

# Executive Summary

The Gateway Commons building in Ithaca, New York is a mixed-use development building being used for retail and residential apartments. It has a basement floor below grade and six floors above grade at a height of 62 feet. CMU walls supporting precast concrete hollow core planks make up the building structure. The building façade uses a combination of brick, an Exterior Insulation Finish System (EIFS), and metal panels.

The purpose of this report is to research the structural system of the Gateway Commons building in Ithaca, NY. It includes descriptions of the foundation, walls, floor system, roof system and lateral system. An overview of the building dead loads, live loads, and code requirements are provided. An analysis of the lateral loading on the building due to wind and seismic forces is provided. At the 4<sup>th</sup> floor the lateral load is distributed onto the shear walls so that a design check of one of the shear walls could be conducted. At the end of the report an appendix includes calculations that were performed to conduct the lateral system analysis. Lateral loads are distributed onto the shear walls by the method of rigidity. Hand calculations proved that the shear wall being checked is able to resist the lateral loading.

It can be concluded that seismic is the controlling lateral force being resisted by the shear walls. It creates a base shear of 208 kips compared to 95.1 kips due to the wind forces, and a overturning moment of 9500 ft-k compared to 3383 ft-k due to the wind forces. It was also found that there were differences between the original design and the analysis that was conducted for this report. The seismic base shear value obtained by the design engineer was 295 k compared to the 208 k in the report. Differences could be due to the use of different codes, values, and procedures. For this report wind and seismic calculations were determined by using ASCE 7-05 and the 2002 Building Code of New York State was used in the original design. There is also the possibility that the original design used different values for wall weights than were used in this report.