



BUILDING DESCRIPTION



Building Description

Location:

The Residences of Sherman Plaza are located in the diverse community of downtown Evanston, IL, just north of the city of Chicago on Lake Michigan. The 25 story condominium is the second tallest building in Evanston and offers residents luxuries that were once only available in downtown Chicago, such as a 54,000 square foot health club, garage parking, ½ acre rooftop garden, and easy access to the El and Metra trains. The building is zoned in the Downtown Retail/Development Core in Evanston, IL. The condominium is located on a site that was originally a parking garage with 566 spaces. The new construction will house 253 condominiums, lofts and penthouse residences, 152,000 square feet of retail space, and a new adjoining 1,585 car parking garage.

Architecture:

The Sherman Plaza condominium building has a rectangular base containing the retail spaces and health club and is topped by a twenty-three story L-shaped condominium tower. The retail spaces are located on the first two floors and are occupied by retail tenants, such as Barnes & Noble Booksellers, Pier 1 Imports, and Washington Mutual. Residents can choose from a one bedroom condominium, a two bedroom loft, or a 2-4 bedroom penthouse suite with private terrace. The walls of the bottom two retail floors are covered in hard fired natural clay face brick with an encircling three foot base made of precast panels and granite. The face brick continues up to the seventh residential floor and the rest of the walls are primarily smooth formed concrete panels.



The building steps back on the third, sixth and seventh floors and the roofs of these floors are covered by an intensive garden. The top three penthouse levels are also stepped back and have large cast-in-place concrete “eyebrows” covering the balconies. The intensive green roof is comprised of layers of intensive soil, filter fabric, drainage/water retention channel elements, and prefabricated drainage courses. The concrete eyebrow roofs on the top three floors are covered with a single-ply elastomeric EPDM fully adhered roofing system above 2 inch roof insulation.

A parking garage is connected to the condominium tower on its west side, and it extends up fourteen stories and holds 1,585 cars. The garage, however, is structurally separate from the tower, and therefore, will not be included in this study.

Primary Project Team:

- **Owner:** Sherman Plaza Partners, LLC.
- **General Contractor:** Focus Construction
- **Architects:**
 - Design Architect: Daniel P. Coffey & Associates, Ltd.
 - www.dpcaltd.com
 - Associate Architect: Otis Koglin Wilson Architects
 - www.okwarchitects.com
- **Structural Engineer:** Halvorson & Kaye Structural Engineers
 - www.halvorsonkaye.com
- **Civil Engineer:** V3 Consultants
 - www.v3consultants.com
- **MEP Engineering:** Environmental Systems Design
 - www.esdesign.com
- **Electrical Consultant:** Huen Electric, Inc.
 - www.huenelectric.com
- **Plumbing Engineering:** Great Lakes Plumbing and Heating
 - www.glyph.com
- **Fire Protection:** Nova Fire Protection, Inc.
 - www.novafire.com



BUILDING SYSTEMS



Building Systems

Electrical:

Sherman Plaza's electrical system is powered by a 480/277 Volt and a 208/120 Volt system. The 480V transformer provides power primarily to the cooling tower and mechanical system. The 208/120V, 3 phase-4 wire voltage system is used to power the rest of the building.

Lighting:

The lighting in Sherman Plaza is primarily standard fluorescent lighting. Accent wall sconces are used in the units' entryways and bathrooms. The roof gardens have extra lighting features with plant up-lighting, landscape, patio and bollard lighting. The bottom retail floor has surface mounted exterior light fixtures in between storefront windows.

Mechanical:

The primary mechanical equipment for Sherman Plaza is located in the 3rd floor and 26th floor mechanical equipment rooms. A cooling tower plant and two chillers are located on the second story roof of the retail building and are sized to service all 25 stories, including the retail area. Air handling units at 40,000 CFM are located in the 3rd floor mechanical room with another smaller air handling unit servicing the lobby at 2,500 CFM. Each of the lofts, condominiums, and penthouses has an individually controlled in-unit electric heat and air conditioning unit. Each of the residences has a fan coil unit with electrical heating with standard ducts. Exhaust fans in the 26th floor mechanical room provide exhausts for the kitchens, toilets, and in-unit dryers.

Fire Protection:

Sherman Plaza follows the 1996 BOCA National Fire Protection Code. Exterior bearing walls and interior columns have a 3 hour fire resistive rating. Stair and shaft enclosures and floor construction has a 2 hour rating, and dwelling unit separations and exit corridors have a 1 hour fire rating. The building contains a state-of-the-art fire alarm and sprinkler system, as well as basic fire suppression materials.

Transportation:

The building is served by three elevators: two passenger and one freight elevator. The passenger elevators are hydraulic type with a 2500 lb. capacity and a speed of 125 feet per minute. The freight elevator is an electric traction type with a 5000 lb. capacity and a speed of 500 feet per minute. A set of escalators serve the first two floors in the retail area. The escalator is a flat-step reversible type for ascending and descending passenger service with a speed of 100 feet per minute.



EXISTING STRUCTURAL SYSTEM



Existing Structural System

Gravity System:

The primary structural system of Sherman Plaza is reinforced cast-in-place concrete two-way slabs, beams, and columns. The primary floor system is two-way slabs, but there are some one-way slabs in irregular areas. The slab thickness of every floor is 8” with the exception of the first retail floor, which has a slab thickness of 9”. The building is surrounded by perimeter edge beams, and there are interior edge beams surrounding slab openings for stairs and elevator shafts. The third, sixth and seventh floor framing has additional beams to account for the large loads due to the green roofs on those levels as the building steps back. The twenty-third floor framing also has large transfer girders to account for the change in the column grid for the penthouse levels.

The slab reinforcement remains fairly constant from floor to floor on the stories above the two retail floors. The bay sizes, however, differ throughout the plan, which causes the reinforcement size to change throughout a floor. The slab is required to have a minimum of #6@12” top reinforcement at column strip intersections, #5@12” bottom reinforcement at middle strip intersections, and #5@12” top and bottom reinforcement at intersections of the column strip and middle strip. The typical floor of the building begins on level 8, and this floor plan is continued up to floor 22. The last three floors differ, because they are penthouse levels.

In general, the columns are lined up along a grid, but the spacing of the columns varies. Most bays are either 14’x14’ or 21’x21’ square bays. Column sizes on the ground floor vary from 18”x54” on the building perimeter to 36”x36” as a typical interior column size. Column sizes differ on the upper floors and vary between a 20” diameter circular column, a 24”x24” square interior column and a 13”x36” on the perimeter. Figure 1 shows the typical floor plan, which extends from level 8 to 22.

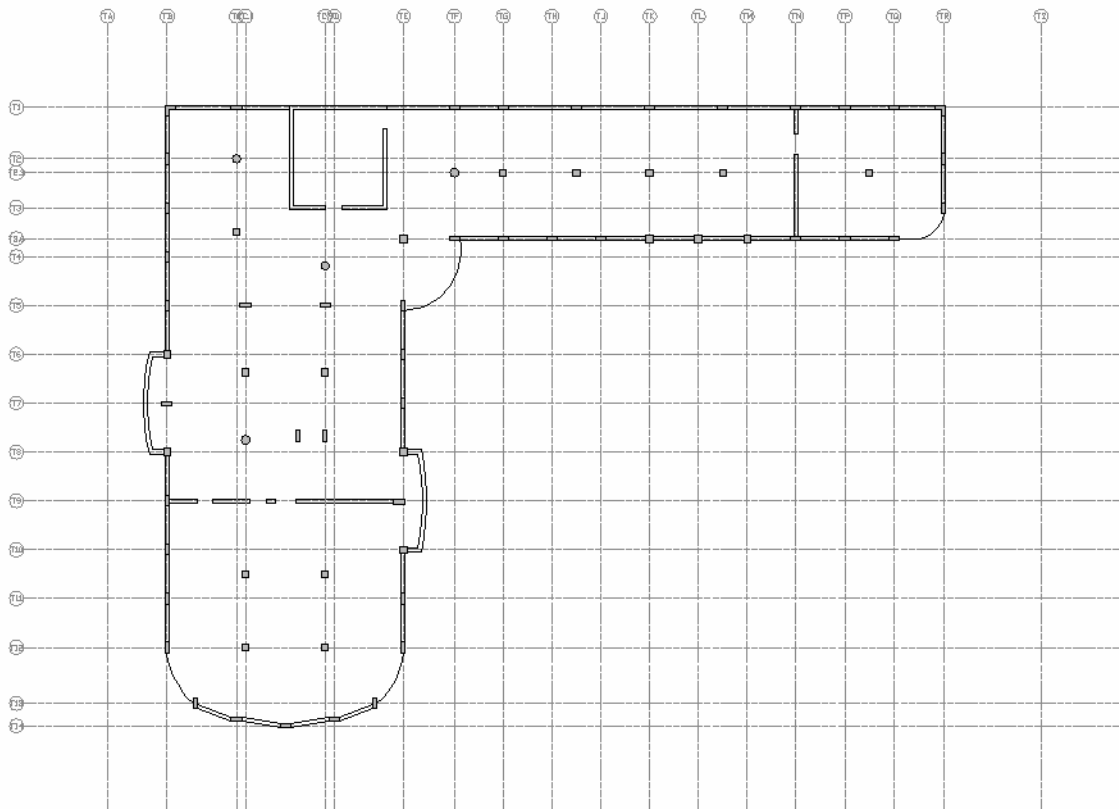


Figure 1: Typical Floor Plan: Levels 8-22

Lateral Resisting System:

The lateral support for the building is made up of a combination of reinforced concrete shear walls and perimeter moment frames for the first twenty-two stories. There are shear walls located around the elevator core, near the intersection of the L-shape of the building. There is also a shear wall in each arm of the L-shape. The elevator core shear walls are 18" thick for the first six floors, 16" thick for floors 7 to 22, and 12" thick for the last three floors. The shear walls located in the L-shape's arms are 18" thick for the first six floors, 15" for floors 7 to 12, and 12" thick for the remaining floors. The reinforcement for the shear walls is #5@12", in general. The moment frames are made up of deep edge beams around the building's perimeter. A typical perimeter beam is a 13"x34" beam with 4 #7 reinforcement bars on top and bottom. The typical perimeter columns are 13"x36" with 8#7 bars.

The top three floors of Sherman Plaza are penthouse levels and have a different column grid than the rest of the building. Therefore, the moment frames do not continue up to these floors. Instead, it is assumed that the shear walls on this level will take all the lateral load. From the 6th floor down, the shape of the shear walls changes, and there is an additional moment frame due to the area where the building steps back. Figures 2-4 show the shear wall and moment frame layouts of each floor.

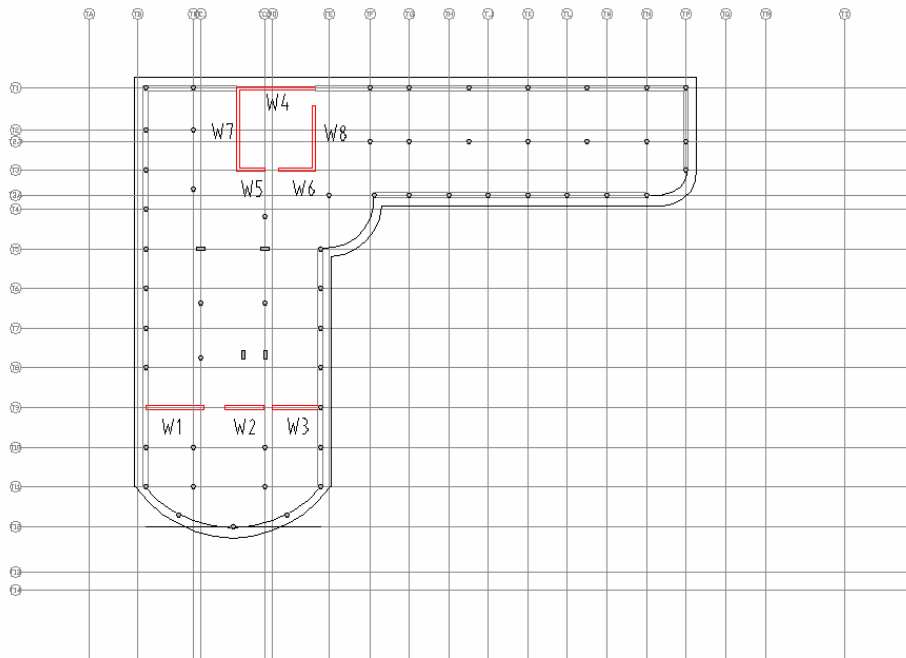


Figure 2: Level 25 (Shear walls are in red.)

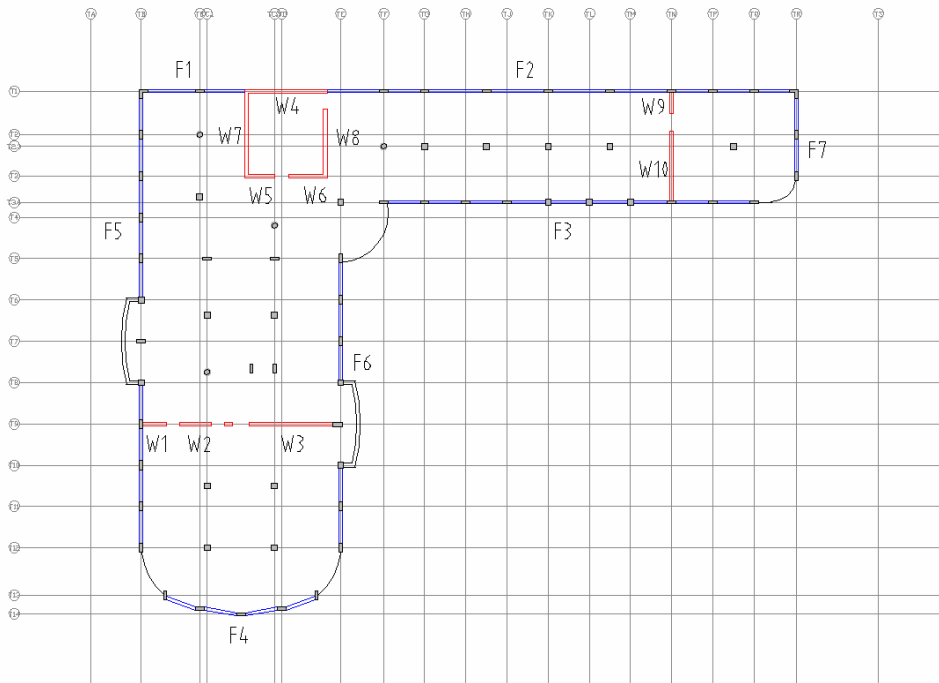


Figure 3: Typical Floor Plan: Levels 8-22
(Shear walls are in red and moment frames are in blue.)

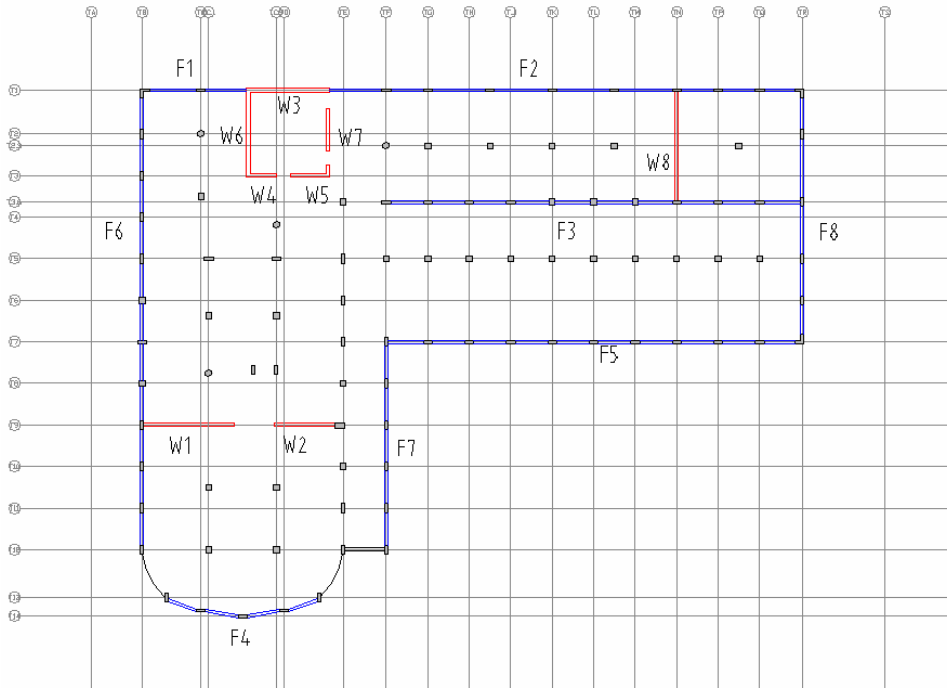


Figure 4: Level 6
(Shear walls in red and moment frames in blue.)

Foundation:

The foundation of Sherman Plaza consists of reinforced concrete belled-caissons, extending to hardpan at approximately 70 feet below grade. All the caissons will bear on hardpan soil strata with a minimum allowable bearing capacity of 30 ksf, except where the drawings indicate a minimum of 50 ksf. The largest caissons have a 15’-6” bell diameter and a 6’-0” shaft diameter in size and are spaced at 28’-0”, in general. The sizes vary down to a 6’-0” bell diameter and 2’-6” shaft diameter, spaced at either 14’-0” or 21’-0”, in general. Above the caissons is a 5” slab-on-grade with one layer of 6x6-W2.1xW2.1 W.W.F. Grade beams are located underneath the building’s shear walls.