

MIXED-USE DEMANDS

ENCOURAGE PARKING E X P A N S I O N

Owners' need to fit more amenities into smaller footprints has led many to include parking and take advantage of precast concrete's benefits to achieve efficient designs

— Craig A. Shutt



Mixed-use projects create unique and significant challenges for blending multiple functions in the proper mix. In many cases, these projects are including parking as a key element as developers seek to provide attractive amenities to entice tenants and visitors. But small sites, often in the downtown area, add complexity for designers and contractors. Many turn to precast concrete structural and architectural components to help meet these needs while providing aesthetic appeal, economical designs, and efficient construction.

“As land values rise, more mixed-use properties are adding parking to take better advantage of the structure,” says Dave Vander Wal, senior vice president at Walker Parking Consultants based in New York, N.Y. “They no longer have the ability to put it on the side.” That trend follows those already established in Europe and the Middle East and North Africa, he notes, where land costs have been at a premium for some time. “They’ve learned to consolidate parking within the footprint of the building.”

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NORRISTOWN GATEWAY

Designers at TimHaahs created a mixed-use parking structure for the Montgomery County Redevelopment Authority in Norristown, Pa., to include retail frontage. This was considered critical to making the precast concrete structure a gateway to the downtown district. The architecture was designed to emulate the materials, scale, and proportions of neighboring buildings. Photo: Nathan Cox.

That's especially true in high-density areas, such as downtown urban locations in gateway and coastal locations, he adds. "In many parts of the U.S., people are moving back into the city from the suburbs, so owners are looking at combining more functions into the building to make them more attractive and add services and amenities. It's routine in India to combine five functions in larger buildings. We don't see that density here, but it's the norm there."

Torrey Thompson, managing principal of the Chicago, Ill., office of Carl Walker Parking, agrees that the growth of mixed-use projects in urban areas creates challenges. "In many instances, providing stand-alone parking is not feasible and requires parking to be integrated into the residential building," he wrote on the company's website. "Integrating parking into a high-rise residential development requires an understanding of many design and construction issues."

PLACING PARKING LEVELS

A key issue is whether parking will be below grade, on the first few levels, or even above other functions. "Underground parking structures have become more commonplace as land values in urban areas rise and city planners push for mixed-use developments to incorporate parking," Thompson wrote. "Though more costly, underground parking provides many long-term benefits, such as preserving prime real estate, offering convenient and centrally located parking, and removing parking from street frontage."

"The location can vary by what's most efficient for that specific project," says Vander Wal. "Retailers want parking to be directly below or above their space to encourage visits. Shoppers usually start at the closest level to where they enter. Developers often want parking to be low, but the first level is too valuable, so it's sometimes put above the retail level."

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ATLANTIC CITY WAVE

Known as "The Wave," the new 1,180-space mixed-use parking structure in Atlantic City, N.J., serves as a gateway to the city and required a dramatic appearance. Designed by TimHaas, the precast concrete structure features solar panels, metal screening with colored lighting, and an LED digital billboard. Retail space and a parking office are located on the first floor. Photo: Steve Wolfe.

Developers frequently are open to adding levels of parking into the project, notes Mike Martindill, principal and regional vice president at TimHaahs in Miami, Fla. “The benefit of adding levels of parking into a project is that it pushes offices or residences higher up, which creates better views.”

To balance the needs while creating efficient space, more owners are performing shared-parking analyses, made popular by the Urban Land Institute’s methodology. Offices, for example, require parking only during the day, while theaters mostly require it at night. “Developers want to avoid having each function need its own parking space,” explains Martindill. “The goal is to maximize daytime-nighttime sharing by ‘rightsizing’ the parking square footage.”

Residential- and office-space needs varies, because tenants often want their own unique spaces, sometimes security protected. With more amenities in the building and more public transportation in urban areas, tenants also use their cars less, so they stay put. “Shared parking typically can reduce the total number of spaces by 5% to 15%,” says a designer who goes by the name Tune at TimHaahs who addressed the issue on the firm’s website FAQ. “In some cases, it may reduce the total parking needed by as much as 25%.”

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WELLNESS PLAZA

The 1,200-space Wellness Plaza parking garage in New Brunswick, N.J., features a Fresh Grocer grocery store on the first floor and the Robert Wood Johnson Fitness Center on the second floor. The precast concrete structure, designed by TimHaahs, features a corner tower with stairs and four elevators that connect to the adjacent train station's platform. Photo: Steve Wolfe.

'When the parking is above retail or other functions, separating those areas becomes a critical concern.'

RETAIL SPACE GROWING

Retail has become a more prominent part of mixed-use projects, including on the ground floor of parking structures to generate more revenue. But more ambitious programs are growing. "We're seeing more projects integrate larger grocery stores, such as Whole Foods and Trader Joe's," says Vander Wal. "Supermarkets are amenable to coming into larger projects with smaller-sized stores, and they're also entering urban locations with parking incorporated into their building."

"Any kind of grocery element aids a mixed-use property today," adds Martindill. "It's a popular addition as more people look to move into downtown areas and need more food options."

Segregating each function to meet building-code requirements creates challenges. "Most projects separate functions by level, with retail and entertainment on lower levels and residential and office space above to provide better views and more control of noise," says Vander Wal. "That way, people can just go downstairs to go to lunch or dinner."

Fire protection and waterproofing are key concerns, followed by noise and vibration control. "Developing a high-rise complex with parking necessitates an understanding of many code and zoning requirements, ranging from property setbacks and entrance locations to parking-space layouts and clearance requirements," wrote Thompson. "Fire separation between uses and code-compliant means of egress must be considered during design and construction."

Moisture penetration from cars arriving from inclement weather creates a significant issue. "When the parking is above retail or other functions, separating those areas becomes a critical concern," says Vander Wal. "We typically use a protective membrane and waterproofing system, then cover it with a floating slab so the cars don't wear out the membrane."

IDENTIFYING ENTRIES

Creating specialized entries also becomes more challenging as functions are added, with parking, retail, offices, and residences requiring distinct appearances. "Identifying each entry can be a challenge," says Vander Wal. "Office and residential entries can be off the beaten path, as those users are familiar with their entrances, but retail requires a prominent entry to direct first-time users."

That's especially true when visitors enter through the parking levels and need to find their destinations. "Entries for shopping or offices are typically placed on the corners where they can be a focal point," says Martindill. "But when the entry is through parking, it's important to have entry signage and ramping create a smooth entry and easy direction to elevators and stairs. The biggest challenge we face in mixed-use projects is ensuring the interiors function well and that ramping and circulation are easy to follow. Some are easier to do than others."

Parking aesthetics have risen significantly as owners come to realize this space provides the first and last impression that visitors encounter. "Parking is about more than just parking the car today," says Martindill. "It's the first destination and sets the tone. Parking is at the center of many mixed-use buildings and is the one shared-use element they have in common."



Photo: Steve Wolfe.



BAYLOR UNIVERSITY

The Dutton Avenue facility for Baylor University features 1195 parking spaces and 30,000 square feet of air-conditioned space for offices and restaurants, including the university's Information Technology Services offices, a Starbucks and Chili's. It features a total-precast concrete structural system to help mimic an existing early-twentieth-century campus building. Carl Walker served as architect, structural engineer, and parking consultant. Photo: Carl Walker Inc.

'We love open spaces. They offer visibility and security.'

Megan Leinart, a designer at TimHaahs, agrees. "The buildings we design impact not only the people who enter them, but also the passersby and the neighborhood or context around it," she wrote at the site's FAQ. "We often provide retail and other uses at grade to activate the streetscape and serve related and auxiliary needs to the parking structure itself. The complementary nature of this mixed-use is indicative in our complex society and changing needs."

That means parking levels must be as open as possible, with good sight lines, easy maneuverability, strong lighting, and easily understood wayfinding systems. "It's critical how we direct visitors after they get out of the car," Martindill says. "We have to help them get where they're going efficiently. Graphics, signage, clear views are super-critical."

Typically, designers use 60-foot bays for two-way traffic and 56-foot bays for one-way traffic. "We love open spaces," he says. "They offer visibility and security. We love long spans to work with the basic formatting of parking and create flexibility for layouts."

Added clearance often is needed on the first level for retail services and for residences or offices higher up, Thompson wrote. "Generally, that results in the need for a speed ramp to access the parking above. Vertical connections between the lobby and residential units often require additional, and sometimes separate, elevators and stairs, resulting in a larger core that passes through the parking area, impacting layout and flow."

PRECAST CONCRETE MEETS CHALLENGES

Many of these challenges can be met with precast concrete designs. "We like precast concrete because it works well with any functions and offers flexibility to develop whatever needs are required," says Martindill. "We use it for any category where parking is needed: single-family, multifamily, office, university, etc."

The benefits cover many aspects. “It works well structurally and functionally and offers low maintenance, easy operation, and ways to incorporate the latest technology controls. We typically use it by default in urban settings because of the lessened impact on traffic and the lack of available space to work in.”

The key, he notes, is precast’s ability to provide flexibility to meet customized needs at an economical cost. “Designs have to be done affordably while meeting all the goals. We want to use the longest spans we can to create more efficiency whenever possible. We can do that most often with precast concrete.”

Its aesthetic versatility not only allows any design style to be created but helps with cost and speed,

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Martindill adds. “Precast provides both structural and architectural elements in one piece. It looks great on the outside and works functionally on the inside. That’s why it’s so popular.”

Its durability also provides benefits, in part because of the variety of functions blended into one building, wrote Thompson. “A significant investment in durability is required. The parking-structure design will require many state-of-the-art features, such as high-strength concrete, low water-cement ratios, corrosion inhibitors, and protected reinforcing steel. Attention to durability in material selection and structural detailing, combined with a good maintenance program, will reduce long-term maintenance costs and improve the long-term performance of the facility.”

Precast can be erected quickly with efficient use of site space. “Even when parking is underground, a two- or three-level parking structure can be built with precast concrete,” says Vander Wal. “We can situate the crane in the basement and still have enough daylight and room to maneuver to work up to grade level. It’s a cost-competitive system even with the crane going into the excavation.”

MIXING MATERIALS

Even when other functions feature different types of structural systems, designers are looking to precast concrete for the parking levels. “Precast concrete provides a strong base for the building that we can build on with other materials to create the spaces needed above for offices or retail,” says Vander Wal. In most cases, the precast concrete levels are below while other framing systems rest on it.

“In some situations, we use a total-precast concrete structural system if the column sizes and utilities work efficiently,” he says. “Its flexibility allows us to use it where it provides the most benefits.”

Precast’s aesthetic versatility means that architectural panels often are used to clad both parking and other portions. “Parking often looks functional and other needs want a more architectural appearance,” says Martindill. “We’re enormous fans of integrating architectural into the entire structure, including the parking, so it blends with the neighborhood, fits its purpose, and is a place that people want to visit.”

Precast concrete’s capabilities for providing a range of aesthetic options ensures all parts are complementary. “The days of gray boxes are over,” Martindill says. “We are using precast concrete façades along with screening, vegetation, brick insets, and all kinds of techniques to dress up parking levels. Precast concrete can help us meet all of the needs and balance architectural desires with functional and economical needs.”

Vander Wal agrees. “Precast concrete works especially well as projects become larger, owing to the economy of scale in being able to use repetitive components,” he says. “We can pop up a frame and erect the skin very quickly in large pieces. Large mixed-use projects benefit from that scale and speed. We do many mid- and high-rise towers with precast concrete to provide long, clear spans from the core out.”

Structural Considerations

Determining the best structural system for a mixed-use project involves many factors. The best system may differ for the parking and other functions, making the choice more complicated as designers factor in the benefits of having one supplier provide the entire structure.

Finding the best system “can require an analysis to determine what works best with the mixed-use facility,” wrote Torrey Thompson of Carl Walker Parking in his firm’s online FAQ.

Among the key ingredients for the selection are:

- Balancing initial costs with long-term economy.
- Coordinating the structural grid between parking and other functions.
- Matching durability needs to the owner’s long-term plans.
- Integrating the structural system with security needs.
- Creating user comfort and function in an efficient way.
- Providing optimal floor-to-floor clearances.
- Detailing so that volume-change restraints are reduced.

“Ultimately, the structural-system selection will be based on owner preference, construction cost, and schedule, efficiency, durability, and maintenance requirements,” he wrote. Early involvement by a local precaster can ensure all of these needs are met at an efficient and cost-effective level.”



MIAMI DESIGN

This mixed-use parking project in the new Miami Design District features a combination of retail, office, and parking space. Designers at TimHaahs planned the total-precast concrete structure to connect between parking and other functions with vibrant façades, dramatic lighting, and ground-floor retail to engage pedestrians. Photo: Robin Hill.



Typically, designers can place shear walls at the core and columns at the perimeter to create open interiors. “Precast concrete provides nice, long spans,” Vander Wal says. “The required functions vary with each project, and we use the best materials for each area, but quite often precast concrete can meet those needs.”

RESILIENT DESIGN ENCOURAGED

“Structured parking is, by nature, sustainable, as it is a more efficient use of land,” argues Tim Haahs, principal at TimHaahs in his website’s FAQ. “There are many opportunities to incorporate sustainable design, construction, and operations practices into the development of parking and mixed-use facilities.”

Precast plants are typically close to the site and minimize construction waste by providing prefabricated components. Additional sustainable-design concepts include creating priority parking for low-emitting and fuel-efficient vehicles and recharging stations for electric vehicles. The use of energy-efficient electrical and mechanical systems also provides benefits.

Owners also are realizing the impact of providing regular maintenance to increase the building’s life cycle, especially to the parking levels. “The good news is that owners are adjusting their expectations and putting more emphasis on maintenance,” says Martindill. “The bad news is that it may have taken a bad experience to make them realize its importance. It’s not something they often give as much attention to as they should. Today, they’re more in tune with the need to set aside some budget to maintain the parking levels of the building.”

As more projects incorporate parking as a key function and amenity, more owners and designers will turn to precast concrete to help them meet challenges. “Integrating parking with high-rise residential buildings can prove challenging,” Thompson wrote. “Having an understanding of the many design issues and requirements makes for a successful project and a great selling point for the development.”

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