

Christopher McCune  
Structural Option  
Eight Tower Bridge  
Faculty Advisor: Dr. Hanagan  
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## Senior Thesis Proposal

### Executive Summary

Eight Tower Bridge is a 16 story steel high-rise office tower located outside of Philadelphia in Conshohocken, Pennsylvania. Completed in April of 2002, Eight Tower Bridge sits on the shore of the Schuylkill River, next to the Fayette Street Bridge, leading to both interstates I-476 and I-76. The building was designed by Skidmore, Owings and Merrill, and is owned by a partnership of Oliver Tyrone Pulver Corporation and Brandywine Reality Trust.

The building is the latest of the Tower Bridge projects to be constructed in the Conshohocken area. As such, the architect has incorporated the signature precast concrete and green-tinted glass façade of the other Tower Bridge buildings into this project. This façade is supported by a steel superstructure resting on pile caps covering groups of auger cast concrete piles. Additional foundation elements include a 4'3" thick MAT slab and concrete grade beams. The W-shape columns and floor beams support a composite concrete slab cast on metal deck. These members help support a rooftop mechanical penthouse that sits atop the 16<sup>th</sup> floor. The lateral force resisting system is a combination of moment resisting frames and a series of braced frames located at the building core.

The main focus of this thesis project will be the transformation of the existing steel superstructure into a concrete structure, employing a flat plate, post-tensioned concrete floor slab. The existing steel columns will be redesigned to be cast-in-place concrete columns, and the existing steel braced lateral resisting system will be replaced with concrete shear walls located around the building core similar to the existing frames. The purpose this concrete redesign is to evaluate and understand fully the impact on the overall building when the structural material is changed, as well as gain an understanding of post-tensioned concrete systems.

Two breadth topics will also be studied during this report. The first will be a construction schedule comparison based on the concrete structural system designed. The second topic will be an analysis of the mechanical system and the affects of increasing the mechanical plenum space, or decreasing the overall building height as a result of a employing a concrete flooring system over the existing steel system.