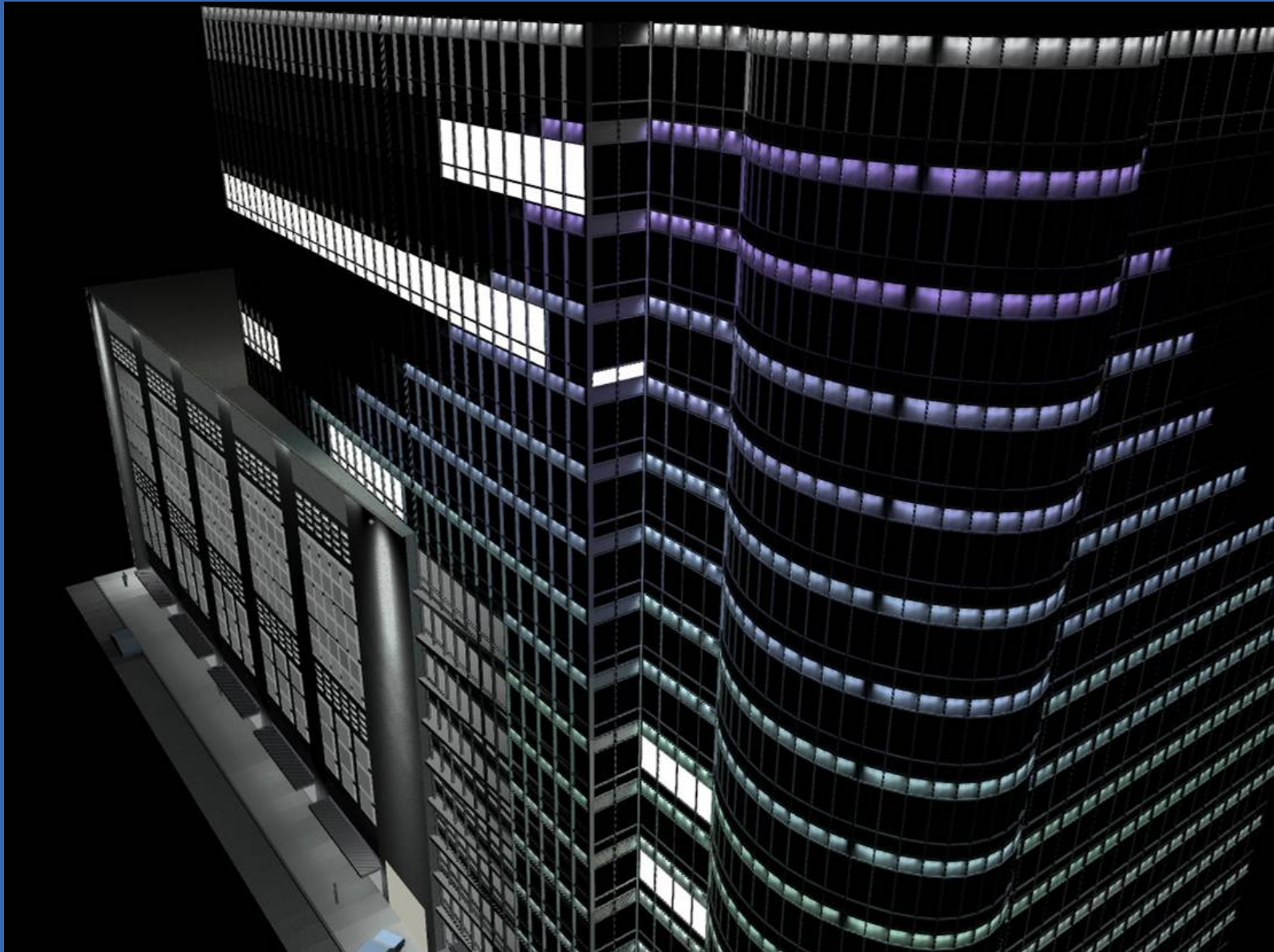
Lighting Depth



Lighting Depth



Lighting Depth



<i>Façade</i>	H	H1	H2	H3	H4	M1												
Luminaire	781	165	312	312	456	2												Power Density
Wattage	1	1	1	1	1	191								SUM (VA)	Area (sf)			
Total Power	1172	248	468	468	684	573								3612	9700			0.372 W/sf

Electrical Depth

Emergency Conditions

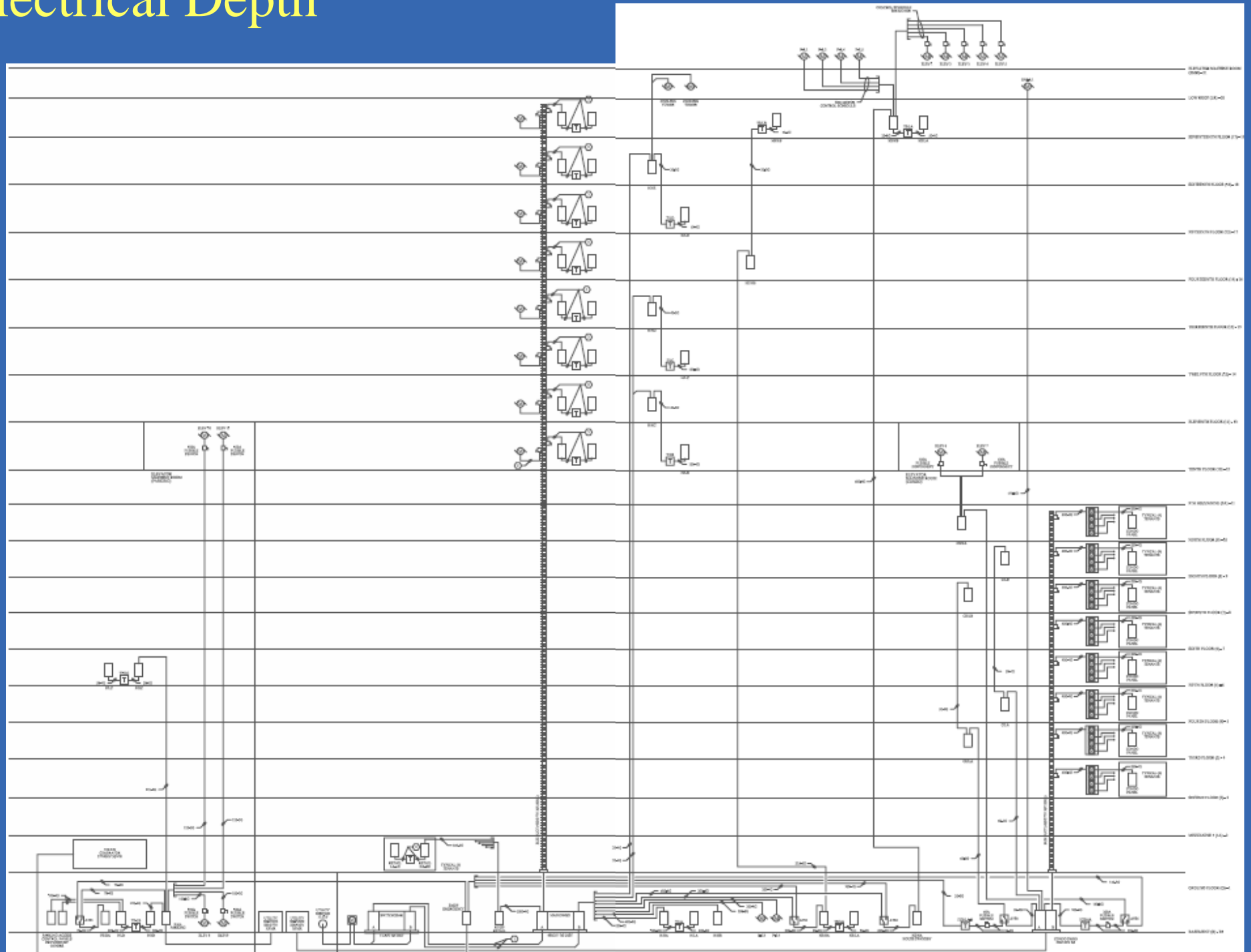
- Current System design
- Proposed Design
 - Benefit for Condominiums
 - Seasonal Benefit for Building

New Distribution

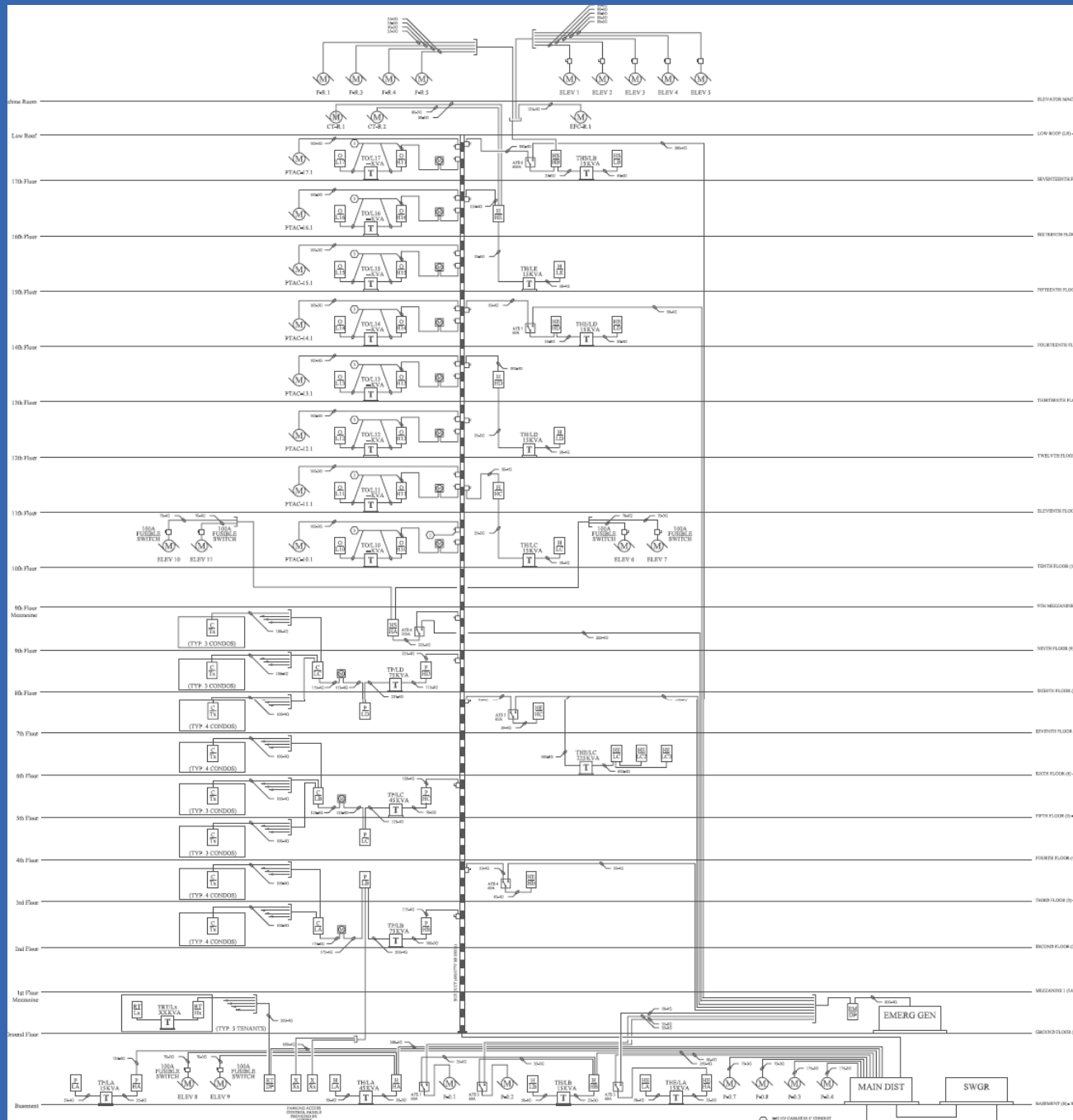
- Overall Installed Savings – individual costs and benefits
- Architectural Benefits and Utility Benefits
- Property Management Benefits

Mechanical Design Integration of Electrical / Emergency System

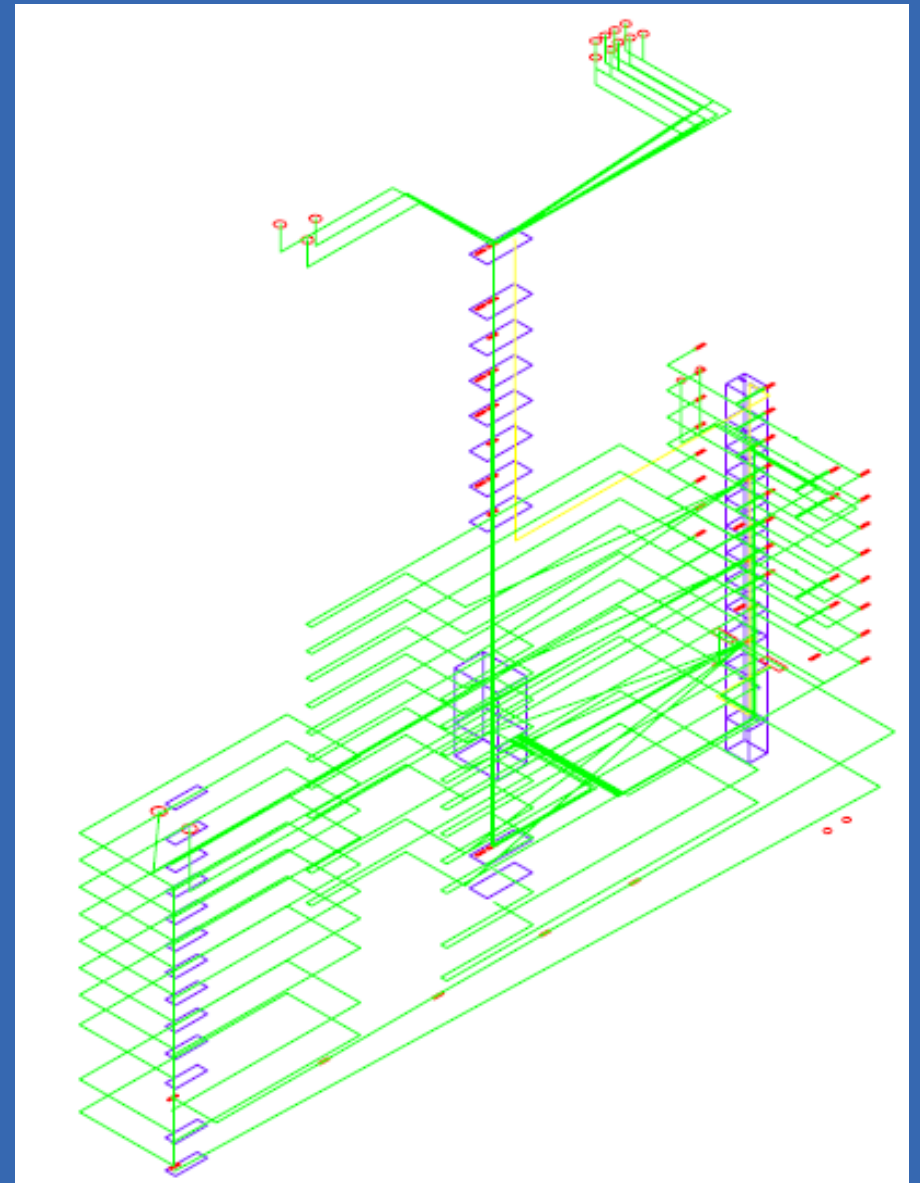
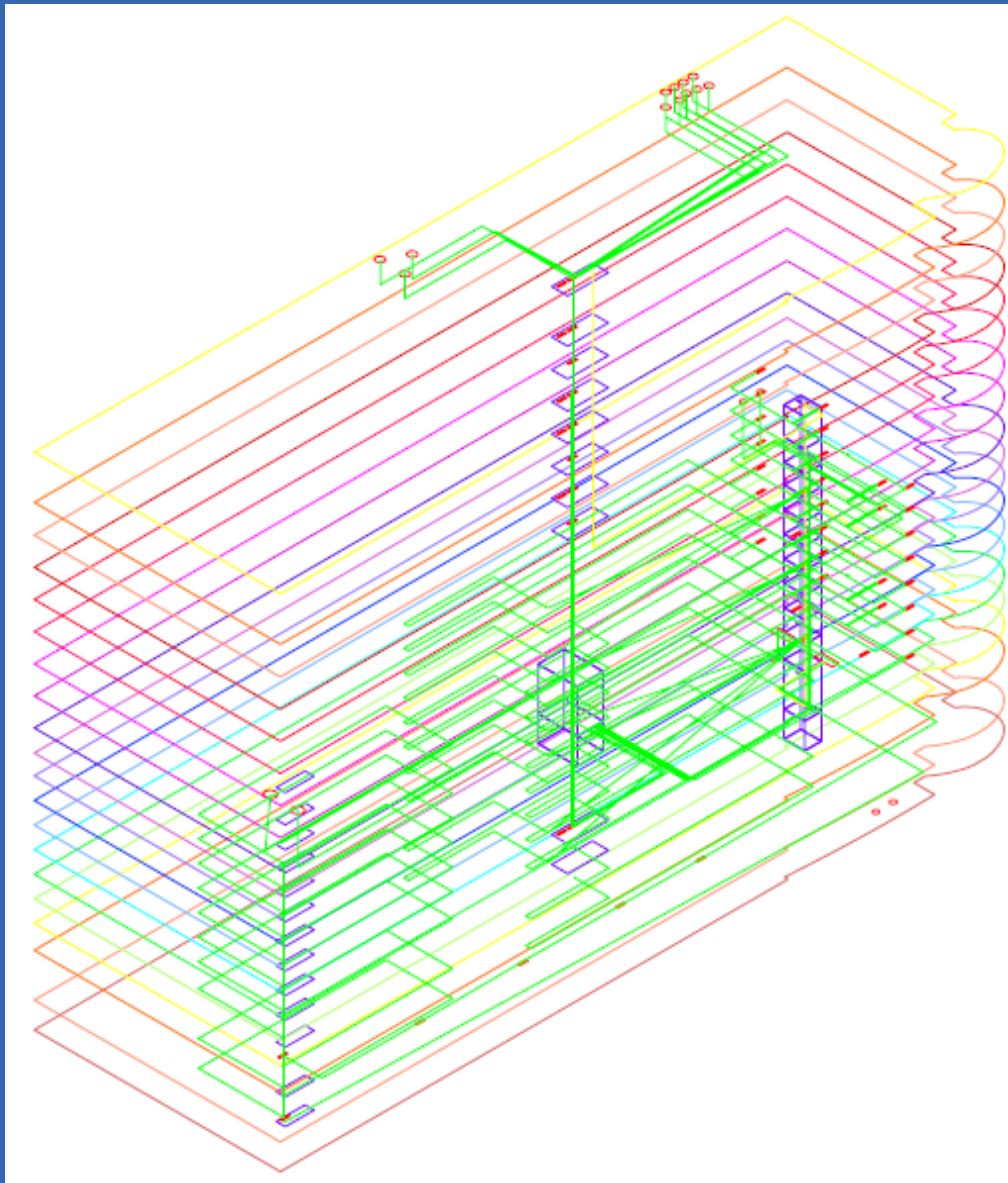
Electrical Depth



Electrical Depth



Electrical Depth



Electrical Depth

Current Design	Cost		New Design	Cost		Difference
CONDUCTOR TOTAL	\$ 198,350.49		CONDUCTOR TOTAL	\$ 121,743.91		\$ 76,606.58
TOTAL BUS	\$ 446,295.00		TOTAL BUS	\$ 447,153.00		\$ (858.00)
TOTAL PANEL	\$ 82,894.00		TOTAL PANEL	\$ 88,306.00		\$ (5,412.00)
TOTAL SWITCHBOARD	\$ 20,815.00		TOTAL SWITCHBOARD	\$ -		\$ 20,815.00
TOTAL ATS	\$ 26,302.00		TOTAL ATS	\$ 33,532.00		\$ (7,230.00)
TOTAL MAIN	\$ 6,150.00		TOTAL MAIN	\$ 7,425.00		\$ (1,275.00)
TOTAL XFMR	\$ 206,585.00		TOTAL XFMR	\$ 241,872.00		\$ (35,287.00)
TOTAL GENERATOR	\$ 76,550.00		TOTAL GENERATOR	\$ 114,850.00		\$ (38,300.00)
GRAND TOTAL	\$ 1,063,941.49		GRAND TOTAL	\$ 1,054,881.91		\$ 9,059.58

Mechanical Breadth

Steam Utility Load Modeling

- Use of Current Consumption and usage
- Assumptions and Hindsight

Capstone Microturbine Implementation

- Design Usage
- Efficiency
- Output

Cost Comparison



Acknowledgements

Faculty

- Dr. Mistrick
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- Dr. Freihaut
- Dr. Geschwindner

Professional

- Joel Lee – Van Buren Management
- Arnold & O'Sheridan MEP
- Solomon Cordwell & Buenz Architects
- Gensler Architects
- Pentagon Property Management

Personal

- Bethy, the most wonderful woman in the world, ever.
- The “330 Sackett” Crowd
- Everyone who kept me sane

Questions, Comments, Concerns, Remarks, Regards or Observations?

Themes of Thesis:

“We learned something very important today. We found another way that didn’t work.”

~~Never put off ‘til tomorrow what you could do today.~~ *Put thesis off ‘til tomorrow.*

