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## **TECHNICAL REPORT TWO**

### **PRO – CON STUDY OF ALTERNATE FLOOR SYSTEMS**

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#### **EXECUTIVE SUMMARY**

This technical report concentrates on the existing floor system of Memorial Sloan-Kettering along with four efficient alternative systems. A detailed analysis of each system is provided, discussing the advantages and disadvantages associated with that particular design. Each alternative is then compared against the original floor design in order to determine how effective of an option it is. All four floor systems chosen for this report appear to be suitable alternatives for MSK. Therefore, these results will help provide a good basis of which systems would be the most beneficial to further investigate.

This report begins by examining the existing composite system found on the second, third, and fourth floors of Memorial Sloan-Kettering. A typical 30' x 30' interior bay was analyzed with hand calculations to check the framing members. After confirming those member sizes, this system was slightly modified into a non-composite system and analyzed for a second time. Member sizes were once again designed for and compared to the original.

The other three systems investigated for this report were a one-way concrete joist system, a hollow-core precast plank system, and a two-way slab system with drop panels. All three of these designs are considerably different than the original since they deal predominately with concrete instead of structural steel. Because of this, the CRSI 2002 and PCI 2000 handbooks were both referenced to aide in the structural design of these systems. All tables referenced for this report can be found in the appendix. Each system was created for the same interior bay as the original with the same superimposed loads acting on it. For each design, the type of floor system is described and then analyzed to determine the correct concrete member sizes, reinforcement size and placement, and slab properties. In addition, advantages and disadvantages are discussed for that particular system along with how those characteristics would specifically influence Memorial Sloan-Kettering.

After all four alternative floor systems were examined, a comparison chart was created to contrast the cost, weight, floor depth, and construction speed of each system against the others and the original. From this chart, it became apparent which systems would in fact work in MSK and which were simply ineffective. This report acknowledges the original composite design's efficiency as well as recommends further investigation of both the hollow-core precast plank and one-way joist system as possible floor system alternatives.