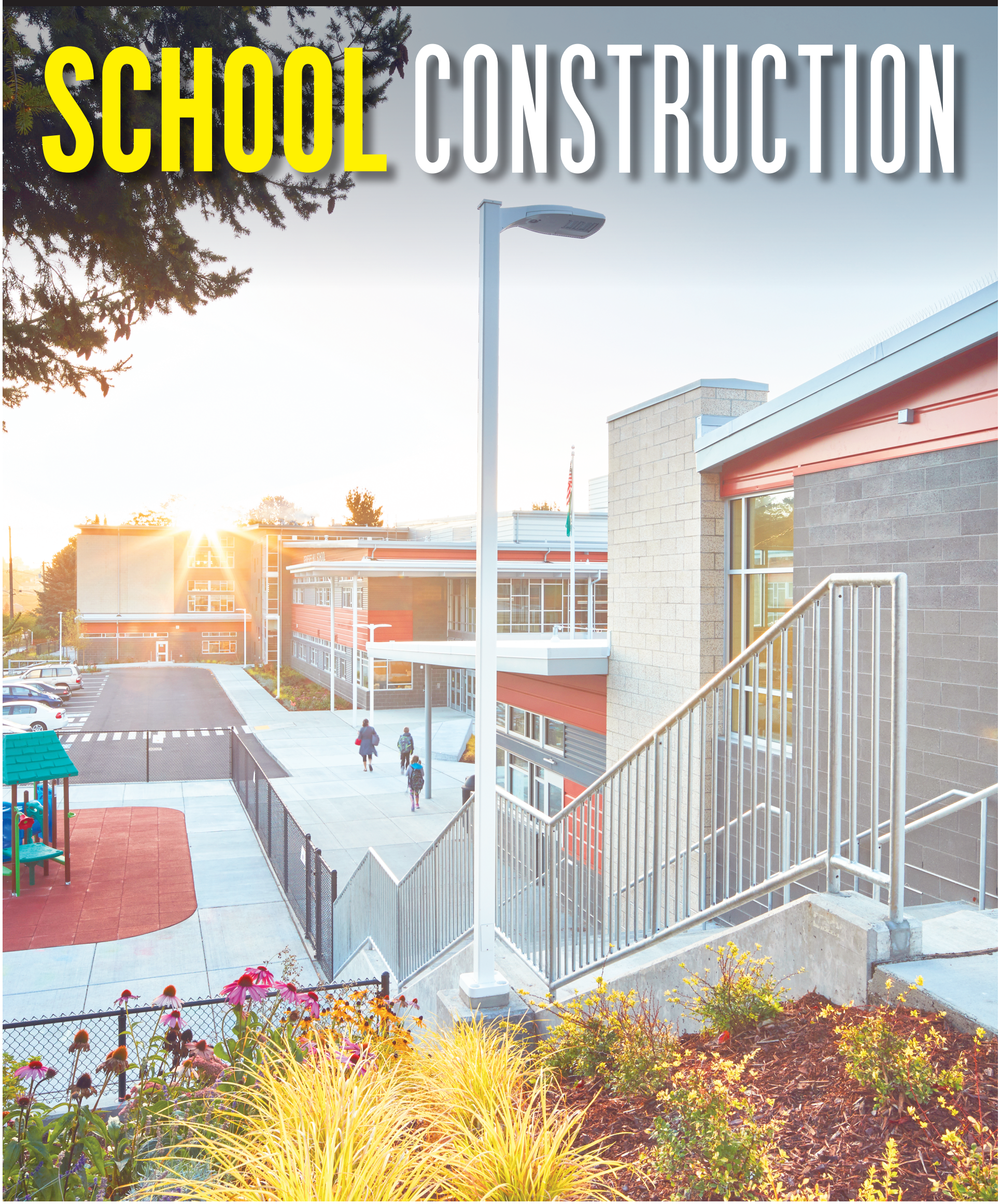
Seattle Daily Journal of Commerce · August 30, 2018

SCHOOL CONSTRUCTION



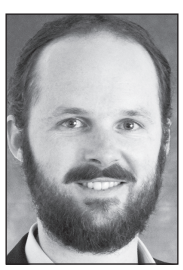
IT'S MUCH EASIER FOR SCHOOLS TO GET TO NET ZERO

Not only is it getting cheaper to install solar energy systems, but local grants and incentives are available to defray improvement costs.

This elementary school in Arlington, Virginia, generates more energy than it uses in a year.

PHOTO PROVIDED BY SAZAN ENVIRONMENTAL SERVICES

According to the U.S. Department of Energy, energy consumption is the second-highest operational expense for schools. K-12 schools across the country spend $6 billion annually on energy bills, more than they spend on textbooks and computers combined.



BY JACK NEWMAN
SAZAN ENVIRONMENTAL SERVICES

Over the past 10 years, schools throughout the United States have targeted net-zero energy as a framework for delivering operational cost savings, student comfort, and increased educational and resiliency benefits. In fact, schools have outpaced all other building types in the net-zero energy marketplace, accounting for 37 percent of all verified and emerging net-zero buildings.

Energy savings

Net-zero energy measures can yield approximately 65-80 percent in energy savings beyond conventional schools. Developing net-zero energy schools is now more achievable than ever, especially with advances in energy-efficient appliances and incorporating age-old passive design strategies.

Best practices include using optimized building orientation, passive heating and cooling strategies, increased insulation, LED lighting, heat pumps, energy monitoring, and rooftop solar photovoltaic (PV) arrays that are connected to the utility's power grid. In this "grid-tied" solar PV system configuration, solar power can reduce a school's energy demands from the utility company and generate surplus power to be exported back onto the grid for billing credits.

Discovery Elementary School in Arlington, Virginia, is one of the larger examples in the nation. Opened in 2015, the school installed a 500-kilowatt solar array with 1,700 solar roof panels that makes the building "net-positive energy," meaning it generates more energy than it uses over a calendar year.

Resiliency

In addition to monetary benefits, net-zero design can improve the student experience. Amarpreet Sethi leads DLR Group's Building Performance Design team.

She notes: "Using good design principles to meet a net-zero goal for schools can also lead to an improved learning environment. It is key that schools first reduce energy consumption using holistic means — by improving daylighting, thermal comfort, indoor-air quality, and reducing global warming potential and carbon emissions. Improving the indoor environment further improves the return on investment through improved student performance."

One additional benefit of net-zero energy schools is the potential for providing resilient power for critical electrical loads and emergency systems. Combining rooftop solar PV and an energy-efficient design provides ideal conditions for incorporating battery storage systems to deliver off-grid energy capabilities.

National Electric Code mandates that grid-tied solar PV installations shut down during an outage, unless the system incorporates smart battery storage. Currently, the city of Seattle is deploying a solar-powered microgrid with commercial-scale batteries to support resilient power in the Capitol Hill neighborhood, which incorporates a public education component focusing on the nexus between climate change and resiliency.

Students are taking action to advance these solutions through initiatives like the Seattle Youth Climate Action Network, UW Solar student organization, and Shoreline Community College's Clean Technology and Entrepreneurship program.

Local resources

Washington state has taken a leadership role on net-zero energy initiatives. In January, Gov. Jay Inslee signed Executive Order 18-01, aka State Efficiency and Environmental Performance, which mandates a net-zero energy design target for all state buildings. Washington state also offers renewable energy production incentives and grant dollars from the Department of Commerce's Clean Energy Fund to support solar on existing K-12 schools.

Other solar energy grants, such as Seattle City Light's Green Up grant funding program, identify K-12 schools as eligible applicants, complemented by Seattle Public Schools Green Team grant funding each year.

Local coalitions such as Shift Zero have formed to unite the green building community around solutions-oriented approaches to help accelerate net-zero energy buildings, policies, programs and resources for the future of Washington's built environment.

Community Solar programs offer district and community-scale renewable energy solutions, and other off-site energy procurement strategies continue to emerge, such as Puget Sound Energy's Green Direct program, which procures wind power for large customers. And the University of Washington Clean Energy Institute's innovations in scalable thin-film solar PV applications, energy storage and smart controls promise affordable, scalable solutions for Washington's clean energy future.

Certification programs

As net-zero buildings scale

NET ZERO — PAGE 7

STRETCH YOUR TIGHT BUDGET BY GETTING CREATIVE

When funding falls short, districts can turn to a number of useful strategies to get back on track.

In our unprecedented regional construction boom, local market conditions stress every construction budget — and public schools are no exception.

General contractors have little control over the exaggerated market forces we're currently seeing, but experienced school builders can assist districts with mitigating them. If confronted head on, today's budget challenges can be eased, minimizing their compounding effects through careful scheduling and strategic teaming decisions.

BY BRIAN RICH
FORMA CONSTRUCTION

Forma is replacing Anacortes High School under a GC/CM contract. Alternative delivery methods can help school districts secure contractors and resources before bidding season.

PHOTO BY DAVID W. COHEN

Strained budgets

Most of the funding for public school construction comes from bond measures, which require meticulous planning and political negotiations to get approved. In bond planning, stakeholders begin by assessing the district's needs, eventually arriving at a value that translates into a tax rate.

Politics drive the next steps, which often include reducing both identified needs and targeted costs in order to arrive at something that will be approved by local voters. Finding this balance generally results in budget reductions and tax rate compromises.

Once passed, districts are bound to deliver what was promised to voters or face the consequence of being unable to renew bond funding for future projects.

Our current construction market is flooded with work, and the rising price of commodities results in a narrower range of bid results, often skewing towards the upper end of — or beyond — district estimates. Unfortunately, the bonds and tax rates approved by voters often fall short of supporting the district's real needs — all before considering price escalation.

Thankfully there are still creative solutions districts can apply to make the most of their strained school construction budgets.

Timing is everything

You can always count on school starting back up in September. Our educational calendar is usually the deciding factor in the planning, bidding and construction of schools. For K-8 schools, the site's size and existing facilities generally lead to a 13- to 16-month construction schedule — or two summers and a school year.

Regionally, there are a limited number of general contractors and specialized subcontractors who dedicate their resources to schools' cyclical work flow. But with similar construction booms in local housing, technology, biotech and health care sectors, the region's contractors are struggling to keep up with the demand on labor and construction materials.

School districts are competing directly for these limited resources. Being first to market during the early spring bid cycle can ensure better pricing than summer. Pushing schedules out later and taking projects to bid at the end of the spring can result in inflated pricing, reflecting the contractors' risk in pursuing additional work when resources are limited and securing materials is more challenging.

This is where an opportunity exists to challenge the status quo by allowing a school to open "off cycle" — for example, not in September, but perhaps at the start of second semester, in January. Another schedule shift could simply involve requiring the building be permitted and ready to bid in December as opposed to May.

This strategy allows districts to contract with builders early and helps GCs get a head start on securing subs.

Alternative delivery

More often, districts are using alternative delivery methods like GC/CM and design-build, securing contractors and resources ahead of typical bidding seasons, ensuring their projects will garner competitive bids from experienced teams.

Another way of securing subs is by hiring mechanical and electrical subcontractors early through MC/CM and EC/CM contracts. This gives the GC/CM or design-build team access to MEP subcontractors' expertise, which can be integrated more efficiently into the project as it moves from pre-construction to construction.

Furthermore, the apparent benefits of alternative delivery methods have led to districts bundling multiple school projects into larger contracts. This serves the dual purpose of enabling the district to secure construction staff and build resources while benefiting from the logistical and financial efficiencies that one design-builder or GC/CM can achieve across multiple projects.

Reconsidering the size

Despite the best pre-construction planning, a project may reach a point where no amount of system optimization or value engineering can realign it with its budget.

At times like these, district stakeholders must begin by revisiting the physical size of the school project. This process can be painful for community stakeholders and district leadership as well as the design and construction team, who have all been working collectively toward an ideal end goal.

Sometimes these projects fit the true needs of the district but are out of alignment with what was able to get approved through bond measures.

The simple fact is that a project's square footage is the single greatest driver of construction costs. Despite furniture and fixtures and the levels of finish quality, budgets are simple arithmetic: units multiplied by unit price. In this equation, focusing on how those unit counts were identified at the start of the project can help inform where the math went wrong.

Keeping perspective

Throughout the project planning phase, users are often replacing a school building that is long past its useful life. The limitations of an existing facility will probably be identified as a top priority in its replacement, but this could result in costly design decisions.

Whether it's a focus on toilet counts, acoustical performance, thermal comfort or classroom size, it is important that we help end users identify their needs in a realistic context, ensuring that the resulting design doesn't overcompensate — compounding budget problems.

This region is experiencing

STRETCHING BUDGETS — PAGE 7

INSIDE

ON THE COVER

Genesee Hill Elementary opened in 2016 in West Seattle. BLRB Architects was the designer and Spee West Construction was the general contractor. Heery International was the construction manager.

PHOTO BY BENJAMIN BENSCHNEIDER/BLRB ARCHITECTS

DJC TEAM

SECTION EDITOR: JON SILVER • SECTION DESIGN: JEFFREY MILLER
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OSU FOOTBALL CENTER OPTS FOR FLEXIBLE LIGHTING SCHEME

The enlarged, remodeled space caters to players, coaches, trainers and recruits, and their wide-ranging lighting needs.

Fixtures integrated into the window mullions illuminate the football center at night.

PHOTOS PROVIDED BY STANTEC

There's nothing like the excitement of a Saturday college game day. But the preparation for on-field success starts behind the scenes.

It's similar with the Valley Football Center at Oregon State University. Beavers players started enjoying the new facilities after the 2017 football season, but the planning that went into many elements of the design were "behind the scenes."

BY ALISON FIEDLER
STANTEC

Consider the lighting design at the football center, which received a renovation and 55,000-square-foot addition. Our Seattle-area-based Stantec design team worked on the project, which includes a new home team locker room, Hall of Fame exhibit, football program meeting spaces, expanded sports medicine facilities and a new building entrance.

Flexible lighting

Spaces need to be used for various purposes — and be ready for change in the future. The new auditorium, for example, needs to meet many needs: game tape review, lecture and note-taking, and special events — all of which have different lighting requirements.

One key to lighting design is creating layers of light that can provide a palette for many needs. In this case, there are four layers of light:

- Recessed, adjustable overhead LED lights, which can go from classroom-bright to movie-theater dim
- Theatrical-style fixtures that light the podium area, which can be moved for future changes or special events
- Perimeter wall washing to highlight branding areas and provide accent lighting
- Tiny LED downlights integrated into the aisle handrails to provide movie-theater style lighting for safely moving around in the dark

Another key to lighting is simplicity — don't over-design it. The sports medicine facilities need to be clean, functional and comfortable, and the recessed LED troffers at OSU provide just that.

The clean grid of fixtures is not visibly anchored to any specific equipment, making the space more flexible, and provides illumination that allows trainers to care for players effectively and efficiently. This streamlined design approach also allows budget to be focused on feature areas.

One of these features areas — and perhaps one of the most challenging spaces to light in this project — is the Hall of Fame. Located in part of the existing building that was renovated, the ceiling height is limited by existing conditions, which gave us fewer lighting tools to work with.

Since the Hall of Fame functions like a museum, with exhibits and displays that may change in the future, the lighting needed to be incredibly flexible. Adjustable LED accent lights reside in a recessed channel in the ceiling, which helps visitors notice the exhibit, not the lights.

The channel also gives OSU the ability to move the fixtures if needed. Optical tools on the fixtures (like lenses for various beam spreads and shielding) can be added or taken away from the fixtures to accommodate changing exhibits.

Efficient design

LED lights are the industry standard now. While LED modules themselves last for years, the driver units that regulate power to the low-energy lights typically fail more commonly than the LEDs.

In many applications, the drivers and LEDs are combined into one unit. However, by using a forward-thinking approach in the

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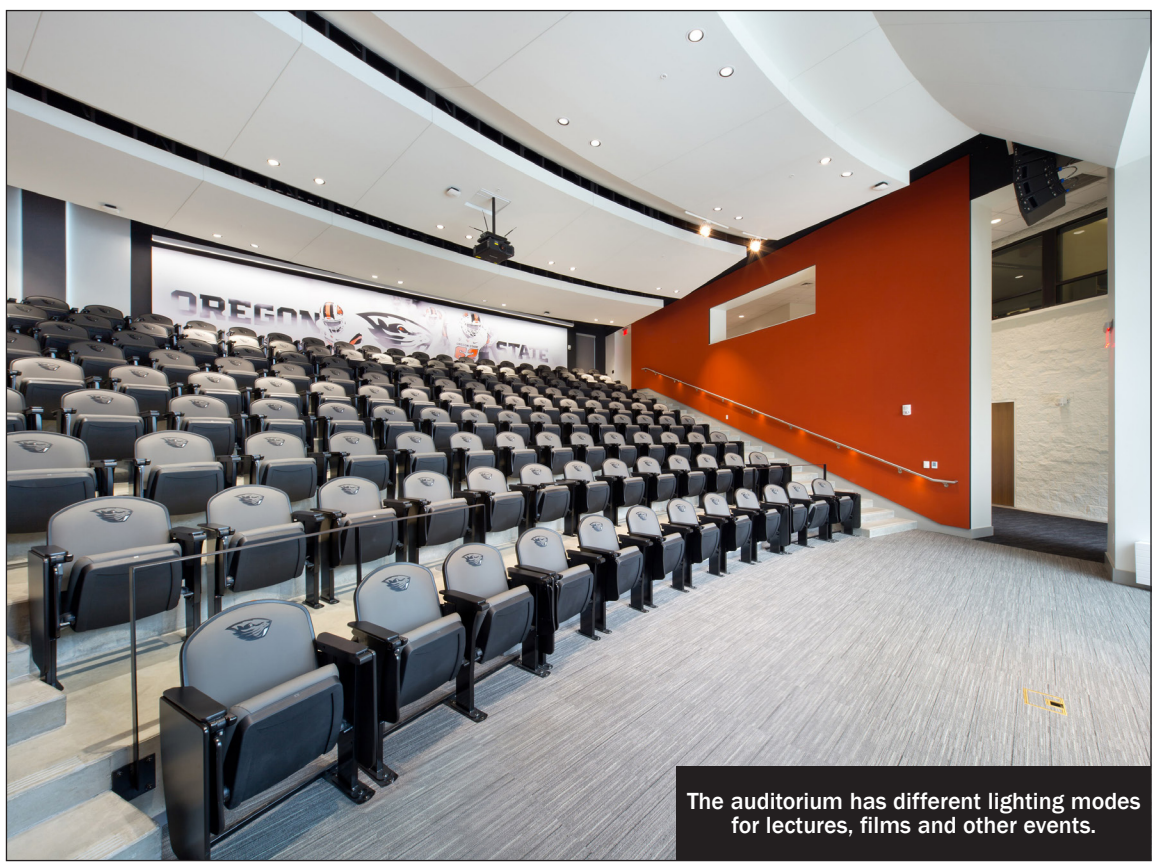


The auditorium has different lighting modes for lectures, films and other events.

SCHOOLS HAVE MORE WAYS THAN EVER TO GO GREEN

More projects are using "active" energy-saving measures like photovoltaics, green roofs and geothermal systems.

The cone is a biomass boiler at Forks High School. It emits 90 percent less carbon dioxide than burning fossil fuel.

PHOTOS BY DAN TYRPAK

When we hear the word "sustainability" our thoughts turn to renewable energy, reducing carbon emissions and being mindful of the balance of our planet's ecosystems.

Sustainable architectural design (aka green design) seeks to minimize the effect of built structures on human health, natural resources and the environment.

BY LEE FENTON
BLRB ARCHITECTS

Improved health and productivity of students and staff, resource conservation and even energy generation are commonly achieved benefits of green school design. Accompanying benefits — reduced maintenance costs, operational cost-efficiency and extended facility longevity — can be a boon to school districts that are balancing perennially shrinking capital budgets against growing capital improvement needs.

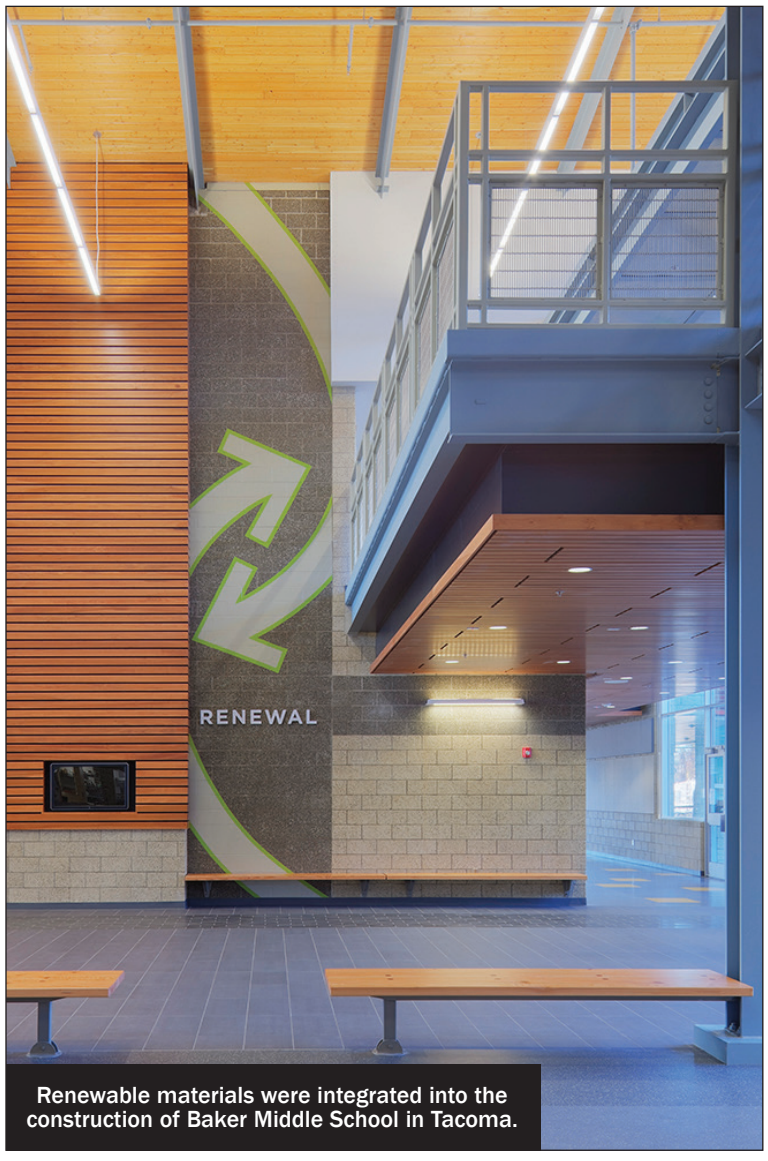
The mandate to design energy-efficient, environmentally conscious schools has been steadily moving from an option to an imperative.

Washington state-funded school construction projects greater than 5,000 square feet are required to incorporate sustainable features outlined in the Washington Sustainable Schools Protocol (WSSP) criteria, a self-certifying standard for the development of high-performance schools. School districts may also choose to pursue LEED certification if their sustainability goals are more aggressive.

Active green strategies

Broadly speaking, sustainable design in educational architecture is a matter of degree. Active sustainable design strategies are deliberate choices that may represent a deviation from what might most often be integrated into designs for comparable schools.

GO GREEN — PAGE 8



Renewable materials were integrated into the construction of Baker Middle School in Tacoma.

SEE-THROUGH SCHOOLS SPARK INTEREST IN LEARNING

When students see their peers working on cool projects, they're more likely to participate.

When it comes to designing successful 21st-century learning environments, studies have shown that daylight-filled spaces improve student learning rates between 7 and 26 percent.

BY JORDAN KIEL
BASSETTI ARCHITECTS

But transparency isn't limited to access to natural light — it also significantly impacts the user's experience within. It can impact whole-child awareness, professional development and a stronger school culture in powerful ways.

A transparent learning lab at Natrona County High School in Casper, Wyoming.

PHOTOS BY JEFF AMRAM

Hands-on learning

As designers of educational facilities, we are seeing an increasing emphasis on providing students with hands-on learning opportunities and project-based lessons rooted in the real world. This trend arises from the knowledge that curiosity and the desire to learn are hardwired into all people.

To honor this, the role of teachers is shifting from "sage on the stage" to one of guiding students through their learning pathway and helping them hone their skills as life-long learners. This type of educational delivery model encourages students to tinker, test, break and create.

When charged with designing spaces that support a shift towards more hands-on learning opportunities for students, we have found transparency to be one of the most useful tools in our architect's toolbox.

More participation

In our experience, transparency in school projects increases student interest and participation in hands-on learning opportunities, both during and after school.

The renovation of Stewart Middle School in Tacoma embraced transparency as a key design theme.

Users can literally look through the school from one end to another, generating an ethos of collaborative learning, while forming a sense of whole-school unity. Creative arts and science labs (da Vinci labs) have become the go-to spaces for class projects, as well as spaces for art displays, science experiments, media arts and performances. Relites line the Career Technical Education classrooms, performing double-duty as display cases where students can show off their work.

Teachers note that students are beginning to participate in classes and activities they previously did not consider because of the school's "learning-on-display" qualities. Robert Kroker teaches computer science and technology classes at Stewart and also heads up an after-school robotics club. Not only has he seen increased interest in his classes because of the school's transparency, his robotics club has grown from 11 to 28 students since the school's remodel.

At Natrona County High School in Casper, Wyoming, transparency in classrooms, labs and flex areas spark student interest and support the curriculum. The school is organized around multi-floor learning communities made up of four career-based academies and a freshman academy.

Project-based learning is accessible in highly transparent flex labs and science labs spread throughout the school. This visible learning and collaboration sparks student engagement and models critical skills for future success. Student interests pique involvement and student excitement ignites school pride.

Students at Stewart Middle School in Tacoma can see from one end of the building to the other.

A boon for teachers

Curiosity isn't relegated only to students — teachers also become inquisitive when different modes of learning are on display.

Ryan Booth, an instructional facilitator for Tacoma Public Schools, relishes the visibility in Stewart's shared spaces and believes it has fostered a more innovative approach to teaching. According to him, teachers see activities in labs and flex areas and ask each other about them during lunch.

"You can't help but show everyone when you're doing really cool stuff," he said.

Booth also noted that, at times, school modernization can be met with resistance from teachers. His job is to help with the transition and encourage the use of modified or new spaces. Because teachers are more inclined to use flex areas when they can see and supervise students, transparency becomes key to flex area success.

Glass classroom doors at Stewart enable quick shifts in the teaching format from whole-class activities to small-group learning while teachers continue to oversee the work.

Booth recalled that the glass doors were not liked at first, "about 60 percent of the staff [didn't use the doors] but now about 90 percent of the staff use them all day, every day."

School culture and safety

Transparency can also have positive impacts on school culture and student safety. On average, more than one out of every five students is bullied each year. Increasing the degree of

SEE-THROUGH — PAGE 7

SEE-THROUGH

CONTINUED FROM PAGE 6

transparency in schools affords more opportunities for passive supervision of common areas.

A school with an open central commons lets teachers allow students to test their independence as they develop, all within the safety of caring adults who are standing by and supporting them. Students feel secure knowing that dependable adult eyes are watching, decreasing the possibility of bullying.

In our experience, these emerging trends have shown significant positive impacts on learning environments. Transparency is a powerful tool for supporting lifelong learners and an amplified school culture.

Humans are natural learners, and the spaces we design to support education can help spark the voracious curiosity of our children if we just offer them things about which to be curious.

Jordan Kiel is a principal at Bassetti Architects and the project architect for Stewart Middle School in Tacoma.

STRETCHING BUDGETS

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unprecedented growth in job opportunities, population and a rise in home prices — all of which directly impact the needs of our community schools. With budgets stretched thin, our local school districts are working tirelessly to deliver state-of-the-art learning facilities for students of all ages.

With the right design and construction partners at their side and some creative planning, school districts can make the most of every project dollar.

Brian Rich is chief estimator at Forma Construction. With nearly two decades of experience in estimating, project forecasting and pre-construction, Rich leads estimating for all of Forma's education projects.

NET ZERO

CONTINUED FROM PAGE 2

around the world, several certification programs verify performance and develop case studies, including the Seattle-based International Living Future Institute's Living Building Challenge and Zero Energy Certification program.

While net-zero energy definitions and certification programs vary, the feasibility of this design strategy has been proven in public and private projects, led by a growing number of energy experts in the local design and construction community.

One example of a local school using solar PV to meet net-zero goals is Seattle's Bertschi School. It incorporates passive and active energy-efficiency measures, with more than 100 percent of the building's net annual energy demand produced by renewable energy.

Bellevue School District has been a local pioneer in driving down the energy use of its new facilities, with Puesta del Sol Elementary School, currently in design, targeting net-zero by installing up to 300 kilowatts of PV panels.

A sensible choice

The availability of grant resources, net metering credits and renewable energy production incentives, coupled with rapidly reduced costs for installing solar PV, makes developing net-zero energy schools increasingly more financially viable and sensible.

Government agencies are encouraging sustainable design, and K-12 schools are implementing net-zero strategies into their performance goals. These strategies provide cost savings and benefits to students, teachers and the broader community.

Similar to how a tree operates within the carrying capacity of its site, net-zero energy schools can serve as a biophilic design strategy to limit environmental impacts while educating and inspiring the next generation of leaders.

Jack Newman is a sustainable design consultant at Sazan Environmental Services and formerly managed the Zero Energy Building Certification program for the International Living Future Institute.

LIGHTING

CONTINUED FROM PAGE 4

auditorium, we placed the drivers separate from the LED fixture housings.

By placing the drivers over the aisles rather than over fixed seating, OSU can maintain the fixtures safely and easily. These sorts of decisions are what design is all about — creating user-friendly spaces.

Energy efficiency is also important to our future and to OSU. Using LED products and an energy-efficient design approach, the project interior lighting is designed to 75 percent of what energy code allowed, while the exterior is designed to just 48 percent of the energy code allowance.

Energy savings saves costs on electricity, which allows OSU to repurpose that savings toward other important endeavors.

Beaver branding

School spirit is important to players, students, alumni, potential recruits and your author, a proud alum of OSU.

The first thing visitors experience is the expansive, three-story atrium, which includes a branding wall just as high. Wall-washing luminaires mounted from the ceiling illuminate the wall, which expands OSU's brand outward to the campus exterior for all to see. Fixtures integrated into the window mullions light the space as well, which make it glow like a lantern at night.

Emphasizing branding with light takes collaboration. The entire design team shared plans for graphics and branding moments to ensure that we highlighted them appropriately and with the proper prioritization.

Strong branding is displayed throughout the locker room, including an illuminated shelf at each locker that highlights every Beaver helmet. Accent lighting at graphic walls adds to individual and team pride — and serves as a recruiting tool.

Just after the project was completed, OSU published a video on social media showing the players entering the locker room for the first time, and it brought a huge smile to my face. I watched with joy as the players practically ran through the space, dancing and taking selfies.

The facility adds to the pride of being part of the Beaver football team.

As a lighting designer and an OSU alumna, it was an absolute pleasure working on this project, and I'm thrilled to have taken part in perpetuating the legacy of OSU through flexible design and up-to-date technology.

The behind-the-scenes design efforts have given OSU a facility that is relevant today and adjustable for the future, supporting the university's students and football program… and, go Beavs!

Alison Fiedler is an associate and lighting designer at Stantec in Seattle. She is also a proud graduate of Oregon State University.

GO GREEN

CONTINUED FROM PAGE 5

These elements, like those that follow, are typically specialized systems or structures that actually generate energy or dramatically reduce energy consumption. Photovoltaic panels are being used more widely in K-12 facilities as the technology becomes increasingly accessible, and end-of-use recycling technologies are evolving to minimize the environmental impact of processing used components.

While upfront purchase and installation costs are still a consideration, life-cycle operating costs are exceptionally lower than traditional power technologies. Continued advances in power output, solar collection and energy-storage capacity are making this one of the fastest-growing sources of clean, renewable energy for schools and other facility types across the country.

Though not as commonly employed in school design as photovoltaics, biomass energy production has several environmental advantages.

Wood is a renewable resource and typically costs less than fossil fuels. Wood combustion systems for electricity and heat utilize wood residues and byproducts, yielding reduced environmental impact from industry waste products. Biomass carbon dioxide emissions are approximately 90 percent less than burning fossil fuel.

A ground-source heat exchange system uses the earth as a heat source in winter and a heat sink in summer.

The system design relies on consistently moderate ground temperatures to boost mechanical efficiency and reduce the operating costs of heating and cooling systems. When coupled with solar heating technology, this becomes a geosolar system, which is even more efficient than either technology employed alone.

Green roofs are both beautiful and a sustainable strategy with positive impacts on multiple fronts. The insulating nature of the planting media and vegetation reduce energy consumption, and, subsequently, heating and cooling costs.

Green roofs can actually extend the life of a roof by narrowing the variance in temperature changes that result in expansion, contraction, and the resulting wear and tear on roofing materials. The resulting mini-ecosystems green roofs provide offer habitat for birds, bees and insects, especially valuable in urban environments with reduced green space. They also provide a unique and engaging teaching tool for science curricula.

Passive green strategies

In contrast with active strategies, passive sustainable elements employ what already exists — sunlight, shade, wind, temperature differences, gravity, etc. — to achieve sustainable impacts without an additional expenditure of resources. These elements are valued for their simplicity, ease of integration, aesthetic contribution to building design, and low or no operational costs.

Rather than adding time and expense trying to wrestle a site into submission, simply tailoring the design and orientation of a school to suit its unique site characteristics yields sustainable benefits.

Preserving existing site characteristics including old-growth trees, vegetation and natural topography helps facilitate a connection between students and the environment, provide outdoor learning spaces, conserve energy via shade-producing plantings, and help manage stormwater run-off.

Interior glazing, expansive exterior windows, integrated skylights and light wells all work to infuse natural light throughout school interiors, reducing lighting costs, enhancing indoor environmental quality and contributing to an energizing interior. Sunshades and building overhangs thoughtfully addressed in building envelope design will mitigate glare and heat build-up.

Likewise, operable windows in classrooms naturally improve indoor-air quality via passive ventilation and also reduce energy use for facility cooling on warm days.

And finally, interior and exterior material choices are key to enhancing sustainability. Integrating sustainably sourced, renewable and repurposed building materials, along with low- or no-VOC interior finishes and flooring, safeguards the environment and contributes to healthy indoor learning environments.

How do we measure the effectiveness of sustainability initiatives in the school environment? While practical issues like life-cycle operating costs, cost-effective maintenance and facility durability are important, healthy schools, healthy kids and a healthy planet are at the heart of the green conversation.

Regardless of the design standard pursued or the sustainable strategies employed in school design, it all counts.

Lee Fenton is a principal at BLRB Architects whose 30-plus years of architectural planning and design has focused on the development of K-12 school facilities.

HOW PLAYGROUNDS MAKE ALL CHILDREN FEEL WELCOME

Features like playful pathways and "dynamic refuges" give kids with disabilities more ways to play and socialize.

BY JASON MORSE & JAMES STUART
AHBL

As the demands on our young people continue to grow and change, the educational environment has evolved in almost every way imaginable. Today's schools teach more than the three Rs — they emphasize student engagement among peers, with their environment and with their community to foster citizens of the world.

Design has evolved to keep pace, and now school districts are seeking ways to maximize the value of every aspect of the student experience. Playgrounds — once thought to be a distraction or break from education — are now understood to hold great potential in teaching intangible lessons such as socialization, imagination, community-building and hands-on learning.

But it is imperative then that these spaces are accessible and inclusive of all students, affording the same value to children regardless of physical or cognitive ability. Site-accessibility goals have moved beyond a formulaic approach to ramps, railings and walkway widths into the realm of true inclusiveness.

A low-barrier play area at Arlington Elementary in Tacoma.

PHOTO BY BENJAMIN BENSCHNEIDER

Inclusive features

AHBL's landscape architects have embraced the movement toward inclusive, accessible spaces and developed a number of guidelines for achieving this goal.

While every project is unique, there are a number of common requirements that must be present for a play area to be considered truly beneficial to students. Among these are features that encourage imagination, concentration, physical development, stress reduction and social learning.

Moreover, these spaces must account for the needs of all students — including those with cognitive disabilities such as autism, and physical limitations such as wheelchairs or limited mobility. Ideally, these outdoor areas also include natural play areas and are designed to allow unstructured activity.

As students grow, these features adapt with them and allow for play and socialization in new ways, thereby maintaining their value to school districts.

Physical accessibility and inclusiveness are often the most easily understood, yet nuanced, requirements of modern play areas. Students who are limited in their mobility benefit equally from the stimulus of outdoor play and socialization. However, traditional playgrounds often lack the forethought to allow their participation.

Playground equipment, steep slopes, stairs and even the surface medium (gravel, mulch, or otherwise) create barriers to inclusion. Even when ramps and other access points are built, they are often an afterthought, further isolating disabled students.

Playful pathways

AHBL has been mindful of this, and seeks opportunities to plan these features into the center of student activity.

See **PLAYGROUNDS** — *page 15*

AFTER TWO DECADES, UW'S SLU CAMPUS NEARS COMPLETION

The second of three final-phase medical research buildings will open this fall. The last building begins construction in 2020.

UW's new eight-story structure has office, research and outpatient clinic space.

PHOTO BY BENJAMIN BENSCHNEIDER

Nearly 20 years ago, the University of Washington envisioned a new urban campus for medical research unlike anywhere else in the world.

It would become a hub for the city's burgeoning biotech sector. It would spark the transformation of a neglected neighborhood into one of the country's fastest-growing communities. It would set a new architectural aesthetic that would not only be purposeful but beautiful and sustainably driven.

BY ANTHONY GIANOPOULOS
PERKINS+WILL

Today, the UW School of Medicine South Lake Union campus is home to thousands of scientists, researchers and staff who work across its various buildings to develop life-changing therapies and cutting-edge medical breakthroughs. It serves as the centerpiece for the city's biotech industry, surrounded by leading health care and biotech organizations like the Bill & Melinda Gates Foundation, Fred Hutchinson Cancer Research Center, and the Allen Institute.

Public-private delivery

When UW set out to create an academic research complex off its traditional campus and on an accelerated schedule, it needed a different kind of delivery method.

The institution looked to a public-private partnership, or P3, model for its efficiencies in process and in timeline. The School of Medicine selected an integrated P3 team of National Development Council, Vulcan Real Estate, Perkins+Will, Turner Construction Co. (first phase) and Sellen (second and third phases) to master plan, program and design the entire two-block campus.

The team was responsible for delivering more than 1.2 million gross square feet of space and seven buildings over a span of two decades using a model of delivery unique for a project of its kind.

The first phase of the two-block project focused on the south end of campus, renovat-

ing the Washington Natural Gas building into a modern biomedical research lab.

Phase two focused on the epicenter of campus, creating a five-story office tower with laboratory and research facilities connected by a new inner courtyard.

The third phase completes the west end with a seven-story research space and an eight-story UW neighborhood clinic, which is slated to open this fall. Facing Mercer Street, the final building is slated to begin construction in 2020.

The P3 process for phase one and two was so successful — delivered in 36-40 months vs. 48-52 months by conventional methods — that the National Council for Public-Private Partnerships recognized the team for its "innovative approach" to development.

The third phase is also being developed by P3, which like the first two phases is being led by the Perkins+Will team.

Building connections

The campus was designed to bridge connections between buildings, fostering opportunities for collaboration, education and interaction between its researchers and staff.

The design unites biomedical laboratories, bioinformatics labs, genomics research, administrative offices and support spaces across campus. With open floor plates in each building, accessibility is efficient and encourages people from various departments to interact.

Common spaces, conference rooms and break areas are also located on every floor to further encourage collaboration and teaming. All of these factors enrich the workspace and are vital to enabling scientific exploration and research.

At the same time, the design emphasizes integration within the neighborhood and surrounding community through features like a pedestrian-friendly path to the city's oldest park and a publicly accessible courtyard with a wooded boardwalk and suspended cable lights.

This transparency across the campus earned praise from the American Institute of Architects Washington Council, which noted it "allows for a connection to the environment and vibrant natural light" and seamlessly integrates stunning architecture with community purpose.

A new aesthetic

At the start of design, South Lake Union consisted primarily of dated, single-story manufacturing and automotive buildings.

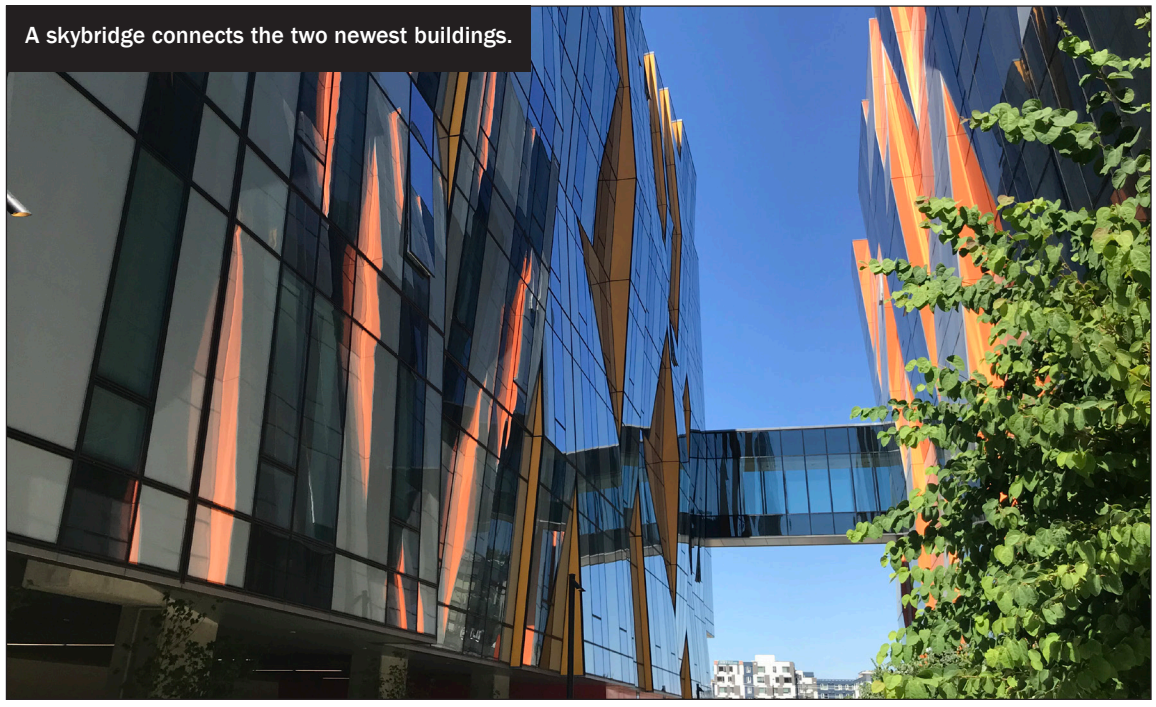
With a modern design of aluminum, steel and glass, Perkins+Will introduced a new contemporary aesthetic to the neighborhood, and a look quite different from other medical and scientific buildings in the region. The rhythm of glass and aluminum curtain walls creates a modern visual experience unlike anything else in the neighborhood.

While designing a modern aesthetic, the team also introduced a new way of thinking about building performance and sustainability. Green strategies like chilled beams, radiant cooling systems, natural daylighting, exterior sunshades, sustainably harvested wood and low-water-use landscaping are embedded throughout the campus, highlighting the team's commitment to environmentally conscious design practices.

Once in a lifetime does a project of this caliber come to light, offering the rare opportunity for true transformation. From delivery model and programming to design and construction, innovative strategies were used to meet ambitious goals.

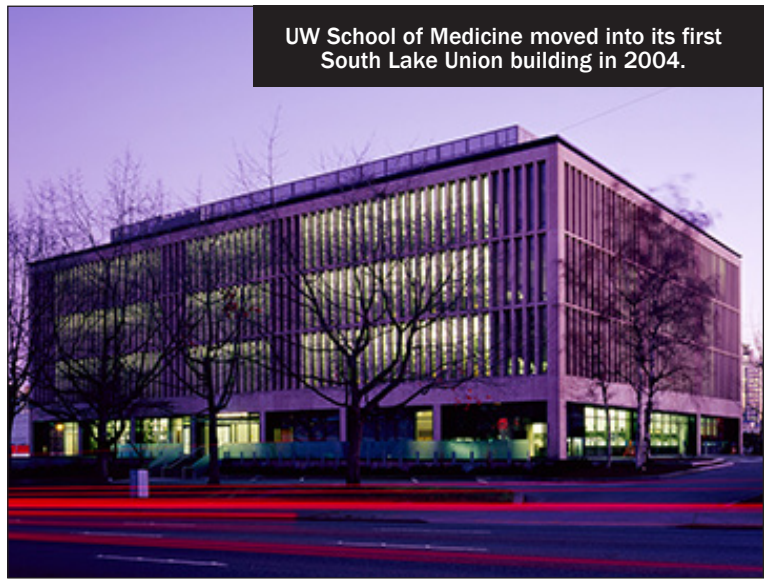
Its vision set into action the development of an emerging neighborhood, creating today what has become an icon of one of the world's leading scientific communities.

Anthony Gianopoulos is a principal with the Seattle office of Perkins+Will.



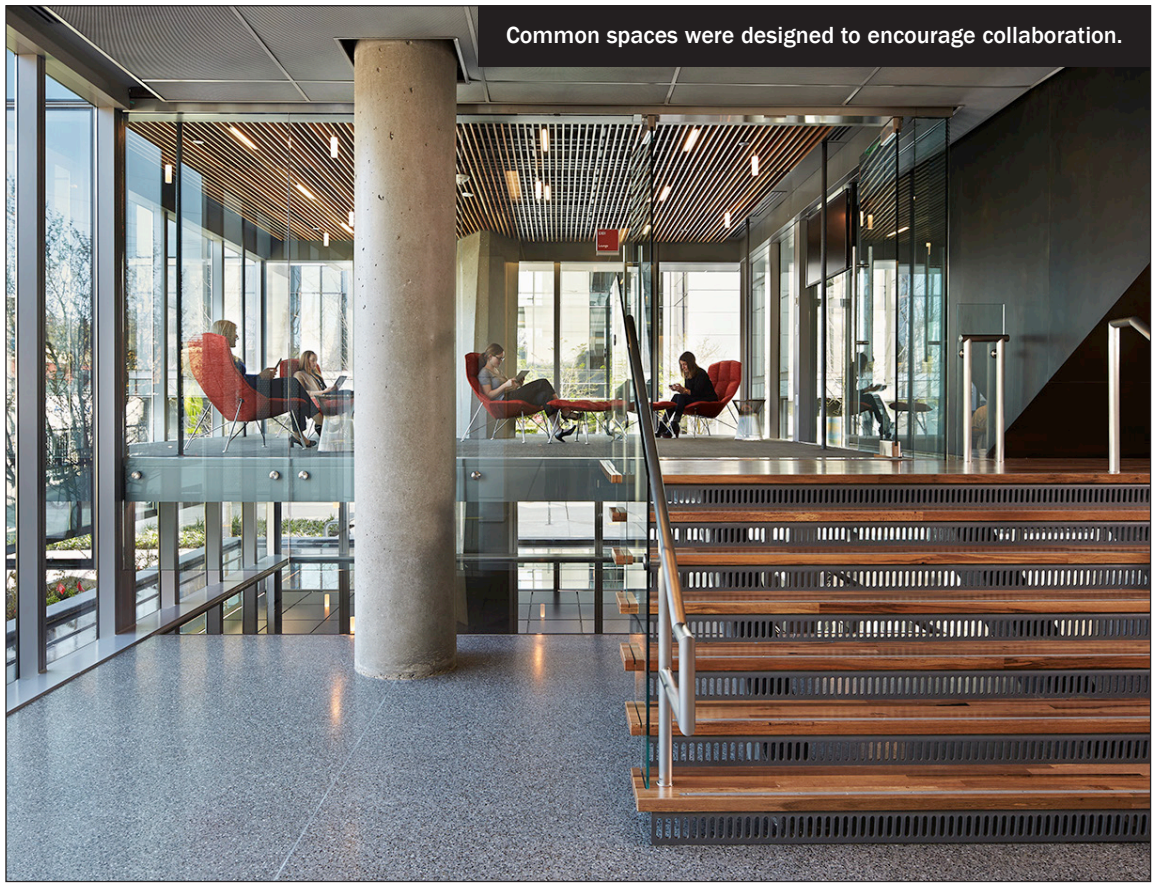
A skybridge connects the two newest buildings.

PHOTO BY BENJAMIN BENSCHNEIDER



UW School of Medicine moved into its first South Lake Union building in 2004.

PHOTO BY LARA SWIMMER



Common spaces were designed to encourage collaboration.

PHOTO BY BENJAMIN BENSCHNEIDER

EASTSIDE PREP'S VERSATILE ARTS HALL MADE FOR CONCERTS, PLAYS AND YOGA

With help from a "sky wall," the theater balcony can be transformed into a lecture hall or activity space.

TALI Hall is a new 105,000-square-foot performing arts building for Eastside Preparatory School in Kirkland. The letters it in its name stand for "think, act, lead, innovate."

This building supports the school's commitment to connecting performing arts to learning across varying disciplines and the school community. Housing a 500-plus-seat auditorium, 21 classrooms, multipurpose spaces and conference rooms, the space was designed for maximum flexibility and adaptability.

BY ERIC PETERSEN
SCHUCHART

Space transformation is key to this building. The auditorium transforms to meeting spaces, and a theater balcony becomes a lecture hall and moonlights as a yoga studio. Add in two floors of underground parking for 100 cars, and TALI nearly doubles the campus' space for program and parking.

The project team worked closely, coordinating its design and construction efforts to get TALI Hall ready for its grand opening this coming school year.

"There are a lot of moving parts when you build a project of this magnitude. It was important the team was on the same page," said TJ Modica, senior project manager at Schuchart.

Drawing on design cues from its sister building, the Macaluso Academic Collaborative, the building embraces the materials that compose it. Large expanses of glass and steel on the exterior transfer to the interior, and concrete columns and floors are left exposed, giving a glimpse into the building's bones.

Structure takes form

Twenty feet below grade level, TALI Hall's journey began with excavating more than 20,000 cubic yards of earth to make room for underground parking.

The combination of soil nails and a tieback system held back the remaining earth while the new 18-inch mat-slab foundation was poured. Add in columns and four post-tensioned slabs, and the four-story building began to take form.

TALI Hall will have 21 classrooms, dedicated arts spaces and a 500-plus-seat auditorium.

RENDERING BY PUBLIC47

A three-story atrium topped with a 40-foot skylight draws light and air into the building core, while a roof terrace creates a green space for interaction and learning.

Focus on arts

The school offers a wide variety of music, theater, choir, visual arts, art, photography and filmmaking classes.

These offerings allow students to progress from the basic understanding of the mechanics of a skill to proficiency in performance and expression. The new space complements these courses by creating a flex space that can be configured to meet the needs of the curriculum.

The auditorium has retractable seating to provide access for full-floor events and functions. It can also be configured for traditional proscenium-style and theater-in-the-round performances.

The balcony space has a "sky wall" that divides the theater and balcony, creating a 130-seat lecture space, a yoga studio or a multipurpose meeting space.

The technical spaces improve the teaching environment for theater with lighting/sound system upgrades and a wire tension grid for safe teaching 8 feet above the stage floor. Administrative offices and study spaces are distributed throughout the building, promoting spontaneous interactions among staff, educators and students.

Dedicated spaces

TALI Hall offers a solution to the high demand for expanded performing arts offerings. In the 2016-2017 school year, 94 percent of Eastside Prep students participated in at least one music, drama or visual art class.

The music program will benefit from dedicated classrooms and performance spaces with appropriate acoustic treatment, greatly improving the experience for both performers and audiences.

The theater program is looking forward to the flexibility the space has to offer. The stage is large enough to hold a full orchestra and choir, but can also be reconfigured to house smaller plays and performances.

The large set-making shop will facilitate more detailed instruction regarding construction processes and set design, enhancing the performance experience.

TALI Hall offers dedicated art spaces equipped with sinks, work space, cupboards and storage — something the prior spaces did not have.

The 2018-2019 school year will mark the 16th academic year for Eastside Preparatory School. What began with 16 students and six employees has grown to 470 students and more than 100 employees. Since its founding in 2002, Eastside Prep has stayed true to its commitment to help students create their own learning experiences in a kind and supportive environment.

"We admit students as individuals, and they graduate as community members," said Terry Macaluso, Eastside Prep's head of school.

Eric Peterson manages Schuchart's Ground Up division. Schuchart is a family-owned, full-service general contractor serving commercial clients in the Puget Sound region.

TALI HALL

Owner:
Eastside Preparatory School

Architect:
Public47

General contractor:
Schuchart

Structural engineer:
Swenson Say Faget

Civil engineer:
Red Barn Engineering

Mechanical engineer:
Evergreen Refrigeration & HVAC

Electrical engineer:
Tri-Nar Eeectric

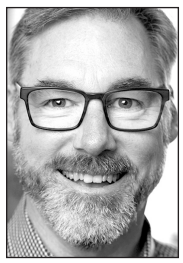
Geotechnical engineer:
PanGeo

THE VIEW FROM INSIDE A SCHOOL: WHAT REALLY MAKES IT SAFE

Security shouldn't come at the expense of making students feel welcome, says one school staffer.

As a society, we have a shared responsibility for vigilance when it comes to the safety of our schools.

At McGranahan Architects, we believe that the design of effective, inspiring learning environments can contribute to keeping the children, families and educators who inhabit them safe. That's why we chose the topic "Safety and Security" for our recent series of weekly learning sessions.



BY MICHAEL MCGAVOCK
MCGRANAHAN ARCHITECTS

While much of the focus is on the active shooter, we learned that the topic is broader than commonly thought, including assault, bullying, suicide prevention, school climate, disease, food poisoning and natural disasters.

We invited four panelists from local school districts to join our conversation: an office assistant at an elementary school, an instructional coach and former teacher, an elementary school principal, and an assistant director of safety and security.

We prompted them with two questions: "From your perspective, what makes a school safe and secure?" and "What are the challenges you've experienced in creating that environment?"

Discrete measures

Luz is the first person parents, staff and students see when they come in through the front door of her elementary school in Federal Way.

She emphasized the importance of a friendly, welcoming and approachable impression as soon as a student enters the school.

"Some of our scholars are coming to school for the first time and are afraid to be away from the security of their home," she said. "Not to mention the new parents that are leaving their children at a school for the first time."

From her perspective, schools in general are becoming more secure, but at the expense of a welcoming experience. She showed our staff photos of schools that resembled detention centers.

Luz's primary message was one of discrete security, especially for elementary schools: buzzers and ID cards at the entrance instead of a "hardened" look that could potentially startle children and their parents, actually making them feel less safe.

An open environment

As an instructional coach and former teacher, Booth works with teachers during their acclimation to a new school design.

From Booth's perspective, school design should address the needs of what he calls the "everyday student" instead of a student in the midst of a catastrophic event, such as a school shooting. This means designing for the challenges a student might face on a daily basis, such as bullying, intimidation or harassment.

Booth emphasized the need for transparency to ensure high visibility and allow teachers to work one-on-one with students.

"What do you do in a lockdown?" That's one of the first questions Booth hears about the open, transparent design of his new school.

Booth challenged designers to re-frame the question and consider the benefits that open, collaborative environments may have on bullying and harassment rates, which have dropped in his new school.

Booth's takeaway was that we might be asking the wrong questions, which may be leading us to design for the worst-case scenario instead of acknowledging the need to resolve daily safety issues.

Building relationships

Anita, the Tacoma elementary school principal, confirmed the importance of creating a welcoming place, and emphasized relationships as the crux of behavioral problems that could lead to extreme events, such as school shootings.

In her school, many students come from low-income families, with parents who might be unavailable to their children for one reason or another. One of her main concerns is building and maintaining strong relationships — between the school and the community, between teachers/staff and students, but also between the students and their parents/guardians.

Schools can employ a range of safety measures without looking like detention centers.

PHOTO BY DANE GREGORY MEYER

She noted, "We have parents who work nights, so bringing their kids in for breakfast and eating breakfast with them is the only time they're having a connection. So am I going to stop every parent at the door? No. I have to have that trust and have them feel welcome."

She felt as though "hardening" the entrance of the school discouraged and weakened parent-student relationships that might already be strained. Instead, she emphasized visibility and staff

SAFE SCHOOLS — PAGE 15

STUDIES SUGGEST DESIGN REALLY CAN AFFECT HOW WELL STUDENTS LEARN

Students do best when they have visual stimulation, natural surroundings and control over their environment.

BY PHILIP RIEDEL & ALYSON MAHOE
NAC ARCHITECTURE

Students at Wilson High in Tacoma can slide walls and move furniture to customize their study areas.

PHOTO BY BENJAMIN BENSCHNEIDER

Environmental psychology is the interdisciplinary study of how our surroundings shape our behavior, mindset and performance.

The principles of environmental psychology have been applied to numerous settings, including work environments, retail spaces and health care facilities. As architects dedicated to creating next-generation learning spaces, we believe that the approach to designing educational environments has a lot of potential to benefit from this field.

While increasing evidence points to the correlation between the physical environment and academic success, studying the effects of environments on learning is notoriously difficult due to the variety of factors that affect learning outcomes for each student. That being said, scholars continue to study this relationship in order to further understand how a building can affect learning.

What research says

Recently, researchers at the University of Melbourne in Australia reviewed thousands of articles searching for evidence of environmental effects on learning outcomes. Through this examination, they determined that "emerging evidence shows a trend that spatial design does positively impact student learning outcomes." (Read the report online at http://bit.ly/2ME8ywO.)

While admitting that the evidence is limited and more research is needed, University of Melbourne researchers found several studies in the last decade that show spatial factors account for a significant portion of the variance in learning outcomes.

These results affirm the findings of a previous study from the University of Salford in England, which support the idea that students in "innovative learning environments" significantly outperformed their peers in traditional schools.

The study grouped environmental factors into three categories, and identified which were found to be significantly influential:

- Naturalness: light, air quality, temperature, acoustics, links to nature
- Individualization: flexibility, ownership, connection
- Stimulation: complexity, color

High-performance building design (lighting, acoustics, air quality, etc.) accounted for 10 to 16 percent of the variance in student academic scores. Also, blended learning environments, which combine advances in technology with traditional teaching, account for a statistically significant improvement in scores.

So how can the results from these studies be applied by architects and planners interested in evidence-based design? NAC Architecture has had the opportunity to incorporate many of these design elements that have been found to support better learning outcomes in our recent pre-K-12 projects.

Links to nature

At Bellevue School District's Bennett Elementary, abundant daylighting is provided throughout the school, particularly in learning spaces such as the library, classrooms and shared areas. Sunshades help avoid direct sunlight and reduce glare on the south side of the building.

The LED light fixtures automatically dim when daylight is sufficient. Operable windows in classrooms are combined with a ground-source heat exchange system for great indoor-air quality and temperature control.

All classrooms and shared areas have views to exterior green spaces, including courtyards and green roofs. Outside play areas take advantage of the site's terraced hillside and existing trees, creating a strong link to nature.

Personalized spaces

The new academic building at Tacoma's Wilson High School features general classrooms, a culinary lab and a media classroom with a TV studio, all within a highly adaptable, collaborative environment.

A variety of learning spaces support flexibility and customization, including informal shared areas, classrooms that can be combined and/or opened to shared areas with operable partitions, a large learning stair and small conference rooms for focused group work.

Students feel ownership of the space when they utilize whiteboard walls, personalize the art gallery and pin-up display areas, and arrange the flexible furniture for impromptu discussions. Connections among these different spaces are enhanced by wide, shared learning areas with soft seating and clear sightlines.

Visual stimulation

The Salford study determined that the benefits of environmental stimulation form a curve.

While both the most complex and least complex environments create poor learning conditions, an intermediate level of complexity is optimal. Similarly, the study found that a mid-level of color benefits learning — present, but not too strong.

At the Lake Stevens School District's new Early Learning Center, varying levels of visual stimulation were incorporated throughout the building.

An abstract tree made from wood slats and accents of colored glass at the lobby introduce visual complexity as students enter. However, this complexity is reduced in the classroom wings, which have soft textures and some curved walls and ceiling elements in the shared areas.

The colors in these learning areas are rich, but not overly bright.

Best practices

It is worth noting that all of the studies cited above mention the need for additional research. Even so, when taken together the findings provide actionable evidence that can inform our designs.

As we have seen in our own experience, the Pacific Northwest school design community understands many of the elements highlighted in this research as effective, considering them to be best practices for creating educational facilities.

It is useful to see the percentages associated with their impact, particularly when budget or schedule implications require choices to be made. Informed with this data, school designers can help their clients make the best decisions to provide optimal learning environments for students.

Philip Riedel is a principal at NAC Architecture and president of the Association for Learning Environments, Pacific Northwest Region. Alyson Mahoe is a member of NAC's Research & Experience Development team.

PLAYGROUNDS

CONTINUED FROM PAGE 9

At Arlington Elementary School in Tacoma, this resulted in the creation of assets designed for students of every physical level. Locally sourced logs form a play area that encourages creative interaction and is approachable from every angle.

The surface medium was selected to support wheelchairs, and there are ramps and pathways around the entire playground, ensuring students have equal access to the entire site. Pathways that playfully traverse the hillside meet Americans with Disabilities Act guidelines but appear to the casual observer as the primary, intentional route of travel for any student moving between the playground and the school.

Similarly, ramps and access points at nearby Stewart Middle School were incorporated into an amphitheater and social space, removing the stigma of ramps and encouraging a mixture of play and socialization. While traditional playground equipment is present on site, the emphasis has been shifted to these more inclusive areas, garnering an appreciation for spaces where all are represented.

Self-paced participation

While the challenges of physical access are wide-ranging, addressing students with cognitive needs is a much broader undertaking.

Autism in particular presents a large challenge to school districts. While reports vary, there is an undeniable uptick in autism and developmentally disabled students. Rather than isolating these children, modern school administrators emphasize inclusion to allow for social adaptation and the benefits of peer-to-peer learning. However, it is important these students are protected from the overwhelming nature of the playground and allowed to participate at their own pace.

AHBL designers have examined every element of the playground experience to develop strategies which enable students with cognitive disabilities, rather than overwhelm them. Among the most important of these strategies is the development of a sense of prospect. When entering the play area, students are presented with several sightlines — perspectives from which to take in their entire environment. These places of prospect allow children to process their surroundings and make choices to match their comfort level. If they then prefer to avoid more active areas, students may proceed to quieter areas on site, but will also have created a mental map of the whole playground should they decide to venture into more active areas after getting settled.

Sensory opportunities such as the water feature at Arlington Elementary provide the chance to engage students in a peaceful manner that activates multiple senses. Children can listen to the falling water, feel it on their feet and hands, and watch as it drains away. This experience, while simple, can have dramatic effect on the happiness and cognitive function of a student.

Other design interventions are more subtle. During a student-focused early design workshop held by Mahlum Architects in preparation for the Arlington project, the design team heard from more than one student that their favorite place on their current playground was a small stairwell that was slightly perched above the most active part of the playground.

The designers realized that these students were experiencing a concept known as dynamic refuge. Being in a defensible space that is directly adjacent to highly active areas can provide a place of comfort for students who wish to feel part of the group, but who may not be comfortable in the center of the action. Furthermore, having a safe space to retreat to can give students — especially those with cognitive disabilities like autism — the confidence to participate directly as their comfort levels grow.

At Arlington, this takes the form of a log semicircle adjacent to active play areas, but removed from active pathways and courts. At Stewart Middle School, students can find shade, seating and sightlines near the basketball courts, but out of the hustle and bustle.

This balance between peaceful refuge and adjacent activity ensures students are protected but not excluded.

Benefits for everyone

Perhaps the largest obstacle in integrating accessibility and inclusion into playgrounds in the future will be overcoming the notion that these design features are a burden to school districts. There are some who may claim these features only benefit a small portion of students to the detriment of traditionally abled students. In reality, inclusion is not a zero-sum game; these modifications to transitional ways of thinking benefit every student of every cognitive and physical level.

Interaction and socialization thrives when the arena is open to all. Today's students will learn what they have in common with their classmates, not what makes them different.

Jason Morse is a principal and the director of landscape architecture for AHBL. James Stuart is a marketing coordinator with AHBL.

SAFE SCHOOLS

CONTINUED FROM PAGE 13

training over traditional security measures.

Safety first

Mike is an assistant security director for Tacoma Public Schools. He is not the first person you see when you walk into a school. Instead, his role in the district is to think strategically and logistically about safety.

Mike echoed some of the sentiments of our other panelists, and was more focused on what he believed to be solutions to safety concerns being discussed on a national level.

Mike acknowledged that schools that look like detention facilities might not be the greatest place to learn and they also may not be effective in preventing a school shooting. He also expressed that "totally open" designs are unsafe and would be equally ineffective in preventing school shootings.

While Mike did provide design suggestions for ensuring safety — such as secure access points — he also recognized the value of relationships, specifically with students and police officers.

He called for a culture shift for both students and parents in building relationships with police officers and implementing security-based design measures: "We want parents to understand that we're not doing it [implementing security] to make them feel uncomfortable, we're doing it to make their kids safe."

Remaining questions

The key questions we are left with are these: Does an open and welcoming environment equate to a sense of safety and security through beneficial connections that foster healthy, nurturing relationships? Can we provide adequate security through strategies that are experienced in the background? Do we design for the everyday interactions among adults and children that address the diverse aspects of safety and security, or do we focus on the relatively rare occurrence of an active shooter, from within or without?

This broader approach to our planning and design conversations will lead to the creation of learning environments that provide a sense of safety to help children through all the daily challenges they face, in and out of school. Our school designs should support a culture that is attentive to the most threatening occurrences, yet mitigates the chances of those occurrences by cultivating a thriving learning environment that provides welcoming experiences and a sense of belonging to a nurturing community, every day.

Michael McGavock is the principal for Learning Environments at McGranahan Architects, leading the engagement, inquiry and planning of meaningful places for learning.

BREMERTON ALTERNATIVE SCHOOL BREAKS DOWN WALLS TO LEARNING

A former call center has been renovated into a flexible space where students can learn at their own speed.

The Central Kitsap community is an engaged and proactive group that has rallied behind its school district. Voters there have approved several key capital project measures in recent years, including a $220 million capital bond in 2016 with funding for the district's alternative school programs.

BY IVI GABALES
RICE FERGUS MILLER

In 2017, the Central Kitsap School District graduated 95 of the roughly 45,000 students enrolled in alternative learning programs statewide. This was the largest, most-attended graduating class the district has seen. It can directly be attributed to the district's concerted effort in improving their schools district-wide.

The district consolidated its alternative programs into a newly renovated building in East Bremerton. The school, called Barker Creek Community School, opened its doors last fall.

Housing all K-12 alternative programs under one roof offers students more learning options, and aims to increase graduation rates and improve college and career readiness for hundreds of students.

Flexible learning

As an alternative school, the new facility provides a learning environment that allows learners to develop at their most effective pace. It also supports varied learning styles by providing flexibility and fluidity to match students with the appropriate learning environment, which is different from traditional school environments.

Teachers can add classroom space by sliding open a white-board wall.

PHOTO BY RICE FERGUS MILLER VIZLAB

"We're improving learning experiences and outcomes for students," said Jeremy Monroe, executive director of secondary teaching and learning.

While some students need smaller class sizes, some prefer online classes, and some might do better home-schooled but coming to school for science lab or robotics class. All are welcome at Barker Creek. The goal is to tailor the school experience to each student's needs.

"When students and families walk in our front door, we'll be

BREMERTON — PAGE 22

3 KEYS TO BUILDING GREEN SCHOOLS: DESIGN, OPERATIONS AND RENEWABLES

Taking a multi-pronged approach to energy efficiency leads to designs that are resilient, adaptable and healthy for students.

A daylit classroom at Sato Elementary in Portland.

PHOTO BY JOSH PARTEE

Performance-driven architecture and design culture in the Pacific Northwest is one of the strongest in the nation.

Collectively, we push ourselves and professionals in other regions across the country to employ proven strategies to reduce energy consumption and investigate new, innovative solutions that enhance our educational facilities while reducing our impact on the environment.

BY AMAPREET SETHI
DLR GROUP

Fortunately, from where I practice in Seattle, both our building energy codes and climate are conducive to an array of sustainable solutions in the built environment. Consequentially, we're able to set an example for others of what is achievable within the project budget allowance to reduce consumption through a three-pronged approach to energy efficiency: design, operations and renewables.

The end goal is to design buildings that will leverage the climate to create healthy learning environments.

Design

When designing new schools or renovating existing facilities, design teams consider a variety of options to best fit learner needs, as well as cost implications for local communities before determining a path for sustainability.

Simple, passive and low-cost design solutions — such as external shading and low-flow fixtures, or taking into account building orientation — can result in a rough range of $30,000-$50,000 of savings per year, allowing districts to redirect funds to other needs.

Beyond these base-level elements, design teams must lead meaningful conversations with school districts and community members to determine other sustainable strategies that positively impact and enhance indoor-air quality, thermal comfort, visual comfort and total cost of ownership. These sustainable solutions come at a cost and must be weighed against available funding and conflicting priorities. However, setting immediate and long-term goals, and quantifying performance of the strategies, results in informed decisions.

When it comes to value engineering or value add, a clear list of items should identify short-term vs. long-term decisions.

Building envelope and selecting a hydronic loop for heating are two such long-term solutions

3 KEYS — PAGE 22

Classrooms at Lake Stickney Elementary in Lynnwood have external shades to reduce glare.

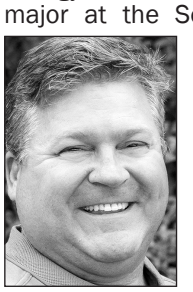
PHOTO BY CHRIS J. ROBERTS PHOTOGRAPHY

UW LIFE SCIENCES BUILDING: GIANT FIRS AND BIRD SONGS OFFER A ONE-OF-A-KIND ELEVATOR RIDE

A specially assembled timber facade greets passengers, who are serenaded by a different bird song on each floor.

About one-third of all bachelors' degrees conferred by U.S. colleges and universities between 2000 and 2012 were in science and engineering fields, according to the National Science Foundation.

At the University of Washington, biology is the most popular STEM major at the Seattle campus, with more than 600 bachelors' degrees awarded annually. A UW biology degree is a portal to careers in the health care professions, allied health sciences, biotechnology, bioenergy, environmental sciences and biology teaching.



BY KIRK BREWER
SKANSKA BUILDING

Starting this September, students and faculty will enjoy the newly completed Life Sciences Building, a complex that includes seven floors and 207,000 square feet designed to foster team-oriented science. The building encompasses a 187,000-square-foot research and teaching facility and a 20,000-square-foot research greenhouse with UW plant collections.

The Life Sciences Building will catalyze the growth of the Department of Biology to meet student demand and transform the fundamental discovery mission by promoting collaborative, interdisciplinary research and innovation among faculty, students and staff.

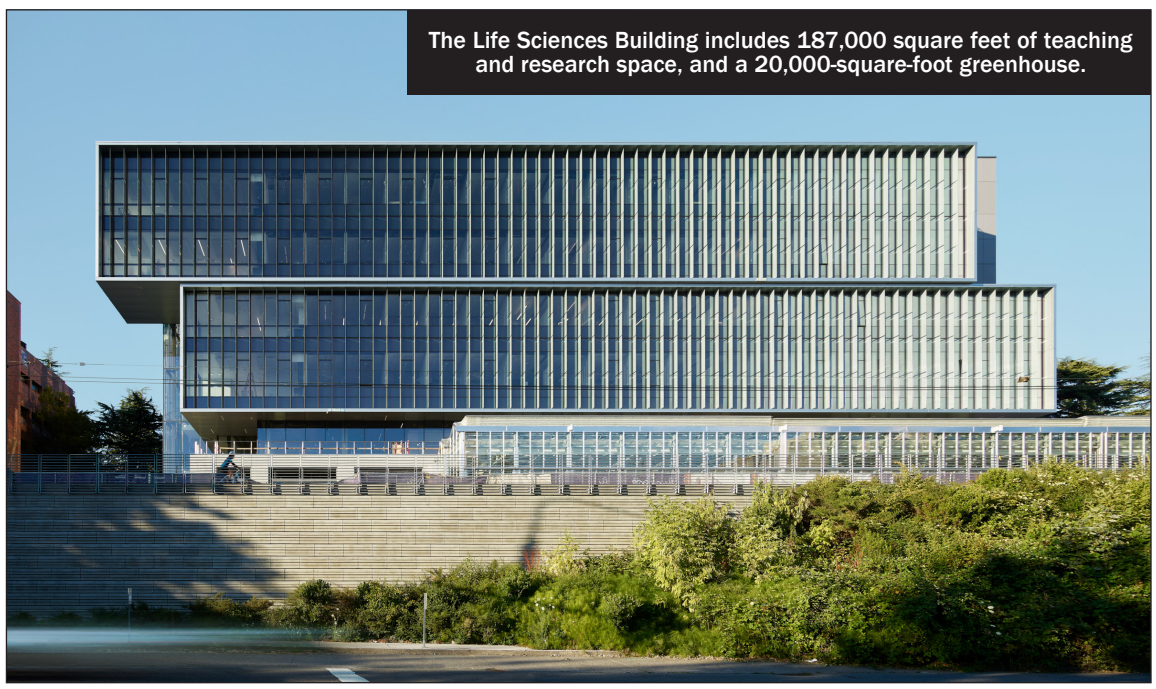
UW's biology department takes an integrative, collaborative approach to understanding the living world. Following the similar collaborative philosophy that inspired the building, the project team worked closely to mitigate construction challenges and prioritized frequent communication to ensure the best possible outcomes.

Harvesting trees

An anecdote about one of the building's marquee features, the elevator lobby facades, perfectly illustrates the deep and engaged cooperation among project partners.

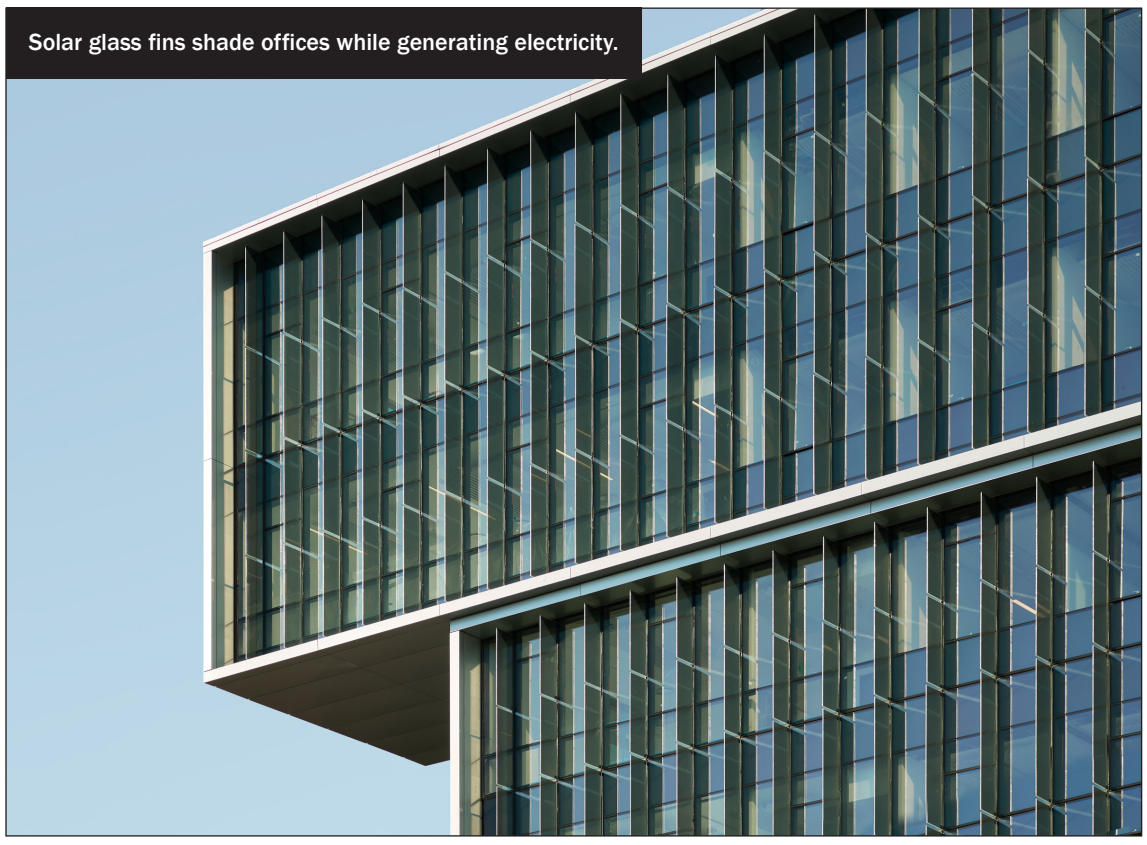
There are many symbols of the Pacific Northwest, and the Douglas fir tree is chief among them. Second only to redwoods when it comes to average height, the trees are as much a symbol of the region as they are a driver for a thriving sustainable timber industry. It's not unusual for buildings to incorporate timber into their designs, but when designs for the Life Sciences Building called for wood to be the facing of the facility's elevator core, the seed of a good idea took root.

UW biology professor Scott Freeman and his wife, Susan Leopold Freeman, donated trees from their conservation property on the Olympic peninsula for use in the building design. Susan is the granddaughter of Aldo Leopold, one of the founders of the science of wildlife management, and she continues her family's legacy as conservationists. A small grove of older trees on the Freemans' property required thinning to strengthen their long-term root structure and prevent the loss of the trees in windstorms.



The Life Sciences Building includes 187,000 square feet of teaching and research space, and a 20,000-square-foot greenhouse.

PHOTOS BY KEVIN SCOTT



Solar glass fins shade offices while generating electricity.

In 2016, our team from Skanska, the Freemans, UW biology department and Perkins+Will traveled to the community of Quilcene at the foot of the Olympic Mountains. There, we hand-selected the nine trees to harvest and mill to the specifications needed for the project. Each tree stood 150 feet tall, which matched the elevator core and full six stories of building height.

I'll never forget the day we hiked the Freemans' 160-acre forest and learned about the life-cycle of birch and alder trees, which after reaching 85 feet can no longer send water to their tops and die. They become nurse logs on the forest floor fueling the mighty Douglas fir and cedar trees.

After flagging the trees to be harvested, we ended the day outside the Freemans' humble cabin, sitting in a circle over some simple cheese and crackers, sharing all our ideas. It put the entire project into perspective and had a huge impact on me.

Careful reassembly

How the trees were installed in the elevator is what's truly special. Each tree has been carefully labeled through harvesting and milling of their center cores to ensure we could later line up the individual pieces along the height of the elevator core.

Essentially, the core of each tree was put back in place in the building on the elevator lobby

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LIFE SCIENCES BUILDING

Owner:
University of Washington

Architect:
Perkins+Will

General contractor:
Skanska Building

Civil/structural engineer:
Coughlin Porter Lundeen

Mechanical/electrical engineer:
AEI

Landscape architect:
GGN

Mechanical subcontractor:
McKinstry

Electrical subcontractor:
Veca Electric & Technologies

HOW ENVIRO CONSULTANTS CAN LEND YOUR SCHOOL PROJECT A HELPING HAND

They can smooth permitting, build public support and ensure designs won't run afoul of regulations.

Mitigation work at Bellevue's Cherry Crest Elementary included new native plantings.

PHOTO PROVIDED BY THE WATERSHED CO.

Successful school design is a collaboration among the district, expert architects and engineers, and a passionate school community. However, there is another factor that is often overlooked: environmentally sensitive areas and the regulations that protect them.

Normally, environmental professionals, like wetland scientists and planners, account for these complicating "trouble spots" early in the process and their report gets referenced throughout the ensuing design.

BY NELL LUND
THE WATERSHED CO.

Much like natural systems themselves, designs change. Walkways are moved, parking lots are expanded, site circulation can take new turns. In each case, environmental regulations can be a disruptor to the architectural and engineering design team's plans and the project's overall schedule.

By involving environmental professionals throughout the project, school districts and design teams can find new opportunities, instead of obstacles, to personalize the site to the school community.

Leaning in

Take Bellevue School District's Cherry Crest Elementary, for example. An important part of the district's project to increase capacity at the school was to rebuild it with a new classroom wing.

Unfortunately, the building's new footprint put it over an existing stormwater outfall, classified by the city as a protected stream channel that supports local habitat functions. The project team planned to pipe and relocate the outfall to a new open channel closer to the forest surrounding the school, but to follow the city's land use code protecting streams they also needed to mitigate for the loss of open stream channel.

There are commonly two options for accounting for this kind of environmental impact: recreate the stream channel elsewhere or enhance the remaining channel's habitat value. Both solutions would need an environmental study.

Yet an in-person study of an area's critical areas and habitat can also foster ideas. When my team and I walked through Cherry Crest Elementary campus' southern end, we found a forest with abundant snags, downed logs and healthy wetland, as well as paths and sidewalks that connect the school to Cherry Crest Park and nearby Bridle Trails State Park.

Instead of simply recreating the entire length of lost channel, we suggested the team lean into the area's strengths as an urban refuge for people and wildlife. Together, we were able to find a solution that maintained the local footpaths, planted native and drought-resistant trees and shrubs throughout the site's developed sections, and enhanced the site's habitat with native songbird nest boxes and large woody debris.

Conveniently, this approach blended well with the neighborhood's expressed desire for more vegetative screening.

Building public support

From high-occupancy parking to athletic fields, most schools have a variety of land uses that may not fit seamlessly into established zoning rules.

To account for these differences, some schools districts need to work with their jurisdictions on permitting, sometimes called "conditional use," to determine the exact need and the benefit it provides the community. At the end of the permit-review process, the jurisdiction holds public hearings, where school districts and the design team answer questions from the jurisdiction and public alike about how the project will affect the site.

Even though many of these improvements are born from community desires and concerns, these meetings can be stressful and ripe for misunderstanding. The school district and the design team need not only need to answer technical questions, but also respond to more abstract concerns from residents who may not have been part of the initial process and don't have the background to understand why, for example, more plants and large woody debris can make up for a prominent tree being taken down.

An environmental professional can provide a useful dynamic to these meetings — be it as sympathetic and informed ear

HELPING HAND — PAGE 22

LONG-DISTANCE TEAMS WORKED IN CONCERT TO REMAKE WYOMING SCHOOL THEATER

The partnership kept costs and schedules in check as complexities piled up for the historic renovation.

Natrona County High School in Casper, Wyoming, stood relatively untouched for nearly 100 years, until the four-story, concrete-and-masonry structure finally underwent an over-$100 million renovation and addition, completed late last year.

BY BRET MADDOX
PCS STRUCTURAL SOLUTIONS

All told, the facility encompasses over 300,000 square feet of renovated and new building area. Construction was completed in six phases over five years, with design beginning in late 2011.

Projects of this scale are complex and involve many players and moving parts. With a design team primarily located in the Puget Sound region — over 1,000 miles from the client, the Natrona County School District — it was important for the design team to have a strong local component. Wyoming-based firms such as Amundsen Associates, Lower & Co. and Adolfson & Peterson Construction provided that connection.

This team worked tirelessly over the project's six-year duration to breathe new life into an iconic historic structure while providing additions that both complemented and celebrated it. This transformation resulted in a modern, full-service high school that can be a source of pride for the community for decades to come.

A cultural resource

While there were many success stories along the way, one of the greatest examples of the project's continual partnerships was the transformation of the theater complex.

One of a small handful of full-service auditoriums in central Wyoming, the John F. Welsh Auditorium is home to NCHS drama and music programs as well as the Wyoming Symphony Orchestra and many traveling shows. Restoring this cultural resource would ensure a home for performing arts patrons in Wyoming for years to come.

Each detail of the renovation was addressed with care, such as the fully functioning fly loft stage and new orchestra pit, the reconstructed plaster ornamentation that dressed the seating areas, and the historic main school entrance that doubles as the public lobby to the theater.

Structurally, this entailed complete reconstruction of the on-grade seating bowl to accommodate updated seating lines, modern accessibility and the construction of a modern orchestra pit. It also included all-new rigging and catwalk structures within the nearly 50-foot height of the existing stage, and new catwalks over the seating areas.

Long-distance logistics

With the majority of the project team working long-distance, close coordination and teaming among the many disciplines was essential, along with support from the construction manager.

One success was the design of the roof structure over the

THEATER — PAGE 23

The renovation added new seating, catwalk structures and an orchestra pit.

PHOTO BY FRED J. FUHRMEISTER/TIME FRAME IMAGES

NATRONA COUNTY HIGH SCHOOL

Architects:
Bassetti Architects, Amundsen Associates

Construction manager at risk:
Adolfson & Peterson Construction

Structural engineers:
PCS Structural Solutions, Lower & Co.

Civil engineer:
WLC Engineering

Landscape architect:
Swift Co.

Mechanical/electrical engineer:
WSP Group

Theater consultant:
PLA Designs

Food service:
JLR Design Group

Acoustical/audiovisual:
Sparling

HELPING HAND

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or a neutral third party that explains the science-based laws and the local regulations that must implement them. In each case, environmental professionals can help raise a discussion out of a perceived political or emotional context, providing an unbiased explanation for project decisions.

An outdoor classroom

Not all projects burden the environment. In the case of Bellevue School District's demolition and expansion of Odle Middle School, the design team actually recreated 4,000 square feet of wetland buffer by relocating an athletic field elsewhere on the campus. Native vegetation was designed to take its place, creating an opportunity for the school's science program to teach students about ecological diversity and habitat function.

For the design team, the question then became how to enhance the area's potential as an outdoor classroom without introducing new problems or accidentally running afoul of buffer-related regulations. By working with environmental professionals throughout the process, the design team addressed regulations proactively in their plans and installed walking paths and seating that draw students close to natural processes without harming them.

The collaboration continued with the development of an interpretive sign program that illustrates the field's environmental restoration and provides interesting facts for further class discussion.

Meeting needs

As our communities become more urbanized and schools are built and redeveloped to meet growing populations, school districts will need to find creative solutions to comply with environmental regulations.

Incorporating environmental professionals into the design process makes it easier for design teams to meet these requirements and opens up new possibilities to develop calm learning spaces, where students can learn firsthand about the great places where they live.

Nell Lund is a senior ecologist at The Watershed Co., a Kirkland-based environmental services and landscape architecture firm servicing school districts, municipalities, and commercial and residential clients throughout Washington.

3 KEYS

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that become intrinsic to the facility's DNA and will remain for the life of the building. By identifying long-term goals, districts can future-proof their schools and effectively plan for the next iteration of new construction and capital improvements by utilizing design to support plug-and-play dynamics for future systems and renewables.

Right-sizing equipment now to support the system(s) anticipated down the road will save time and money when those systems are eventually installed.

For example, future installations of solar or high-efficiency systems impact the infrastructure, and therefore should be incorporated into facility master plans. Sizing of baseboards and hot water piping in classrooms are affected by the supply water temperature and the use of ground-source heating, but with proper planning, a facility can see a seamless transition.

Here in the Puget Sound area, Seattle Public Schools uses a master planning effort as part of its schematic design efforts to ensure that all decisions will benefit in the long term and tie into the infrastructure anticipated in the future.

The district has established an owner's project requirements document that highlights prioritized strategies, allowing design teams to factor these in during the design phase. The document states the requirement of an EUI target of 20 for new construction and 25 EUI for upgraded existing facilities.

According to the document, "An EUI is like 'miles per gallon' for a building, however lower is better. It is the amount of energy a building consumes annually per square foot."

This requirement defines the project path highlighting priorities, and sometimes establishes unique goal-setting for projects with varying budgets.

Operations

When it comes to operations, Seattle Public Schools consistently embraces progressive strategies related to sustainability.

District policy and standards are aligned to meet their set EUI goals. The district utilizes an active operations approach to reduce energy consumption. Its facilities team includes dedicated facility staff and resource conservation managers, and as part of their diverse job functions, this team continually monitors the operations and helps set achievable goals for the schools to target through occupant behavior.

One of the key strategies at Seattle Public Schools is a robust, active management system that utilizes direct digital controls and continual retro-commissioning of existing facilities.

Operational schedules and set points cannot be changed without notifications sent to the management team, and a shared-savings program has been put in place to help schools that are able to reduce their energy consumption and meet the goal to be rewarded (http://bit.ly/2odpGfb). The shared savings program incentivizes individual schools to meet set EUI goals and recognizes their efforts and achievements.

Another example from the standards includes set points that are included in the district's resource conservation policy and cannot be deviated from without a medical accommodation request.

This multifaceted approach shares responsibility for energy savings with the users. Occupant behavior can play a large role in further reducing energy consumption, and policy can help set expectations from the beginning to ensure user buy-in.

This also allows designers to use these as design guidelines, for example, designing mindfully for no cooling through passive cooling strategies.

Renewables

Seattle Public Schools has a plan in place to integrate solar in new and existing schools as they build and upgrade facilities. The district is implementing solar at six of its school buildings and intends to include more in the future.

In the realm of sustainable solutions, solar is icing on the cake. It is important that first investments reduce energy consumption and get to an EUI that can then be supported using renewables to reduce the total energy consumed to zero (or minimal), annually.

When solar is fully operational, this initiative will reduce energy consumption and has the potential to feed back to the grid for a few months each year.

When we combine design, operations and renewables we achieve two outcomes: establish future-proof and resilient school facilities that positively impact our planet, and create healthy learning environments that promote environmental stewardship to students, staff and local communities.

Amarpreet Sethi is a principal at DLR Group and leads its Building Performance Design team. Sethi focuses on bridging the gap between architectural design teams and their engineering counterparts to deliver high-performing buildings.

BREMERTON

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able to help them pick the program or schedule that's right for them," said Principal Stuart Crisman.

The school brings together elements of online learning, classroom-based high school classes, and a parent partnership program that provides support and enrichment for students who learn at home.

The design of the school needed to provide learning spaces that support the wide spectrum of teaching, learning needs and styles.

"We're going to have a good space that allows different styles of teaching," Crisman said. "Teachers are excited about having the opportunity to learn from each other, make changes and offer more opportunities for kids."

Primed to be open

Architects and interior designers at Rice Fergus Miller were tasked with designing a space that supports the goals and programs of this new school. The 60,000-square-foot former call center was already primed for an open concept.

"What we're trying to do is break down the 'traditional' walls where you have to be inside the school to do your learning," Crisman said.

The sliding white-board walls between the classrooms and common areas are manifestations of that idea. The adjustable walls allow teachers to have flexible room sizes.

Breakout areas and maker spaces, with their various types of seating and desks, encourage collaboration and creativity. Classrooms are integrated with new technology such as flight simulators and art/science labs.

Incorporating bold colors and big letters on walls help with wayfinding and reinforce the school identity, which is especially important to the students here.

Building a culture

Although learning experiences differ from student to student, the goal is to foster a sense of school community for students and families.

The new identity begins with a new name, Barker Creek Community School, after the creek that flows behind the building. The students participated in choosing the school colors and their mascot.

The students identify with the school and feel like actual students, rather than relegated to portables on other campuses.

"We're going to build a culture at the new school that will help students feel like they're all part of one school," Crisman said.

It looks like they succeeded. Barker Creek Community School students walked through their school's doors for the first time last September.

"I absolutely love it," said Izabela, a student at the school.

Last June was their first graduation ceremony, held at the Newlife Training Center in Silverdale. It was the most well-attended alternative school graduation in the district's history.

Ivi Gabales is an associate and business development manager at Rice Fergus Miller. While she has left architectural design in favor of the business side of the practice, she still involves herself in technical research and enjoys developing project narratives.

THEATER

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seating areas. At this location, the structural, mechanical and theater consultants worked closely with the help of as-built information from the local team members to achieve a very thorough analysis of the existing long-span, riveted structural steel trusses that spanned the auditorium.

The team used the analysis to determine where and how new loads could be supported with only very minor improvements to the existing trusses. This collaboration reduced required work in the field, which kept schedule and budget concerns in check while still supporting the lighting and conditioning needs of a modern theater space.

The team also worked together to develop cost-effective solutions to reconstruct and support ornate plaster ceiling features, which were tied seamlessly into the historic plaster finishes along the sides of the space.

In the back of the house, similar collaborative efforts among the construction manager, structural and theater consultants allowed for installation of large amounts of new structural steel within the existing stage loft boundaries to support the fly loft system. This was all completed atop an existing concrete pan-joist system that was shored to allow placement of construction loads without damaging the existing floor.

A fast finish

The only hiccup in the construction process occurred when excavation of the orchestra pit revealed unstable soils, causing settlement and damage to one of the historic plaster proscenium jambs that had been slated for preservation.

The team dealt with the issue quickly and efficiently, from early triage of the conditions by the local structural engineering team members to a hands-on design charrette involving the architect, structural engineering team and contractor teams. The resulting solution allowed construction to continue with minimal schedule disruption, and costs were minimized to the greatest extent possible.

In the end, the team successfully completed the project within budget and approximately one year ahead of the original schedule. Close collaboration among dedicated team members near and far resulted in the beautifully restored performance space, which celebrates Natrona County High School's storied history while updating it with all of the function of a 21st-century theater.

Bret Maddox is an associate principal with PCS Structural Solutions in Tacoma and a proud Wyoming native. He served as project manager for the NCHS project and has over 25 years of structural engineering experience in the Pacific Northwest.

ELEVATOR

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facade exactly as the tree stood in the forest. From top to bottom, the trees were reassembled. Additionally, adjacent sides of the elevator cores utilized the outer shells of the trees, depicting the sides of each tree in the forest.

A mock-up of the elevator core was useful in the early coordination of this unique feature, as it flushed out numerous detailing and coordination challenges. It provided opportunity to solve the challenges before they found their way into the field, allowing subcontractors to learn how to build this one-of-a-kind feature prior to actual installation.

Incorporating these Douglas firs into the elevator experiences speaks to the customer commitment for this project. There is no shortage of places that can source this wood. Instead, though, we created something with someone who will work in the building.

Elevator music

The ingenuity and massive attention to details characterizes much of the construction of the Life Sciences Building.

The building is designed to meet LEED gold criteria and includes innovative sustainable features such as water that's reused for greenhouse irrigation and solar glass fins that shade the offices and generate electricity — a first-of-its-kind installation.

A unique feature in the elevators is the incorporation of bird songs, where the elevator ring for each floor is assigned a specific bird song.

The idea to incorporate bird songs was brought to Skanska by UW biology faculty. Emeritus professor Sievert Rohwer worked with Mike Webster and Matt Young of Cornell University's Macaulay Library of Natural Sounds to identify bird species that live from the top to the lower levels of the forest.

As a result, each floor's elevator ring has a specific bird song associated with it, including a Swainson's thrush, red-breasted sapsucker, varied thrush, red-breasted nuthatch, western tanager, Townsend's warbler and olive-sided flycatcher. This was another fun way to showcase the department's broad-based work and research of all living things.

Life sciences are the branches of science that involve the study of organisms, such as microorganisms, plants and animals, including human beings. It is this synergy that the Life Sciences Building intertwines with Douglas firs from the natural world as a visual focal point.

The new building ensures that the Department of Biology will continue to lead the transformation in how biology is practiced. The design is open, flexible and modular, allowing for adaptation of the space when emerging research questions require novel methods and newly developed instrumentation. Undergraduate teaching labs and an active learning classroom will allow faculty to engage all students in hands-on, dynamic learning and discovery.

Our team is thrilled that students, faculty and staff will experience the legacy of collaboration in the design and construction process for years to come.

Kirk Brewer is a senior project manager at Skanska Building.

Value Insights with Timothy Buckley, AIA, VMA, LEED AP

IT'S MORE THAN SIMPLY CUTTING COSTS

The importance of an independent value analysis team in alternative delivery K-12 school design projects

In recent years there has been a shift in the way many projects are being delivered at K-12 school districts throughout the Northwest. More districts are exploring alternative delivery methods like General Contractor/ Construction Manager (GC/CM), Design-Build and Progressive Design-Build to help accommodate the demands of fast-tracked, complex, and multi-phased projects. The successful delivery of a new school is of vital concern to all stakeholders within a district, and the need to deliver these projects on time and on budget are as important as ever.

While State law (WAC 392-343-080 & 392-344-065) requires that a Value Engineering (VE) study be conducted on all major construction projects that receive state funding, there is often an assumption that the contractor can "take care of VE" by managing construction costs alone. This is one of the most common misconceptions about VE – that it is just about lowering costs. While construction costs are one factor that is analyzed, a more beneficial VE process is one which follows a rigorous process and focuses on identifying opportunities that improve long-term value and are in the best interest of the owner. These may include a building's functionality, performance, life cycle costs, reducing maintenance and operation costs, project risk reduction, and overall project quality and success.

As more and more projects utilize alternative delivery processes, integrating the expertise of an experienced VE team is highly beneficial to the success of the project and is a valuable tool when combined with the skills and knowledge of the GC/CM.

As an example, MENG Analysis was hired in 2016 by Central Kitsap School District (CKSD) to provide value engineering, constructability and building commissioning services for four major school construction projects from their 2016 Capital Bond. These included the replacements of Central Kitsap High School and Central Kitsap Middle School with Skanska as the GC/CM, as well as a modernization and addition of Olympic High School with Korsmo Construction as the GC/CM.

For Olympic High School, the project involves the complex and sensitive replacement of the central 1/3 core of the existing school, while adding a library and larger theater. The schedule and budget were tight, and construction activities occurred on an occupied site with school functions to be maintained throughout construction. The VE study team included four key members of Korsmo Construction's project team, along with MENG Analysis' multidisciplinary team of independent professionals.

One of the key members of the team was William Floyd, an Estimator with Korsmo. "Being a part of the study helped us to identify the major project risks we as a contractor were facing/about to face & put a plan in place early on to mitigate those risk," Floyd said. "On this particular project, we were essentially doing open heart surgery on the school, all while it was still operational, which created a lot of inherent risk. Having Kormso, the architect, the engineers, and outside consultants in the room all together early on proved key in identifying risk factors, as well as coming up with unique solutions to mitigate them."

"Having the contractor on board early helps us to better identify the real function of the building, the owner's wants and needs, and the ultimate goals of the project. This allows us as a contractor to shape our process from the start to meet and ultimately exceed the project goals and expectations."

Integrating members of the GC/CM's team into each of the CKSD VE studies allowed for the generation of design and construction alternatives that addressed potential improvements such as construction phasing, schedule, site safety, stormwater systems, structural framing, and various first and life cycle cost savings.These types of ideas provide increased value by delivering a project that meets the district's project goals and design standards, while also being fiscally responsible in regards to total cost of ownership.

Keys to VE Success

- Focus on function, resources, and quality.
- Professionally licensed, multi-disciplinary VE study teams with SAVE International certified team leadership.
- Develop solutions that align with the district's project objectives, standards, and educational learning environment goals.

Even on projects using alternative delivery methods, having a VE team who is truly independent from the design/construction team provides significant benefits through objective insights and the introduction of new design ideas and alternatives — all while including the contractor in the process and eliminating even the appearance of any potential conflicts of interests.