

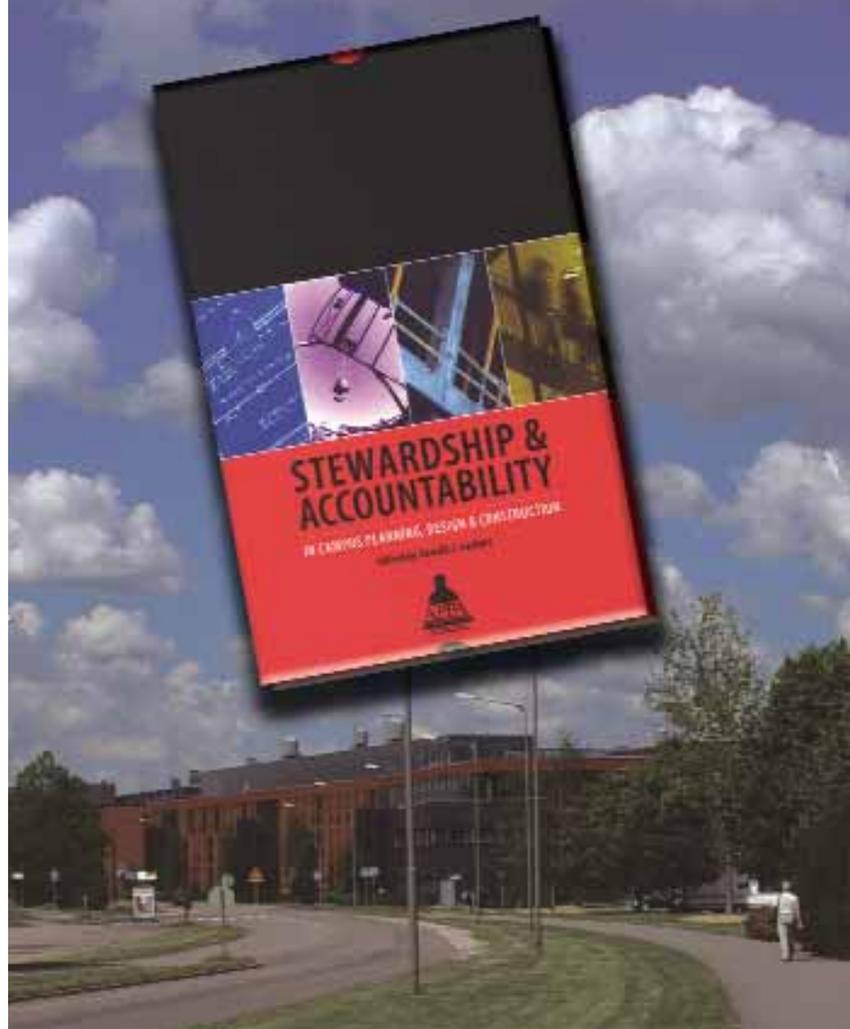
Designing for Stewardship:

Aligning Project Decisions with the Total Cost of Ownership

By Donald J. Guckert, P.E. and Jeri Ripley King

As the dust begins to settle after the building boom of the past decade, campus administrators and governing boards have developed a heightened sensitivity and awareness of the commitment necessary to support their expanded facilities portfolios. Many are discovering that their facilities require financial obligations of an unexpected magnitude. Others, however, are celebrating the completion of projects that employed commissioning and sustainable design and are therefore touting the institutional successes attained by serving as good stewards of limited resources. Neverthe-

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less, all are learning that the decisions they make about projects have long-term implications for future budgets.

Project budgets have long been the responsibility of facilities project managers, who balance the scope of the project and the time it demands against the budget for the project. However, institutional budgets include costs required for operating and capital renewal for the completed project, and these budgets have been the responsibilities of others. Thus, administrators now recognize the impact that early decisions have on the operation and renewal of a building and are therefore starting to hold project managers accountable for ensuring that the decisions that are made and the scope of the project that has been determined take into account the optimal return on the institution's investment in the project. To meet this requirement, project managers will need to align their craft—creating physical assets—with the long-term stewardship of the facilities for which they are responsible.

A stewardship approach to the planning, design, and construction of campus facilities is based on a comprehensive perspective of the total financial and operational impacts that a facility will have on the institution. Moreover, the planning horizon for a facility that is yet to be built is extended through its complete life cycle and into the far reaches of the university's resources—both financial and human—that will be affected. Because of the long-term impact that project de-

isions will have on the institution, decision making needs to be increasingly institution-based rather than customer-based. Meeting this demand is particularly challenging because of the forces that push against making the best long-term financial decision.

Competing Perspectives

Project managers have long been expected to serve a myriad of often competing needs and interests in order to serve multiple institutional customers and stakeholders. There is undeniable tension in negotiating the scope of trade-offs, which must be made to fit the needs and desires of the customers within a project budget that never seems quite large enough. Predictable clashes occur at points when the customer-driven program and architectural design meet the institutionally driven concerns for cost-effective operations and maintainability. A classic example of this problem is the case of a customer who wants to move dollars earmarked for the mechanical room to the atrium at the same time that a facilities manager wants to move dollars from the atrium to the mechanical room. Compounding the issue is the disjointed higher education financial model created by separate funding sources for capital costs and the long-term operation and eventual capital renewal of the facility. This creates a disjointed financial model that logically leads to competing perspectives.

After successfully raising funds for the planning, design, and construction of a building, deans, department chairs, faculty members, and development officers frequently turn to the campus administration to ante up the finances needed to support the operational demands of the facility. Over the years, faced with rising costs and budget constraints, institutions have tended to either underfund or fail to fund the operating costs of new facilities. Even when adequate operational monies are dedicated initially, in future budget cycles the funding is at risk of being reduced when budgets are tight. This situation has a tremendous impact on operational staff's ability to serve users' needs. Project managers can help by making decisions that assume that the operating money will never be proportionately more than the amount that has been allocated the day the building opens.

Similarly, campus administrators and budget officers, faced with the challenge of funding the operation of the new building, have not been focused on annually investing 1 to 2 percent of the building's replacement value in order to address capital renewal needs that will occur 20 or 30 years down the road. To plan, design, and construct facilities that will mitigate these costs, project managers should have an understanding of how operations staff care for the facility, what resources the facility will consume over its life cycle, how and when building systems and components will be renewed, and how and when the building will be decommissioned when it reaches the end of its useful life. By looking at the total life cycle of the asset, rather than at the life of the project, the project manager can guide the planning and decision making

involved in the project according to the total cost of ownership.

Total Cost of Ownership

The total cost of ownership is a composite of building costs from concept for the original design through decommissioning or demolition. The amount includes design and construction costs, operating costs, and the costs associated with plant renewal. Thus,

Total Cost of Ownership = Total Project Cost + Operating Costs + Capital Renewal or Deferred Maintenance + Decommissioning

From the perspective of total cost of ownership, the capital cost for a new building represents less than half of the total cost of ownership during the life of the facility. The costs associated with renewal and operations (maintenance, custodial care, and utilities) are just as important as the cost of designing and constructing a building.

Project managers are well aware of the "first costs"—the project costs related to the design and construction of both new buildings and renewal or renovation costs. But to understand the total cost of ownership of a building, project managers also need to understand operating costs: the annually budgeted expenses for all activities necessary for the routine, day-to-day use, support, and maintenance of a building or physical asset. This budget item includes the costs required for routine maintenance, minor repairs, preventive maintenance, custodial services, snow removal, groundskeeping, waste management, energy, and utilities. Within the myriad of operating costs, energy consumption is generally the highest and often commands the most attention in the design of the facility. However, the cumulative effect of all the other operational needs can also have a profound impact on annual operating budgets.

Decisions made in the design phase of a project frequently pit programmatic needs and desires against institutional financial interests. Project managers generally are not in a position to make this decision unilaterally. Instead, campus policies and standards can set minimum institutional requirements for the decision making involved in the project.

Standards

Having an institutional baseline for standards of design and construction can help to ensure a total cost of ownership approach to decision making. Just as state and local building codes, fire and life safety codes, and the Americans with Disabilities Act (ADA) establish minimum standards that protect the public interest while using a facility, campus design standards should be developed, implemented, and enforced to protect the institutional operational and financial interests in the project. No one would debate whether a building's design should comply with fire and life safety codes; similarly, there should be no debate about whether to invest in money-saving

energy-conserving systems, or whether equipment that requires servicing should be designed for safe access by maintenance workers.

Over the last two decades, an increasing number of campuses have developed institutional design standards. Recognizing the value of such standards, the project management staff usually has taken the initiative to develop and revise the institution's design standards manual. These design standards generally apply to materials, equipment, building components, design guidelines, and design details that campus stakeholders and service providers have found to facilitate the facility's serviceability and cost effectiveness. However, the initial standards were often based more on preferences than on sound life cycle cost principles. In these cases, there may be a perception that the standard has been "gold plated," leading project managers and customers to become critical of design standards that were determined primarily by stakeholders. To avoid this perception, standards should seek to be based on the best life-cycle value.

Standards should take into account that the best life-cycle value does not mean always specifying the building component that has the lowest cost of maintenance. Instead, the best life-cycle value should be a balance between the initial cost and the operating cost of a component. Generally the higher

quality, higher cost item will yield a longer service life—but often only to a certain point. Sometimes, the total cost of ownership can be lower when a component that has a lower cost and lower quality is used.

Design standards should also incorporate qualitative decisions that are not based solely on the total cost of ownership. A prime example is the debate between users and custodians about classrooms that have a hard surface versus carpeting. When viewed from the total cost of ownership only, hard surfaces will win every time. However, the quality of the acoustics in the classroom, which cannot be measured in dollars, generally points toward carpeting for the better classroom learning experience. Project managers should still facilitate this discussion with users and custodians, and all should recognize that decisions involve more than just the bottom line.

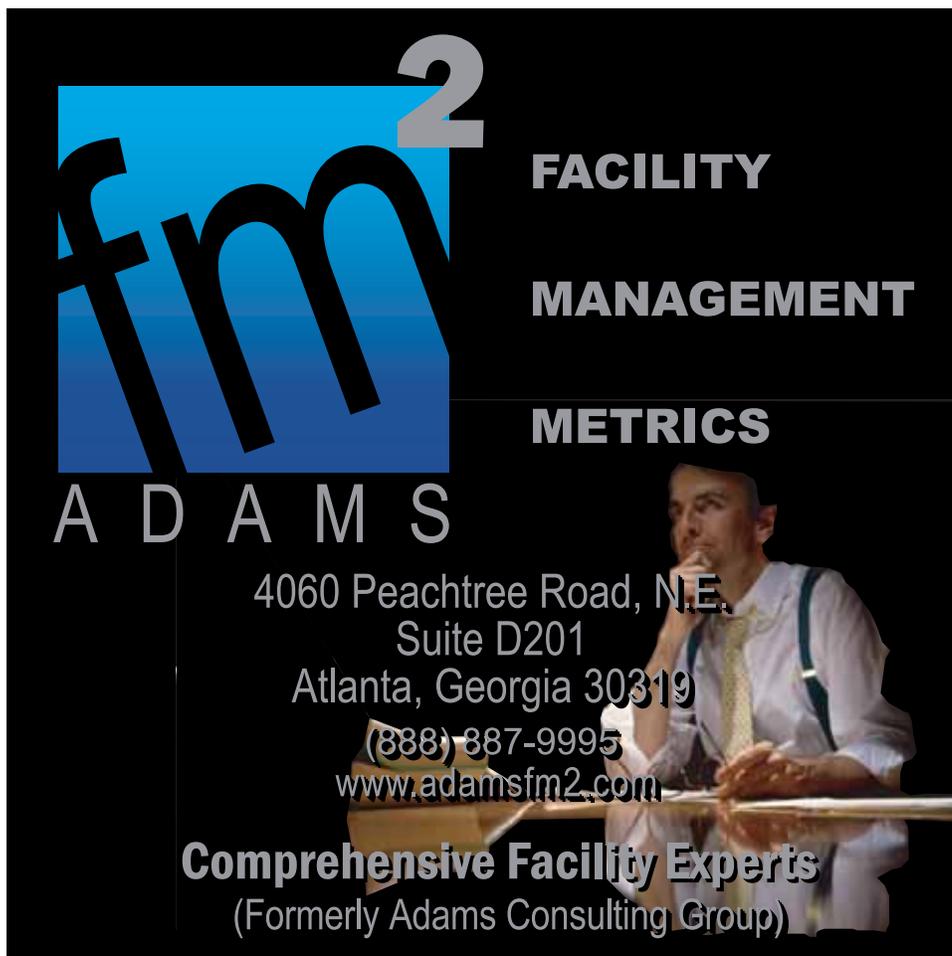
Developing campus design standards that reflect both institutional qualitative and quantitative priorities demands hard work and commitment. Effective standards are those that involve all invested parties in a collaborative effort.

Collaboration

The most successful project managers in educational facilities are those who have discovered the richness of the body of institutional knowledge that lies within the operations,

maintenance, and utilities staffs. Institutions achieving the highest level of success with a total cost of ownership approach are those that have developed enabling procedures and processes that tap into operating staffs as resources for reviewing plans, developing standards, and commissioning buildings.

Commissioning, in particular, has served the needs of users and operating staff by ensuring that facilities are built systematically to comply with standards of quality and serviceability. The days of "working the bugs out" of new facilities for the first four seasons of operation are quickly disappearing, as operations staff members work side-by-side with project managers to design, inspect, test, and accept building components and systems prior to occupancy. Customers are now enjoying their new and renovated facilities with fewer needs to call back facilities management staff or contractors to correct deficiencies. The integration of the skills and knowledge of the project manager and the operating staff—coupled with the enormous benefit this



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collaboration provides to users and operating budgets—is the reason why the concept of commissioning is changing from that of a best practice to a standard practice.

Another example of the power of collaboration is found in the increasing popularity of sustainable design. The interests of customers, project managers, and operations staff are converging through efforts to reduce energy costs and resource consumption involved in new and renovated facilities. Sustainable design generally is a customer-based initiative that builds on the tools of commissioning and design standards and drives better institutional decision making that is aligned with total cost of ownership principles.

The reason why collaboration is so effective for sustainable design projects is that the customer, project manager, and facilities operator align their various perspectives to reach a common goal. The customer wants the image and reputation that sustainable design brings; the project manager enjoys the challenge of thinking creatively about meeting the goals for sustainable design; and the facilities manager achieves an outcome that requires fewer resources to be consumed. As a result, the institution gets a physical asset that is designed for effective stewardship and for the lowest cost of ownership.

If the goal of good stewardship represents the destination for project managers, understanding expectations is the road map that gets them there. The challenge for the project manager is to understand the expectations of the customer, the institution, and stakeholders before making the trade-offs and sacrifices that will accomplish the goal of facilities stewardship.

Whether the project manager is faced with competing perspectives, the need to develop standards, or the requirement to take into account the demands of many stakeholders whose interests are represented by the total cost of ownership, the key to effective project management is alignment with facilities stewardship. By using the compilation of institutional understanding of building systems, operations, and construction, the project manager can produce a life-cycle approach to facilities operations that goes well beyond the design and construction of a building. Collaborating with others enables project managers to solve complex problems and formulate a comprehensive facilities strategy for long-term stewardship.

Conclusion

As project managers accept responsibility for decisions that will affect long-term institutional needs, they are transforming their accountability to capital projects from first cost to total cost. This transformation needs to be built on a solid foundation that takes into account competing perspectives, develops defensible standards, and provides collaborative compilation of knowledge that can help align decisions to facilities stewardship. Overall, the decisions made today will have an impact on creating, providing, and caring for the physical facilities that provide a place for current and future generations of individuals involved in academic pursuits.

Adopting a long-term stewardship approach accepts the fact that individuals come and go, but our institutions live on. For generations to come, the institution will live with consequences of the decisions made during a relatively brief design period. As project managers wrestle with the day-to-day challenges posed by new projects, using facilities stewardship as their compass will guide them toward the right choices and decisions to make when considering the design and construction of a facility. 🏛️



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