

AE482 Proposal

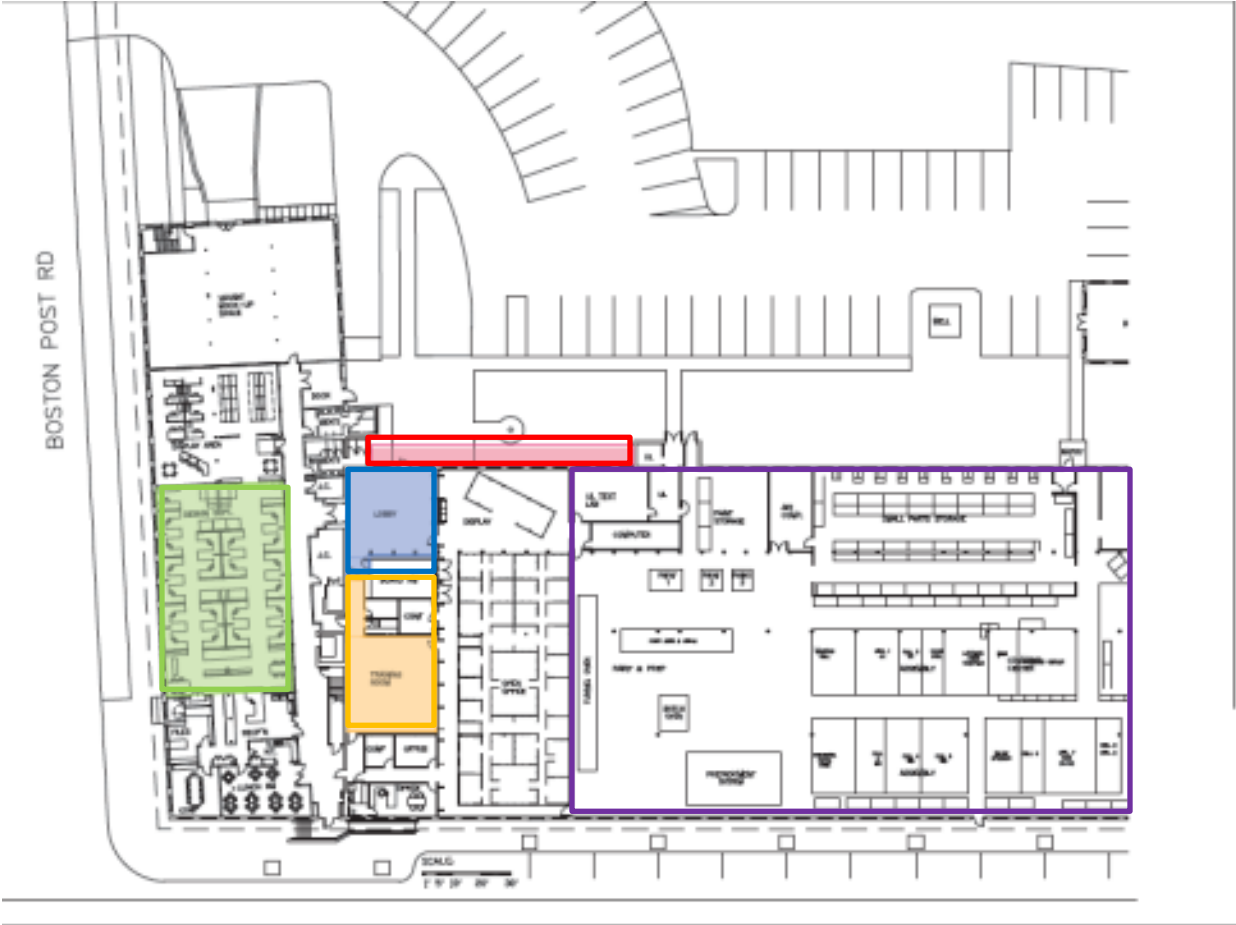
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Executive Summary

The following report contains the basis for the second semester of the cumulative senior thesis: AE482. The proposal will address the main areas of focus. Required is for the branch circuits of four locations to be redesigned. Also, a short circuit analysis will be conducted on a single branch circuit. Two depth topics are to be performed. Of many options to choose from, the two that were selected are a design change of panel consolidation, and the addition of a photo voltaic array. Two out of option topics must be included. These breadth topics include an architectural breadth, and an acoustical breadth.

Overview of Spaces

- Façade - Red
- Lobby - Blue
- Conference Room - Orange
- Office - Green
- Factory Floor - Purple



Electrical

- Four Spaces
 - The branch circuit distribution for the four spaces will be redesigned. These spaces include the façade, lobby, conference room, and office.
- Short Circuit
 - A protective device coordination study will be conducted. The study addresses a single path through the distribution system, showing the coordination of protective devices for the redesigned system components along its path. Calculations of short circuit current will be included, along with trip curves for each device.
 - The particular branch circuit in study will be determined following the completion of Depth Topic 1.
- Depth Topics
 - Changes – Panel Consolidation
 - Not only are some panelboards underutilized, but so too are main distribution panels, the bus duct, and transformers. I propose to redesign all major electrical equipment starting from the service entrance based on the needs of the occupant.
 - Additions – Photo Voltaic Array
 - The sawtooth fenestrations on the factory roof is the perfect opportunity for a Photo Voltaic array.
 - The analysis would include: Drawings indicating the proposed layout, cost analysis based on estimates of materials and installation, a wiring diagram, and a building shadow study.
 - The results of the analysis would also determine the correct orientation of the panels, and an estimate of the payback period.

Lighting

- Façade
 - Existing Conditions: The existing lighting is comprised of parking lot lighting and walkway lighting
 - Problem: There is no lighting on the facade to distinguish a proper entrance
 - Proposed Solution: in conjunction with an Architectural Breadth, I would like to incorporate facade lighting. The solution will not only provide functionality by leading the pedestrian to the proper entrance, but would also show off the strong architectural aesthetics.
- Lobby
 - Existing Conditions: General downlighting and perimeter accent lighting
 - Problem: since the lobby is the first space a guest walks into, it should be exciting. This space more potential than its bland and boring scheme depicts.
 - Proposed Solution: in conjunction with an Architectural Breadth, I would like to open up the drop ceiling and uplight the wood structure.
- Conference Room
 - Existing Conditions: General downlighting on a dimmer, as well as some accent lighting on the artwork.
 - Problem: the space requires constant rearrangement for several different types of meetings and presentations
 - Proposed Solution: Create a selection of programmed scenes to cover a multitude of different events.
- Office
 - Existing Conditions: The lighting is all indirect. The ceiling and walls are washed.
 - Problem: The power consumption is very high. A better solution can be achieved.
 - Proposed Solution: A task ambient system may be the best solution. This would retain the same quality of the indirect lighting, at a fraction of the cost to operate.

Breadth Topics

- Architectural Breadth
 - I propose to include an architectural breadth. This would include a complete redesign of the main entrance and lobby area. As it stands the main entrance is difficult to pick out of the many entrances. When the building was redone in the 80's the main entrance was moved from the street to the parking lot. However they just used a side door. My proposition is to make the current main entrance a prominent architectural statement, and to match the style of the existing building. This redesign would affect the façade and lobby space as well as any systems that it may pertain to. This may include the mechanical system, roof and wall structure, sprinkler system, and lighting including daylighting.
- Acoustical Breadth
 - I propose to conduct an acoustical analysis of the factory space. Included would be a visit to the factory to take baseline measurements of equipment noise. Then a comparison to OSHA standards would show where the sound level stands. Noise reduction solutions such as hanging panels, resonance chambers, and floating slabs will be investigated. The space will be modeled, and an appropriate solution will be obtained. This solution will be coupled with a cost analysis.

Proposed Schedule

| Date by Mondays | Objective |
|------------------------|---|
| 1/10 | Building Modeling |
| 1/17 | Façade and Lobby Lighting |
| 1/24 | Breadth - Architectural |
| 1/31 | Conference and Office Lighting |
| 2/7 | Branch Circuit |
| 2/14 | Short Circuit |
| 2/21 | Electrical Depth – Panel Consolidation |
| 2/28 | -- |
| 3/7 | Electrical Depth – Photo Voltaic Array |
| 3/14 | -- |
| 3/21 | Breadth - Acoustical |
| 3/28 | Final Report and Presentation Completed |