

EXISTING STRUCTURAL SYSTEMS DESCRIPTION



Lateral System:

Concrete shear walls are currently under construction in the JW Marriott and will serve as the primary lateral force resistance. Located within the elevator core, the walls will span from the basement to the roof. Two major pairs span in each direction (two 25'-6" walls in the East-West direction and in the North-South direction a 35' and a 10'-7" wall). All shear walls are 12 inches thick. The shear walls are shown in blue in Figure 1.

Additional lateral support must be considered from the wall-columns placed along the exterior of the JW. These walls are typically 11'-8" wide and 10" wide. Even though the walls are placed in a radial pattern they offer some effective rigidity. The wall-columns are staggered at angles ranging from approximately 45-78 degrees from vertical. The concrete used in both shear walls and wall-columns vary with height above grade from 6 to 10 ksi.

Gravity System:

The existing floor system of the JW is a one-way reinforced concrete flat plate from floors 5 through 22. The slab is 7.5 inches thick and uses 5000 psi strength concrete (unless otherwise noted). 14 openings in the slab, located in the main corridor, allow for mechanical duct access. The overall shallow depth of the system permits greater flexibility for the architect's interior design. The size of the typical bay is a trapezoid with vertical lengths 10'-7" and increasing to 17'-9" and a horizontal length of 35'-3". The flat plate system in the JW allows for maximum freedom of design of partitions and ceiling finishes. A shallow floor system has significant savings in MEP runs from floor to floor. Simple formwork reduces construction costs by increasing uniformity. Guest views are not obstructed by edge beams and create larger glass windows to view the skyline. A typical bay is shown in red in Figure 1.

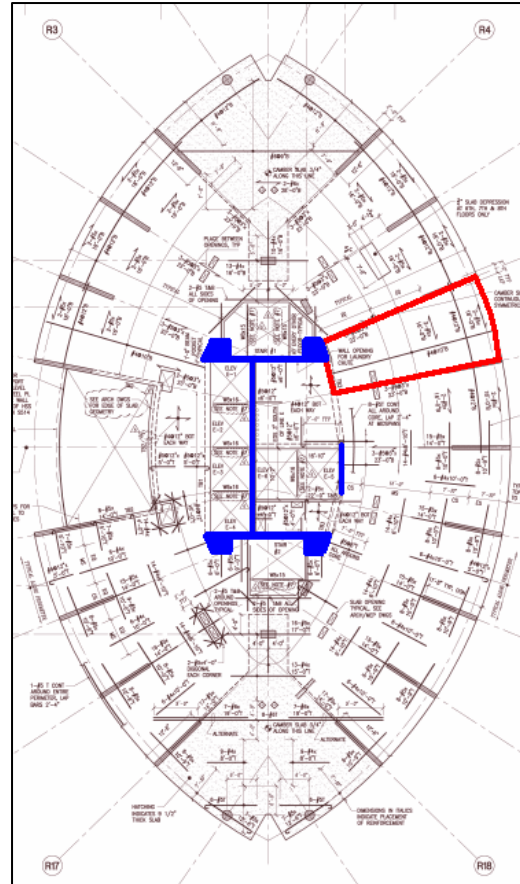


Figure 1. Shear walls and typical bay

Foundation:

The foundation of the JW Marriott consists of multiple parts. A slab on grade covers the entire basement with 6 inches of 4000 psi concrete reinforced with WWF and 10 inches of 4000 psi concrete reinforced with 4#12 bars each way in the loading dock area. Grade beams travel between the building elevator core pile caps, a few exterior pile caps, and the perimeter of the basement crawl spaces. All grade beams are 6000si concrete reinforced top and bottom. Along the perimeter of the tower there are (21) piles that consist of (4-7) 200 ton micropiles. Each micropile is driven 19' into the ground. In the elevator core there is a cache of (94) 200 ton micropiles,.

Structural Codes:

- *Building Code*
Michigan Building Code 2003. The 2003 Michigan Building Code is an adoption of the IBC 2003 with state amendments.
- *Structural Concrete*
ACI 318-2002. Building Code Requirements for Structural Concrete.
- *Concrete Masonry*
ACI 530-1999. Building Code Requirements for Masonry Structures.
- *Structural Steel*
LRFD Specification for Structural Steel Buildings, 2nd Edition. AISC.