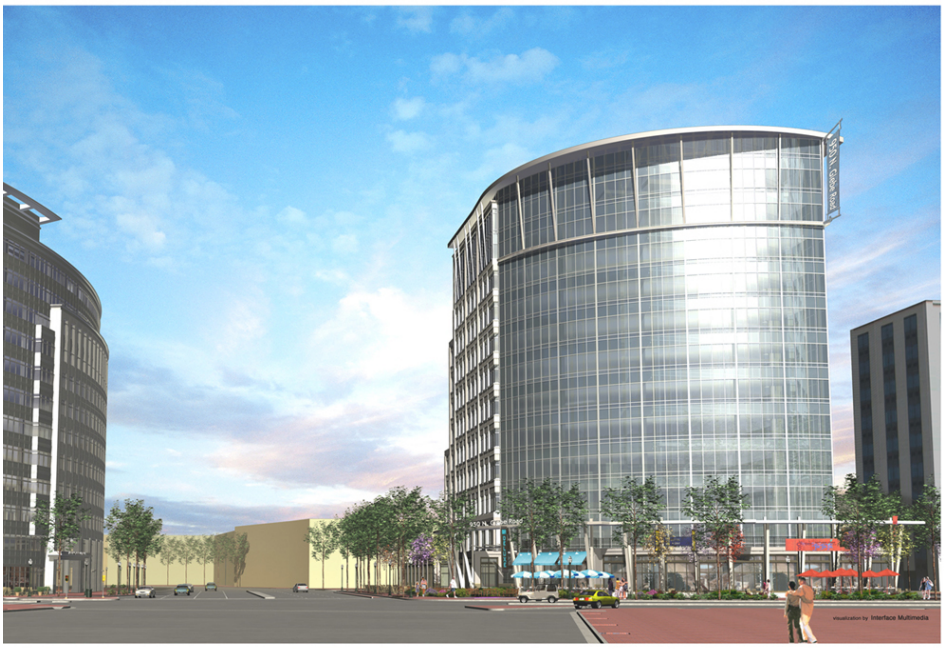
The Regent

950 N. Glebe Road
Arlington, VA



Architect: Cooper Carry Architects

Structural Technical Report 2:
Executive Summary

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Option:	**Structural**
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Executive Summary

This report provides an overview of the existing structural system, focusing on the existing typical floor framing system and four other alternative floor framing systems for The Regent, which is currently under construction in Arlington, VA. The Regent is a 12-story office building which has retail space on the first level and a 3-story parking garage below grade.

The four alternative systems considered include: hollow-core planks with steel framing system, precast double tees with precast framing system, cast-in-place, one-way, wide module joists with cast-in-place framing system, and finally, a two-way flat slab with drop panels with cast-in-place framing system. Each alternative floor system design is discussed and their advantages and disadvantages are compared among each other and to the existing floor framing system. A schematic floor framing system plan, showing representative members of the floor framing system is provided with each alternative system discussed. The Appendix includes all of the calculations and design aids used to complete the preliminary structural floor designs as well as existing typical structural floor plans for The Regent. A typical structural floor plan and typical bay plan have been included in the body of this report.

After completing the designs and discussing the advantages and disadvantages for each floor system, it is recommended that the hollow-core planks with steel framing, the precast double tees with precast framing, and the one-way joists with cast-in-place framing systems be studied further.

The existing system has proven to be a very efficient system with many advantages and few disadvantages. Some of the advantages include: relatively small member sizes and self weights, smaller floor system depths, and being able to span the longer spans in the bays. Some disadvantages include: more framing members and likelihood that the long span steel system will cause concrete ponding due to deflection.

The two-way flat slab with drop panels should not be studied further as a two-way CIP system with the existing bay sizes. A 16.5” slab is not practical and not easily constructible. Switching to a two-way post-tensioning system may thin out the slab depth making a post-tensioning system a practical option.

The cast-in-place, one-way, wide module joists have both several advantages and disadvantages. The structure, as preliminarily designed, would weigh a lot more than the existing system and would require larger foundations. Also, the amount of labor that needs to be done on site would require a lot of construction time and field labor, which can be expensive. For a spec office building, construction time is very critical and would be very risky for the involved placement of the cast-in-place concrete joist system. However, this system does provide a uniform depth that does not exceed the existing design’s maximum depth. This system also has a good fire rating and can accommodate the longer spans in the larger bay sizes. Considering more columns and

smaller bay sizes may reduce the size of the framing members and the entire structural system may be more efficiently designed as a result.

The hollow-core plank system has several advantages over the existing structure including quicker construction time since the hollow-core planks are precast, the quality control advantage of the planks being precast in a plant, good fire rating, good acoustical value, and less steel beams per bay. Some disadvantages discussed include the labor and cost going into the angle connection to hold the hollow-core planks for a flush floor system, the downtown site being able to accommodate the extra precast deliveries, and the increased beam depths and weights and their effects on the foundations and floor depth.

The precast double tees with precast framing member system is also another possible good alternative. Its advantages over the existing system include: concrete quality control, quick construction time, lighter self weight of the double tees, good fire resistance, and good acoustical value. The disadvantages include heavier beams and columns and the resulting larger foundations, the extra deep depth of the flooring system, and the downtown site being able to accommodate all of the precast deliveries.

All of the alternative systems that have been discussed will be studied further either as a continuation of the preliminary design or a modified design based on what has been learned in from this report.