All-Precast Design Spurs Renaissance in Atlanta's Buckhead District



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Urban renaissance in U.S. cities is grounded in, and galvanized by, landmark buildings of exceptional architecture. Historically, outstanding urban architecture is the underpinning for a city's individual character and atmosphere. The Two Buckhead Plaza Office Building in Atlanta, Ga.—an award-winning, innovative, all-precast-concrete design in the famous Buckhead district—is proving to be a catalyst for continued development along the city's most prestigious business corridor. In this article, the authors discuss planning, permitting, design, manufacturing, and construction of this important culminating structure of a planned, mixed-use development program in Atlanta. On a difficult site, tightly constricted by existing buildings and the city's busy Peachtree Road, the many advantages of precast concrete construction—from lower costs and new product designs to rapid erection—proved pivotal in the owner's selection of an untried precast concrete solution.

The site of the 1996 Summer Olympics and setting for *Gone with the Wind*, Atlanta is the capital of Georgia and its largest metropolitan area. Within Atlanta, Buckhead is the most prestigious and famous district, housing important business centers, cultural landmarks, and the city's wealthiest neighborhoods. In this district, Two Buckhead Plaza Office Building fronts on the historic north-south Peachtree Road, which runs through the heart of Atlanta. Many of Atlanta's most prominent landmarks are located along Peachtree Road, an avenue of long and storied history (see Atlanta's Peachtree Street: History, Wealth, and *Gone with the Wind*, p. 20).

Two Buckhead Plaza is a significant piece of architecture for many reasons, in addition to its PCI award–winning and innovative precast concrete structural system. Located on 4.3 acres (1.7 ha) at a well-known and historic intersection in Buckhead, Two Buckhead Plaza is proving to be a catalyst for urban development and a resurgence of this northern portion of Atlanta, called Buckhead Village. Fronting the upscale Peachtree Road, the buff-colored architectural precast concrete cladding creates Two Buckhead Plaza's neoclassical statement, giving the building's exterior its distinctive lines and sophisticated massing (**Fig. 1, 2**).

In this article, the authors address the significant design, permitting, and construction challenges preceding the realization of the Two Buckhead Plaza Office Building. Major project challenges included:

- Building permitting;
- A federal moratorium on new sewer hookups in Atlanta;
- Difficult stepped foundation conditions;
- A restricted urban site with no available laydown area;
- An accelerated construction schedule; and
- The owner's mandate for continuous-span construction.

Also presented are the project-winning advantages of two new product lines developed by the project precaster, Tindall Corp. of Conley, Ga.: a tri-slab deck member and a W-beam, which functions as a stay-in-place form. To meet the project's time line, Trammell Crow Residential (TCR) of Atlanta, the general contractor, was able to win city approval for permit drawings before the deadline.



Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 1. Neoclassical architecture, crisp detailing, and a dignified stature make the Two Buckhead Plaza office building a stunning asset to Atlanta's entertainment district.

PROJECT DESCRIPTION

Designed by CNNA Architects Inc. of Atlanta, Two Buckhead Plaza is a seven-story, Class A, all-precast-concrete office building. The building offers 210,000 ft^2 (19,500 m^2) of occupancy above a footprint of 244 ft 8 in.×127 ft 4 in. (75 m×39 m). The 7.5 levels of elevated precast concrete framing house offices, with retail space and a restaurant on the ground floor. Floor-to-floor distance between the first and second levels is 18 ft (5.5 m), and 14 ft (4.3 m) is typical for all other levels. From street level to the roof, the building elevation is 106 ft 4 in. (32 m). Precast/prestressed concrete elements include the structural framing system (columns, beams, tri-slab floor members, shear walls, and stair walls), the exterior architectural cladding, stairs, and walls and the roof for the mechanical penthouse at the top of the building.

Along with two neighboring structures, a 21-story tower and 8-level parking facility, Two Buckhead Plaza is part of a new mixed-use, urban development project for Atlanta. Due to site constraints and a limited laydown area, construction of the tower and parking structure began first, using the future Two Buckhead Plaza site to house erection equipment and construction materials (**Fig. 3, 4**). When it was time to build Two Buckhead Plaza, the site was confined by existing buildings on three sides and by a busy street on the fourth, which meant that Two Buckhead Plaza had to be built within the confines of its own footprint.

HURDLES ON THE ROAD TO FINAL DESIGN

Project Development and Permitting

Two Buckhead Plaza is the culminating structure of the Buckhead Village mixed-use project codeveloped



Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 2. In the prestigious Buckhead district, which boasts Atlanta's wealthiest neighborhoods, Two Buckhead Plaza is the "front face" for the mixed-use urban development project on historic Peachtree Street.

by owners Stafford Properties of Atlanta and TCR. David Oliver, president of Stafford Development, brought the project concept to CNNA in early 2001. Stafford Properties owned about 3.5 acres (1.4 ha) with Peachtree Road frontage, a portion of an original 17-acre (6.9-ha) urban development site that had been planned 20 years earlier. In the two decades since the parcel was zoned for urban development, many developers had considered the site's potential, but even with its prime Buckhead district location, for whatever reasons, nothing was built.

For almost one year, CNNA and Stafford worked together on multiple designs for the 3.5-acre (1.4-ha) site, adjusting the square footages of the retail, office, and residential portions of the project. Massing models were built for study and discussion with other

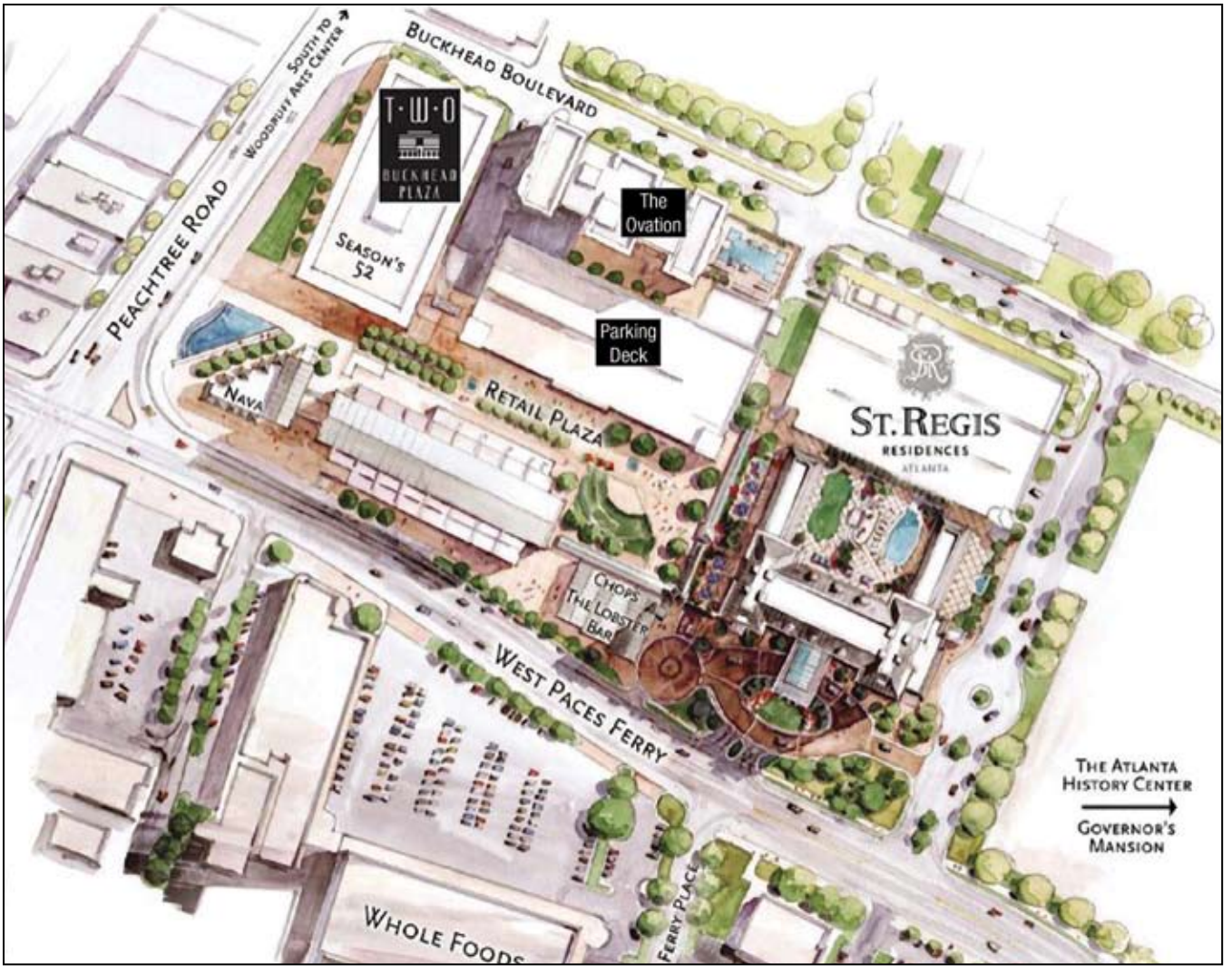


Fig. 3. This site plan indicates the Two Buckhead Plaza office building fronting on Peachtree Road, the 21-story Ovation tower, and an 8-level parking structure.



Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 4. This aerial view of the Buckhead Village development site in Atlanta reveals the restricted construction access conditions, with busy Peachtree Road in the foreground.

potential codevelopers. Ultimately, Stafford and TCR came to mutually agree on a site plan. TCR would develop the 21-story residential tower, the Ovation, while Stafford would develop Two Buckhead Plaza. Together, the two organizations would codevelop the shared retail and parking structure. TCR's construction division would manage construction of the entire project.

Moratorium on Sewer Hookups

Once the site plan and project team were in place, the next major hurdle, and a concern for the developers, was sewer capacity and availability. Atlanta was under federal mandate to limit system expansion due to multiple violations over the years, and there was a moratorium on new sewer hookups and capacity expansions throughout the metropolitan region. Through Stafford's and TCR's efforts, an agreement was made with the city to construct off-site sewer-line improvements to Atlanta's failing system. A large crossover trunk line and overflow manhole system was installed along Peachtree Battle Creek, a waterway about 2 miles (3 km) from the site. Not only did this agreement provide Stafford and TCR with the needed capacity for the Buckhead site, but it also created additional capacity for other developments in the area.

This technique to obtain sewer access rights was groundbreaking in that private-sector developers had not previously been allowed to make improvements to Atlanta's sewer system except for work directly related to a developer's own project. This new proactive approach results in capital improvements to parts of the municipal sewer system that are not in areas of the planned development. In this manner, sewer improvements are possible without city funding if a developer needs capacity in a restricted area. Once this off-site work was completed, the project's Land Disturbance Permit (permit to proceed with site excavation) was released. Securing this permit, however, was not necessarily a given.

Like most large U.S. cities, the process of navigating Atlanta's departments of zoning and permitting is often difficult. With respect to potential permitting snags, Tindall and Castone Corp. of Opelika, Ala., the two precasters for the project, were aggressive in completing project construction drawings and prepared the reviewed permit drawings long before the city deadline for submission. The project drawings were approved for permit to proceed without difficulty.

High Price for Steel Makes Way for Precast Concrete System

At the start of the project, the owner, Stafford Properties, wanted a steel-frame building to maximize floor-to-ceiling heights and the total unobstructed open space for rental occupancy. Two Buckhead Plaza's original design called for steel framing (oriented 90 degrees from that of the final precast concrete solution) with a stone and brick veneer. The first two buildings built on the urban development parcel,

ATLANTA'S PEACHTREE STREET: HISTORY, WEALTH, AND *GONE WITH THE WIND*

Once a railroad boomtown and the setting of Margaret Mitchell's Pulitzer Prize–winning novel *Gone with the Wind*, Atlanta was a focal point of the United States' Civil War before being reduced to smoldering rubble in 1864 by Union General William T. Sherman during his march to the coast. Like its symbol, the phoenix, Atlanta rose from its ashes, becoming the postwar capital of Georgia in 1868 and a symbol and cultural center of the South. Atlanta grew up around Peachtree Street, which fronts the city's most important landmark buildings, including the Federal Reserve Bank of Atlanta, the Woodruff Arts Center (home to the Atlanta Symphony Orchestra), and the High Museum of Art. Once notorious for its nightlife, Buckhead Village at Peachtree Street cradles Atlanta's wealthiest neighborhoods, the Governor's Mansion, and one of musician Elton John's homes. The majority of residential properties in Buckhead start around $500,000 and prices extend well beyond $10 million. Buckhead is today one of the most prestigious entertainment and shopping meccas in the southeastern United States.



Photo courtesy of Corey Greika, Tindall Corp.

Atlanta's skyline is shown from the once-notorious Buckhead district.

the 21-story Ovation residential tower and the 8-level retail and parking structure, are cast-in-place, post-tensioned concrete structures.

During the rezoning and design process in early 2004, the price of structural steel skyrocketed, up almost 50% from the material costs estimated in the original project budget. It was at this time that CNNA and TCR began to investigate other materials for the structure and the costs of alternative cast-in-place concrete and precast concrete designs were assessed. During this exploration process, CNNA and TCR were introduced to Tindall's tri-slab system and quickly realized its potential for the Two Buckhead Plaza project.

Tindall priced the Two Buckhead Plaza design as a precast concrete structure for the project architects and noted the following advantages of a precast concrete frame system over one of steel. The precast concrete frame system includes the following features:

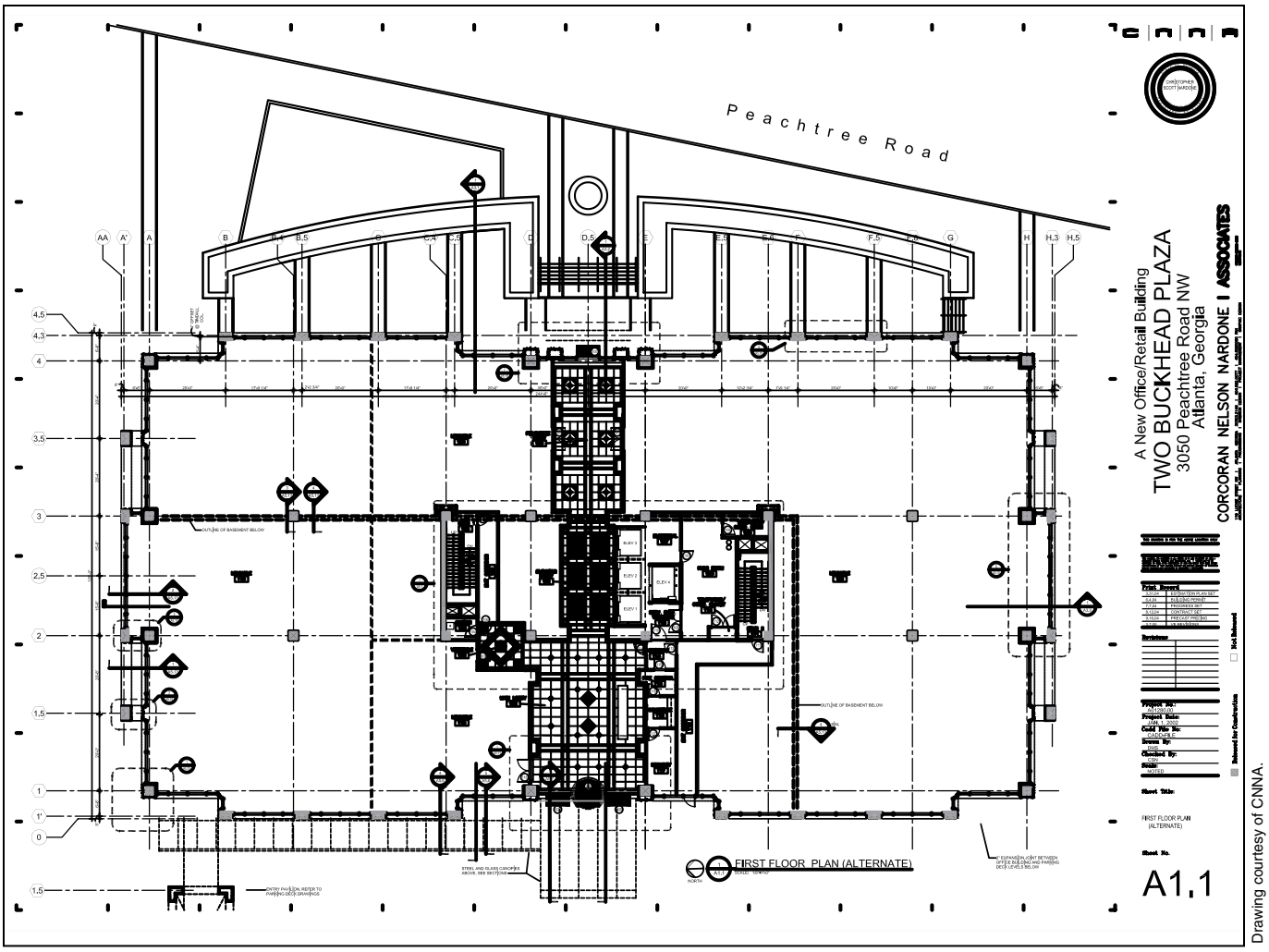
- Has a much stiffer floor system;
- Behaves similarly to a cast-in-place concrete system in terms of structural continuity;
- Requires no shoring for field concrete placements (as with a steel frame–concrete deck system);
- Allows for rapid construction, meaning quicker access for trades;
- Can integrate the exterior facade as part of the load-bearing system; and
- Increases open-floor rental space (due to fewer required columns).

After several meetings among the architect, contractor, and precaster, the project principals confirmed that the intent of Two Buckhead Plaza's original architectural design would not be compromised by an all-precast-concrete structural solution. In the process, project principals made several trips to see similar projects using Tindall's precast concrete designs and toured two precast concrete facilities to evaluate manufacturing processes and quality control measures. Because of this investigation, the development team selected Tindall as the structural precaster, with Castone providing the finished architectural precast concrete cladding panels as a subcontractor under Tindall's contractual umbrella. (Castone also provided the architectural precast concrete cladding panels for the eight-level retail/parking structure facade.)

As a First for Atlanta, Precast Concrete System Raises Questions

For many years, the majority of Atlanta's developments were of cast-in-place construction. Use of precast concrete in Two Buckhead Plaza was a first-time occurrence for the design of a Class A high-rise structure in the city. As with any new system, the project owner, architect, and general contractor had many concerns and questions about the design potential, economics, and quality of the precast concrete elements. Specifically, a major concern focused on the finish quality of the architectural precast concrete panels, which would also be load-bearing for the precast concrete floor members. Some questions arose:

- Once precast concrete elements are in place, if a flaw or defect occurs, how will it be replaced or repaired;
- If a precast concrete panel is removed, how much downtime does it create for the project;



Drawing courtesy of CNNA.

Fig. 5. The Level 1 floor plan shows the orientation of Two Buckhead Plaza to Peachtree Road.

- How are penetrations in the floors handled;
- What are the proposed floor deflections, and will the topping slabs account for the cambers;
- How does the seventh-floor balcony design work without making the topping too thick inside the building footprint;
- What about waterproofing;
- How can the 20 ft (6 m) cantilevered glass and steel entrance canopy be attached without incident; and
- How are the large 8 ft and 11 ft (2.4 m and 3.4 m) concrete "eyebrow" cornices secured?

The design team, contractor, and Tindall employees worked together to completely address the questions and concerns. Buoyed by the cost and time benefits offered by a precast concrete system, the project team decided to move forward.



Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 6. Sophisticated, stepped-back massing establishes welcoming human-scale architecture along Peachtree Road.



Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 7. Buff-colored architectural precast concrete cladding with deep reveals incorporates a white cement mixture with a very light sandblast finish.

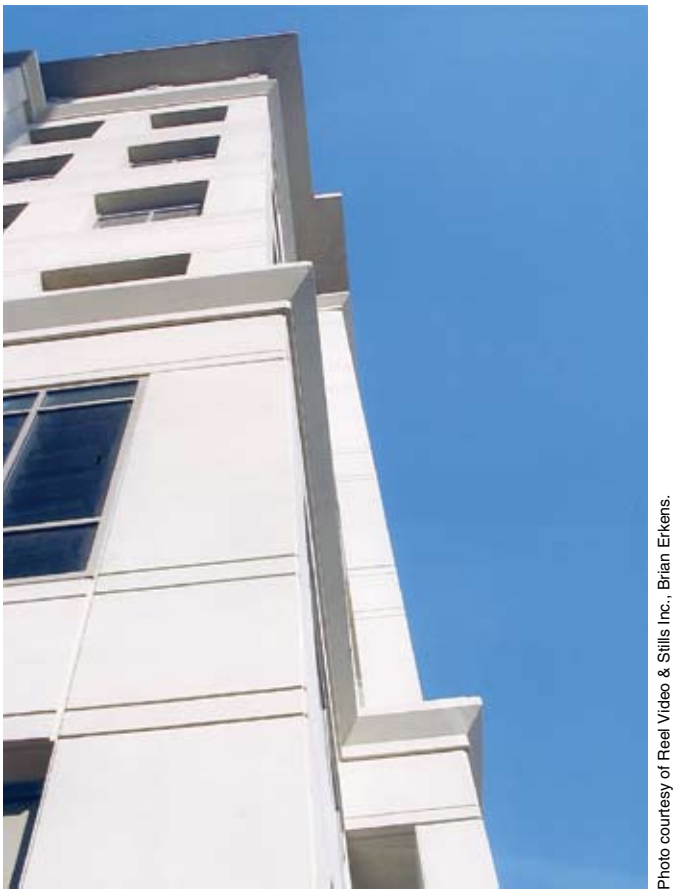


Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 8. This view upward from ground level shows how the projecting cornices etch crisp lines against the Atlanta sky.

Final Design a Contemporary Interpretation

In its final configuration, oriented to reinforce the existing roadway axes, Two Buckhead Plaza became a seven-story office building fronting Peachtree Road with retail stores and restaurants at street level (**Fig. 5, 6**). The site orientation and height of the building creates the community's desired stepped-back massing for new developments, which establishes pleasing human-scale architecture. The shared, eight-level parking structure (three levels below the plaza level and five levels above) is behind Two Buckhead Plaza and adjacent to the Ovation residential tower. Parked vehicles are concealed behind a storefront system above the plaza-level retail shops. Separate vehicular access is provided for loading and service activities, segregating the car and truck traffic.

Design of Two Buckhead Plaza is based on a contemporary interpretation of a conservative building facade. The final design plays off the verticality of the existing taller building (the 21-story One Buckhead Plaza) by establishing strong horizontal elements (Fig. 1, 2). Building corners were emphasized and articulated with deep punched windows that contrast the flush window system at the extruded bays along the structure's middle elevations.

Generally symmetrical in both directions (north-south and east-west), the building's design effectively splits the plan into four equal quadrants. A symmetrical design translates into many production efficiencies in the structural and architectural precast concrete elements. Building entrances are the only major departures from plan symmetry. With the parking structure hidden behind the office building, the large main-lobby entrance opens on a lovely setting at the rear of the building. A ceremonial entrance at the Peachtree Road elevation presents a dignified address to the street and the 20,000 vehicles that pass by daily.

An all-precast-concrete structure is cost-competitive with a cast-in-place concrete skip joist structure primarily because the precast system utilizes the architectural precast panels as load-bearing elements for the floor members. It was decided to use the exterior architectural precast concrete cladding as the intermediate moment frames for the structure when analytical models showed that the precast concrete cladding's depth, weight, and resulting stiffness attracted 70% of the lateral load (the remaining 30% transferred to the interior column and beam lines). Load-bearing precast concrete cladding results in savings, not only in the amount of reinforcing steel required for the interior framing, but also in the elimination of exterior columns and beams. Load-bearing panels deliver a more flexible and profitable lease space as an added benefit.

According to the analysis of the structural system, the field-topped, precast

concrete tri-slab structure and precast concrete shear walls established the building's lateral-load resistance in its short direction. The shear wall layout that was originally proposed was determined through analysis to cause too much torsional irregularity due to the walls being too close to one another; the walls were shifted out somewhat by the design team to alleviate this problem. Architectural precast concrete panels (manufactured under PCI's *Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products*[1]) serve as intermediate moment frames for lateral load resistance in the building's long direction. Interior structural members were manufactured and erected in compliance with PCI's *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products*.[2]



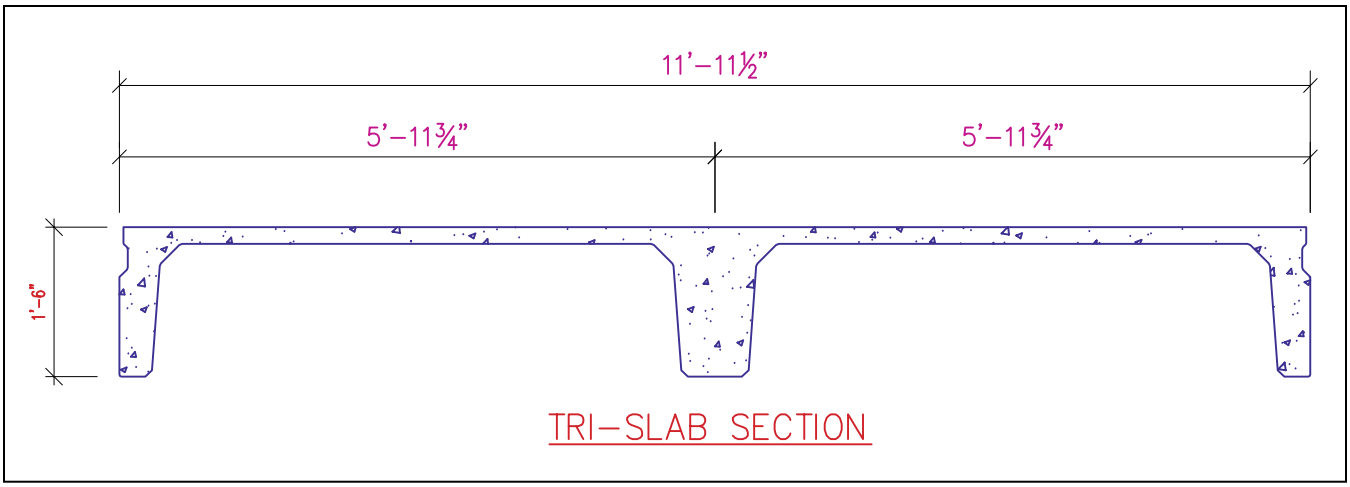
Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 9. Projecting precast concrete cantilever eyebrows at Two Buckhead Plaza's roof level have ornamental pendants immediately below.



Photos courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 10. With Atlanta's skyline in the distance, the balconies at the top floor of Two Buckhead Plaza are dramatic reflections of a dynamic urban area. The inset is a closeup view of the balcony level.



Line art courtesy of Tindall Corp.

Fig. 11. This line art of Tindall Corp.'s tri-slab design provides dimensions in a sectional view. Note: 1 ft = 0.3048 m; 1 in. = 25.4 mm.

Architecture for a Prestigious Location

Befitting Atlanta's upscale Buckhead district and fronting on the prestigious Peachtree Road, architectural precast concrete cladding composes fresh and graceful neoclassical architectural geometries for Two Buckhead Plaza's exterior. To create its buff color, architectural precast concrete cladding was cast using a white cement mixture and has a very light sandblast finish (**Fig. 7, 8**). Details of the architectural cladding include deep reveals, cornices, setbacks at the second level, 14-in.-thick (355 mm) window wall panels at the typical upper levels, cornice and balconies at the top-floor level, and pendants and a defining 6.6 ft (2 m) cantilevered eyebrow from the roof level (**Fig. 9, 10**).

Continuous-Span Construction

An important owner design requirement was for continuous-span construction for the beams and floor joists. The owner also did not want welded connections for fear of increased maintenance costs. All structural connections were wet (grouted), emulating cast-in-place construction. Flowable concrete was used in many of the structural products and in the cast-in-place concrete trough placements in the W-beams.

Another owner requirement was that the structural floor depth be limited to an equivalent cast-in-place system, which specified a 21 in. (530 mm) total depth at the floor joists and a 28 in. (710 mm) total depth at the beams. Put simply, the owner wanted a cast-in-place building at the speed, quality, convenience, and cost of a precast concrete building. The precaster succeeded in satisfying the owner's design mandates with two creative new product lines, which are discussed in the following section.

PRODUCTION

Two Plants Coordinate Production

Because the production of precast concrete components was divided between two manufacturing facilities, designs for all elements had to be closely coordinated. Tindall generated in-house design for the structural precast concrete, and Castone provided exterior architectural/structural precast concrete design drawings. Detailing was subdivided into structural and architectural shop drawings. The two sets of drawings were integrated into one set of the field-issued drawings for erection of the structure. Effective coordination and communication between the two plants were critical elements to the success of the project. Cross-checking of the design and detailing, and of the quality control and production, ensured that all elements of the project were properly coordinated.

A member of Tindall's Quality Control Department spent days at Castone's Alabama plant cross-inspecting the product as a double-checking measure. This extra effort was needed because coordinating the timing of delivery of the precast concrete product from manufacturing facilities in different states was a major challenge. With Castone transporting product 100 miles (160 km) to the site and Tindall only trucking materials 30 miles (50 km) to the city, it was crucial to accurately maneuver the just-in-time deliveries to the project erector, Rutledge & Sons Inc. of Woodstock, Ga. From a logistical aspect, at times it proved easier to drop the Castone loads at Tindall's Conley yard to await an integrated delivery to the site because both plants are south of Atlanta.

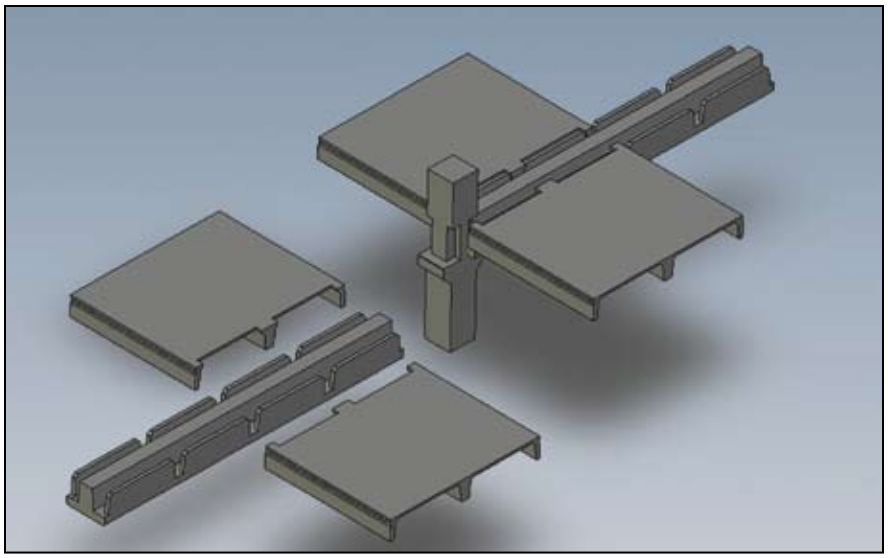
Two New Product Lines

Because the owner essentially wanted a cast-in-place concrete building with all the benefits of a precast concrete building (speed of construction, material quality, and aesthetics), Tindall proposed two new products for the Two Buckhead Plaza project. The first product is a 12-ft-wide (3.7 m) × 18-in.-deep (455 mm) tri-slab deck member. The tri-slab is so named because it has three stems: two half stems on each side and a full stem in the middle of the member (**Fig. 11**). When the tri-slabs are set side by side, the two half stems create one full stem, and the resulting structural system has a joist spaced at 6 ft (1.8 m) on center.

The sides of the tri-slabs have a shear key running the full length of the half stems so that the slabs can be grouted together. Thus, no welded connections between the tri-slabs are necessary.

The second, recently developed product line is a 36-in.-wide (915 mm) × 25-in.-deep (635 mm) W-beam. The W-beam gets its name from its cross-sectional shape. There is a center web and two thinner outside webs that each have pocket blockouts for the tri-slab stems to fit into. After the tri-slabs are set, two trough sections are formed on either side of the center web of the W-beam. These troughs are filled with cast-in-place concrete in the field, and when the closure concrete is cured, the tri-slabs and the W-beams are locked together (**Fig. 12**).

The W-beams thread over reinforcing steel couplers on the columns, and these connections are grouted together as well. After all the precast concrete is set in place and concrete is placed in the troughs, each floor receives 3 in. (75 mm) of concrete field topping, locking everything together. In the end, the precast concrete assembly is used as a stay-in-place formwork system, but without expensive shoring requirements. This system provides huge competitive advantages in the construction industry. The combination of the quality of precast concrete manufactured products with the emulation of cast-in-place concrete structural design—but without costly shoring—is a highly desirable construction scenario for owners.



Line art courtesy of Tindall Corp.

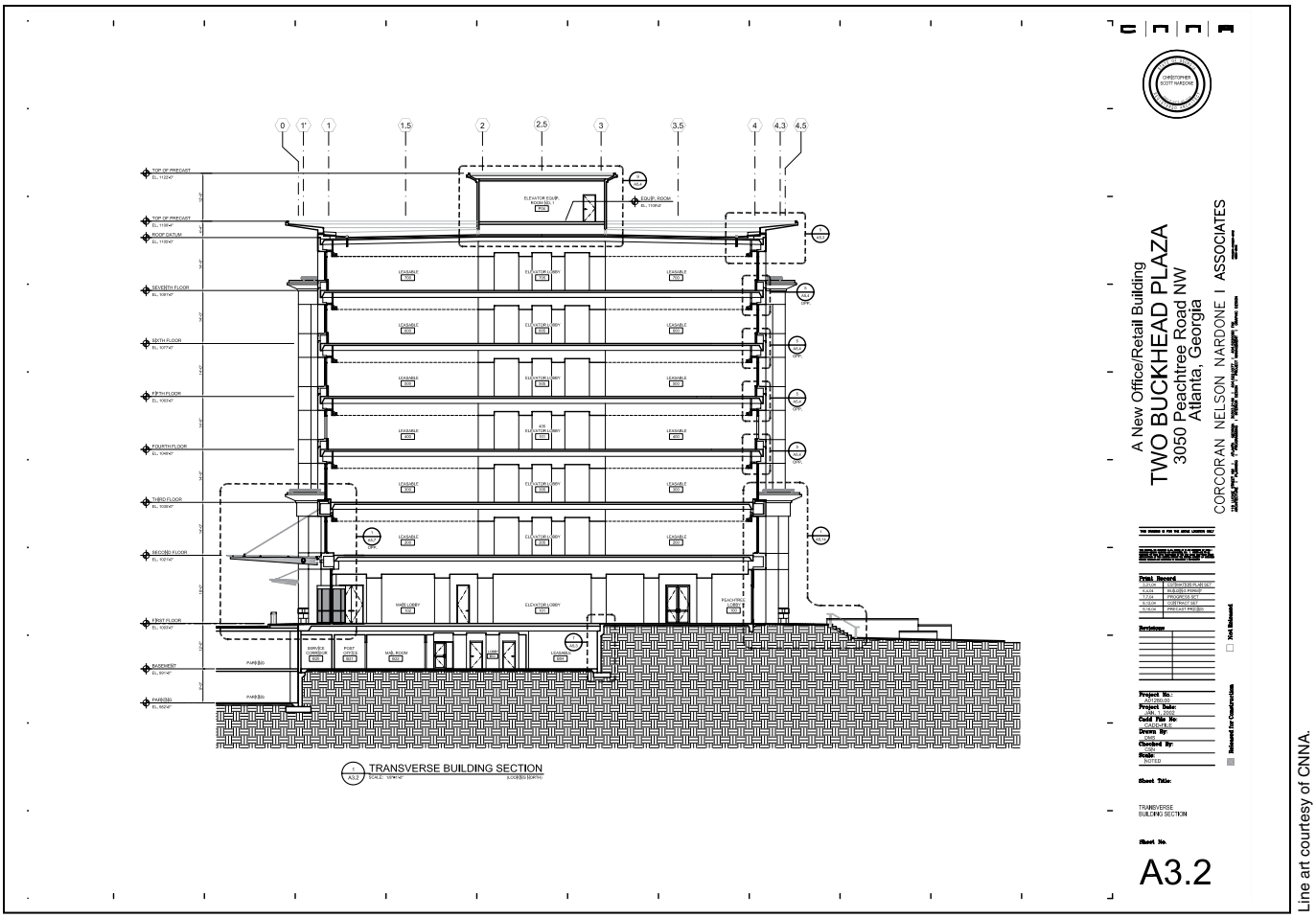
Fig. 12. This isometric rendering of tri-slabs and W-beams illustrates how these two new precast concrete products configure in construction.

The idea behind the W-Beam system originated in the late 1980s when Tindall used the design in construction for the pulp and paper mill industry. Loading requirements for mill structures were in the nature of 1000 psf (4900 kg/m^2). This early W-beam system required a stout floor system for minimum vibration with minimum

Table 1. Number and Dimensions of Precast/Prestressed Concrete Pieces for Two Buckhead Plaza Office Building

Structural Prestressed/Precast Concrete, Structural Gray with Form Finish	
24 in. × 48 in. flat columns	24
24 in. × 24 in. square columns	73
36-in.-wide × 25-in.-deep W-beam	103
8-in.-thick stair wall panels with column pilasters on each end	24
8-in.-thick wall panels	30
Miscellaneous rectangular beams	42
12-ft-wide × 18-in.-deep tri-slabs	463
8-in.-thick flat slabs	65
Stair sections with strongback	30
Buff-Colored Architectural Precast Concrete Cladding, White-Cement Mixture with Light Sandblast Finish	
14 in. × 48 in. column covers	104
10-in.-thick moment frames, 14 ft × 23 ft, with 16 ft 4 in. × 9 ft 8 in. window openings	108
14-in.-thick wall panels	90
Various spandrel sections (20 in. thick × 32 in. tall, 52 in. tall with pendants)	125
3 ft 5 in. and 6 ft 6 in. cantilevered eyebrow sections, 12 in. to 4 in. tapered thickness	42
Total number of precast concrete pieces	1323

Note: 1 in. = 25.4 mm; 1 ft = 0.3048 m.



Line art courtesy of CNNA.

Fig. 13. The transverse building elevation reveals the difficult stepped foundation, grade-change elevations, and cast-in-place concrete retaining walls. Project designers used the stepped foundation to their advantage in the layout of the parking structure.

depth. Tindall took this concept and shrunk it down to a smaller scale for use in offices and mixed-use facilities. Following are the benefits of the W-beam system:

- Continuous spans (such as those in cast-in-place concrete construction) that reduce mid-span moments and effective span lengths;
- Shallower floor systems and larger column spacing (compared with the conventional T-girder precast concrete system);
- Reduced deflection due to structural continuity;
- Reduced floor slab vibration;
- Elimination of costly shoring during construction; and
- Higher loading limits.

Accelerated Production Schedule

An effective working agreement between Tindall and Castone established tight material quality-control procedures, seamless coordination of drawings and details, and just-in-time product delivery to the Two Buckhead Plaza construction site. One quarter of the architectural precast concrete cladding was loadbearing for the structural framing. All of the architectural cladding was erected at the same time as the structural elements, saving time and reducing the space needed for construction equipment or materials in the limited area outside the building footprint. Simultaneous erection of precast concrete structural framing and architectural cladding meant that the glazing operations began early in the construction process, facilitating closure of the structure.

The two plants manufactured over 1300 precast/prestressed concrete pieces, including the architectural cladding (**Table 1**). The structural precast concrete was fabricated at Tindall's Conley facility, and the architectural cladding was manufactured by Castone in their Opelika manufacturing plant.

CONSTRUCTION AND ERECTION

A Difficult Stepped Foundation

Tindall's precast concrete structural wall connections worked well with the difficult stepped foundation. Cast-in-place concrete retaining walls were built for the basement area of Two Buckhead Plaza, and a significant change in grade necessitated careful consideration to ensure that the system started out of the ground properly. **Figure 13** is an elevation drawing showing the grade changes beneath Two Buckhead Plaza's foundation.

Peachtree Road was originally constructed along what is known as the Peachtree Ridge. This ridge has a relatively consistent subsurface granite bed 15 ft (5.6 m) below the roadway, with the water table located a few feet (less than one meter) above the granite stratum. Most sites along

Table 2. Project Time Line and Cost

Activity	Date
Letter of intent provided to precaster from general contractor, based on 50% design documents	August 2003
Precaster submits complete structural design, project goes in for permit to the city of Atlanta, Ga.	May 2004
Construction begins on site, 21-story residential tower and 4-story parking deck are started, office building footprint is used as a laydown area	September 2004
Contract signed between contractor and precaster	April 2005
Foundation work started on office building	May 2005
Structural and architectural precast concrete fabrication begins	June 2005
Erection begins on the office building	August 2005
Erection is completed on the office building (130 erection days total at an average pace of 10 pieces per day erected)	February 2006
Office building available for occupancy	July 2006
Project cost	**$21 million**

this ridge drop off in elevation going back from Peachtree Road. In Two Buckhead Plaza's case, the site drops about 30 ft (9 m) in 500 ft (150 m) of distance along the building's footprint. The design of the mixed-use project—for which Two Buckhead Plaza is the "front face"—took advantage of this sloping topography by providing two underground parking levels, with the lowest level sloping from the −30 ft (−9 m) elevation up to 12 ft (3.7 m) above grade, coinciding with Two Buckhead Plaza's partial basement. Special attention was required in setting the caps of the drilled piers with the sloping deck foundations (as well as for the 21-story residential tower's caps at the midpoint of the slope) and Two Buckhead Plaza's pier caps at both partial basement height and at the building's main level.

Onset of the foundation work for the office building began in May 2005, two years after the precaster was brought on board the project and a year and a half after the 21-story residential tower and the parking structure construction commenced (**Table 2**). In June 2005, the precast producers began fabricating the precast concrete pieces. Erection of the precast concrete structure for Two Buckhead Plaza began in August 2005 with the crane sitting inside the building's footprint.

Erection within the Building's Footprint

The Two Buckhead Plaza site was difficult to work on (**Fig. 14**). Utilizing an all-precast-concrete structural and architectural system for the office building made construction on this site feasible because the precast concrete structure could be erected from within the building's footprint for the bulk of the construction schedule (Fig. 14). An all-precast-concrete system's just-in-time deliveries eliminated the need for a material laydown and storage area.

After planning the construction sequence for this restricted site, the office structure was first erected in an L-shape, leaving a 48 ft×220 ft (15 m×67 m) section open so that the crane did not need to encroach outside the building footprint. The erection crane (a



Photo courtesy of Tindall Corp.

Fig. 14. Because of the congested and hemmed-in urban site, most of the erection for Two Buckhead Plaza required that the crane operate from within the building's footprint.



Photo courtesy of Tindall Corp.

Fig. 15. A precast concrete system requires no expensive labor-intensive shoring and offers the important practical advantage of permitting other building trades to follow immediately (access, material laydown, setup) after erection of a level.

275 ton [250 Mg] Manitowoc 999 Series 3 with a Luffin jib) then walked its way back toward the center of the building, eventually hoisting from outside the footprint for only the last 15 days of the construction schedule. Completed in February 2006 after 130 days of erection, the structure was erected at a pace of 10 pieces per day. The building opened July 15, 2006, only five and a half months after the structure was erected, an indication of how much work was completed by the other trades while the precast concrete pieces were being hoisted into place (Table 2).

No Shoring Translates to Rapid Construction

A particularly important benefit of a precast concrete building system over a cast-in-place concrete construction is the elimination of costly (both labor and materials) shoring. In addition to saving a significant percentage of total project costs, the practical importance of not having shoring is that other building trades are able to follow immediately after erection of a level, and workers can store materials and tools on the precast concrete flooring panels without a delay (**Fig. 15**). On this project, precast concrete stairways provided quick and safe access for the trades to the upper levels; vertical access meant there was no need for boom lift equipment or an exterior hoisting elevator for workers. According to the general contractor, the fact that shoring was not required was crucial to the efficiency of the other building trades. For example, the ductwork was installed the day after the topping was placed at the level above. Finish work came together as quickly and efficiently as possible.

PLAZA PROVES SIGNIFICANT

Two Buckhead Plaza is a significant piece of architecture for many reasons in addition to the innovative precast concrete structural system employed. Located at a historic intersection in the heart of Buckhead, Atlanta's most prestigious and famous district, Two Buckhead Plaza is proving to be a catalyst for a resurgence of this portion of Buckhead, called Buckhead Village. A 20-story, 5-star hotel is under construction near Two Buckhead Plaza on the 17 acre (6.9 ha) tract of land designated as a planned office development community. This new hotel will provide the visual focus and termination of the pedestrian plaza created by Two Buckhead Plaza's parking facility and the existing One Buckhead Plaza. Plans are under way on an adjacent block for another high-end, mixed-use development comprising retail, hotel, and condominiums, and more new construction is expected to follow.

Two Buckhead Plaza is a fine example of a state-of-the-art, all-precast-concrete structure, exemplifing what precast concrete can bring to a project in terms of reduced site disturbance, speed, quality, and overall cost savings. Two Buckhead Plaza's success in Atlanta broadens the reach and possibilities for precast/prestressed concrete in terms of superior structural performance and advertises the efficient multiple uses of architectural precast concrete cladding as a loadbearing element.

So far, the leasing of Two Buckhead Plaza has been a great success, with occupancy at about 70%. Two Buckhead Plaza has attracted desirable long-term tenants, including the offices of the project's general contractor, TCR, the first tenants to move in. The project's success mirrors Atlanta's current sustained renaissance—buoyed by sound urban planning, inspired architecture, and the best the precast/prestressed concrete industry has to offer (**Fig. 16**).

PCI AWARD JUDGES' COMMENTS ON TWO BUCKHEAD PLAZA

In giving Two Buckhead Plaza the prestigious Harry H. Edwards Industry Advancement award, the PCI Jury commented:

> The innovative features implemented into this total precast building make it worthy of award. This is not the first total precast building, and it won't be the last, but there is definitely something new and unique about the use of so-called W-beams. These beams are apparently an upgrade to a typical inverted tee girder, but they enable the structure to provide continuity and provide for continuous moment frames without costly connections. The beauty of it is that it also provides for structural integrity, something we all anticipate will be implemented in the next building code cycle. By already implementing structural integrity into the design of our structures, our industry will be ready tomorrow when it becomes reality.



Photo courtesy of Reel Video & Stills Inc., Brian Erkens.

Fig. 16. With its precast concrete cantilevered eyebrows illuminated at night, Two Buckhead Plaza adds to the excitement of an evening in the Buckhead entertainment district.

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CREDITS

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