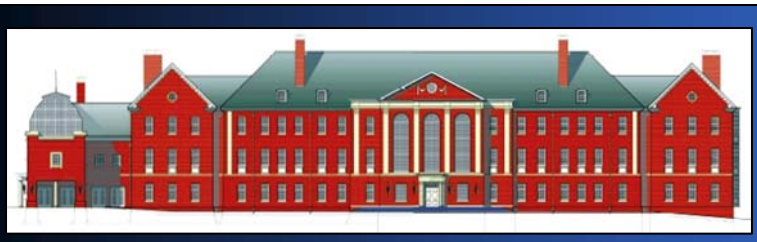

Barshinger Life Science & Philosophy Building

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Structural Option
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Structural Technical Report #3

Lateral Systems Analysis & Confirmation Design

Executive Summary

Tech Report #3 further investigates the lateral force resisting system of the Barshinger Life Science and Philosophy Building. The structure utilizes a system of ten (10) concentrically braced steel frames placed throughout the building. The braces are composed of wide-flange A992 horizontal and vertical members with A992 ½-inch thick HSS diagonal braces. The loads experienced by the frames are calculated in detail in the report.

The analysis of the lateral system was completed using preliminary calculations from Tech Report #1. Distribution of lateral loads was accomplished according to the relative stiffness of the frames. STAAD.Pro structural analysis software was utilized to determine frame stiffness and to spot-check the diagonal braces of two critical frames.

The basic findings of this report are listed below:

- The seismic load on the building is more than 6 times greater than the wind load. As a result, the governing load combination from ASCE7-02 is 1.2D + 1.0E + 0.5L + 0.2S.
- Although the frames appear to be symmetrical located about the structure's major axes, varying rigidities produce an eccentricity from the building's center of mass, causing torsion in the structure that must be accounted for by the braced frames.
- Story drift and overall drift is well within the H/400 limit.
- The HSS diagonal braces are suitable for the applied lateral loads.
- Overturning is not a concern for the building given its low vertical profile and wide base.
- Overall, the system is fairly inefficient and does not approach its capacity under the assumed loadings.