



Aaron Snyder

Structural Option

Advisor: M. Kevin Parfitt, PE

Structural Technical Report III

October 31, 2006

Pro-Con Structural Study of Alternative Floor Systems

Executive Summary:

The second structural technical report is a summary analysis and comparison of proposed alternative floor systems to the existing system of the Odyssey. The current system is a 2-way post-tensioned flat slab located throughout 15 residential levels of the building. A description of this system over a typical frame/bay is included in the preliminary sections of the report.

In the remaining sections of the report are the general analysis and descriptions of the following five alternative floor systems for the Odyssey:

- 2-way Concrete Flat Slab
- 2-way Concrete Flat Slab with Drop Panels
- Prestressed Concrete Hollow-Core Plank
- Open Web Steel Joists / Composite Deck
- Composite Deck / Composite Beams

The alternative systems will be analyzed over the typical span conditions of the current system with loading developed from provisions of ASCE7-02. Properties and component sizes of each system are determined through analysis located in the Appendix. A summary of analyses and depictions of typical floor plans and sections are included in sections of the alternative systems. Advantages and disadvantages of each system are described throughout the report with a summarizing comparison table in the concluding sections. The table compares the floor systems by characteristics including overall depth, constructability, and general cost.

Throughout the analysis of the five alternative systems, the existing 2-way post tensioned flat slab remains the ideal floor system for the Odyssey's residential levels. Both steel designs provided better constructability of the floor system, however each greatly exceeded comparable floor depths. The concrete sections will require further investigation to determine whether or not they would be viable alternatives to the existing system. Primarily, the 2-way concrete flat slab compares most favorably to the existing conditions and would be the focus of an alternative floor design for the Odyssey.