# Design and CONSTRUC Stand

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**By Peter M. Slavin**

Chances are, your college, university, or school campus did not develop without direction and planning. Most large universities and many smaller schools, public and private, are governed by a set of design and construction standards for many kinds of campus structures as well as the spaces and infrastructure between them. Covering labs and residence halls, water and sewer lines, phones, sidewalks, outside lighting, and landscaping, among other things, these standards number in the hundreds. They also prescribe the school's review and approval process for standards.

**William A. Daigneau**, APPA Fellow and member emeritus, and now a consultant based in Colorado Springs, Colorado, says that space standards for buildings came into use because "presidents and trustees wanted to build these monuments, and kids were just looking for a place to sit and learn. As a result, many states put in building efficiency standards that tried to control overdesign and other concerns."

William A. Daigneau

The aim was to build only what was needed at state colleges and universities for the taxpayer's sake, Daigneau explains. Space standards accomplished that, while building efficiency standards limited construction costs. Then, the standards caught on at private institutions as a way to hold down construction costs and so led them to build more facilities, he adds.

Today, some standards are broad, while others are exacting in their precision, down to specifying the locks and hinges to be used. A number of state universities go further and rely largely on highly prescriptive specifications.

Large schools tend to collect their standards (sometimes called guidelines) online in comprehensive "design manuals," and give them to the architects, engineers, and designers they work with. The latter are obligated to follow them. "It's their 'Bible' that they hand to us," says architect **Robert E. Nalls**. Often the guidelines are written into contracts.

Smaller schools tend to have limited standards. Others have nothing in writing and simply tell designers what they want, says Nalls, president of Nalls Architecture, Inc., Ardmore, Pennsylvania, and past chair of the Society for College and University Planning. Many schools have a building committee on the board of trustees or regents that reviews all designs, he explains.

Robert E. Nalls

Most big schools routinely republish or upgrade their standards (or a portion of them) every few years. Princeton published its 12th edition in April. By contrast, Nalls has found that over time, smaller schools rely on the corporate memory of staff about how they do things.

Deviations from standards manuals are possible if justified with good reason, and they are frequently approved. Architects and engineers will push back when a standard is not appropriate to a project for technical or aesthetic reasons, says Nalls. Such exceptions are readily granted "if you can show why it's a more efficient design or whatever," remarks Daigneau, who long managed operations and facilities at the University of Texas MD Anderson Cancer Center.

Erik Backus

Some might wonder why such care isn't taken with everything on campuses, such as how buildings are maintained year after year. There are a multitude of reasons why standards are so highly valued.

"Absent any set of standards, your campus starts to look like an eclectic statuary museum. You don't have any definition of what your architecture is supposed to look like," says **Erik Backus**, who directs the construction engineering management program at Clarkson University in New York.

Backus, who's also a civil engineering professor, says until recently at Clarkson an architect "would design a building that would look good on its own and would really attract donors . . . but wouldn't fit otherwise within the campus.

"That's an institutional image issue, and that's what sells your students," he adds. "They're making a decision within the first moments of being on campus, and a big part of that is 'what does it look like?' And if it doesn't look attractive. . . . "

John Gibbemeyer

A set of standards "reinforces the brand," says Daigneau. He points to the University of Rochester, where he formerly directed university facilities. Rochester takes pride in its quadrangle—red brick, limestone finishes, columns, exterior lighting—and had applied architectural and other standards throughout the campus to cement that image, he says.

Standards also establish the characteristic look of a university by determining building sizes and spatial relationships and materials, says Nalls—for example, when they mandate that buildings should be brick with white trim. That produces a consistent look across campus. Standards are vital because "you're dealing with a changing cast of characters on every project," he adds. Standards also lead to consistency in maintenance work. You don't want four different locking systems, he says.

In addition, standards also lower operating costs through standardization. Mechanics at Southwest Airlines only have to learn to maintain a single type of aircraft, and campus design standards have the same effect, notes Daigneau. "You can train your mechanics, for example, on one type of building control system, how to maintain it across the entire complex, building after building," he explains. The standards allow stocking of standard parts from elevators to carpeting and buying in bulk. Office furniture and signage can also be standardized.

Backus adds that through standards, operating expenses also can also be reduced by improving the long-term performance, energy performance, and life of buildings. In addition, money can be saved on design fees because a set of clear standards gives design firms a head start.

Standards also permit schools to set building maintenance costs upfront, says Backus. For example, a mandate to use terrazzo flooring over ceramic in hallways means a particular custodial cost, length of service, performance, and noise level, he notes.

The cost of different standards has to be weighed in choosing them, says Backus. That should mean considering life-cycle costs of construction as well

University of Rochester

as first costs, remarks **John Gibbemeyer**, a facilities manager at George Mason University (GMU) in Fairfax, Virginia. "There's a push to get people to think long term," he says.

There is a larger financial rationale for standards being an educational institution's fiduciary responsibility. Backus notes that both students and schools benefit when tuition and other costs are competitive. Affordability is vital in the present era of diminished state support of higher education and capped federal loans—big factors in the student debt crisis.

Median operating costs for university facilities at a four-year baccalaureate college run about $2,500 a year per student, often higher at institutions with significant research, Backus says. If standards can help a college can lower that figure by a few hundred dollars, the savings for a student over four years can be appreciable, he adds.

Backus, who worked at George Mason before moving to Clarkson, observes that after GMU chose terrazzo as a standard, "Nobody was enforcing it." He emphasizes that "standards are only as good as how consistently you enforce them."

Things change, so standards have to be reviewed and updated every two or three years, notes Backus. Gibbemeyer thinks this should be done even more frequently.

The pace of technological changes seems to pose the greatest challenge to keeping standards current. "Technology is advancing so quickly, especially in the university where you have WiFi and Internet and AV (audiovisual) equipment . . . most institutions are not able to keep up," explains Gibbemeyer. He says of GMU's 2013 design manual, "We knew it was out of date when we published it."

Daigneau points to major changes in instructional labs—from physics to biomedicine—in the past decade. As for classrooms and lecture halls, he calls them "obsolete." How students learn has already changed so much, he says, that schools have overbuilt these facilities. New construction under current standards would simply add more idle lecture halls and classrooms.

Instruction and learning, he observes, has shifted from the lecture to work in small groups. The library, where students can meet to work on projects, has become the center of learning.

"Technology has made it possible to learn and teach in different ways," Daigneau explains. With so much material available online, it's no longer necessary for a professor to lecture and a student to sit in a lecture hall or classroom and take notes. Now a student in the classroom can ask questions based on what they have learned online, instead of simply listening to a professor hold forth.

Technological change in buildings, says Nalls, "gets out of date very quickly."

Gibbemeyer believes the pace of change means that "the manual should be updated once a year at a minimum." How many schools do this is not known.

But at least one school, Michigan State University (MSU), goes much further. MSU is updating standards continually.

## MSU DESIGN STANDARDS CASE STUDY

Michigan State University has an unusual approach to formulating design and construction standards. Rather than a number of departments hashing them out around a table, 10 staff members from various building trades and other specialties call the shots in each of their fields.

Called "construction standard stewards," they are the go-to person when a change in their respective field—architecture, civil engineering, interior design, and so forth—is requested by another staff member. After a proposed change is examined by other staff in the field and works its way up to the steward, he or she decides whether to adopt the change. A steward can also change a standard on his or her own.

Is this decentralized decision making? "I would say it's *collaborative* decision making," remarks Leisa Williams-Swedberg, performance manager in MSU's Planning, Design, and Construction Department.

MSU may also have an unusual approach to deciding whether to allow deviations from standards. Deviations that may have a sizeable economic impact are determined by a project team. The team includes representatives of the university client, the Infrastructure Planning and Facilities division, and other MSU community members who may be affected by the deviation, such as the MSU police or Resource Center for Persons with Disabilities.

MSU is also ambitious about keeping track of technological change and changing standards/specs. (See main story.)

LEED standards are incorporated into MSU standards, and energy efficiency is emphasized, says Williams-Swedberg. In addition, recycling is very important on campus. Sorting is required to divert construction materials from the landfill, and recycling stations are located at every building. All this reflects students' desire for environmental stewardship by the university, she says.

MSU has been innovative in evaluating its efforts. In 2015, at the university's request, a Michigan architectural and construction firm conducted a peer review of MSU's standards and made recommendations. Then last year, all staff involved in the standards took part in a facilitated "Pause 'n Learn" session to critique their standards process. They removed some steps as a result.

At MSU, Williams-Swedberg says buildings have been designed to last 75 to 100 years, but she thinks that day is over. Things are changing too fast economically, technologically, and in terms of student needs. "I have a 19-year old son. I have no idea what his housing, technology, or preferences are going to be when he's 30," she says. "There are a lot more questions today than we had even 15 years ago about how we're constructing buildings on campus."

## A SELECTION OF DESIGN STANDARDS

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| **Montana State University:** | http://www.montana.edu/pdc/projects/2015/design-guidelines.html |
| **National Institutes of Health:** | https://www.orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesand-Guidelines/Pages/default. aspx |
| **Princeton University:** | https://facilities.princeton.edu/sites/facilities/files/DSM.pdf |
| **Rutgers University:** | https://pdd.rutgers.edu/university-design-standards |
| **Southern Methodist University:** | https://www.smu.edu/BusinessFinance/-/-/media/Site/BusinessFinance/FacilitiesManagementSustainability/Design-Guidelines-and-Construction-Standards-Dec-2017.pdf |
| **University of Iowa:** | http://www.facilities.uiowa.edu/cds/ |
| **University of Kansas:** | http://admin.ks.gov/offices/ofpm/dcc/bdcm/ |
| **University of Nevada Las Vegas:** | https://www.unlv.edu/plancon/standards-contracts |
| **University of Oregon:** | https://cpfm.uoregon.edu/campus-design-standards |
| **University of Pennsylvania:** | https://www.facilities.upenn.edu/standards-policies/standards/design-standards |
| **University of Virginia:** | https://oubo.virginia.edu/assets/documents/FDG12thEd-201804.pdf |
| **Whole Building Design Guide:** | http://www.wbdg.org/guides-specifications |

MSU staff have ongoing conversations with its craft trades employees, supervisors, university service providers/partners (e.g., information technology (IT) services such as phone systems, data infrastructure, and IT equipment), and its classroom committee, states MSU's Performance Manager, **Leisa Williams-Swedberg**. "We are informed if different systems/materials should be considered, and[then] the process of vetting the suggestion begins, which will determine if the change will be accepted and incorporated."

Standards may be expected to serve an institution's needs, but they don't do so directly, comments Nalls. While schools rarely write their philosophy into their design and construction standards, it's not uncommon for a school to include its goals there, he says. "In that sense, standards can support [both] student and institutional needs. It's not uncommon for them to put their goals on sustainability into their standards—for example, all buildings shall be LEED [Leadership in Energy and Environmental Design] Silver certified."

Leisa Williams-Swedberg

New standards can be controversial. They can pit the capital funds staff against operations and maintenance people, notes Nalls. Those writing the standards may be pitted against a faculty construction client who believes that those standards permit less space than they need, he says—and the classic fight is over the size of faculty offices.

When Backus led GMU's standards revision in 2013, several departments were at odds over who would lead the effort. There was also disagreement on other several matters: By issuing more ambitious standards, was the university assuming liability for what was normally the responsibility of outside architects and engineers? After hiring top-notch architects and engineers to tell the university what to do, why make them follow the manual? There was also general concern that the more demanding standards would boost construction bids. Gibbemeyer believes such political struggles are common on campuses.

Those involved in the discussions at GMU also had underlying views about the standards that conflicted, says Gibbemeyer. Facilities managers wanted to exclude certain products they'd had problems with, and those in planning and design favored manufacturers they had a relationship with and systems with lower costs. Project managers wanted to entirely disregard the standards manual.

"There was definitely disagreement on whether [the manual] should be published," says Gibbemeyer. He also recalls that "some contractors and engineers were told to ignore it and that it would not be enforced."

The manual was issued, but it was far from complete, says Gibbemeyer. GMU planned to form a committee to meet monthly to consider updates. However, Backus left for his position at Clarkson and had a series of short-term replacements. The manual has yet to be changed.

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