1 Executive Summary

The purpose of this report is to perform a block load energy analysis to predict the energy consumption, energy cost and carbon footprint for EMD Serono Research Center – existing lab building. An energy model simulation was performed in Trane Trace 700. Block load analysis was chosen due to its simplicity and level of accuracy.

In order for the model to have comparable result when compared to the actual design, modeling data was taken from the actual design documents, such as design criteria, equipment load, and lighting loads. This building was divided into 5 types of spaces: lunch area, office area, mechanical room area, vivarium area, and research & development area. There are total of 9 blocks for this building. Blocks were assigned to 3 air handling units (AHU) according to the actual design.

The resulting loads generated by the model were then compared to the actual design load. Some of the discrepancies in this energy analysis were higher heating load, higher cooling load, and higher ventilation rate. Variation from the design values was mainly due to the assumptions for block load modeling.

The total annual energy consumption for the EMD Serono Research Center-existing lab building is 4,721,208 kWh, with 3,610,276 kWh coming from electricity, 1,110,932 kWh (37907 therms) coming from natural gas. The annual water consumption for mechanical equipment of this building is 1,875,000 gallon. This building has a large equipment and lighting load, due to the fact that pharmaceutical research and development building has high electric demand of lab instruments and light.

The total energy consumption calculated for EMD Serono Research Center – existing lab building is $112,097/year, with $75,697/year coming from electricity, $34,525/year coming from gas, and $1875/year coming from water. Based on the energy consumption of the building, it will require $1.99/sf to operate annually.

Overall, the modeled energy simulation was within a reasonable range to the design. The biggest difference between the actual design and the model is the modeling method used. Room by room calculation method was used for the designed calculation versus block load method for the modeled calculation.