Combining strong aesthetic goals with sophisticated programmatic needs can create challenges that require careful consideration of every aspect of a healthcare project. That combination led designers to use a cast-in-place reinforced concrete structural system when they built a new eight-story building on top of an occupied four-level parking garage.

Because of its dominant location on the Vanderbilt University Medical Center campus, the new Bill Wilkerson Center had to project a strong, confident image while staying within a limited budget. The project also had to incorporate a variety of sophisticated facilities, including a two-story anechoic chamber, a reverberation chamber, sound-testing booths, a therapy tank, and an indoor track. Entries to both the center and the parking structure had to remain easily accessible.

The building’s structural system features cast-in-place reinforced concrete framing that supports precast concrete architectural panels. Reinforced concrete components were specified for a number of reasons, foremost among them being concrete’s ability to resolve vibration and acoustic issues with its inherent damping characteristics. The cast-in-place concrete frame also minimized the structure’s depth compared to a structural-steel system, ensuring that the installation of all above-ceiling infrastructure needs could be accomplished easily.

The reinforced concrete system also eliminated the need for fireproofing, which was especially important on the therapy level, where designers felt an exposed structure was appropriate.

The precast concrete architectural panels simplified cladding the building, which is located in a congested campus area. A crane was placed on the existing parking structure during construction, erecting the panels with minimal traffic disruptions. Close communication between the contractor and structural engineer ensured the garage remained open during construction phases with minimal impact to available parking.

Reinforced concrete post-tensioned girders produced an economical way to achieve the complex curved exterior appearance the designers sought, which was achieved with large cantilevered shapes and curved floor plates. A reinforced two-way flat slab to create low floor-to-floor clearances was used on the lower floor, while roof decks were provided to offer an extension of therapy and program activities.

The cast-in-place reinforced concrete frame minimized the structure’s depth compared to a structural-steel system.