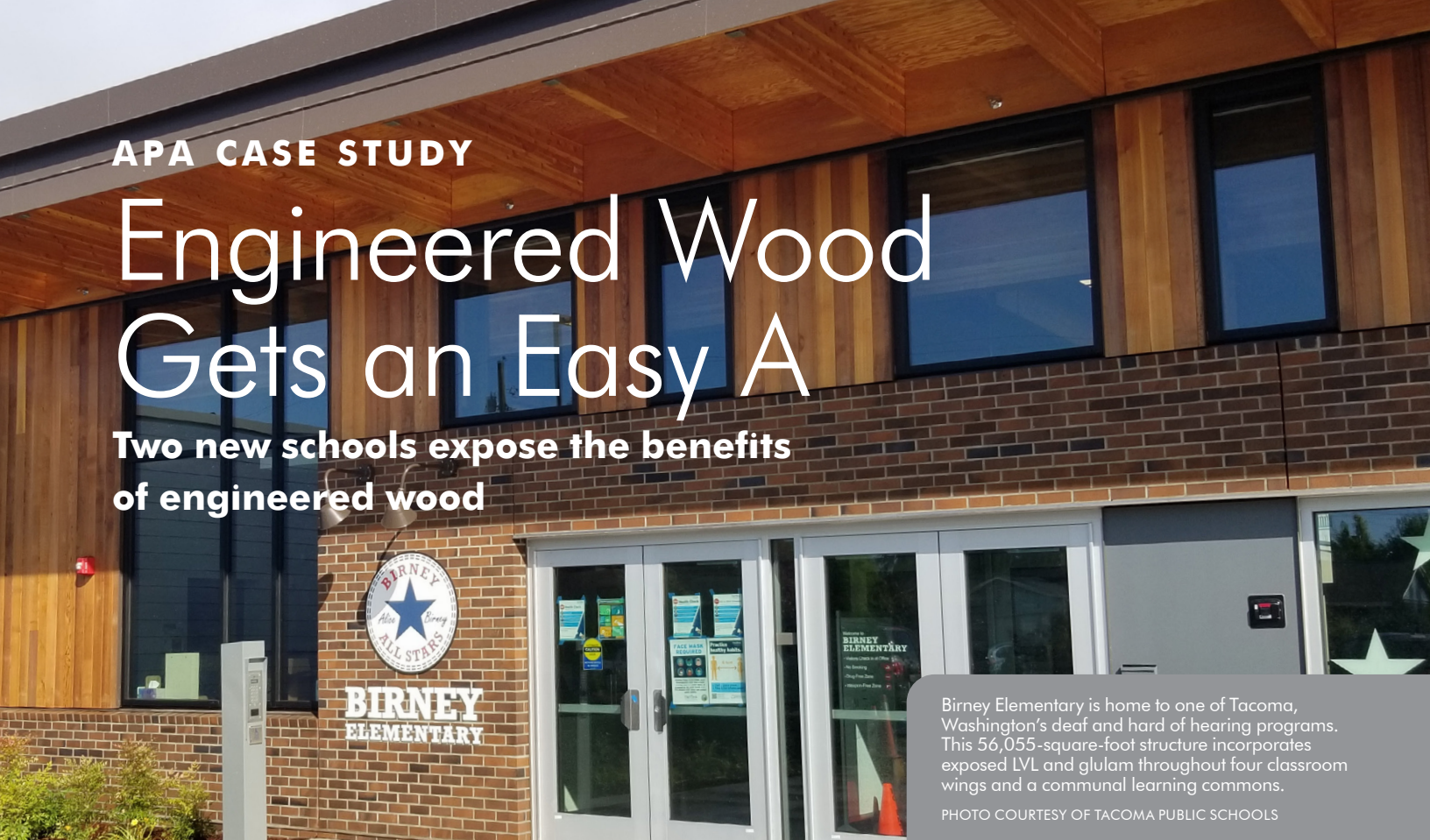


APA CASE STUDY

Engineered Wood Gets an Easy A

Two new schools expose the benefits of engineered wood



Birney Elementary is home to one of Tacoma, Washington's deaf and hard of hearing programs. This 56,055-square-foot structure incorporates exposed LVL and glulam throughout four classroom wings and a communal learning commons.

PHOTO COURTESY OF TACOMA PUBLIC SCHOOLS

Engineered wood is never too cool for school. Sustainable, cost-effective and aesthetically appealing, wood is ideal for school construction. Two Washington school districts creatively leveraged the benefits of exposed wood products in their newly constructed schools.

VANCOUVER SCHOOLS

The McLaughlin Middle School/Marshall Elementary School, located in Vancouver, Washington, is one of the largest mass timber projects in the Pacific Northwest, at an astonishing 203,000 square feet. The project was carried out by Western Wood Structures, a local construction company based out of Tualatin, Oregon, that specializes in mass timber installation.

Mike Dyer, project manager for Western Wood Structures, is no stranger to the benefits of engineered wood products. Western Wood Structures has been building with engineered wood for more than 50 years. "We love the product because it doesn't have the natural flaws of traditional traditional timber," Dyer said. "It's a very consistent building material."

Vancouver Public Schools wanted to begin incorporating wood into its schools.

"People are moving toward wood because of the environmental benefits," Dyer said. "It's sustainable and renewable, and people feel good about that."

— Mike Dyer

Project Manager for Western Wood Structures



PHOTO COURTESY OF WESTERN WOOD STRUCTURES

Environmental Benefits of Wood

Increased demand for wood products encourages healthy forest maintenance, and the regeneration absorbs more greenhouse gases. Wood sequesters carbon from the environment as the tree grows, and buildings made with engineered wood continue to have a net benefit on the environment.

In addition to sustainability, the school district was also enamored by the warmth and natural aesthetic of the mass timber. The school district chose to leave the wood exposed, so people could see its natural beauty and the structural elements, creating a strong focal point.

The Vancouver school project used multiple engineered wood products, including cross-laminated timber (CLT), glulam and laminated strand lumber (LSL). Using mass timber significantly increased the speed of erection. “Our crew was able to set entire floors of CLT panels in just a few days, which would normally take a week or two with traditional framing,” Dyer said. “The beauty of mass timber is that all the fabrication required for the project is done when it shows up. It’s much more precise and very beneficial for the timeline of the project.”

Engineered wood products can be manufactured in dimensions specific to the project, resulting in less wasted scrap materials. Traditional lumber requires cutting, drilling and tooling on location, which requires more labor hours, produces more waste and creates more room for errors.

The mass timber improved safety on the job site. “It allowed our crew to spend less time preventing safety issues and constructing components to walk on, because instead, they had a large, sturdy panel to walk on,” Dyer said. “It reduced the number of our crew members that were in the air.”

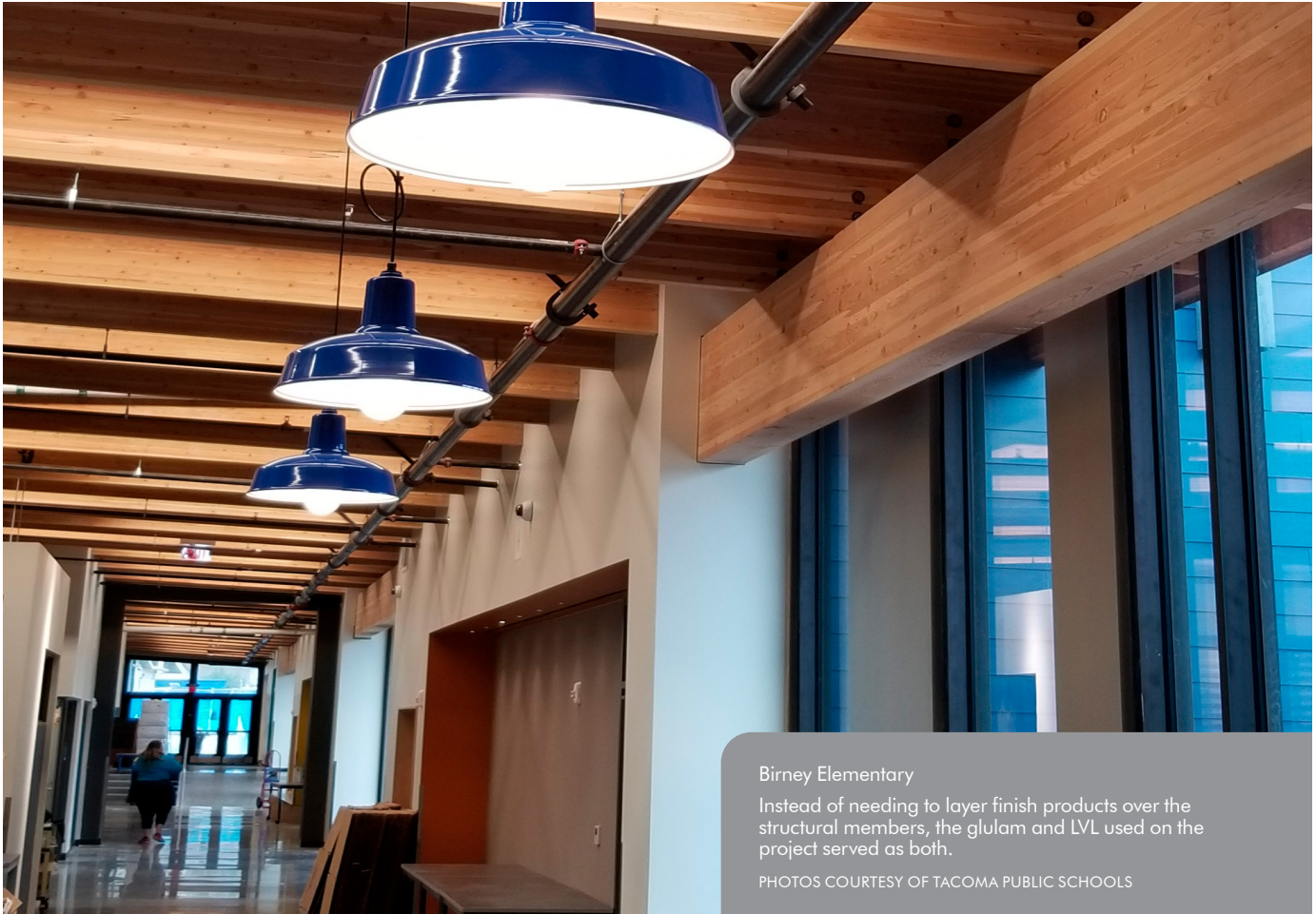
The project was met with innovation by Western Wood Structures. “We developed a special rigging form for lifting the different sized CLT panels and ensuring they were precisely set in place,” he said.

Biophilia and Learning



Wood products can positively affect the learning environment. The natural beauty and aesthetic of exposed wood creates a warm and enriching atmosphere. More research is backing the hypothesis of “biophilia,” or the tendency for humans to prefer natural materials. Research suggests that natural materials, like engineered wood, support increased focus and productivity that is conducive to an effective learning environment. Read more about biophilia and the research behind it at apawood.org/biophilia.

PHOTOS COURTESY OF WESTERN WOOD STRUCTURES



Birney Elementary

Instead of needing to layer finish products over the structural members, the glulam and LVL used on the project served as both.

PHOTOS COURTESY OF TACOMA PUBLIC SCHOOLS

With over 800 CLT panels, and more than 700 different shapes and weights, the company needed a rigging system that was simple but could accommodate the variety. Western Wood Structures' project engineers designed, developed and manufactured a rigging system that allowed the crew to install over 30 panels, or 10,000 square feet of floor or roof a day.

"It's hard to move the panels once they are set, and this rigging form allowed us to increase our crew's productivity and improve their safety on the job."

TACOMA SCHOOLS

About 175 miles north, Tacoma Public Schools also discovered the benefits of incorporating exposed engineered wood into their new school. Birney Elementary is home to one of Tacoma, Washington's deaf and hard of hearing programs. Its



existing building is being replaced by a brand new 56,055-square-foot structure featuring four classroom wings and a communal learning commons. The new school is scheduled to open this fall, and is being completed by Turner Construction Company.

For Tacoma Public Schools, engineered wood was an easy choice.

According to Kris Stamon, project manager for McGranahan Architects, early in the project, mass timber components were chosen instead of steel because of wood's inherent beauty. "The design expresses the warmth and beauty of the wood products, specifically via the exposed roof structure that unifies the main circulation spaces throughout the school," said Stamon.

One of the main drivers of the project was being able to maximize the openness of the building. "The visual openness unifies the school," Stamon said.

But for Tacoma Public Schools, choosing engineered wood was about more than just good looks. For the single-story building, wood products were also the

most cost-effective solution. Instead of needing to layer finish products over the structural members, the glulam and laminated veneer lumber (LVL) used on the project served as both. "We were able to use the structural wood as the finish material, which reduced our costs when compared to a layered approach," said Tacoma Public Schools Project Manager Greg Stidham. "The fact that many of the wood elements could be left exposed and expressed structurally had added benefits. The ability for the students to see the structural and exposed connections can also be used as an educational tool."

The structural design was intentionally repetitive and allowed the construction process to be sequenced for improved efficiency. "We were able to pre-construct panelized walls, which allowed for mass installation. Using the sequencing system improved our crew's productivity," said Turner Construction Engineer Karen Lawton.

"Glulam served as the main beams, which we installed first with plywood spans, then



PHOTOS COURTESY OF TACOMA PUBLIC SCHOOLS

PHOTO COURTESY OF TACOMA PUBLIC SCHOOLS

Acoustic Advantages

The wood products also offered some acoustical advantages for the deaf and hard of hearing students. Wood doesn't reverberate sound as much as its steel or concrete counterparts. The wood helps soften the noise and makes sound easier to control, creating an enhanced learning experience for the students.

we installed the roof system. The exposed glulam beams and plywood provide roof structural support and horizontal stability throughout the main hallways of the school," Lawton continues. "These beams can span longer distances for flexibility of design and construction."

By using wood on the project, Turner Construction was able to cut labor costs and support the local economy by sourcing the wood materials from local suppliers. "We were able to tap into the large, local carpentry force," said Amanda Packer, project manager for Turner Construction. "We were also able to save on labor costs because we didn't need to hire

additional welders or ironworkers, whose wages are typically more expensive."

"The wood products were local and readily available, so we didn't need to wait for shipping from another country, which was a big advantage," Packer added.

"Engineered wood products and traditional materials were combined to form a beautiful, cost-effective and safe learning environment for the students," Stidham said. "The exposed wood makes this school unique; it makes it stand out."

It's clear that for these two school districts, engineered wood gets an easy A.

We have field representatives in many major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying engineered wood products, contact us:

APA HEADQUARTERS: 7011 So. 19th St. • Tacoma, Washington 98466 • (253) 565-6600 • Fax: (253) 565-7265

APA PRODUCT SUPPORT HELP DESK: (253) 620-7400 • E-mail: help@apawood.org

DISCLAIMER: The information contained herein is based on APA – The Engineered Wood Association's continuing programs of laboratory testing, product research, and comprehensive field experience. Neither APA nor its members make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this publication. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements. Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed.

© 2020 APA – The Engineered Wood Association

Form No. W170
Issued October 2020

