

## Executive Summary

This thesis report contains detailed building system analysis and proposed changes for David S. Ingalls Rink. Investigation of existing building system was conducted with the goal of finding potentials in new design solutions. Detailed contents include lighting depth, electrical depth and two breadths studies. Senses of seeing, feeling, hearing are engaged through alternative design solutions in lighting, electrical, acoustic, architecture and structure.

The lighting depth involves design of four spaces: building exterior, circulation corridor, rink, and Schley Club Room. With an overall concept of HABITATION, the proposed lighting design is aimed for an illuminated environment that suites both for the architecture and the people. Elements such as architectural statistics, design criteria and system implementation were comprehensively studied and analyzed to achieve the ultimate lighting solution. Calculations and renderings were generated to simulate the design outcome.

Three topics studied for electrical depth include branch circuit analysis, short circuit analysis and copper vs. aluminum wire cost estimation. With proposed system lighting, new panel board loads were analyzed for evaluation of feeder upsizing potentials. Short circuit analysis was performed at five selected points to ensure feeders are effectively rated for fault protection. A cost analysis of copper versus aluminum wire was conducted to compare and investigate the possibility of saving labor and material cost.

For acoustic breadth, a calculation of reverberation time was conducted to evaluate the acoustic performance of the rink area. A change in ceiling material was proposed to optimize the sound absorption performance. The structural breadth contains research of Saarinen, the building architect, and his architectural practice in material. Wind analysis and glazing load resistance analysis were examined for building structural stability.