

River Tower at Christina Landing
Wilmington, DE

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Structural Technical Report #3:
Lateral System Analysis and Confirmation Design

Executive Summary

This report provides a more in-depth analysis of the lateral system of the River Tower at Christina Landing than produced in previous technical reports. The River Tower is part of the latest phase of redevelopment along the banks of the Christina River in Wilmington, DE. The redevelopment site consists of luxury townhouses, a 22-story apartment building, and will now add the River Tower, a 25-story condominium tower. The River Tower's structural system consists of a slab-on-grade structural slab and 8" post-tensioned floor slabs with reinforced concrete columns for gravity load support.

This report again uses the loading information obtained from reference to the BOCA 1996 Building Code from previous technical assignments. In this report, the lateral system of the River Tower is specifically highlighted. The River Tower's main lateral resistance is provided by reinforced concrete shear walls located mainly around the perimeter of the central elevator shaft and also at the western walls of the tower. For a site in Wilmington, DE, wind provides the primary lateral loading, and this fact is confirmed in the following calculations. For the purpose of simplification, lateral loading was considered for six sections of this 25 story building, the top five floors and every four floors beneath. The report that follows contains an introduction to the overall structural system for the River Tower, followed by the results of lateral loading (both wind and seismic) calculations. Critical shear wall strength checks, drift calculations, and overturning considerations also are provided in this analysis.

The drift and overturning calculations yielded favorable and acceptable results, while the strength check calculations were not successful. Reasons for this failure of the shear walls in flexure negate the generalized assumptions of this report. Factors not considered in the scope of this analysis are the lateral resistance of the columns, which may provide additional stiffness based on their orientation in the floor plans. The post-tensioned concrete flat plate system at each floor also provides lateral stiffness for the River Tower. The self weight and other gravity loading of the structure provide enough axial force on the shear walls to stiffen each shear wall through compression.