AIA Best Practices:
Factors determining building costs

Excerpted and adapted from The Architect's Handbook of Professional Practice, 13th edition

Summary

Building costs are influenced by several factors. A detailed review of such factors as location, design, performance requirements, construction, and time are considered here.

Location factors

Geographic location. Costs will be influenced by such factors as climate and comfort requirements, building codes and regulations, ease of access, distances from sources of labor and materials, degree of union influence, and productivity of workers in the area.

Condition of the site. The bearing capacity of the soil, presence of rock, location of groundwater, slope, and existing conditions (such as old foundations or buried hazardous wastes) influence substructure costs and basic building design. Urban sites may require underpinning, extraordinary security, and limitations on access and maneuverability.

Regulations. Building design and construction are affected by a wide range of building codes and standards as well as planning, zoning, environmental protection, construction labor, and site safety laws and regulations. These requirements, and the regulatory fees the owner must pay, may vary considerably from locality to locality.

Marketplace. Construction prices are subject to change according to the laws of supply and demand. Overstressed and understressed construction markets will affect the level and quality of competition as well as the prices charged.

Design factors

Plan shape. The plan dictates the amount and complexity of the perimeter required to enclose a given space. Generally, the higher the perimeter-to-floor area ratio, the greater the unit cost. Exterior closure is a high-cost item (often 10 to 20 percent of total cost) and has a secondary effect on lighting and heating, ventilation, and air-conditioning (HVAC) system capacities and operating costs.

Size. As buildings increase in size, unit costs tend to decrease. This is due to more efficient perimeter ratios, better utilization of high-cost service elements (e.g., elevators, toilets, HVAC plant), and the effect of greater quantities on the contractor's purchasing power. As a rule of thumb (and, like all rules of thumb, unworkable

in extreme cases), an increase or decrease in size by a given percentage is likely to lead to an increase or decrease in cost of roughly half that percentage.

Building height. Above six or eight stories, unit costs per square foot tend to increase due to the costs of increased loads, wind bracing, elevators, and fire code requirements. Taller buildings also become less efficient in their use of space, requiring more built area to house the same functions.

Story height. The greater the floor-to-floor height, the greater the cost. The vertical elements in a building may account for 25 to 35 % of the total cost; thus a 10 % reduction in story height might save 2.5 to 3.5 % overall.

Space utilization and efficiency. To arrive at the gross building area, circulation, toilets, mechanical and electrical space, custodial, and other non-usable spaces must be added to the owner's stated net usable square feet requirements. The design task, which may be made more complicated by site or program adjacency requirements, is to minimize these non-usable areas and keep the net-to-gross floor area ratio as high as possible.

Qualitative factors

There is a direct correlation between qualitative factors, as stated in performance terms, and cost. The more demanding the performance requirements, the higher the cost. Some owners may have specific performance concerns or aesthetic preferences. Better quality and performance may need to be justified on a lifecycle basis to optimize higher costs over a longer term.

Construction factors

In a marketplace with many available qualified constructors, competitively bid lump-sum contracts are generally expected to produce the best prices. All things considered, negotiated lump sums are often most appropriate for smaller projects, and cost-plus contracts may be useful when time or complexity of construction is a factor. Clear and complete documents reduce uncertainties (and possible contingencies) in competitive bidding.

Time factors

Accelerated schedules often increase construction costs due to overtime, extra shifts, or other requirements

Winter construction may cost more because of extra heating and protection requirements and the influences of bad weather. Time must be considered on a case-by-case basis. As an example, a winter start may ultimately make significant sums for a retail client if the project can be completed before the next major holiday shopping season.

About AIA Best Practices

AIA Best Practices is a collection of relevant, experience-based knowledge and expert advice on firm management, project delivery, contracts and more, aligned with the *Architect's Handbook of Professional Practice, 15th edition*. See the full AIA Best Practices collection at aia.org/aia-best-practices.

This article corresponds to:

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