

Executive Summary

This senior thesis is an in depth study of the new construction project located at 1099 New York Avenue in Washington, DC. Included are research into the sustainable options for the building, two technical analyses focused on the energy efficiency savings & structural considerations for installing a green roof, and a look at mapping & testing the MEP Coordination Process while implementing Building Information Modeling (BIM) technology.

Shortly after 1099 New York Avenue had been designed and construction was underway, Tishman Speyer Properties enacted a new policy that required all new construction projects to achieve a minimum LEED Silver Rating. According to the United States Green Building Council's Reference Guide for Core & Shell Construction, 28 credits must be earned in order to achieve the silver rating. The first part of Analysis I determined that the building has already earned 9 of the 28 required credits. The second part is an in depth investigation into 26 other areas where Tishman Speyer could have focused their efforts on sustainability for this project and provides goals to achieve for future projects. Some of these areas include water conservation, use of recycled content, indoor air quality, and the installation of a green roof.

The effect a green roof can have on a building's energy performance varies according to the composition of the roof layers, the orientation & footprint of the building, and the ratio of that footprint to the total building area. To determine the energy savings a green roof might provide for 1099 New York Avenue, two building energy models were created and the consumptions of source energy were compared. The first model was the building as designed; the second was the building with the insulating properties of a green roof included. It was determined that a green roof could reduce energy usage by 3.54% annually.

The second technical analysis considers the amount of weight that can be added to a structure after installing a green roof. The lower roof area was determined to be structurally sound, but the penthouse roof required a resizing of the slab reinforcement. Cost savings were estimated by being able to eliminate the drop panels with the increased shear strength.

Well into the construction phase of the project, it was noticed that there had been some errors in the MEP Coordination Process as the designs of the different systems were conflicting with each other. This problem was also recognized later in the main lobby area with the decreased plenum space available. The construction depth analysis took a look at the current 2D Design Coordination process from a Lean Production perspective and compared it with the 3D Design Coordination Process through dynamic systems modeling. The process model was then tested by creating a sample model of the lobby space. Findings included a possibility of increased productivity and a 17.3% in the overall project schedule.