

**MASS TIMBER**



HEALTHIER  
**MASS**  
BETTER  
**TIMBER**  
FASTER

# Primed for the 21st Century.

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Mass timber buildings go up faster. Building them is healthier for environments and economies. Living and working in them is healthier. And because wood is the only scalable building material that sequesters carbon, building with mass timber can substantively respond to climate change.

The 20th Century was made of concrete.  
The 21st Century will be built with mass timber.

Ankrom Moisan is ready.

We have strong and broad AEC connections along the forested West Coast. For over 30 years, we've led projects across industry markets, from urban high-rise to affordable housing to hospitality and more.

We work at massive scales. We push building code for smarter applications, and we're passionate about pushing wider acceptance for mass timber buildings everywhere. We're learning more and more every day.

Shifting to mass timber will measurably benefit our clients, our buildings, our communities, and our future.

Mass timber should be the baseline assumption for every new development project, starting now.

But we can't do it alone.



## Sustained economies.

As development shifts to mass timber, rural economies that support timber growth are positioned to answer demand with supply.

By bringing sustainable economic growth to areas hit hard by the Great Recession, and by bringing careful harvesting practices to the architecture and construction industry, mass timber can help evenly distribute urban wealth among rural cities and towns in timber country.

## Happier people.

Wood offers connection—to living materiality, to craft and source—that few materials provide. On an individual level, mass timber answers people’s need for biophilic living and working spaces.

On an ecological level, mass timber buildings carry a far lighter carbon footprint than traditional buildings, making them healthier for unbuilt environments, present and future alike. In our reality of climate change, mass timber’s ability to sequester carbon within buildings can’t be overstated.



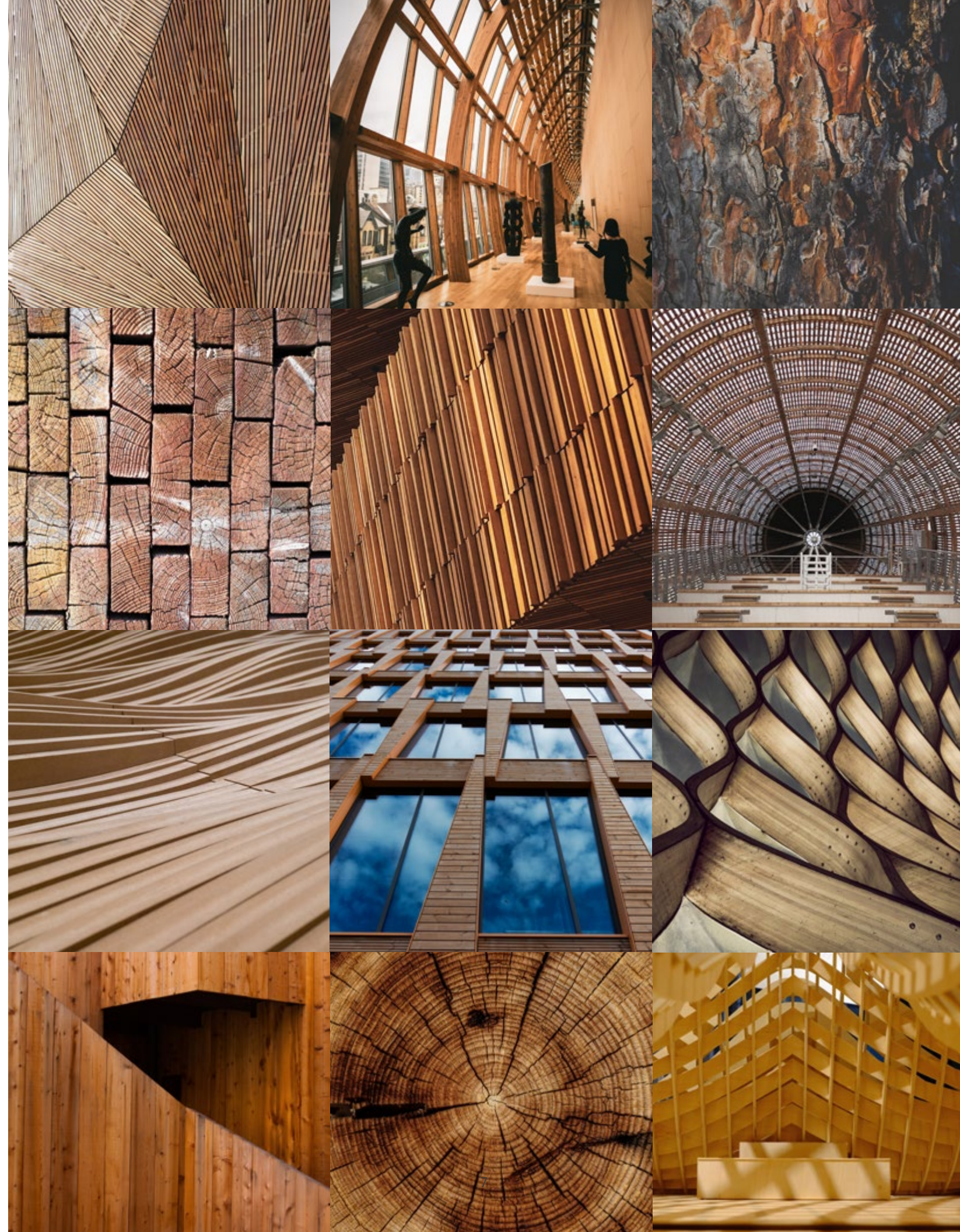
# BETTER

## Stronger, lighter, and more beautiful. Naturally.

Mass timber beams—proud and sweeping, or stoic and rectilinear—express human-scale elegance that no other building material can. We evolved beneath trees. Across the eons, we’ve equated mass timber with comfort, warmth and security. Mass timber buildings are simply beautiful.

“Strong as oak” is not just a saying. Mass timber members are incredibly strong for their weight, which allows them to sit lighter on soils that would otherwise require extensive ground improvement. The massive nature of these members means that they will char during a fire, but maintain that robust strength. And they don’t conduct heat and cold like concrete or steel, making the “warmth” of wood a literal benefit.

Expertise: Mass Timber





# FASTER

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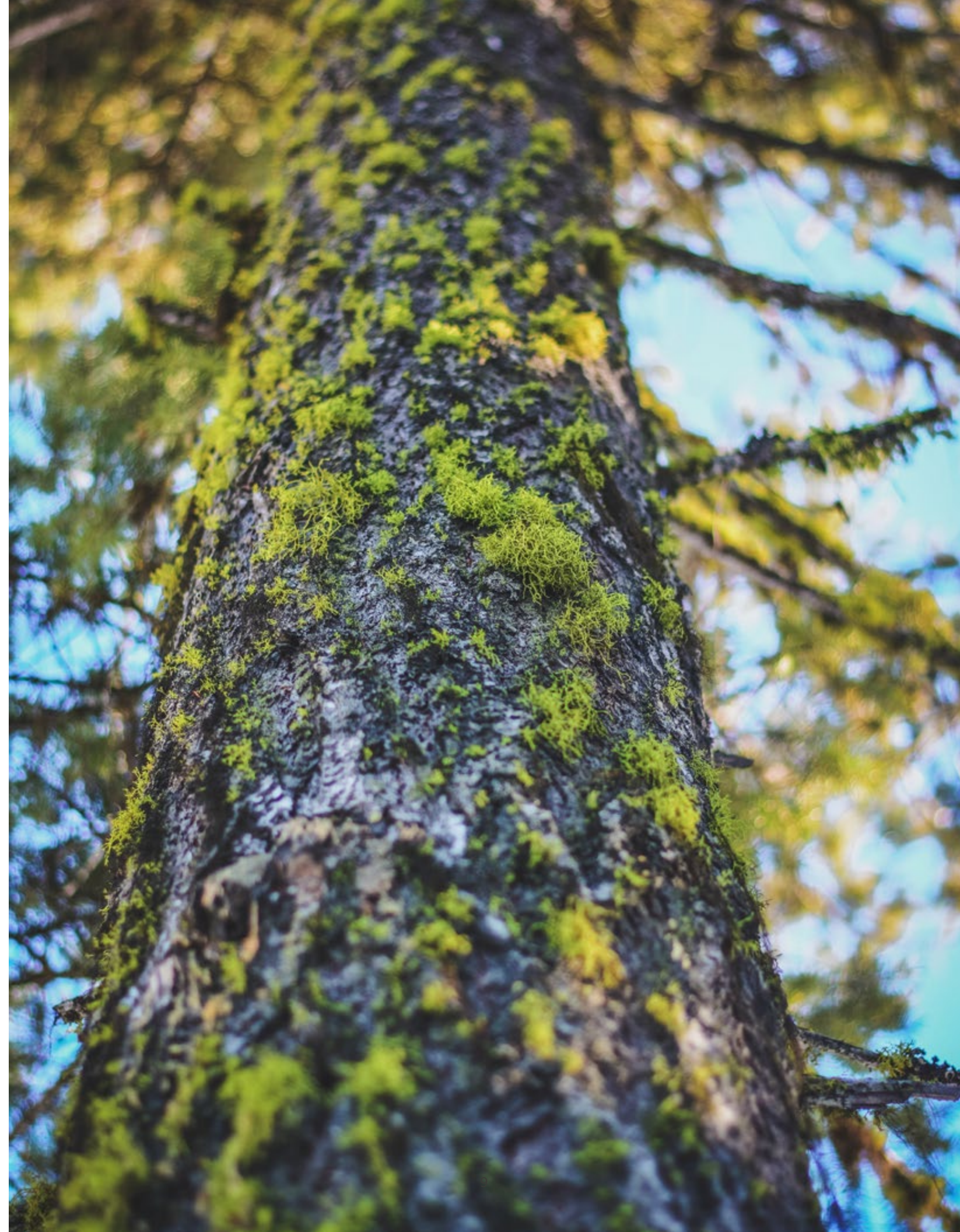
More efficient.  
More competitive.

Mass timber buildings come together like a kit of parts, so they erect faster than traditional concrete or stick frame buildings. Each component is fabricated off-site, which means it takes fewer, more experienced people to craft the best building. The product delivers exactly when needed, making storage unnecessary. And wood can be harvested and fabricated locally, reducing shipping and tightening the chain of raw material to built product.

Time is money. People are money. Transportation is money. Supply is money.

All the efficiencies inherent in mass timber systems align in this high-quality product, both in structure and aesthetics, for an extremely competitive overall cost.

Expertise: Mass Timber





# REAL RESPONSE

## Climate-changing.

Earth's atmospheric carbon dioxide is 409 ppm in late 2019—far past the threshold of persistent, catastrophic disruption. In 2018, the IPCC reported that by 2050, we must reduce global CO2 emissions to net zero to prevent global temperatures from heating beyond catastrophic levels. Instead, global CO2 emissions have increased.

Climate change now affects nearly every facet of life on Earth. It unifies us.

We can substantively respond to the realities of our warming planet by changing how we build at scale. We know how much carbon so-called traditional building releases. We know mass timber not only emits less carbon during construction, but because wood captures atmospheric carbon as it grows, mass timber acts as a carbon sink.

A simple technological solution is growing right in our back yard.

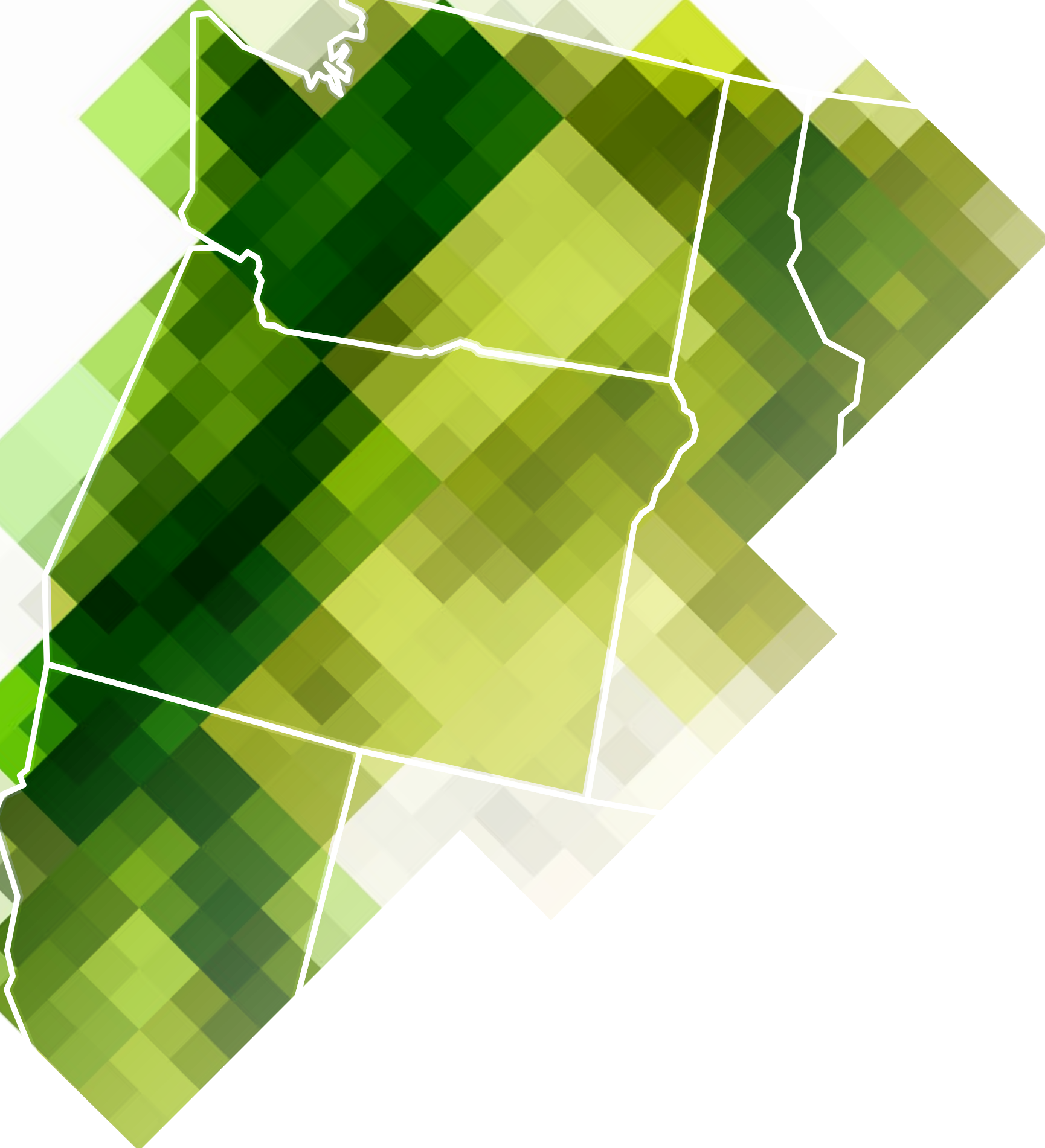
**Ankrom Moisan wants to take the lead on a substantial and practical response to climate change.**

Our industry releases massive amounts of CO2 into the atmosphere. The built environment is responsible for approximately 40% of global carbon emissions. Of that, approximately 11% are released through building materials and construction alone.

Mass timber can potentially reduce global carbon emission by 14-31%, offsetting carbon-emitting materials and sequestering carbon beyond that.

We want to work with partners who feel the same and are ready to do something about it—something more than just talk.





# PNW Advantage

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The Pacific Northwest is surrounded by the United States' largest timber resources and all the expertise that supports this industry.

Our wealth of practical knowledge in sustainable building and the infrastructures can turn good ideas into beautiful and innovative buildings.

And our region is the home to one of the world's strongest structural wood species: Douglas fir.

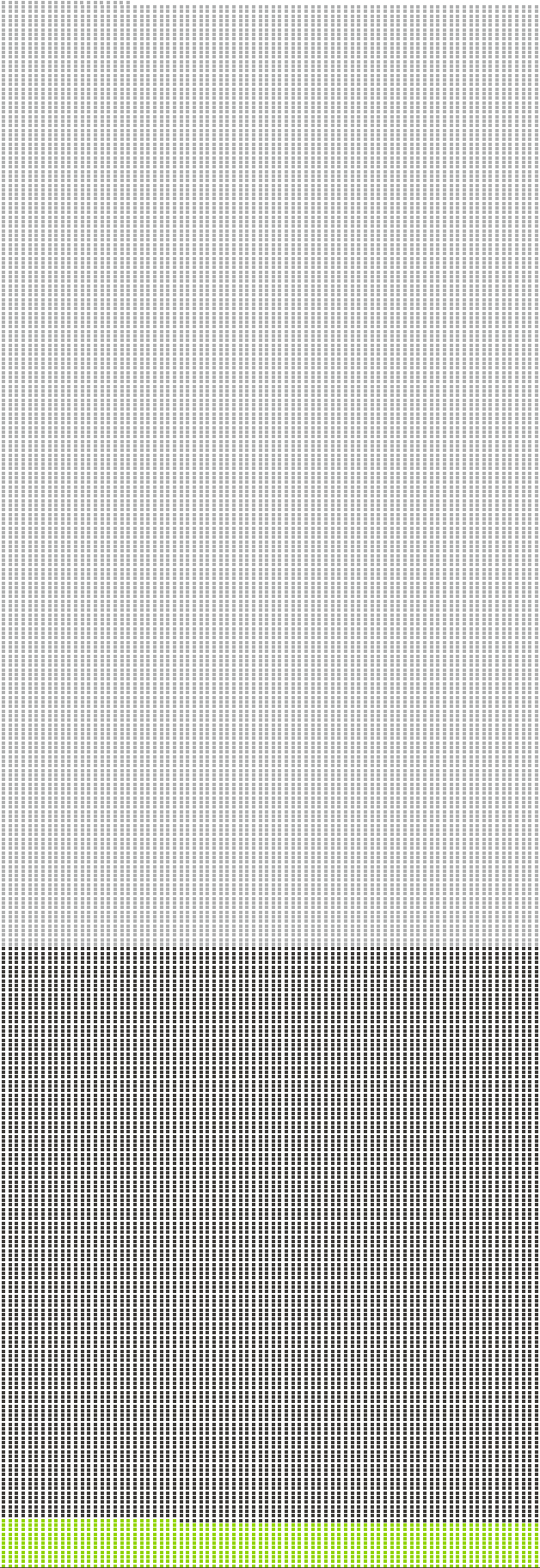


# Critical Mass

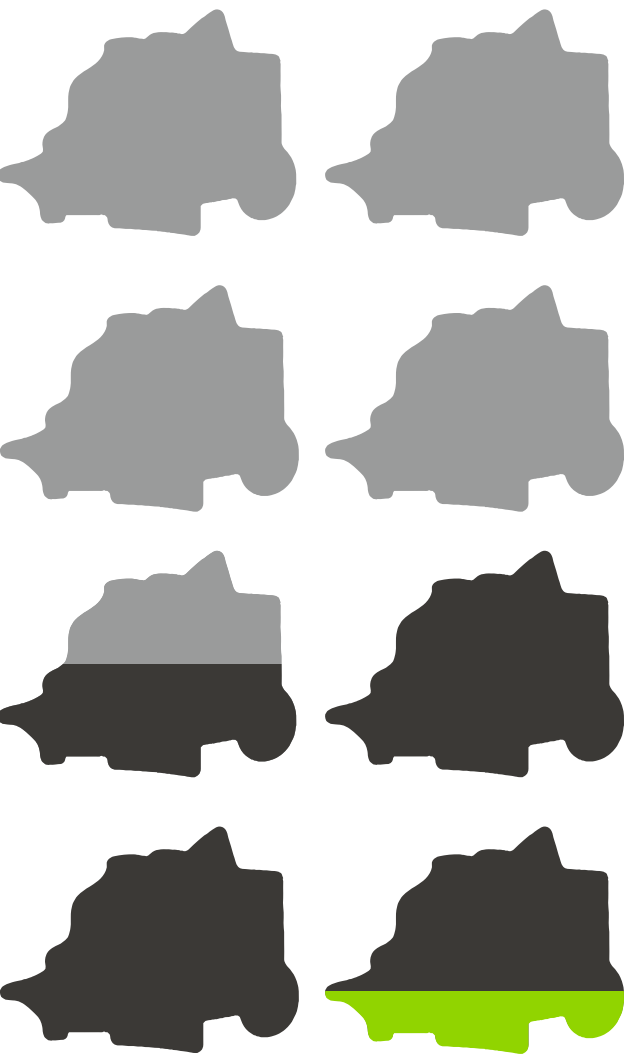
## When giants shift, we feel it.

Ankrom Moisan shares ideas and discoveries and connections: What we learn in one market sector informs another. We link isolated knowledge and resources both internally and externally, among markets and industry connections. Innovations in one sector—hospitality, for example—affect innovations across retail, healthcare, and office spaces. Everything we do is connected.

Other, smaller firms may only do mass timber. And while their work is important, it’s a drop in the bucket. When Ankrom Moisan and our partners shift to mass timber, even partially, that drop can become a waterfall.



THE SQUARE FOOTAGE OF ANKROM MOISAN'S BUILT UNITS IN THE PAST FIVE YEARS IS 877 ACRES OR ABOUT EIGHT VATICAN CITIES.



TOTAL BUILT  
SUSTAINABLY CERTIFIED  
MASS TIMBER



OVER THE PAST FIVE YEARS, ANKROM MOISAN BUILT 27,220 UNITS. APPROXIMATELY 40% OF THOSE UNITS WERE SUSTAINABLY CERTIFIED, WITH 3% OF THE TOTAL SQUARE FEET IN MASS TIMBER BUILDINGS.





# Our work is just starting.

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As architects and designers of innovative buildings across the West Coast, we're focused on new mass timber development.

Our work includes changing codes to support mass timber construction, international field research into practices and standards, and focusing our market expertise. We want to spark, listen to, and learn from the mass timber conversation.



# Skylight

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## Where industrial pasts join optimistic futures.

For the creative office spaces in Skylight, located at 120 SE Clay, we used a hybrid mass-timber/steel frame to reflect, in a very modern way, Portland's historic Central Eastside Industrial District. Exposed mass timber and hybrid, double glulam trusses create both a vibrant interior space with versatile, open floor plates and an inspirational new pavilion for an evolving district.

*Key Labels: Office, Type IIIB, Mass Timber Hybrid, Concrete Lateral, NLT*

Expertise: Mass Timber



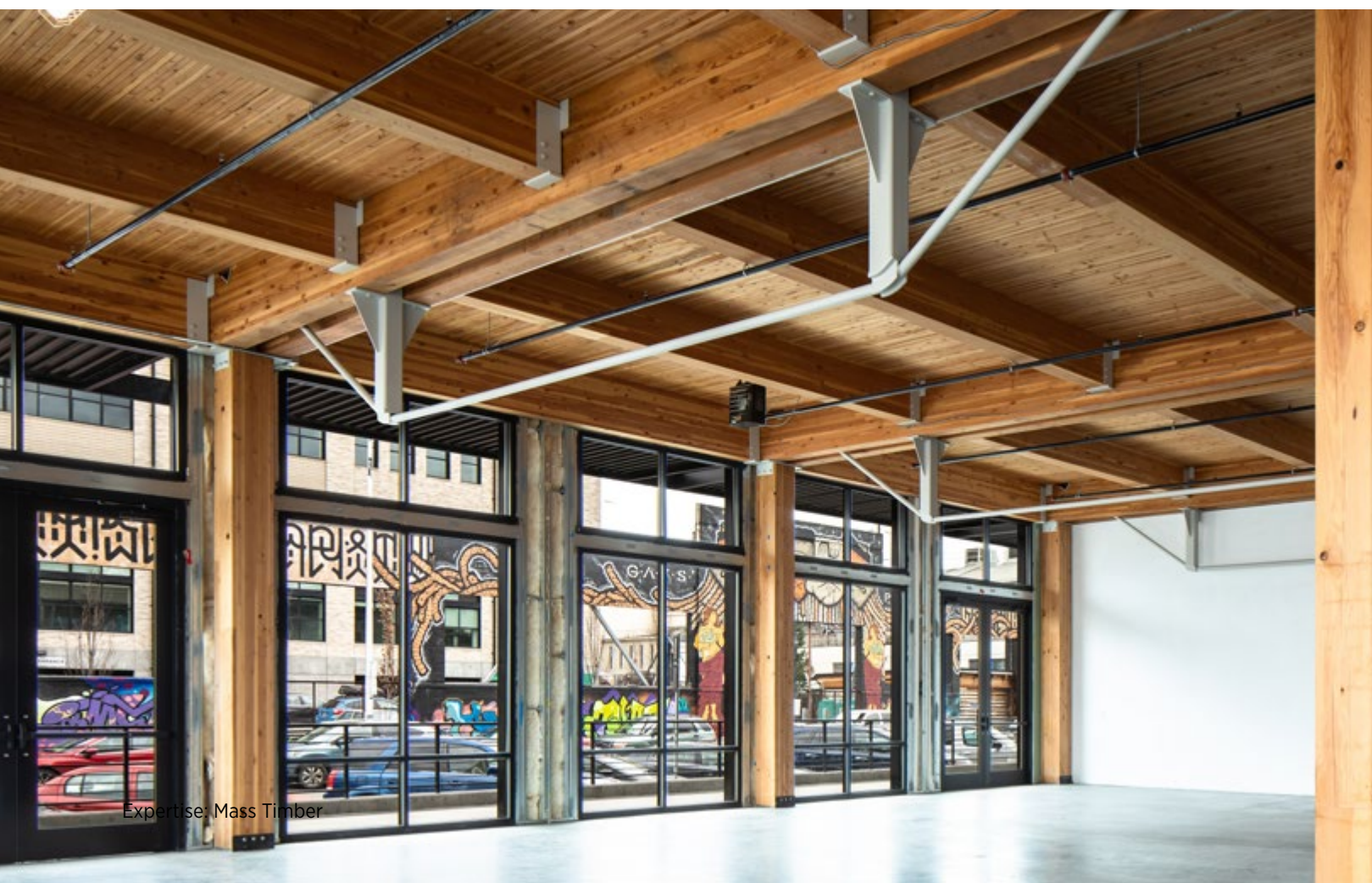








## Serving both pragmatic and highly creative needs, equally.



Creative offices tend to attract discerning people interested in inspirational environments and versatile open spaces.

At Skylight, structural materials achieve this goal both aesthetically and functionally. Architecturally, industrial-inspired exposed joints and connections lead to an energetic interior that intertwines warm timbers with cool steel and concrete. Nail-laminated timber is the element unifying the building's two wings.

Skylight helped us explore and apply the full potential of NLT to create an inspiring new pavilion for an evolving district. Exposed timber materials support a bright, warm office environment. This, in turn, reflects the industrial fabric of the surrounding neighborhood. Supporting NLT with hybrid trusses led to an open, adaptable interior environment for current and future tenants. Panelizing it with a local framer captured the time-savings benefit of the more advanced mass timber technology at a fraction of the cost.

This project fired us up about new mass timber applications. Its overall success relied, in no small part, on strong collaboration between the design, development, construction, and engineering team members, who include Turner Construction, DCI Engineers, Glumac, Shapiro Didway, Mackenzie, and Potestio Studio.



# 38 Davis

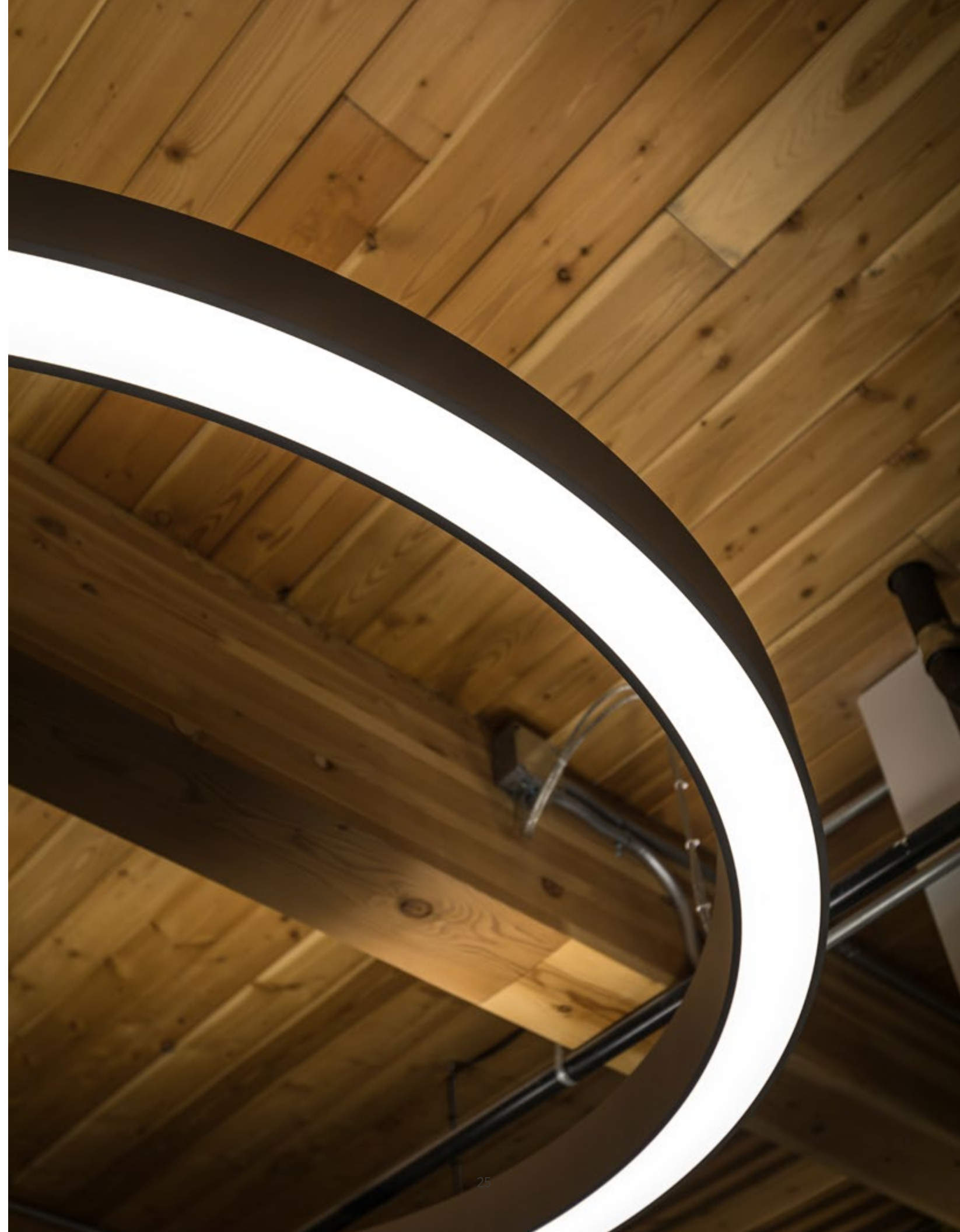
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## Expressing raw craft with care.

Materiality is critical to creating sustainable, vibrant buildings. Mass timber is more than warm and honest—it's structurally sound and, if locally sourced, saves development and construction time while supporting regional economies. We designed our headquarters to reflect our workplace culture and lower our overall carbon footprint.

*Key Labels: Office, Type IIIB, Podium, Mass Timber, Concrete Lateral, T&G Decking*

Expertise: Mass Timber





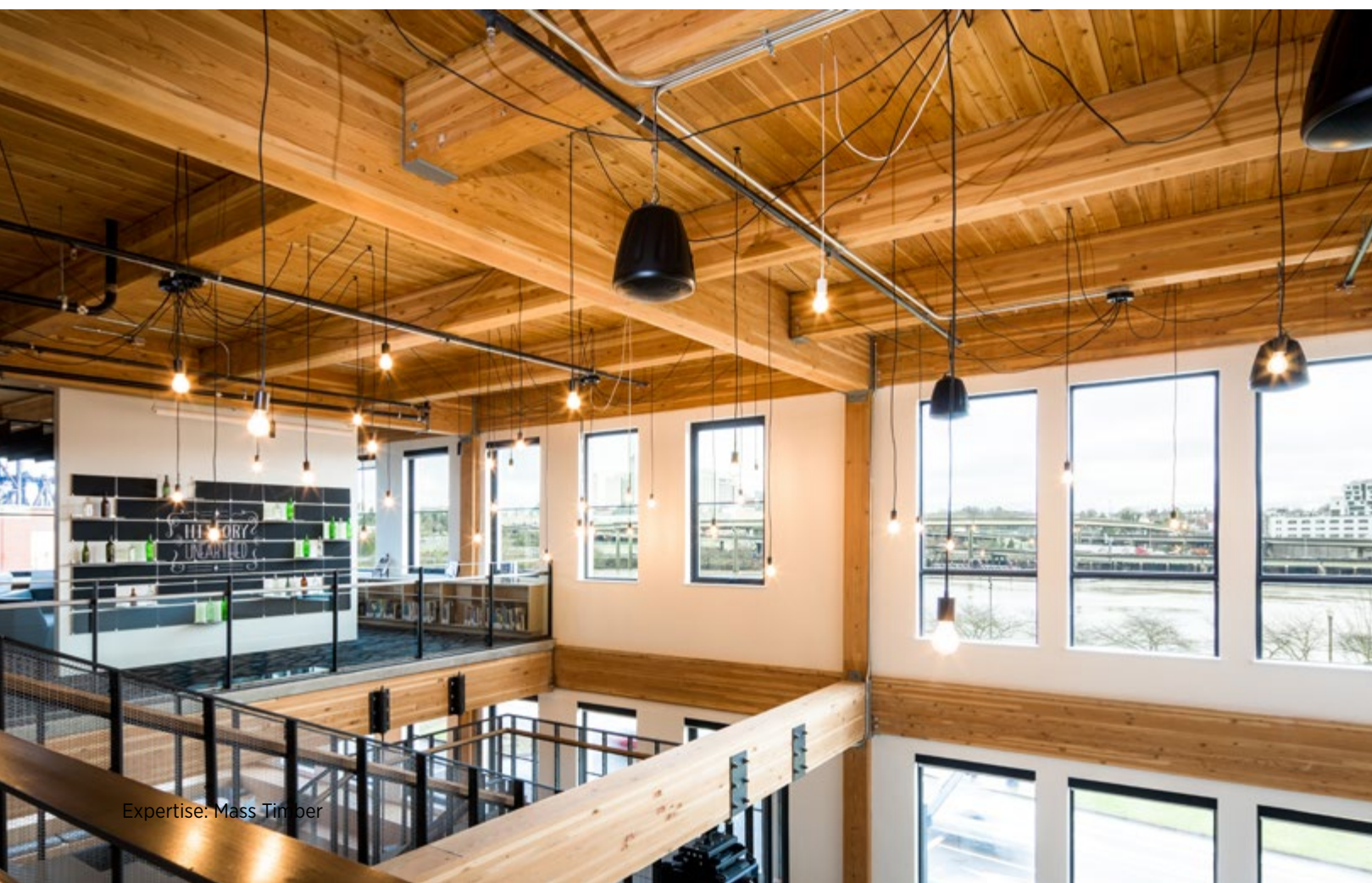






38 DAVIS  
MIXED-USE MID-RISE  
PORTLAND, OR

## Integrating work and home through mass timber.



Expertise: Mass Timber

Ankrom Moisan's own headquarters is a mixed-use, 6-story timber frame building over a concrete podium that houses office, residential, and retail spaces. One of the world's first LEED v4-certified developments, the building was designed with software-guided fans and operable windows rather than relying solely on an HVAC supported air conditioning and heat recovery system. A testament to our commitment to sustainability, the 124,000 sq. ft. headquarters also features a greywater reclamation system and green roof that treats water and removes contaminants on site.

We believe that diversity and sustainability are of paramount importance to the vitality of our lives, neighborhoods, and cities. Designing from an owner's position, we seized the opportunity to create a vibrant, mixed-use development in Portland's Old Town/Chinatown where our staff live, work, and learn alongside local community members.

At 38 Davis, we share building space and systems as one interdependent group of users. The six-story timber-frame building houses retail on the ground floor, office space on the second through fourth floors, and workforce housing on the fifth and sixth floors. The 65 units of the building have 13 housing units at 80% AMI, creating a diverse home for students, seniors, employees and adjusted income residents.

A communal lobby, elevator, rooftop, bike storage, locker room and gym area create dynamic interactions between AMA staff, building residents, and University of Oregon students. A unique, inter-use greywater reclamation system filters runoff shower water from the upper residential floors and uses it to flush the toilets of the offices below, saving an estimated 202,800 gallons of water annually.





# A Global Pulse on Mass Timber Innovation

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Mass timber is capturing the attention of designers and developers across the globe.

Over the last decade, the United Kingdom has become a pioneer in mass timber development and technology, with more than 500 projects completed to date. As the recipient of Ankrom Moisan's 2019 Travel Scholarship, our Senior Associate Sadaf Quddusi traveled to London to research and tour 13 of them. She met with project teams and gathered insight on the primary social, economic, and developmental factors that made mass timber the best structural system for each.





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## Alleviating London's housing crisis.

London's housing crisis is pushing developers to demolish and rebuild existing council/ social housing stock from 1950s and '60s. In many cases, rehabilitation is either impossible or extremely expensive, making project delivery time critical.

Mass timber has become a viable solution, letting teams deliver projects on time or even before schedule, requiring fewer than one-third the workforce compared to steel and concrete.

Most sites available for development are either brownfields or have extremely restricted construction access. Mass timber offers benefits over concrete and steel as a lightweight structural material that can be more easily constructed on confined sites.

Although mass timber is a premium investment, because of its precise nature, mass timber buildings meet or exceed the Passive House standard, an important marketing point for developers.



**Kingsgate House**  
HCL Architects



**Barrett's Grove**  
Groupwork



**Whitmore Road**  
Vaugh Thistleton Architects





# Industry & Details

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New technologies and fundamental changes to building codes have led to an explosion of interest about mass timber structures. And the industry is rising to meet that excitement, rapidly expanding new production and construction capacity and knowledge, year over year.



# The State of Things

## Regrowing the wood industry.

Mass timber buildings are flaring up all over the West Coast. Demand is strong and fabricators are scrambling to ramp up production.

Facilities that produce beams and columns are expanding to produce CLT. Plywood companies are producing mass plywood. Contractors are looking at opening their own CNC facilities. All of this makes mass timber an easy choice for every building.

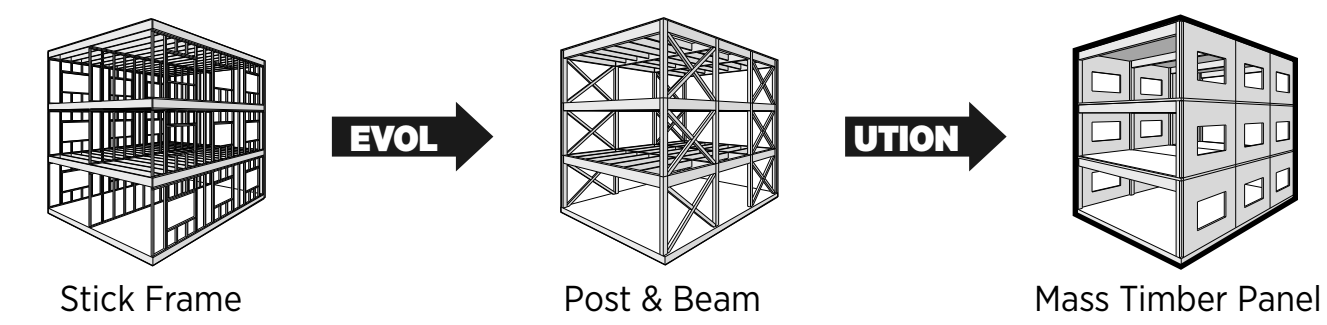




# What Is Mass Timber?

Based in history, wholly modern.

Humans have made buildings with wood since we could pick up sticks. Then we glued the sticks together to form them into bigger, stronger sticks. Today, we’re forming those sticks into panels as well, and that’s pushing timber into the big league of big buildings. From rural to suburban and now to urban.



## GLULAM

### Glue-Laminated Timber

Glulam beams and columns are not new, but they are being assembled—and used—in new, more efficient ways. They form the frame for all modern mass timber buildings.



## T&G

### Tongue & Groove

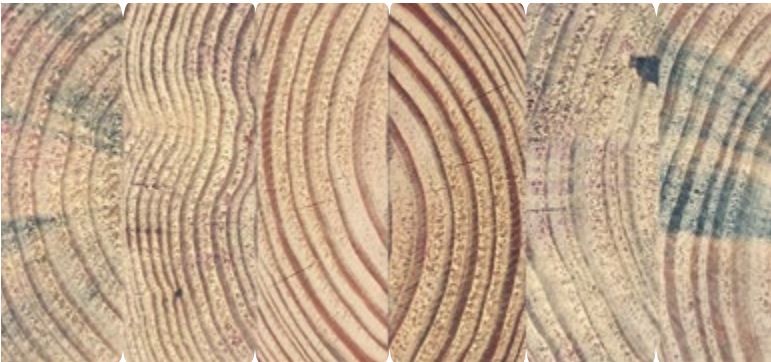
T&G decking, also called “car decking,” is a historic floor spanning system. It installs slowly, piece by piece, but can be cost-efficient and is well established, and the joints provide a great textured surface. It offers the environmental benefits of wood, but not the speed and efficiency.



## NLT/DLT

### Nail/Dowel-Laminated Timber

NLT is a composite of simple wood studs nailed together: low-tech, but labor-intensive. DLT is a modern variant that uses expanded wood dowels instead of nails. Both can be produced in panels and have great surface textures that help dampen sound in loud environments.



## CLT

### Cross-Laminated Timber

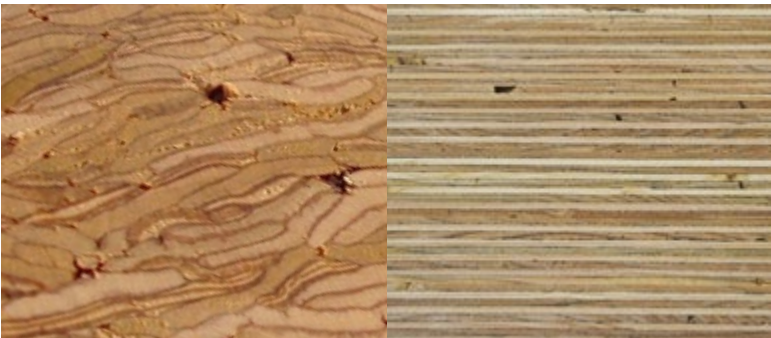
CLT is made up of a series of 2x members laid flat, laminated in layers, each alternating directions. This means it can often span in two directions. Panels fabricated with giant presses can be built up to achieve spans that historic wood floor systems can’t.



## COMPOSITES

### Structural Composites & Mass Plywood

From plywood to composite beams, composite wood has long been part of our wood structures. Now, however, composites are being produced massively, akin to CLT panels. They are less attractive, but very strong, and can be perfect where gypsum fire protection coverage is required.





# What Else Is In a Mass Timber Building?

Carefully considered.

While it's important to understand what makes up a mass timber building, the best results come from understanding every piece that contributes to making spaces wonderful while maximizing the value of that beautiful wood.

## MEP

### Thoughtfully Exposed

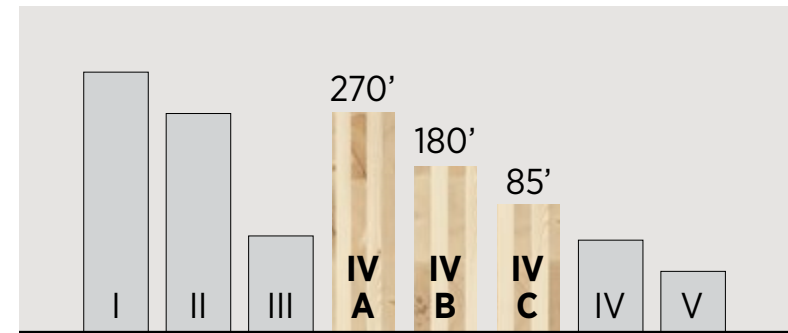
When exposing structure, we often also expose ducting, piping, and conduit, so it's critical to consider the right system. With a little care, we can design the structure to create spaces for these systems.



## CODIFIED

### New Code, New World

Changes in the IBC code allow for up to 270' or 18-story wood buildings that meet all of the safety requirements of similar concrete and steel buildings. These changes are being implemented in Oregon, Washington, and soon, California (with official ICC release in 2021).



## FIRE PROTECTION

### Building Up a Thick Skin

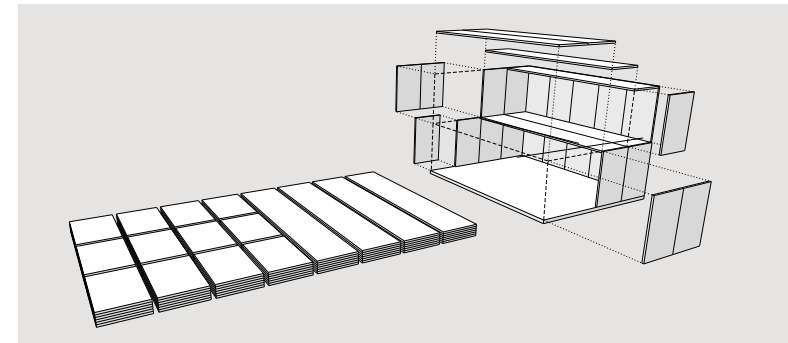
Taller wood buildings must meet the same fire rating requirements as concrete and steel. To do this, a little extra wood lets members char while maintaining their full structural capacity. With the new code, mass timber can be fully exposed up to 85' and partially up to 120'.



## UNITIZED

### A Kit of Parts

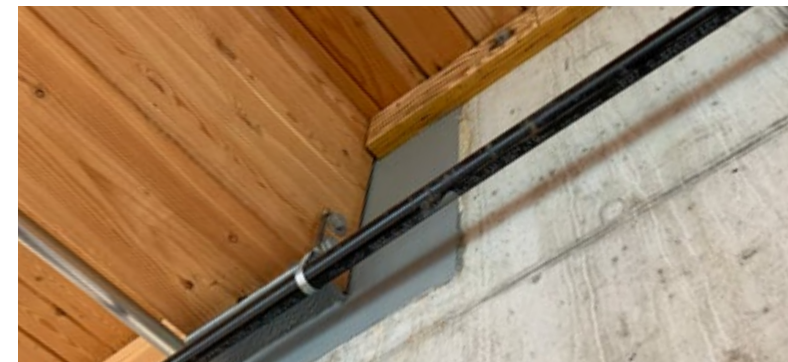
The speed of mass timber systems is rooted in prefabricating unitized elements that drop into place quickly and easily, with minimal labor. Where these efficiencies can be expanded to other systems like the exterior envelope, that fluidity can be maintained throughout construction.



## HYBRID

### It's Never that Simple

We love timber, but it is often advantageous to combine wood systems with other materials. This is particularly evident for shear systems on tall wood buildings where the structural code still needs time to catch up. Concrete or steel at the core or building edges can bridge the gap until mass timber lateral has a clear code path.





# The Starting Point

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## Why now? Why this project?

We know practical considerations must be met when starting out a project. Mass timber may feel like a luxury, but it is quickly becoming the right solution for many project types and conditions. It's the only solution that can truly have a long-lasting environmental benefit to our future, and there are real, practical benefits to using mass timber instead of steel or concrete. Anytime we can take advantage of those benefits, we should maximize our investment in timber.



# Mass Timber Benefits

## SITE/LOCATION

**HEALTHIER:** Since lumber and mass timber products are grown and produced regionally, there's **less transportation and storage of base building materials**. Significantly lower construction noise can help reduce neighborhood concern.

**FA\$TER:** Wood systems are efficient, lightweight systems that can yield smaller, **lower-cost footings and less complexity in dealing with poor soil conditions**.

## USE/PROGRAM

**BETTER:** Most programs benefit highly from exposed wood, and wood has a warm social presence, where concrete and steel are often viewed as cold and unapproachable. Under the new code, **buildings up to 85' or 9 stories can fully expose wood. Buildings up to 180' or 12 stories can expose a portion**.

## SITE USE

**FA\$TER:** Implementing code changes for tall wood buildings can maximize the available site in timber construction. Point-supported or bearing wall strategies are possible with wood floor panel systems (like CLT), allowing for **similarly low-structural profiles and floor-to-floor height requirements as concrete in a lighter, unitized package**.

## FUNDING

**FA\$TER:** While the base material cost of wood is currently a premium, reduced timeline costs, onsite labor, import duties, and other efficiencies can lead to a cost savings.

**BETTER:** Exposing a structure with such **great aesthetic character means saving the cost of additional finishes**.

## SCHEDULE

**FA\$TER:** The prefabricated components of mass timber structures assemble quickly, yielding **less soft costs for time onsite** like management, street closures, storage, and more. As new mass timber building systems evolve, unknowns can affect timeline certainties. But jurisdictions and contractors are enthusiastic about mass timber, so this is quickly improving.

## GLOBAL BENEFIT

**HEALTHIER:** Mass timber **sequesters carbon** and can be grown sustainably rather than mined destructively. Mass timber also requires less energy to produce. This means mass timber is already a recognized value in Living Building and LEED life cycle analysis criteria.

**FA\$TER:** Regional economic benefits could lead to local government backing and promotion.

## REVENUE

**FA\$TER:** Sooner completion dates yield earlier revenue or a faster transition to new facilities. **Thermally, wood performs better**, potentially reducing energy costs over time.

**HEALTHIER:** There is marketing value behind the story of mass timber and the benefits of sustainable strategies and biophillic materials.

**BETTER:** Panelizing mass timber floors can offer significant flexibility for future adjustments.



## FA\$TER

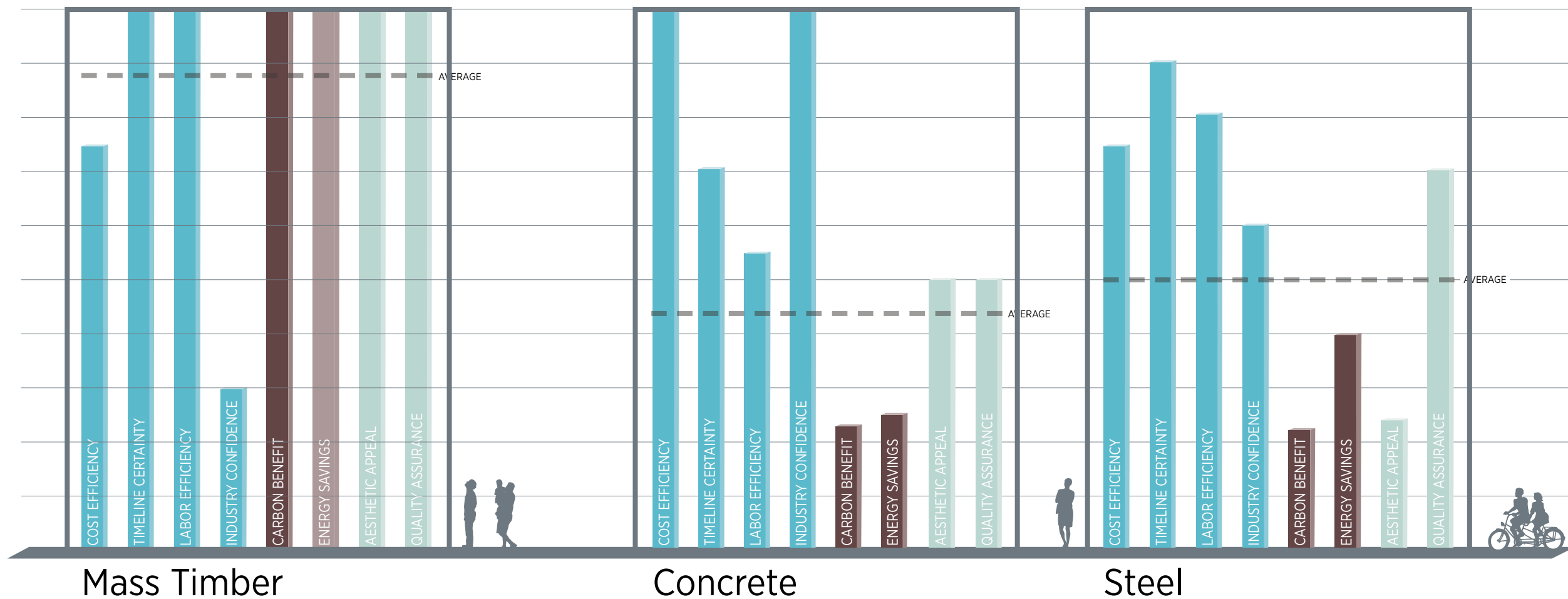
COST EFFICIENCY  
TIMELINE CERTAINTY  
LABOR EFFICIENCY  
INDUSTRY CONFIDENCE

## HEALTHIER

CARBON BENEFIT  
ENERGY SAVINGS

## BETTER

AESTHETIC APPEAL  
QUALITY ASSURANCE



# How Do They Compare?

## Mass timber vs. concrete vs. steel.

The practical costs of all three are very similar, with concrete often winning out with most contractors. But the overall value of mass timber is clear.

## ENVIRONMENTAL DATA

The industry is currently measuring the lifecycle benefits of mass timber, but the direction is clear.

Concrete/cement production accounts for approximately **5-8%** of global CO2 emissions. Steel production accounts for approximately **5-7%** of global CO2 emissions. Concrete and steel could account for as much as **50%** of building material carbon emissions.

Mass timber has the potential to produce net zero carbon emissions—or even net positive carbon benefits.

## CONSTRUCTION DATA

Construction data is still anecdotal, but more and more projects are being built every day, the bulk of which substantiate these trends.

Projects have reported as much as **70%** reduction in installation labor over concrete or **40%** reduction over steel.

Depending on the conditions, contractors have seen schedule savings over concrete of as much as 5 months on a 24 month-long construction timeline.



# Resources

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## There’s always more to learn.

Ankrom Moisan Architects is committed to making mass timber in tall buildings a standard practice in the industry. If you want to learn more about using mass timber, please contact us and our expert staff.

*Additional Sources*

WoodWorks: [woodworks.org](http://woodworks.org)  
Tall Wood Design Institute: [tallwoodinstitute.org](http://tallwoodinstitute.org)  
Think Wood: [thinkwood.com](http://thinkwood.com)

American Wood Council: [awc.org](http://awc.org)  
Mass Timber Conference: [masstimberconference.com](http://masstimberconference.com)



## Benjamin Stinson

SENIOR ASSOCIATE

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Ben has been involved in multiple mass timber building projects, including Clay Pavilion at 120 SE Clay St. in Portland, and is passionate about growing his knowledge on the subject. His goal is to make mass timber the default choice for all new buildings.



## Sadaf Quddusi

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Sadaf’s research in mass timber projects has primarily focused on analyzing cost and technical data. She is passionate about social equity and justice in housing, and she believes that mass timber technology, with its environmental benefits and efficiencies, offers the answer to fight the ever-growing disparities in the built environment.



# Ankrom Moisan

We use design every day to improve lives.

Our diverse teams, rigorous creativity, and robust technical experience make us strong.

Our passion and commitment makes us fun.

And we’re so excited to work with you.

Portland | Seattle | San Francisco

Nine Market Sectors

308 Employees

92 Registered Architects

40,000 Residential Units Designed

## Architecture

We awaken sites. Our design philosophy is centered in humanity, translating what people need and want into distinctive, inspiring places. By considering site with social context, and by collaborating freely among our teams, clients, and colleagues, our work embodies ideas and—above all else—serves people.

## Interiors

Moving fluidly through interior and architectural programming to influence unforgettable meaning, moments, and emotion, our interior designers shape both intimate and shared experiences. By understanding every element that defines the interior space—lifestyle, community, aspirations, cultures, histories, memory—they create vibrant, distinct environments where people want to live, work, and play.

## Planning

We design better futures, advocating for prosperous, resilient cities built around human lives. We do this by first understanding what cities need now—researching to connect context and architecture with people and possibility—then by holistically designing site, master plan, client needs, and personal experiences into a harmonious and anticipatory whole.

## Brand

A complete user experience is a bundle of many strands converging. Some are easily found. Others lie deeper, rooted in human intuition, individual perspectives, and shared lives. Finding these unseen threads, we work the future through the present. We’re tightly focused on creating your loyalists of tomorrow, whose intuition is to simply share and promote the experiences they love.



