

EXECUTIVE SUMMARY

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*Embassy Suites
Hotel, Springfield
Virginia*

Embassy Suites Hotel

Springfield, Virginia

Dominick Lovallo

Structural Option

Building Statistics



Size: 185,000 Square Feet
Building Height: 93 Feet

Number of Stories: 7, 6
Stories Above Grade +
Basement

Project Delivery Method:
Design-Bid- Build

Project Cost: \$31.5 Million

Construction Dates:
Start- November 2011,
Completion- July 13th 2013

Owner: Miller Global
Properties, LLC

Architect: Cooper Carry

Structural Engineer: SK & A
Structural Engineers, PLLC

Construction Manager:
Balfour Beatty Construction

Architectural

- **219 , Two Room Guest Suites**
- **Glass Enclosed Open Air Atrium**
- **Large Pool Area and Fitness Room**
- **Retail Store Space**
- **Adhered Concrete Stone Veneer and EIFS Facades**

MEP

- **Split System Air Conditioning**
- **100% Rooftop Outside Air Unit**
- **Custom LED Pendant Lighting Fixtures**

Structural

- **8" Two - Way Flat Plate Floor System**
- **Reinforced Concrete Columns**
- **Lateral Force Resisting System - Ordinary Reinforced Concrete Moment Frames**
- **Mud Matt Foundation System**

Sustainability

- **Use of Local Construction Materials**
- **LEED Certification**
- **Waste Management Control**
- **Partial Green Roof System**
- **Recycling of Materials**

Executive Summary

The Embassy Suites Hotel is a 7 story all-suite hotel located in Springfield Virginia. The Embassy Suites contains 219 guestrooms and the building will also contain many retail stores located on the lower level. The building stands at 91 feet 10 inches and is approximately 185,000 square feet. The typical story height is 9 feet except for the ground storefront level and the roof level, having heights of 18 feet and 10 feet respectively.

The purpose of the final thesis report is to delve into an alternate proposed area of study for the Embassy Suites Hotel Project. The existing building contains reinforced concrete moment frames and flat slab construction. A redesign of the structural system proposed a conversion of the current concrete framing system to a steel framing system. As a result of this new design, steel reframing members and a composite floor system were selected and designed in looking to achieve an alternate design as efficient and functional as the existing system in place. One standard W14 x 74 column size was selected to resist lateral and gravity loads that were applied to the building, trying to limit the architectural impacts to the overall layout of the building. The steel gravity and moment frame systems resulted in a decrease in overall building weight, which reduced the base shear in the determination of seismic loads. Additionally W 10 x 26 beams were designed for flooring members trying to limit the overall increase to the building height, choosing beams with the shortest depth that would adequately resist the loads. All framing members were designed and met ASCE 7-05 serviceability conditions including allowable story drift. Overall the use of the steel framed system proved to be an adequate design and was able to resist the loads applied to the structure.

In addition to the structural depth, two alternative areas of study were investigated. The first study examined looked at the acoustics of a typical guest room. The Sound Transmission Classes of walls between guest rooms were calculated using Transmission loss data plotted over select frequencies. The results showed that both the current curtain wall, existing and redesigned floor system were adequate for the recommended sound levels.

The second topic looked into the impact of changing the structure of the building on the construction site layout. A site layout plan was developed for the erection process of the steel framing members. Additionally a crane was specked that would be able to handle the erection of the steel framing of the redesign.

The ultimate goal of redesign was to try to design an effective and efficient structural system that would be comparable to the original concrete framed structure. Overall due to zoning limitations and height restrictions the original design would be the best option for the Embassy Suites project however this redesign could be a viable option if circumstances were different.