

GOUVERNEUR HEALTHCARE SERVICES

NEW YORK, NY

THESIS PROPOSAL – EXECUTIVE SUMMARY



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Structural

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EXECUTIVE SUMMARY

The Gouverneur Healthcare Project is the expansion and renovation to the Gouverneur Healthcare Facility. The focus of this thesis project is the 75,000 sq. ft. addition to the existing building. The project will create modern ambulatory care center and long term facility in the heart of the Lower East Side of Manhattan.

The current design for the Gouverneur Healthcare Facility is an addition to a concrete building, and employs steel framing for gravity and lateral systems, with members reaching spans greater than 44ft. The long span steel framing allows significant freedom for the architectural design, and saves on foundation costs. However, the lateral system is less efficient and has higher torsional effects than a shorter-span, more regular layout. To accommodate MEP equipment, cellular beams are used for nearly all gravity members due to tight floor height restriction. The design of other systems is further constrained because moment frames divide the floors into individual zones that cannot be changed; assemblies simply cannot pass beyond these frames because there is no clearance between the beams and the ceiling below.

The current design is more than adequate, however, many alternatives exist. For the reasons summarized above, this proposed thesis will include an investigation of the performance and feasibility of a two-way flat plate floor system. Typical construction will comprise of 30ft x 22ft bays with 10" thick floor slabs. Shear walls will be designed to resist lateral loads and attempt will be made to develop a regular scheme to ensure that the center of mass and center of rigidity will coincide.

In order to perform this proposal, both hand methods and computer modeling will be performed. Programs utilized to design structural members will include PCA Slab, PCA Column, and ETABS. Loads will be determined using the provisions of ASCE 7-05, and the concrete structure will be designed to meet the specifications provided by ACI 318-08.

Changing the structural system will have many far-reaching impacts to the overall project. In order to investigate the feasibility of the proposed design change, an architectural and construction breadth will be studied.

Breadth Studies

Changing structural systems from steel to concrete may greatly impact the architectural design of the Gouverneur Healthcare Facility, making an architecture breadth a logical area of investigation. In order to accommodate the change in design of 44ft bays to 22ft bays, an extra row of columns will be needed. The use of shearwalls will also affect the architecture of the building as it will somewhat restrict the open plan that the original moment frame affords. The impact of these columns and walls on the floor layouts will be investigated, and rearranging of spaces will be performed as necessary, while still meeting IBC and ADA requirements.

It may also be of interest to investigate the architectural impact of the new structural system on key spaces such as the atrium. It will be important to ensure that shearwalls and concrete frames do not interfere with the atrium. If this impact is unavoidable, it may be possible to incorporate the structure into the design of this space.

Along with the architecture, the change in systems from steel to concrete will influence the construction process considerably. It will be necessary to investigate these impacts as a second breadth study to determine if the proposed changes to the structural system are feasible. Schedules and cost estimates will be evaluated for both the current design and the proposed design. Special attention will be given to the investigation of the critical path. Findings will be compared in order to understand the benefits and drawbacks of both systems.