

High Hopes

CUTTING TIME AND COST IN HIGH-RISE DEVELOPMENT

BY BRIT L. PERKINS

track commercial high-rise projects. The value engineering process depends upon coordination among the entire consultant and construction teams, so it must be continuous.

How would you like to cut construction costs by 20 percent without affecting the value of your project? That's what Genesis Real Estate Group, the Dallas-based developers of Ocean Villas, managed to do by continually evaluating design and construction options right up to the completion of the foundation. This process is known as value engineering.

One of the main goals of the community, a two-tower, 19-story condominium project in Long Beach, Calif., was to reduce overall construction time so occupancy could begin as soon as possible. Genesis and EDI Architecture Inc. determined early in the development stage that using a tunnelform system would meet an aggressive construction schedule and save approximately 30 percent in direct construction costs. With the tunnelform system, walls and floors are poured simultaneously. This not only reduces construction time but also eliminates as much as 60 percent of interior partition framing and drywall.

Value engineering may make the difference between a high-rise project that gets built and one that doesn't. To get the maximum benefit, it's important to assemble a fully integrated design team experienced in large-scale fast

Line Item Decisions

The owner's pro forma serves as the baseline for cost-reduction efforts. As the preliminary design is produced, the design teams work together to create the outline specifications. Then, early in the process, the contractor provides the first cost estimate, which is almost always higher than the target. The owner, architect, and general contractor systematically reduce costs item by item until a price can be obtained that is in line with the owner's goals.

The design team and the owner must be flexible. The cost of a design can't be fully anticipated until well into the pricing process because major and minor building components are continuously re-evaluated.

At Ballpark Place, a Trammell Crow mixed-use project in downtown Houston, re-evaluating building components reduced costs by \$7 million. Some of the major component decisions, which are typical, included:

- **Structural frame:** Is it a concrete bearing wall system (tunnelform) or concrete columns and flat floor slabs?
- **Building skin assembly:** Is it an exterior insulated foam system (EIFS) versus pre-cast concrete panels or a brick cavity wall?
- **Window systems:** Are they flanged windows versus commercial sub-sill windows or storefront type systems?

COSTS FOR EIFS BUILDINGS

CSI#	Description	Percentage of Construction Cost
1	General conditions	6.0% - 8.0%
2	Site work	2.0% - 4.0%
3	Concrete work	23.0% - 28.0%
4	Masonry	0.1% - 1.0%
5	Thermal & moisture	5.0% - 10.0%
6	Metals	1.0% - 3.0%
7	Woods & plastics	2.0% - 4.0%
8	Doors & windows	4.0% - 7.0%
9	Finishes	10.0% - 15.0%
10	Specialties	0.5% - 1.0%
11	Equipment	2.0% - 4.0%
12	Furnishings	0.0% - 0.5%
13	Special conditions	1.0% - 3.0%
14	Conveying systems	2.0% - 4.0%
15	Mechanical	10.0% - 13.0%
16	Electrical	8.0% - 12.0%
17	Allowances	0.0% - 1.0%
	Profit	3.0% - 4.0%

Based on the Construction Specification Institute (CSI) standard categories, high-rise residential construction costs generally fall into these ranges for an EIFS-skinned building.

Minor building components, such as the appliance package and floor finish selections had a substantial impact on the cost of the project as well.

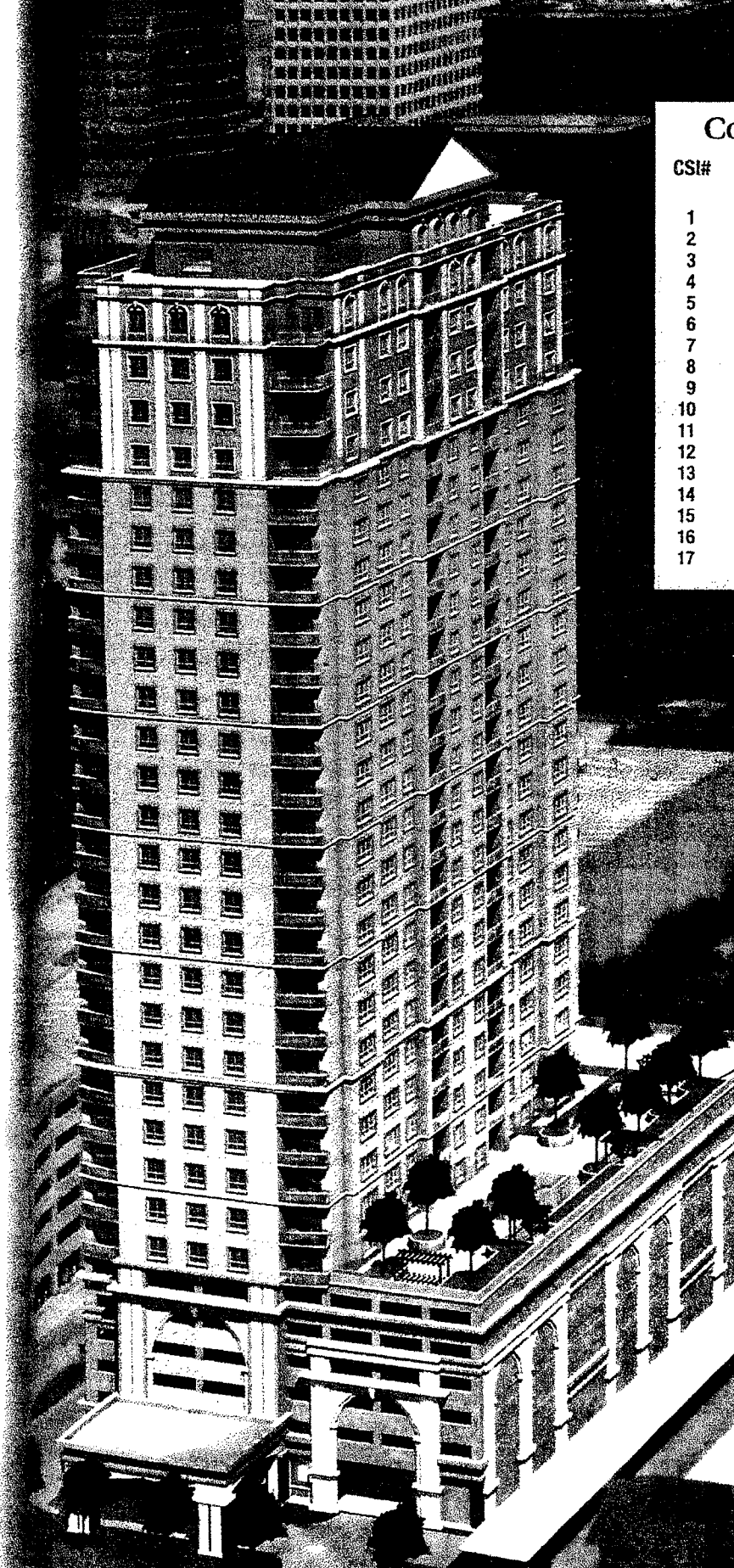
Cost-Cutting Techniques

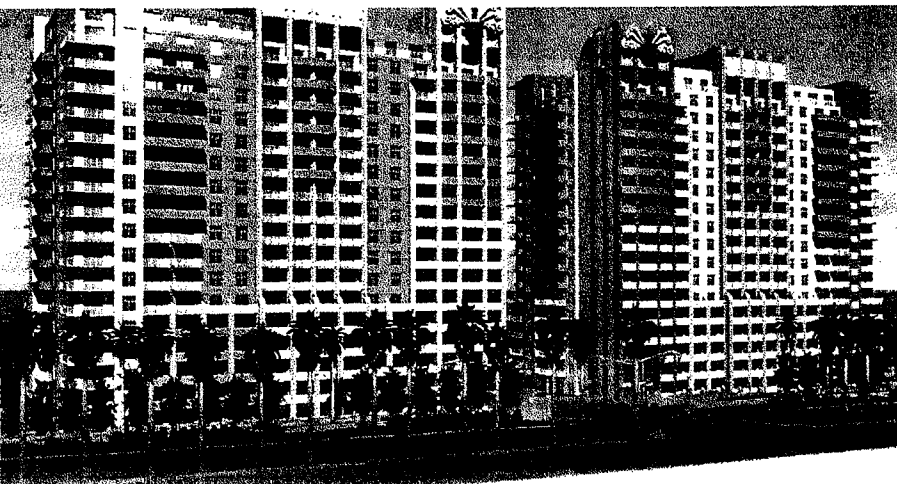
While it is not uncommon to have 15 to 20 unit types in a single building, it's imperative that plumbing risers stack in order to reduce the cost. Also, it is desirable to standardize kitchen and bath layouts to simplify the buyout process and make accessibility compliance easier to control.

To achieve efficiency, create unit plans with plumbing stacks in common runs. This minimizes chase and soffit areas needed to integrate and hide the systems. For cost effectiveness, install a split HVAC system for each residence versus a more costly central mechanical plant.

Save by using the same residential sub-contractors who work on medium-density multifamily projects for the non-structural and non-exterior skin items—interior framing, electrical, mechanical, plumbing, drywall, and finishes. They are familiar with the requirements and can bid the

Dominion at Post Oak, a 238-unit building in Houston, integrated parking under the residential tower. A 27-inch column grid is carried all the way up the tower, eliminating the need for any load transfers.





jobs accurately and quickly. At Ballpark Place, switching from commercial to multifamily subcontractors reduced bid prices by more than \$2 million.

On any high-rise tower, the design and resulting construction methods must coordinate into a production line process known as the daily cycle. Each day, each sub trade must complete approximately 4,000 square feet of floor area and exterior (closure) construction. Decisions on exterior skin construction need to consider construction sequencing.

In the best scenario, the structure should be topping out above while a completed sales model is open on a lower floor—general construction is occurring in between. This can significantly decrease financing costs.

Exterior façade materials and closure wall composition may evolve significantly during a project. The architectural design must be capable of accommodating these changes and still result in a façade worthy of a landmark structure.

Parking Challenges

Parking is always an expensive line item. Structured parking requirements, in particular, are a primary driver of the overall structure and cost of the building. Typical structured parking configurations fall into three categories: parking under the tower, parking adjacent to the tower, and a combination of the two where the parking garage is butted up to the tower with some parking occurring within the tower.

Adjacent parking is the simplest and least costly. Structural issues related to the rest of the building are eliminated and construction can happen simultaneously with the high-rise.

Options for this type of parking structure include cast-in-place or pre-cast concrete or steel frame with a light-weight concrete deck. While the construction costs are less, adjacent parking requires more land, and residents can't access their home as conveniently.

The most costly parking occurs directly under the tower. High-rise construction and life safety elements for the tower must extend through the parking structure. Cost savings occur when the column structure is designed to avoid the need for a change in the structural grid between the parking below and the residential units above.

This requires using an efficient structural bay, typically 18 feet or 27 feet, that meets both parking and residential unit layout requirements. At Dominion Post Oak, 238-unit project in Houston's Galleria area being developed by Chicago-based Whiteco Residential, the 37,000-square-foot site demanded this approach.

Column-and-plate buildings, such as Dominion Post Oak, generally achieve this goal easily. But it's also possible to have residential units over parking by using the tunnelform system.

The tunnels on parking levels can be constructed with a series of cut-away sections, creating drive aisles and visibility into parking spaces. The tunnels will then rise up and through the residential portion of the building in an

At Merritt on the River, a 227-unit community in Norwalk, Conn., using a tunnelform structure eliminated the need for transfer decks—resulting in \$1 million in savings.

Design build coupled with tunnelform construction allowed Ocean Villas, in Long Beach, Calif., to achieve construction costs that were 20 percent below similar projects in the area. The project will encompass a total of 576 units and 63,000 square feet.

efficient manner that eliminates any need for a structural transfer deck.

At Merritt on the River in Norwalk, Conn., a 227-unit community developed by Building and Land Technology based in Norwalk, this concept produced savings of about \$1 million in construction cost by eliminating the need for the typical and costly transfer deck.

Efficiency Goals

The efficiency of the overall building layout must be considered during the design process. An overall goal of at least 85 percent building efficiency (net usable area to gross building area, not including parking) must be achieved.

Similarly, the ratio of exterior skin area to floor area must be no more than 50 percent. If these ratios are not achieved, it is unlikely the building's overall costs will be in line.

Reducing construction time and cost is the key challenge in the design and construction of high-rise residential buildings. Without a relentless drive to lower costs and coordinate the design in a manner consistent with construction sequencing practices, the project will not meet the owner's cost projections.

A thorough understanding of how to control construction time and cost can bring a project budget in line and make a project feasible. □

Brit L. Perkins, AIA, is a principal of EDI Architecture Inc. in Houston. He can be reached at Brit@EDIarchitecture.com.

