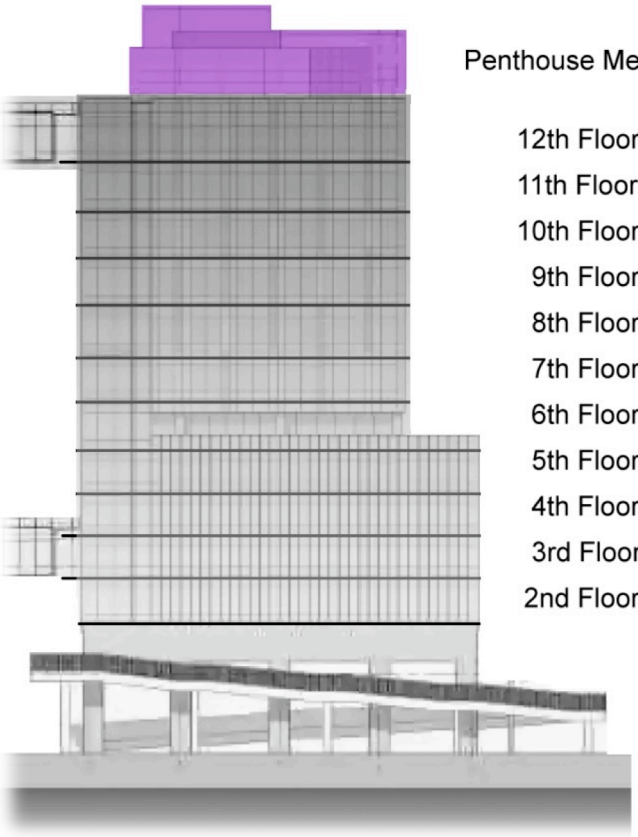
EXISTING BUILDING BACKGROUND

BUILDING DESIGN BACKGROUND

The HSS River Building is a twelve story 88,245 square feet building located in the Upper East Side of Manhattan. The building is used for acute medical care, containing primarily exam rooms, X-ray rooms, doctor offices, and a rehabilitation gym on the second floor. The HSS River Building is designed to be on top of the FDR Drive highway, overlooking the East River.

Inside the River Building, the project was designed as a core and shell, leaving the interior programming to the client's request. The core and mechanical system were designed to use the least amount of space possible so that the client will be able to rent out the space. This being said, the HSS River Building's mechanical system only takes up 1% of the rentable space available as all equipments are located in the penthouse and concealed in the plenum. **Figure 1** shows each floors rentable space breakdown along with the penthouse area.



Penthouse Mechanical Room	**3,560 sqft**
12th Floor	**6,151 sqft**
11th Floor	**6,846 sqft**
10th Floor	**6,181 sqft**
9th Floor	**6,196 sqft**
8th Floor	**6,210 sqft**
7th Floor	**6,321 sqft**
6th Floor	**6,013 sqft**
5th Floor	**8,278 sqft**
4th Floor	**8,290 sqft**
3rd Floor	**8,983 sqft**
2nd Floor	**8,909 sqft**

Total Rentable Square Footage: 78,382 sqft

Figure 1 – Rentable Square Footage Breakdown.

STRUCTURAL BACKGROUND

In order to support the HSS River building on top of the FDR Drive, (10) 36 meters deep caissons are anchored to the bedrock below. With this foundation, the building raises twelve stories above ground with the support of six feet by four feet-spread footings on the interior columns. Typical beam sizes are W12x26 spanning 25 feet and spacing at eight feet.

Typical girder sizes for the building are W12x65s and W12x120s spanning 25 feet and spaced at 25 feet also. The building also contains two bridges on the 3rd and 12th story to connect the HSS River Building to the existing hospital. The bridge is built on W8x24 beams with braces that are W8x24 and columns at W14x99. For lateral forces, the building uses chevron brace frames for the 3rd and 12th floors along with a truss system on the 1st and 2nd floors.

MECHANICAL SYSTEM EXISTING CONDITIONS

DESIGN OBJECTIVES AND REQUIREMENTS

The mechanical system for the HSS River building is a heat pump system that provides cooling and heating for the 100% Outdoor Air Handling Unit and also terminal heat pump units that condition each floor space. The minimum outdoor air is brought in and mixed with the return air in each terminal heat pump unit serving each area. The main heat pump provides cooling and heating for the AHU is a water-to- water heat pump where as the terminal units are water-to-air. The design of the mechanical system for the HSS River Building was developed for the following objectives:

- User-end Controllability
- Energy efficiency
- Space conservation
- Reduce spread of contaminates

With these objectives in mind, the HSS River Building uses multiple terminal heat pumps, providing user-end controllability of temperature for each serving space. To increase energy efficiency, the HSS River Building mechanical system uses a heat pump loop with a 100% air-handling unit sized for the minimum outdoor air, reducing energy needed to condition a larger amount of outdoor air and return air mixture. Lastly, by sizing the duct penetrations for the amount of outdoor air only and mixing the recirculation and outdoor air at the terminal end reduces the amount of space needed for the ductwork. By not mixing the return air with the outdoor air in the AHU, the