UC Davis Fleet Services Lighting Retrofit

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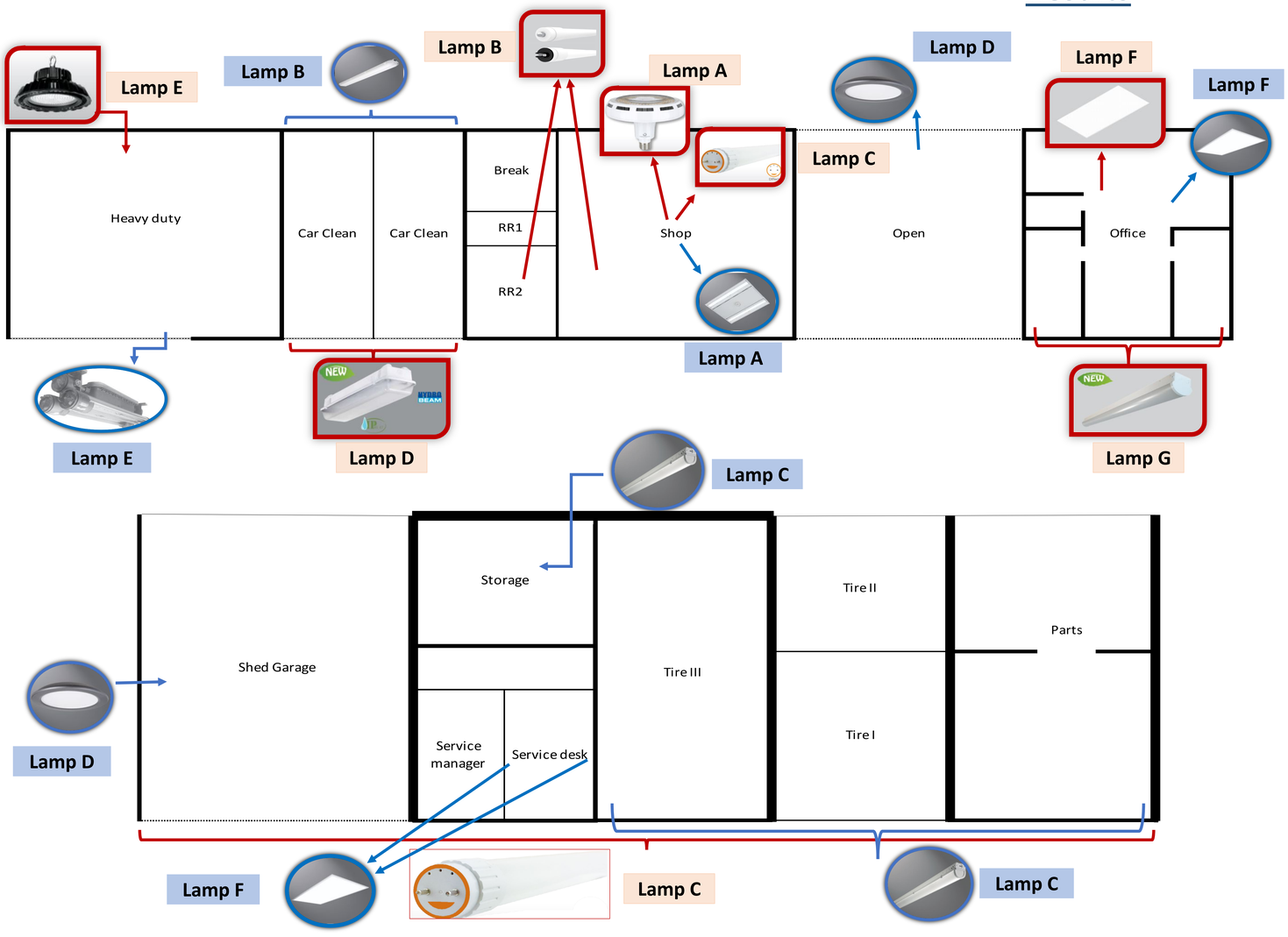
Objective

UC Davis Fleet Services has not had a lighting upgrade since the 1960s. As a result, our team has been tasked with the purpose of retrofitting the lighting system at their facility with a focus on sufficient lighting, durability, and cost savings.

Results



Label	CAL LIGHTING	ALR Associated Lighting Representatives
A	Metalux VHB LED	Green Creative 90HIDHB/840/BYP/EX39
B	Metalux Vaportite LED	Green Creative 43T8/8F/840/DEB/R17d
C	Metalux SNLED Lensed LED	Green Creative 13T8/4F/840/IS/DIR
D	Metalux TB TOP BAY LED Solid State LED	Elite 4-OW1IP-8000L-DIM10-MVOLT-40K-85-OW1IPFL-SSL
E	Indatech HXPEL SERIES	HE Williams GC-L120/840-W-DIM-UNV
F	Metalux 24FP LED	Elite 24-FPL1-LED-5000L-DIM10-MVOLT-35K-85
G	-------	Elite 4-OEC-LED-4000L-DIM10-MVOLT-35K-85

	CAL LIGHTING	ALR Associated Lighting Representatives
Cost of Retrofitting	$101,236.30	$46,047.19
Annual Energy Cost Saving	$1,400.15	$1,924.28
Payback Period	72.3 Years	23.9 Years
Improving Existing Light Level	83%	67%
Meeting Recommended Light Level	67%	50%
Durability (Averaged Lifespan of Light Fixtures)	66,667 Hours	54,714 Hours

Figure 1: Date Analysis

	CAL LIGHTING	ALR Associated Lighting Representatives
Energy Cost Saving (x3)	1	2
Lighting Performance (x2)	2	1
Initial Investment (x1.5)	1	2
Durability (x1)	2	1
Payback Period (x0.5)	1	2
Total Score (After weighting)	11	13

Figure 2: Comparison Matrix

Summary

For this project, our team followed a general timeline: determining lighting requirements, meetings with vendors and contractors, ranking alternatives, and identifying sources of error. In the first step, our team identified project constraints, time constraints, as well as client concerns, durability of the new retrofit.

For the next step, our team met with lighting vendors to get a list of potential lights and fixtures for the facility. We also consulted with a contractor to find out the labor costs for the implementation of the design. In addition, we measured the luminescence of the facility using an illuminance meter (T-10) and the dimensions of the facility using a laser rangefinder. Once this was completed, we created a floor plan that included luminescence as well as room dimensions.

Furthermore, once we got all the data from the vendors, we compared alternatives and ranked them based on specific categories. It should be noted as well that in our research, our team came across multiple points of error: getting accurate device measurements, the estimated luminance (output) from the potential designs, the material costs, as well as vendor lighting design issues.

References

[1] The National Optical Astronomy Observatory, “Recommended Light Levels.” [Online]. Available: https://www.engineeringtoolbox.com/light-level-rooms-d_708.html. [Accessed: 04-Jun-2019].