
EXECUTIVE SUMMARY

The Landscape Building at Janelia Farm Research Campus is a 546,436 square foot world-class biomedical research facility owned by Howard Hughes Medical Institute. The facility is built into the side of a large hill overlooking the Potomac River on the grounds of the historic Janelia Farm Mansion. It is currently beginning its third year of construction in Ashburn, Virginia located 45 minutes outside of Washington, D.C.

The mechanical system was designed with the goal of adequately conditioning and ventilating all spaces and at the same time being located in such a way that maintenance will never interfere with the research projects. All equipment is located outside of the laboratory area for ease of maintenance.

The mechanical system is a variable air volume system that provides 100% outdoor air. There are 15 air handling units that serve on large plenum. This plenum in turn distributes the air throughout the building. There are 5 chillers and 3 boilers that are used condition the air as well as meet other loads such as, steam for sterilizing laboratory equipment, chilled water for cold rooms, and chilled water for the data center cooling.

For the laboratory spaces alone, the total cooling load is 684 tons and the heating load is 2,602MBU. At peak load there is 181,933 CFM providing 100% outdoor air to 81,456 square feet of laboratory space. Existing design documents state 20 W/SF equipment loads for all laboratory and laboratory spaces. Lighting loads range anywhere from 0 W/SF for specialized rooms to over 5 W/SF. All lamps in the lab spaces are fluorescent.

This report examines the actual mechanical and lighting design of the laboratory spaces and their supporting spaces and compares them to the actual design criteria. It was found that most spaces are over designed and that simply following design guidelines can drastically reduce annual operation costs.

Ground coupled loops were evaluated to see if they were economically feasible. The closed-loop ground system was not feasible due to extremely large first costs, but the open-loop system utilizing two existing ponds was found to be the best option. The original campus design proved to be very conducive for installing such a system without many additional costs.

The final analysis for this report was to determine if the new equipment installed in the mechanical room presented a problem for adjacent spaces. Again, the original architectural plan proved well designed as there are no critical spaces in the vicinity of the mechanical room.